GHR Developments Limited

Virginia Park, Phase 1A Area 1, Caerphilly

Reclamation Validation Report

12476/GNS/23/RVR

Intégral
Géotechnique

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PROJECT:	**Virginia Park, Phase 1A Area 1, Caerphilly**
TITLE:	**Reclamation Validation Report.**
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1.0 INTRODUCTION

1.1 GENERAL

GHR Developments Limited are in the process of reclaiming and developing the site referred to as Virginia Park for residential end-use. The location of the site is shown in Figure 1.

Outline Planning Permission (Application No. 17/0804/OUT) was approved in December 2019.

Intégral Géotechnique completed a Scoping Site Investigation in 2016 report ref: 11637/RB/16/SI followed by a Supplementary Site Investigation undertaken in 2019 and reported in 2020, report ref: 12476/RAH/20/SICOND30/RevA dated February 2020.

The Supplementary Site Investigation Report included a remediation strategy, the principle of which was agreed with the Environmental Health Officer at Caerphilly County Borough Council.

Prior to commencement of the site remediation/reclamation works, a remediation implementation plan was prepared detailing how the remediation works would be carried out. Reference should be made to Remediation Implementation Ref. 12476/RAH/20/RIP/RevA dated July 2020.

Intégral Géotechnique (Wales) Limited were appointed as the Geotechnical Engineers to design and undertake site investigations, risk assessments and prepare a remediation strategy for the site. Intégral Géotechnique were also appointed to monitor the earthworks and site remediation works and to provide a validation report upon completion.

The site is being reclaimed in phases. This report specifically relates to the northwest area of the site, referred to as Phase 1A Area 1. The extent of 'Phase 1A Area 1' (herein referred to as 'the site') in relation to the wider development area, is indicated in Figure 2.

The remediation and reclamation works were then undertaken in accordance with the above approved reports. The works were monitored by a qualified engineer from Intégral Géotechnique.

1.1 GENERAL (CONTINUED)

This reclamation validation report has been prepared to validate the first build phase comprising the following:

- Phase 1A Area 1 including Plots 1 to 49 and Plots 54 to 68 inclusive.

The report certifies that the Phase 1A Area 1 of the site has been satisfactorily remediated and reclaimed in accordance with the agreed Site-Specific Target Levels (SSTLs), as outlined in the remediation strategy and remediation implementation plan, and in accordance with the earthworks specification.

It should be noted that this validation report does not include the final capping layer to gardens and areas of soft landscaping. The placement of the clean cap materials should be completed by the developer and validated on a plot-by-plot basis, as and when they are completed. These works should be covered under separate validation reports.

This report (including all appendices to it and any subsequent addendums or correspondence) has been prepared for the sole benefit, use and information of GHR Developments Limited and no third party is entitled or permitted to rely on it. This report may not be used, reproduced, or circulated (in whole or part) for any purpose without the written consent of Intégral Géotechnique (Wales) Limited. Intégral Géotechnique (Wales) Limited shall not be liable to any third party who does not have such express written permission to rely on the report for any losses they may suffer.

1.2 PROPOSED DEVELOPMENT

The 'Phase 1A Area 1' development will comprise the construction of 65 residential dwellings with private gardens, access roads, driveways, areas of public open space (POS) and attenuation ponds. The most up-to-date development layout available at the time of writing is shown in Figure 2.

The site reclamation works includes significant cut and fill earthworks in order to create a plateau suitable for residential development.

It should be noted that the majority of the earthworks carried out within the area of the site discussed in this reclamation validation report (Phase 1A Area 1) comprises fill, after excavation and removal of compressible peat layers below the in-situ made ground materials.

1.2 PROPOSED DEVELOPMENT (CONTINUED)

A remediated plateau has been prepared to a standard suitable for appropriately designed reinforced concrete raft foundations designed for a 3m lack of support over a soft spot, a 1.5m cantilever at building corners and an allowable bearing pressure of 50kN/m^2 for low rise buildings, with residual contamination levels in accordance with the derived SSTLs and suitable for routine subsequent capping works.

Consideration could be given to further ground improvement, such as dynamic compaction/High Energy Impact Compaction (HEIC), which subject to further testing may result in the use of more lightly reinforced foundations.

Where proposed plots are located in close proximity to the boundary, where it is not possible to achieve the same level of compaction throughout the placed fill, the use of raft foundations is not recommended, and consideration should be given to piled foundations. In this instance, the advice of a specialist piling contractor should be sought. The plots where piled foundations are recommended are Plots 1, 26, 27, 41, 53,54 and 61.

Alternatively, consideration could be given to constructing all plots on piled foundations.

Completion works for the development, such as filling to final highway, hard finished and public open space levels, building works, infrastructure and external, including sourcing and placing of clean inert soils to gardens and soft finished areas will be by others with a requirement for independent third-party validation.

2.0 BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The site is located at the former Virginia Park Golf Club in Caerphilly, north of the town centre, at a National Grid Reference of 316010, 187680, see Figure 1.

The whole development site is irregular in shape and occupies an area of approximately 18 hectares. The boundaries of the site are defined by extensive residential development to the north, south, east and west. Caerphilly Leisure Centre, Virginia Park Recreation Ground and rugby ground are also present to the southwest.

The Phase 1A, Area 1 development is located within the north-western extremes of the overall development and is bordered by residential houses to the north and west, and existing tennis courts to the south. The eastern boundary of the development area remains open to the next phase of the adjoining development land.

The previous topography of the site ranged between 74m AOD to 78m AOD with various localised bunds or depressions (such as previous bunkers) associated with the sites former use as a golf course.

The site was formerly a nine hole golf course and included a club house, driving range and car parking facilities in the western part of the site. The remainder of the site is laid out as a golf course and includes and number of mature trees and some areas of dense vegetation.

Japanese Knotweed has been observed at a number of locations around the site, particularly around the perimeter.

2.2 AVAILABLE SITE INVESTIGATION DATA

A number of previous phases of site investigation have been undertaken across the site and the wider proposed development area. The most recent reports of which are listed below and has been reviewed as part of the preparation of this report:

- Virginia Park Golf Course, Caerphilly, Site Investigation and the Proposed Remediation Strategy Report Condition 30 of the Outline Planning Permission by Intégral Géotechnique Ref. 12476/RAH/20/SI/Cond30 Rev B dated March 2020.

2.2 AVAILABLE SITE INVESTIGATION DATA (CONTINUED)

- Virginia Park, Caerphilly, Remediation Implementation Plan by Intégral Géotechnique Ref. 12476/RAH/20/RIP/RevA dated July 2020.
- Virginia Park, Caerphilly, Groundwater Scheme of Monitoring, by Intégral Géotechnique Ref. 12476/RB/20/GSM dated December 2020.

The above reports detail the reclamation strategy for the delivery of the site to a standard suitable for the proposed residential end use, and provides details of how these works will be monitored and validated

For completeness, relevant sections from our previous reports have been extracted and included in this report, where required.

2.3 SITE HISTORY

The recent history of the site was traced with the aid of an Envirocheck Report and Ordnance Survey maps contained therein.

The earliest editions of the historical maps dated 1875-1885 showed the site to be undeveloped fields covered with rough pasture and heath. Tree lined field boundaries were also evident and passed through the site. The surrounding areas were also largely undeveloped at this time, although a Gas Works and Rhos Llantwit Colliery were evident to the southeast of the site. Porset Brook was also evident flowing between the Gas Works and the colliery. At this time Caerphilly itself was also developing to the southwest.

The 1901 edition of the map showed the site itself to have remained unchanged and there were no significant changes to the surrounding areas. However, Rhos Llantwit Colliery was now disused.

The 1922 edition of the map showed no significant changes to the site but additional residential development had taken place along Pontygwindy Road to the west and Bedwas Road to the southeast. Virginia Park (Athletic Ground) and allotment gardens were now evident adjacent to the west of the site.

The 1947-1951 map editions showed the site to have remained undeveloped. Virginia Park Stadium had been constructed to the west along with some factory units to the north of the stadium. During the 1950's these were known to be a Glove Factory.

2.3 SITE HISTORY (CONTINUED)

By the early 1960's evidence of refuse tipping was obvious to the west of the site between the factory buildings to the west and the site itself. The materials encroached across the western boundary of the site. By 1969/1970 this area had widened across to the eastern edge of the site and covered the majority of the northern area. The south eastern area was now shown to be marshy and more factory units had been constructed to the southeast of the site boundary. The factories to the west were for clothing, car accessories and protective headgear with tracks evident from the factory units across to the site.

By 1976 the tipped materials were no longer evident and the site was now shown to be covered by scrub vegetation with a drain shown which passed through the south western corner of the site. Extensive residential development had taken place to the east by this time, and additional warehouses had been constructed to the south.

The site then remained undeveloped until the 1993 edition of the map where Virginia Park Golf Course and Driving Range was evident and occupied the entire site, as it is today.

A selection of aerial photographs were provided in the site investigation report. These show the evolution of the landfilling operations at the site, commencing in 1947 from Bedwas Road, and extending through the 1960's through the centre of the site, into the northern and western areas until by 1971 the entire site area was covered by landfill. The landfilling operations were ceased in the 1980's, however evidence of end tipping of materials (possibly soils), was evident in the northern part of the site in 1989 and 1991.

2.4 SUMMARY GROUND CONDITIONS

The following provides a generally discussion of the ground conditions encountered beneath the site during the intrusive site investigations, prior to commencement of the site remediation works. Reference should be made to Virginia park Golf Course, Caerphilly, Site Investigation and the Proposed Remediation Strategy Report Condition 30 of the Outline Planning Permission by Intégral Géotechnique Ref. 12476/RAH/20/SI/Cond30 Rev B dated March 2020. Carried out on behalf of Withey Developments Limited.

The previous ground conditions encountered across the site typically comprised a thickness of topsoil from ground level, overlying a capping/restorative made ground layer, over landfill/waste materials, over in-situ natural deposits.

2.4 SUMMARY GROUND CONDITIONS (CONTINUED)

Typically, there was no obvious trend regarding the nature of the landfill materials and they were quite heterogeneous throughout. This likely reflected the random 'as-tipped' nature of the former landfill materials which were encountered beneath the entire site. The made ground/landfill materials were generally thicker in the northern area of the site.

The majority of Phase 1A Area 1 was underlain by peat deposits and/or organic peaty clay.

The site surface was typically overlain by either tarmac hardstanding in car parking areas or a thickness of topsoil.

Perched water was encountered typically around the interface between the base of the made ground/landfill and the underlying peat/peaty clay deposits. Locally, pockets of perched water were encountered within the body of the made ground/landfill materials, often in ashy/gravelly lenses within the landfill waste.

At greater depth, water ingress was also observed within the granular superficial deposits. Groundwater ingress ranging from slow to fast was noted between approximately 3.0m and 4.2mbgl in the medium dense gravels.

During the drilling of the boreholes on site, groundwater depths were variable and often several strikes were recorded. Perched water within the made ground was recorded at depths of 0.9m, 1.1 and 2.7mbg. In all locations, groundwater was recorded between 3.9m and 6.7m, around the transition from superficial clay/silt to sands or gravels. Locally a third water strike was recorded at 9.10mbgl.

The groundwater conditions are based on observations made at the time of the site investigation fieldworks. It should be noted that groundwater levels may vary due to seasonal and other effects.

The river network data map presented within the Envirocheck Report indicates that there is a tertiary river present at the northern site boundary, which flows towards the north-east and via a culvert into the Nant yr Aber and then into the Rhymney River. There is also a secondary river indicated along the eastern site boundary, which flows towards the south and then via a culvert to the Porset Brook, which in turn flows towards the north and into the Rhymney River. The Rhymney River flows towards the east.

Based on this, and on the groundwater levels beneath the site, groundwater is considered to flow in a general eastern direction beneath the site.

2.5 PREVIOUSLY IDENTIFIED CONTAMINATION

Prior to commencement of the remediation site works, the ground conditions beneath the site broadly comprised a capping/restoration layer, over made ground/fill/waste over in-situ natural peat/peaty clay/clay deposits.

Each soil layer identified beneath the site was sampled and tested at a number of locations and a brief summary of the previously identified contamination provided below.

Capping Layer

The results of the laboratory testing of the shallow capping soils indicated a number of exceedances above the applicable screening criteria values for a number of metals, PAH compounds and a single sample of petroleum hydrocarbon C12-C16. Asbestos was also identified in a number of samples.

Made Ground/Landfill Materials

Representative soil samples of the made ground/landfill materials were taken from across the site. The results of the laboratory testing of the made ground/landfill materials indicated a number of exceedances above the applicable screening criteria values of metals, PAH compounds, petroleum hydrocarbons and locally VOC/SVOCs and asbestos.

In addition, it should be noted that significant asbestos containing materials (asbestos sheeting) were encountered in trial pits TP09 and TP28 and that potential asbestos containing material was recorded in TP120 (fibrous/insulation material within plastic bags) and locally elsewhere across the site.

In-situ Natural Deposits

Representative sampling and testing of the in situ natural soils did not identify significant levels of contamination. Locally, elevated concentrations of PAH compounds and beryllium were recorded.

No asbestos was identified in the in situ natural soils.

Soil Leachate

The results of leachate testing on samples of made ground/landfill identified only locally elevated PAH compounds, phenol and nickel (two samples), and arsenic and copper (one sample).

2.5 PREVIOUSLY IDENTIFIED CONTAMINATION (CONTINUED)

Groundwater

Three rounds of pre-remediation groundwater monitoring and sampling were completed following the 2019 intrusive investigation, during which, samples of both perched water and groundwater were collected from the first round of groundwater sampling and testing, and from the groundwater only in subsequent rounds of sampling and testing.

A summary of the results and comparison against the screening criteria were presented in the remediation strategy report.

In general, the results of both the perched water testing and groundwater testing did not identify significant contamination levels. Only iron and ammoniacal nitrogen were detected at notably elevated concentrations. The worst case projected un-ionised concentration of ammonia did not exceed the Water Framework Directive threshold value for groundwater and the elevated concentrations of iron typically only exceed the UK Drinking Water standard and not the EQS value, indicating a potential risk to groundwater quality, but not surface water. Furthermore, with the exception of localised variations, the trends in the data set indicate general reducing trends between first and third rounds of monitoring and between up and down gradient locations.

It was therefore concluded that the potential risk to controlled was considered to be low.

3.0 RECLAMATION AND REMEDIATION IMPLEMENTATION

3.1 SUMMARY STRATEGY

The main objective of the proposed reclamation works is to render the site suitable for use as a residential development. The required reclamation activities can be summarised as follows:

- To provide an engineered formation suitable for the construction of reinforced concrete raft foundations, subject to appropriate validation testing. The proposed rafts should be designed to a maximum applied pressure at any one point beneath the raft of less than 50kN/m^2 with the maximum average pressure applied by the raft of less than 30kN/m^2. At this intensity of loading, the total settlements should not exceed 30mm and any angular distortions caused by differential movements should be less than 1:750. Rafts should be designed to span a 3.0m soft spot and 1.5m cantilever at build corners.

A review of the remedial methodologies will be a continuing process and will be subject to the findings of the validation works, and if necessary quantitative risk assessments.

3.2 WORKS UNDERTAKEN

3.2.1 Phasing of the Remediation Works

The reclamation works are being carried out and completed in phases as areas of the site are released and made available.

The site has been divided into three main areas, these being Phase 1A, 1B and 2. With smaller subdivisions of these main phases.

The reclamation works within Phase 1A Area 1 were commenced in April 2021. The reclamation works were undertaken under the monitoring of Intégral Géotechnique (Wales) Limited.

3.2.2 Site Establishment

A contract for site reclamation works was let by GHR Developments Limited to Prichards Earthmovers Ltd. A normal site establishment was considered appropriate with welfare and PPE arrangements for similar type of brownfield sites.

3.2 WORKS UNDERTAKEN (CONTINUED)

During the site reclamation works, a reporting system between Intégral Géotechnique and the appointed contractor was established to identify and report any occurrences of impacted perched water or soils, in order that controlled implementation of the planned remedial measures could be undertaken in a controlled and supervised fashion, if such occurrences were observed.

Site preparation and operational constraints were covered by the appointed contractor's method statements. Site procedures for managing the reclamation works in a manner that would not cause pollution to controlled waters was covered in the appointed contractor's method statements.

A Construction Environmental Management Plan was prepared by Prichard's and a copy presented in Appendix A.

3.2.3 Preliminary Works

All surface fly tipped materials were removed from site. The site was protected by heras fencing around the entire site perimeter.

Access to the site was through the former car parking area of Virginia Golf Course in the south of the site. A secondary access was later created in the north-western area of the site off Heol Bro Wen, although no access was made for plant through this area.

Following ecological clearance, vegetation present was stripped and removed from site.

Japanese knotweed within in the boundary of Phase 1A Area 1 development has been treated and removed from within the development boundary. It should be noted that Japanese Knotweed may still be present within the boundaries of the site and any occurrences should be managed and treated by routinely spraying with an appropriate herbicide.

3.2.4 Excavation

Materials excavated from the site were subject to screening and processing to remove any unacceptable materials such as cobbles/boulders, tree trunks/limbs and roots.

All surplus deleterious materials were removed off-site. All acceptable excavated materials for re-use were stockpiled on site. The processing, sorting, and removal of unacceptable materials resulted in a uniform/more consistent material suitable for re-engineering.

3.2 WORKS UNDERTAKEN (CONTINUED)

Peat was removed in its entirety from beneath the development area.

During the earthworks bulk samples were taken and despatched to the laboratories of GSTL/Apex Testing Solutions for physical classification comprising:

- Moisture Contents
- Atterberg Limits
- Particle Size Distribution (PSD)
- Optimum Moisture Content (OMC)
- Remoulded California Bearing Ratio (CBR)

The results of the Atterberg Limit testing indicates that the materials have a plasticity index of between 11% and 45% and the modified plasticity index values of between 5.17% and 31.5%, but typically below 10.0% indicating the majority of engineered fill on site to be essentially non shrinkable. Locally some fill materials have a low or medium volume change potential.

The results of PSD testing indicated the following percentage ranges of materials.

- Cobbles – 0.0 to 19%
- Gravel – 21 to 49%
- Sand – 19 to 42%
- Silt/Clay – 20 to 43%

The PSD results indicated a material classification of Class 2C stony cohesive general fill in accordance with the Specification for Highway Works 600 Series Table 6/1 Acceptable Earthworks Material: Classification and Compaction Requirements.

Optimum moisture content varied from approximately 8.2% to 16% with the natural moisture content typically wet of optimum, hence materials required conditioning prior to placement.

Remoulded CBR's at optimum moisture content were recorded at between 0.74% and 1.3% for unconditioned materials.

A full set of geotechnical test results are presented in Appendix B.

3.2 WORKS UNDERTAKEN (CONTINUED)

3.2.5 Replacement and Compaction Works

In order to prepare a uniform formation, following any reduced level dig in Phase 1A Area 1 and the removal of all compressible natural peat deposits, the sub formation was subject to proof rolling with suitable compaction plant and any soft spots removed.

Previously excavated and processed material was returned to the works in Phase 1A Area 1, together with excavated natural sand and gravels from elsewhere on site (and imported natural soils from offsite used to bring reduced levels back up to the required level. All fill was placed and compacted in conventional engineered layers, after removal of peat deposits at depth.

All earthworks' materials were selected placed and compacted in accordance with DTp Specification for Earthworks.

4.0 RECLAMATION VERIFICATION AND REMEDIATION VALIDATION

4.1 REPORT OBJECTIVES

A remediation and reclamation validation report is required to detail the data gathering requirements and to demonstrate that the works meet the site reclamation criteria and have been carried out in accordance with the summary strategy, as detailed in Section 3.1.

4.2 RECLAMATION VERIFICATION AND DATA GATHERING

The reclaimed plateau has been verified by the following measures:

4.2.1 Re-engineering Works

During the works and on completion of the reinstatement a series of 62 No. CPT tests and 43 No. plate load tests were carried out across the site.

Tests were carried out post reclamation at approximately 600mm-800mm below final finished ground level.

The approximate locations of the continuous CPT tests and plate load tests are shown on Figures 3A and 3B.

The plate load tests were taken to a maximum applied pressure of typically 150kN/m^2 in three load cycles. The results have been summarised and are presented below in Table 1. Where tests originally failed, placed materials were excavated, conditioned and placed again in thin layers. The area of plate failure was re-tested following the conditioning works.

TABLE 1: SUMMARY OF PLT RESULTS: PHASE 1A AREA 1

LOCATION	AVERAGE PLATE SETTLEMENT (mm)		
	@50kN/m^2	@100kN/m^2	@150kN/m^2
1	1.47	2.97	4.61
2	1.59	4.62	8.21
5	0.92	2.29	4.0
6	1.74	4.54	7.56
8	1.95	3.61	6.41
9	1.10	2.3	3.89
10	1.78	3.81	6.78

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

TABLE 1: SUMMARY OF PLT RESULTS: PHASE 1A AREA 1			
LOCATION	AVERAGE PLATE SETTLEMENT (mm)		
	@50kN/m^2	@100kN/m^2	@150kN/m^2
11	2.49	5.15	7.11
12	2.65	5.66	8.65
13	1.35	2.71	4.38
14	2.34	3.91	5.53
15	2.37	4.68	6.82
16	3.09	5.36	7.21
17	2.00	4.21	6.28
18	2.92	7.28	10.51
20	2.52	4.53	6.94
21	2.29	4.55	6.53
26	1.69	3.48	5.66
27	1.71	3.58	5.50
28	2.55	5.62	9.19
29	1.56	2.97	4.48
30	1.80	3.51	5.11
32	2.68	5.26	8.02
33	3.34	7.88	10.85
40	3.03	6.30	9.45
41	0.69	1.19	1.98
42	3.17	6.37	9.68
43	0.75	1.46	2.35
44	1.16	2.47	3.70
45	2.07	4.31	6.44
46	1.09	2.34	3.43
47	2.38	5.12	7.57
48	3.11	6.40	9.09
55	3.33	6.75	9.91
57	2.22	4.30	6.75
60	2.11	4.16	6.02
61	1.70	3.81	5.61
62	1.74	3.76	6.18
63	2.33	6.36	9.75
64	2.16	4.96	8.24
66	1.50	3.21	5.41

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

TABLE 1: SUMMARY OF PLT RESULTS: PHASE 1A AREA 1			
LOCATION	AVERAGE PLATE SETTLEMENT (mm)		
	@50kN/m^2	@100kN/m^2	@150kN/m^2
68	2.27	4.73	7.51
71	2.89	6.16	10.61

If the initial plate load testing identified a soft spot at the plate test locations the area of the failed test would be investigated and any soft spots replaced with suitable structural fill at the location. The location would then be retested to confirm the adequate placement of engineer fill.

Following the remedial works above and at the recommended maximum allowable bearing pressure of 50kN/m^2 average settlements ranged between 0.69mm up to 3.34mm.

A copy of the plate load test results is presented in Appendix C.

Following completion of the filling works, closely spaced continuous CPT testing has been undertaken on the finished Plateau. A copy of the results is presented in Appendix D.

The continuous CPT testing reported N values of >5 (typically >10) in the top 2.0m of the engineered fill, which is considered satisfactory when considering the foundation proposals to be adopted on site.

At locations where this criterion was not achieved, the engineered fill was excavated, removed and replaced with suitable structural fill and the ground re-tested.

The plate load test results and continuous CPT results are considered satisfactory for 2-storey residential development using a suitably designed reinforced concrete raft foundation with an allowable working load of 50kN/m^2, bearing a minimum of 300mm into the prepared reclaimed plateau. Foundations should be designed to span a 3.0m soft spot with a 1.5m cantilever.

In order to consider a reduction in the reinforcement within the raft foundations, further ground improvement of the reclaimed plateau using dynamic compaction/HEIC could be considered. Following completion of HEIC across the development plateau it would be necessary to undertake appropriate verification testing prior to confirmation that a lighter raft foundation may be considered.

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

Where proposed plots are located in close proximity to the boundary, where it is not possible to achieve the same level of compaction throughout the placed fill, the use of raft foundations is not recommended, and consideration should be given to piled foundations. In this instance, the advice of a specialist piling contractor should be sought. The plots where piled foundations are recommended are Plots 1, 26, 27, 41, 53,54 and 61.

Alternatively, consideration could be given to constructing all plots on piled foundations.

Allowances should be made for overbreak in excavations and for their backfilling with either well compacted granular materials or with mass concrete.

To date, site levels have been raised to within approximately 600 - 800mm of final garden finished level subject to detailed engineering infrastructure design.

4.2.2 Contamination Testing – Compliance Testing

Made ground materials have been excavated, processed and replaced in well-compacted layers.

Natural soils from site have also been used within the works.

In addition, materials have been imported to site by Pritchard's to be used in the earthworks.

Materials have been imported from the following sites.

- Pritchard's Project Yellow (including soils from Pandy Road, Bedwas and Plas Dwr, Radyr)
- Materials from Bridgend
- Materials from Hendredenny

Soil samples have been taken at regular intervals across the site and at varying depths during the filling works. Materials have also been obtained from stockpiles of materials brought onto site prior to placement of these materials at depths greater than 1.6m below finished plateau depth or at depths of between 0.6m and 1.6m below finished plateau level. The results of the compliance testing are provided in Appendix E.

All soil samples have been tested for a suite of determinants as detailed below.

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

The concentrations of the following chemical elements/compounds were determined in the laboratories:

Beryllium	Cadmium
Total Chromium	Hexavalent Chromium (VI)
Copper	Lead
Mercury	Nickel
Vanadium	Zinc
Arsenic	Boron
Selenium	Elemental Sulphur
Total Cyanide	Total Sulphate
Sulphide	Water Soluble Sulphate
pH	Monohydric Phenol
Polyaromatic Hydrocarbons (PAH)	Petroleum Hydrocarbons (VPH/EPH)

Screening for asbestos fibres was also undertaken on all samples.

The results have been summarised and compared to the SSTL's for the site according to the depth from which samples were obtained or the depth at which materials were placed i.e. between 0.6m and 1.6m below finished plateau or greater than 1.6m below finished plateau level.

For samples obtained of materials placed at between 0.6m and 1.6m depth they have been screened against SSTL1, whilst those materials greater than 1.6m depth were screened against SSTL2, in accordance with the agreed Remediation Strategy/Remediation Implementation Plan.

Samples ES4 to ES10, ES15 to ES35 and ES42 to ES85 were taken from materials placed at >1.6m depth. Samples ES86 to ES98 were taken from depths of between 0.6m and 1.6m below finished ground level.

Earthworks Compliance Testing >1.6m depth below Finished Ground Level

The laboratory test results indicate that the materials placed at below 1.6m depth are generally below the SSTL2 values derived for the site.

Two elevated concentrations of naphthalene were recorded in samples ES48 and ES48W. At these locations the extent of the elevated concentration was delineated by taking four additional soil samples from around the identified centre point. This was repeated until satisfactory results were obtained. The unacceptable materials were then locally removed and replaced.

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

In addition, asbestos was identified in 20 out of 77 samples screened for asbestos. Quantification analysis has indicated that the amount of asbestos in the materials is generally <0.001% asbestos by weight. Three samples were found to contain asbestos at greater than 0.001% but less than the SSTL2 limit if 0.01% asbestos. One sample was found to exceed the SSTL2 limit of 0.01%. At this location four additional samples were tested from around identified location.

Asbestos was not detected in two of these samples. Asbestos was detected at <0.001% in one sample at 0.06% in the fourth sample. All of these additional samples were below the SSTL2 limit. The materials that did not meet the SSTL2 limit were locally removed from the earthworks.

Earthworks Compliance Testing 0.6m-1.6m depth below Finished Ground Level

Earthworks compliance testing was also undertaken as materials were placed between 1.6m and 0.6m depth. These results (samples ES86 to ES98) have not recorded any elevated concentrations above the SSTL1 values. In addition, no asbestos was identified in any of the samples screened.

A summary of the results of chemical analysis taken during the earthworks works is provided in Appendix G. These have been split into soils between 0.6m and 1.6m and soils below 1.6m depth. The sample locations are shown on Figures 4A and 4B.

4.2.3 Contamination Testing – Plateau Validation Testing

Upon final completion of the earthworks up to reclaimed plateau level (typically 600-800mm below finished ground levels) shallow soil samples of the reclaimed plateau surface have been obtained from windowless sample holes VPWS01, VPWS02 and VPWS03 and from shallow sampling points VS01 to VS06 and P1 to P8.

The results of the plateau validation testing are presented in Appendix E. The sample locations are shown on Figure 5.

A summary of this testing is provided in Appendix G where the results have been screened against the site-specific target levels (SSTL1) derived for materials to be placed at 0.6m to 1.6m depth.

The results indicate that none of the determinants analysed exceeded the SSTL's.

The results of the validation testing are consistent with the site investigation findings, conceptual model and risk assessments, and with the wider testing carried out during execution of the earthworks.

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

It is therefore considered that the site will not pose a potential risk to site end users and does not require any remedial works to protect the health of future residents other than the implementation of the required garden capping works.

4.2.4 Ground Gas Monitoring – Post Reclamation

Post reclamation ground gas monitoring standpipes were installed in three windowless sample boreholes (VPWS01, VPWS02 and VPWS03) drilled in early 2023 and these were monitored at approximately fortnightly intervals following completion of the reclamation works. The location of the ground gas standpipes is provided in Figure 3C.

The post reclamation and gas monitoring programme commenced on 14 March 2023.

The concentration levels of methane, carbon dioxide and oxygen were measured in the standpipes during each visit by using a GA5000 Landfill Gas Analyser. In addition, gas flow rate and the atmospheric pressure at the time of the field measurements were also recorded.

Gas monitoring was carried out over a range of atmospheric pressures to include at least one reading in low and/or falling pressure, in accordance with the recommendations made in CIRIA Report C665.

The results of the field gas monitoring are presented in Appendix H. A summary of the results is given in the following Table 2.

Table 2: Summary of Ground Gas Results

Borehole	Maximum Methane Concentration (%)	Maximum Carbon Dioxide Concentration (%)	Minimum Oxygen Concentration (%)	Gas Flow Rate (l/hr)
VPWS01	2.10	1.1	14.8	<0.3
VPWS02	2.9	1.5	7.2	<0.3
VPWS03	4.8	1.2	9.3	<0.3

The results show a maximum methane concentration of 4.8% and a maximum carbon dioxide concentration of 1.5%. A maximum gas flow rate of <0.3l/hr was measured during the gas monitoring programme to date.

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of <0.0144l/hour has been calculated.

The typical total methane concentrations recorded in the post reclamation ground gas monitoring standpipes have been recorded at above 1.0%, but less than 5.0%.

Based on these results, the ground gas classification for the site is Characteristic Situation 2/NHBC Amber 1.

Ground gas protective measures will therefore be required on site, in line with a site characterisation of Amber 1.

The results of the ground gas monitoring are presented in Appendix H.

4.2.5 Groundwater Monitoring – Post Reclamation

Post reclamation groundwater monitoring standpipes were installed in two shell and auger boreholes (BH1A and BH2A) drilled in late 2022 and these have been sampled during three return visits to the site.

The original groundwater monitoring standpipes at BH1 and BH2 were removed during the reclamation works. The new standpipes were installed close to the original borehole locations.

Groundwater was sampled from these boreholes on the 15 September 2022, 26 January 2023 and 4 May 2023. Copies of the results are presented in Appendix I.

It should be noted that Natural Resources Wales (NRW) previously approved the Intégral Géotechnique Groundwater Scheme of Monitoring (Report Ref. 12476/RB/20/GSM dated December 2020), which was based on, and included the groundwater testing and assessments provided within the site investigation report and confirmed that they had no objection to the discharge of condition 30 (Contamination).

The Groundwater Scheme of Monitoring stated that the established baseline conditions will be used as criteria against which the groundwater results would be compared. Additionally, the results have also been compared with the EQS guidelines and a summary presented in Appendix J.

When screened against appropriate EQS/UKDWS standards, the results indicate elevated concentrations of ammoniacal nitrogen and manganese.

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

A single elevated concentration of magnesium was also detected in the first round of testing from borehole BH01a but was below acceptable limits within the subsequent rounds of testing.

Ammoniacal nitrogen was detected at concentrations of up to 75ug/l in BH01a and up to 1,700ug/l in BH02a.

During sampling of groundwater, representative groundwater parameters are recorded using a multiparameter meter. A copy of the recorded parameters are included in Appendix K and summarised below in Table 3 (note the maximum recorded pH from lab testing has also been summarised):

Table 3: Summary of Groundwater Parameters

Borehole	Maximum Temperature (°C)	Maximum pH	Maximum pH (Lab Testing)
BH01a	12.01	7.45	7.3
BH02a	11.87	7.52	7.1

Only the un-ionised component of ammonia is toxic to aquatic life, and therefore it is relevant to compare the un-ionised ammonia in groundwater against the relevant EQS value.

The un-ionised ammonia concentration is a function of the total ammoniacal nitrogen concentration, the maximum temperature and the maximum pH of the groundwater. The un-ionised ammonia concentrations have been derived for BH01a and BH02a and for a combination of the worst-case parameters above and the results presented in Appendix L and summarised below in Table 4.

Table 4: Summary of Unionised Ammonia Calculations

Borehole	Maximum Temperature (°C)	Maximum pH	Maximum Ammoniacal Nitrogen Concentration (mg/l)	EQS Value (mg/l)	Unionised Ammonia Concentration (mg/l)
BH01a	12.01	7.45	0.075	0.015	0.00045
BH02a	11.87	7.52	1.7	0.015	0.0119
'Worst Case'	12.01	7.52	1.7	0.015	0.0120

4.2 RECLAMATION VERIFICATION AND DATA GATHERING (CONTINUED)

Based on the above, the calculated values of un-ionised ammonia are all below the EQS value and are therefore not considered to present a potential risk to controlled waters.

Manganese has been detected at concentrations of between 870ug/l in BH01a and 16,000ug/l in BH2a.

Site specific predicted no-effect concentrations (PNECs) have been calculated for manganese using the Water Framework Directive M-BAT (Metal Bioavailability) Tool (using a function of dissolved organic carbon, calcium and pH). A copy of the M-BAT assessment is presented in Appendix M.

The results of the M-BAT analysis indicate that the bioavailable manganese concentrations are below the derived PNEC's for BH01a, but above the PNEC's for BH02a.

Borehole BH01a is located within the northeast corner of Phase 1a and BH02a is located within the southwest corner of Phase 1a. Groundwater flow has previously been established as flowing towards the northeast/east, towards the Rhymney River. Therefore, BH02a is considered to be up hydraulic gradient and BH01a is considered to be down hydraulic gradient.

Based on the above, it is therefore concluded that the background concentrations of manganese coming onto the site are at elevated concentrations, but the down gradient concentrations at BH01a are within acceptable limits and do not present a potential risk to controlled waters.

It is therefore considered that the results of the groundwater sampling carried out in September 2022, January 2023 and May 2023 are within acceptable levels and do not indicate a potential risk to controlled waters.

4.3 RECLAMATION VALIDATION

This report is confirmation that the main reclamation works to Phase 1A Area 1 of the site have been satisfactorily completed by Prichards Earthmovers in accordance with the Summary Earthworks Specification.

Phase 1A Area 1 of the site has been effectively reclaimed and remediated, and the validation test results confirm the successful completion of the remediation works.

4.3 RECLAMATION VALIDATION (CONTINUED)

It should be noted that there is always a possibility that isolated and localised areas of residual minor contamination, such as areas with materials with low levels of asbestos fibres, may still be present. The proposed clean cap, placed on top of a hi-vis geotextile separation membrane, will deal with any residual exposure and associated risk as a result of such isolated areas.

It should also be noted that although the excavated materials were screened/processed and, where present, any visible Japanese Knotweed rhizomes removed, the possibility that some residual rhizomes remain within the replaced materials cannot be completely discounted. If any of the residual Japanese Knotweed rhizomes unknowingly have become included in the replaced materials, then any regrowth of Japanese Knotweed needs to be dealt with by spraying with an appropriate herbicide. Similarly, Japanese Knotweed is present within the buffer zone and site boundaries surrounding the site. A programme of treatment and eradication by spraying with an appropriate herbicide should be maintained.

The development will not be complete, in accordance with the remediation strategy for the site, until placement of the final 600mm (minimum thickness) capping soils to soft finished areas, placed over a hi-vis geotextile separation membrane. Checks, in the form of site monitoring, visual inspection of the hi-vis geotextile membrane, and sampling and testing of the placed subsoil and topsoil should be undertaken in order to confirm that an adequate thickness of inert soils are in place.

The capping system is to comprise imported clean inert materials conforming to appropriate soil screening criteria values for a residential with homegrown produce end use.

Samples of topsoil and subsoil should be taken for laboratory analysis, as above, at the rate of approximately one in every four gardens.

Monitoring and validation of the final 600mm capping is typically late in works, usually on a plot-by-plot basis and should be maintained until the completion of the development.

Reporting of the clean capping to garden areas should be submitted independently of the reclamation works.

In order to promote natural drainage, prior to placing any subsoil/topsoil in soft landscape areas the existing reclaimed plateau should be scarified.

APPENDIX A

CONTRACTORS CEMP

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Virginia Park Remediation

October 2020

INDEX

SECTION **PAGE**

1. INTRODUCTION

1.1 DESCRIPTION OF THE PROJECT

GHR Developments are to remediate the former golf course and landfill site at Virginia Park, Caerphilly to provide a clean, safe development plateau ready for housing development.

1.2 PROJECT ORGANISATION AND RESPONSIBILITIES

1.2.1 Overall project organisation

Figure 1 shows an overall management structure for the project from Prichard's with roles and responsibilities of key team members.

The main responsibility for the project will be with Contracts Manager Meyrick Williams, Project Manager Jason Austin and Site Foreman Neil Walker.

Operations Manager Frank O'Kelly will be responsible for the resourcing of all plant and labour.

Health and Safety Manager Sam Tantum will oversee all health and safety related to the project and will carry out monthly safety audits on site, but Project Manager Jason Austin will be responsible for the health and safety on site.

PRICHARD'S

PRICHARD'S

Earthmover's House, Unit 16, Llantrisant Business Park.
Llantrisant, PONTYCLUN CF72 8LF
Tel: 01443 226170
Email: info@prichardholdings.co.uk
www.prichardholdings.co.uk

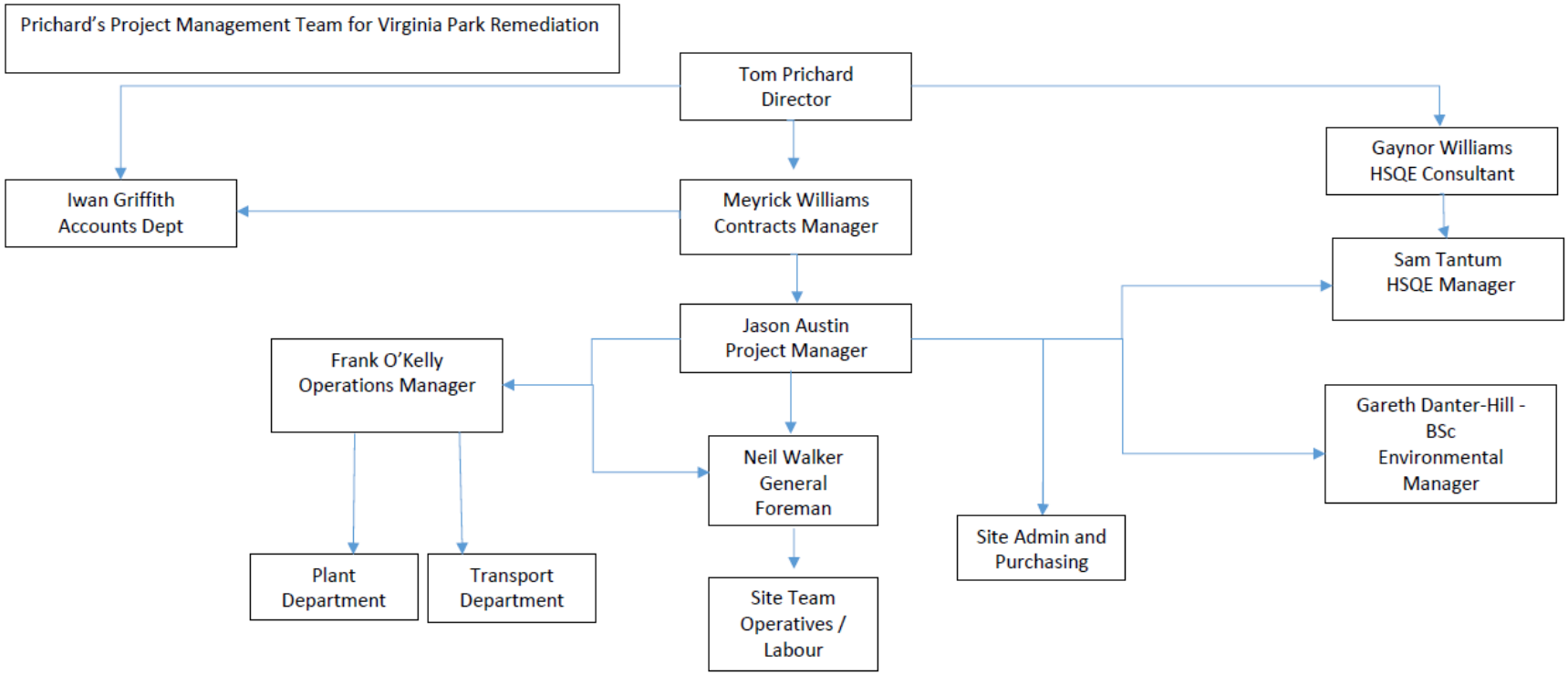


Figure 1: Project Management Structure for Prichard's.

1.2.2 Responsibilities of the Environmental Manager

Gareth Danter-Hill is the companies Environmental Manager who is responsible for all of the company's Environmental activities. Gareth will visit site at the start of the project to ensure environmental compliance and aid the site setup. He will then call into site fortnightly to advise and ensure that all potential risks are mitigated against throughout the operations. Gareth will also be responsible for the deployment of any environmental permits for the treatment of contaminated land, if any such contamination is encountered.

Prichard's trainee Environmental Manager, Callum Mitchell will be responsible for setting up the monitoring of dust and PM10 and for taking the appropriate samples.

The environmental team will collate all waste movements to and from the site during the project to input into the final Health and safety files.

1.2.3 Supply chain

Prichard's have a robust system in place to ensure the competencies of our supply chain and sub-contractors. Prichard's are not proposing to use any sub-contractors to aid the remediation works, but if any are used they will be vetted against the companies stringent requirements.

1.3 CEMP REVIEW AND UPDATING

The CEMP is designed to be dynamic in nature throughout the course of the project. It will be updated monthly as the project progresses and different milestones are reached.

2. SCOPE AND BENEFITS OF A CEMP

2.1 PURPOSE OF THE CEMP

The CEMP is written to provide all relevant parties to the site to be informed of all potential environmental concerns and issues that could result from the construction activities being carried out on site and the measures to be put in place to mitigate against any negative consequences. The CEMP allows all parties to provide their input into the site and to discuss any other relevant environmental concerns.

3. COMMUNICATION

3.1 MEETINGS

Monthly progress meetings will take place on site between Prichard's (Principal Contractor), Integral Geotechnique (Principal Designers) and GHR Developments / Landmatters (Client). Environmental concerns will be on the agenda for each of these meetings. Records of these meetings will be recorded and stored. A Prichard's contract directory is included at the end of this document for any party to communicate with at any time to discuss concerns.

3.2 SUB-CONTRACTORS AND THE SUPPLY CHAIN

As Principal Contractor, Prichard's will be responsible for the site sub-contractors and supply chain and ensure the highest standard of environmental safety is upheld across the project.

3.3 TRAINING

Tool-box talks shall be provided to all operatives on site on a weekly basis and daily briefings will be given to the site team by the site supervisor. Environmental awareness will be a regular topic to ensure it is always fresh in the operative's minds.

3.4 ENVIRONMENTAL RECORDS

Records will be kept in the site file of any environmental incidents on site. GHR and Integral Geotechnique will be immediately informed of any such incident and Prichard's environmental manager will be responsible for following up on incidents and keeping track of records. All monitoring records and sample results will be kept throughout the project and records of material movements around the site and imported materials and exported wastes will be kept throughout the project.

4. SITE REQUIREMENTS

4.1 SITE OPERATIONS

Figure 2 shows a development layout of the site with the houses in the 'Development area' and the southern public open space 'POS'. The sub-surface in the development area comprises of topsoil underlain by made ground, landfill waste and peat deposits above the natural ground.

The POS area sub-surface comprises of topsoil underlain by made ground, landfill material on top of the natural ground.

The purpose of the remediation operations is to remove all of the peat underlying the development area and transport this via site haul routes to the POS area, then remove the made ground, landfill materials and some of the natural ground excavated from the POS area to be deposited in the development area to build up the site levels.

The landfill wastes will be processed using screens to remove any oversize or unsuitable materials before it is placed and compacted in engineered fill layers in the ground.

The POS area is currently part of a floodplain, so the site operations will be careful to avoid raising the site levels in this area and materials will be stockpiled in segregated piles before being reused on site.

If there is a deficit of material available to fill the development area, then materials will be imported to site and placed.

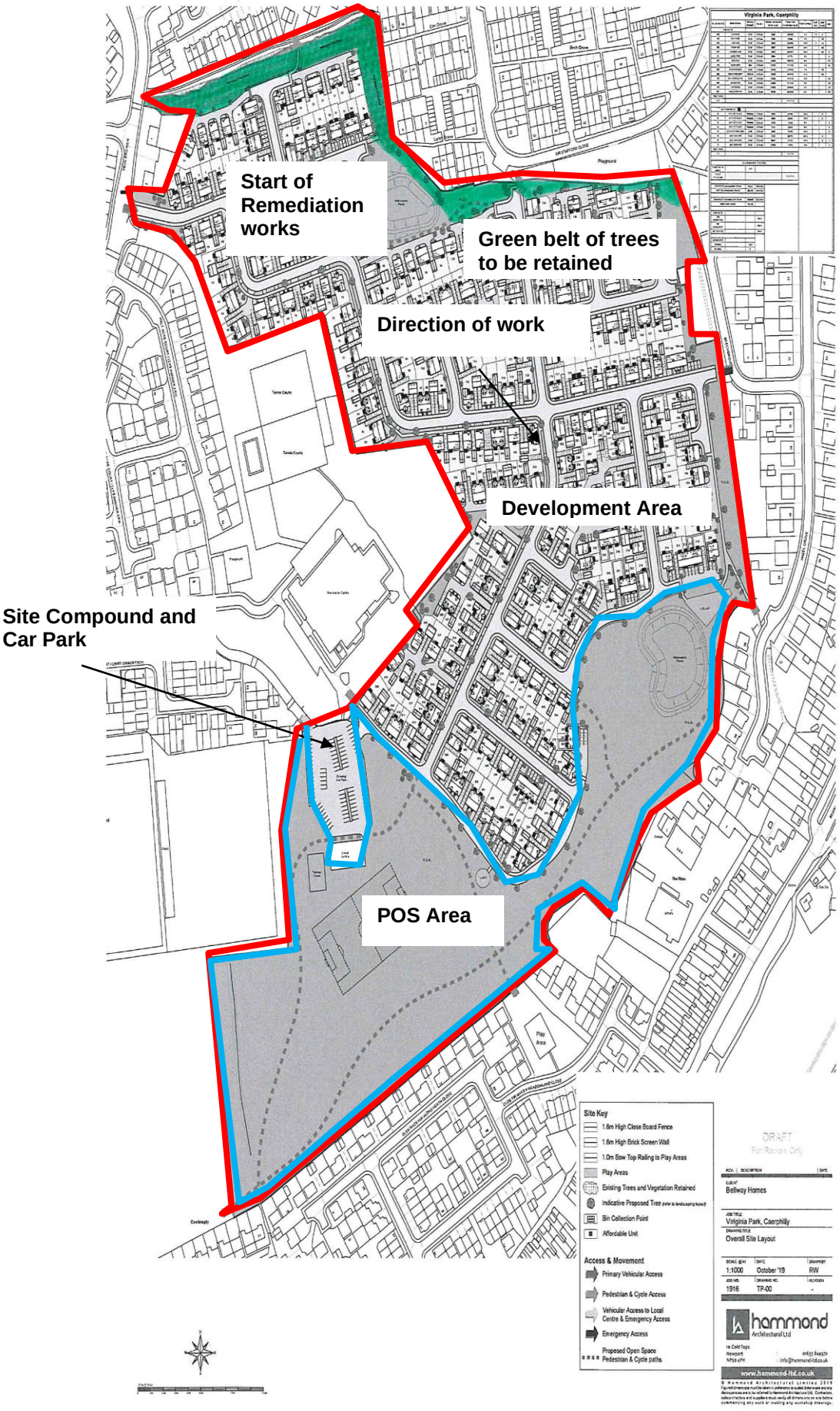


Figure 2: Development plan for the site

4.2.1 Pollution control and contingency plan

There are several watercourses that exist throughout the site, the known ones are shown in Figure 3. Prichard's will erect some drift style silt fences around the pond and the watercourse on the eastern boundary to prevent any silt accessing the watercourses. The other watercourses throughout the site will be excavated through and the water will be controlled as part of the earthworks through a series of settlement lagoons away from the excavation working area. these lagoons will also be surrounded by silt fencing.

It is not anticipated that any herbicides shall be used on the site, or that any contaminated material will be encountered during the earthworks to have the potential to cause pollution to the site watercourses.

Diesel for site plant shall be stored in double bunded bowsers capable of storing 110% of the volume of the tank, hydraulic oil shall be stored in the site compound area COSHH area complete with drip trays and suitable bunding. It is not anticipated that any other COSHH items are to be used during the remediation works.

An enclosed skip will be situated in the site compound area for the disposal of any oil drums, rags and grease cartridges.

All plant contains drip and spillage trays to control any fuel spills and will be stored near to the site compound area when not in use.

Should any pollution occur, the works will be halted immediately and GHR and Integral Geotechnique will be informed, an action plan will then be put in place to control the pollution event the spillage will be cleaned up immediately using the site spill kits.

The site access road at the entrance to the car park will be cleaned using a road sweeper to prevent any debris being taken out onto the surrounding roads during periods of vehicle movement.

Figure 3: Aerial view of the site showing the locations of the known watercourses on site and protection measures to be put in place.

Key

Approximate location of known watercourses onsite

Location of Silt fencing to be erected.

5. EFFECTS

5.1 LANDSCAPE EFFECTS

5.1.1 Changes to the existing environment

The proposed development will improve the existing site by enhancing the public open space environment and drainage to allow local communities to fully enjoy the site. The landfill wastes will be processed and any contamination or unsuitable materials will be removed offsite to provide a safe, clean development area.

5.1.2 Potential construction impacts

The construction operations will alter the existing landscape in the short term creating segregated material stockpiles and haul routes throughout the site. Once an area has been completed and brought up to level the finished plateau will be dressed and look similar to the existing environment.

5.2 ECOLOGY EFFECTS

5.2.1 Existing environment

The existing site has widespread trees throughout, the majority of these will be removed during the development, but a 15m green corridor of trees will remain along the northern boundary. There is widespread Japanese Knotweed throughout the site which will also be removed from its current location.

5.2.2 Potential effects

The majority of trees throughout the site will be removed as part of the construction works, and also the Japanese Knotweed stands will be removed from the development area. Once the housing development and final landscaping has been completed there will be a large number of new trees planted throughout the site.

5.2.3 Management and mitigation

Appendix A shows an arboricultural method statement by Treescene showing the protection measures to be put in place along the northern boundary of the site.

5.3 WATER QUALITY EFFECTS

5.3.1 Existing environment

The Existing watercourses, shown in Figure 3 are deemed to be clean of contamination and it is unknown at this stage the level of contamination throughout the perched waters and site groundwater, but it is assumed to be clean and able to accommodate clean pumped water to be filtered back into the ground through site lagoons.

5.3.2 Potential effects

During the site operations there is a potential for silt runoff to the existing watercourses. These will be protected using silt fences in the locations shown in Figure 3. The groundwater is assumed to be clean and the quality will therefore not alter during the site operations. Any contamination in the soil will be removed and cleaned up as part of the works, which in turn will ensure that the groundwater stays clean.

5.3.3 Management and mitigation

Silt fencing will be erected in the locations shown in Figure 3. Throughout the earthworks the water will be managed by a series of settlement lagoons, where it will be pumped away from the working area to the middle/southern part of the site to allow the excavation areas to be dry and free of water. This pumping operation and lagoon location will alter as the programme of works progresses.

5.4 WASTE MANAGEMENT (DUTY OF CARE)

A materials management plan will be put in place to cover the material movements around site and into and out of the site. A Site waste management plan (SWMP) will be in place to cover all waste movements offsite. All landfill wastes encountered on site will be processed using a screen and a skip bin will be onsite for the oversize / unsuitable materials to be removed offsite. Prichard's are an upper tier registered waste carrier and all of Prichard's transport fleet are operated by ISYS intelligent systems, which record all material movements electronically and provide duty of care tickets directly to an online portal, which we can give the client and principal designer access to, to show transparency throughout the waste movements of the project. Prior to the commencement of the site works the SWMP will be produced to provide a forecast of the expected wastes to be removed offsite or recycled throughout the project, this will be updated monthly to reflect the site activities.

During the operations there will always be at least 5 operatives who are fully asbestos awareness trained. If any asbestos is encountered on site during the waste processing operations then the site supervisor will be informed and an asbestos awareness trained operative will collect the suspicious materials wearing the relevant respiratory protective equipment, double bag the material, seal it with tape and dispose of in an enclosed skip for offsite disposal in a licensed facility. Records will be kept of the positions and details of each discovery.

5.5 NUISANCE (INCLUDING NOISE, VIBRATION AND DUST)

5.5.1 Existing environment

The existing environment is quiet with residential properties and sports facilities in the adjacent area.

5.5.2 Potential effects

The site activities have the potential to be very noisy and can generate large amounts of dust and vibration throughout the project.

5.5.3 Management and mitigation

Working hours shall be limited to those stipulated in the planning conditions for the project. All plant and machinery used shall be well maintained and thoroughly checked before being used on site to ensure noise is kept within the operating standards. Dust shall be controlled on site by a towable water bowser, which will be used to dampen down haul roads or a portable dust boss suppression system where works are carried out adjacent to residential properties. Dust, PM10 and asbestos fibres will be monitored using frisbee style dust gauges situated at 8 locations around the site, the deposits will be sampled weekly and tested against control measures.

Baseline readings for noise and vibration will be taken at specific locations around the boundary of the site near to existing housing prior to the commencement of the works and readings will then be taken continuously throughout the project at the same locations during working hours. If any measured levels exceed threshold limits in the planning conditions then a management plan will be put into place and screens will be erected around the working areas. These measurements will take place 2 weeks prior to commencement on site.

A permanent wheel washing facility will be setup near to the site entrance as a self contained unit to clean any vehicles exiting the site to ensure no debris is spread across the road as a result of the development.

There shall be no waiting or idling of delivery vehicles and site traffic in nearby residential areas during the site operations, including any vehicles waiting for the site to open.

Site working hours are to be:

Monday – Friday 08:00 – 17:00

Saturday – 9:00 – 13:00.

Figure 4 shows the locations of the monitoring stations around the site.

Figure 4: Proposed location of dust monitoring stations throughout the site during the works.

6. CEMP CONTACT DETAILS

Role	Organisation	Name	Email Address	Mobile no.
Contracts Manager	**Prichard's**	**Meyrick Williams**	**Meyrick@prichardholdings.co.uk**	07945 761174
Project Manager	**Prichard's**	**Jason Austin**	**Jason.a@prichardholdings.co.uk**	07837 929819
Site Foreman	**Prichard's**	**Neil Walker**		07943 377952
Operations Manager	**Prichard's**	**Frank O'Kelly**	**Frank@prichardholdings.co.uk**	07495 761152
Environmental Manager	**Prichard's**	**Gareth Danter-Hill**	**Gareth@prichardholdings.co.uk**	07494 310727
H&S Manager	**Prichard's**	**Sam Tantum**	**Sam@prichardholdings.co.uk**	07931 808268

Appendix A – Arboricultural Management Plan

Arboricultural Method Statement
and
Tree Protection Plan
for
Virginia Park
Caerphilly

Inspected by:-
Julian Wilkes BSc.For, MSc.Land Man, MIC.For, TechArb
Treescene Ltd
The Walled Garden
Old Coedarhydyglyn
St Nicholas
Cardiff
CF5 6SG
Tel No. 029 20599300

25th November, 2019

Registered Office: Treescene Limited
The Walled Garden, Old Coedarhydyglyn, St. Nicholas, Cardiff CF5 6SG
Tel. 029 205 99300 Email. trees@treescene.co.uk

1. **BRIEF**

I have been instructed by Mr Joe Ayoubkhani of Barton Wilmore to prepare an Arboricultural Method Statement (AMS) and a Tree Protection Plan (TPP) in relation to the proposed development at Virginia Park, Caerphilly in order to discharge Condition 26 of the planning permission.

2. **TREE SURVEY**

The information in the AMS and TPP relates to the attached Treescene BS5837:2012 Tree Survey and Tree Constraints Plan dated 03.01.2017.

3. **TREES TO BE RETAINED**

Trees to be retained are indicated on the attached Treescene TPP 11/2019.

4. **TREE WORKS/PRUNING**

The following tree works/pruning are proposed;
G221 Remove dead, dying and collapsed specimens,
T236 Prune to remove major deadwood (diameter >50mm) and storm damaged branches,
T237 Prune to remove major deadwood (diameter >50mm),
T238 Prune to remove major deadwood (diameter >50mm),
T239 Prune to remove major deadwood (diameter >50mm).

All pruning and felling/coppicing works are to be undertaken by suitably qualified and experienced Arboricultural Contractors working to BS3998:2010 Recommendations for Tree Work.

5. **ARBORICULTURAL CONTRACTOR**

The details of the arboricultural contractor are as follows;
Pritchard's, Earthmovers House, Unit 16, Llantrisant Business Park, Llantrisant.

6. **TREE PROTECTION PLAN**

The position of the protective barriers is indicated on the enclosed Treescene TPP 11/2019. The tree protection will be installed immediately after the conclusion of the tree works and before the commencement of any construction activity on site.

7. **TREE PROTECTION BARRIERS**

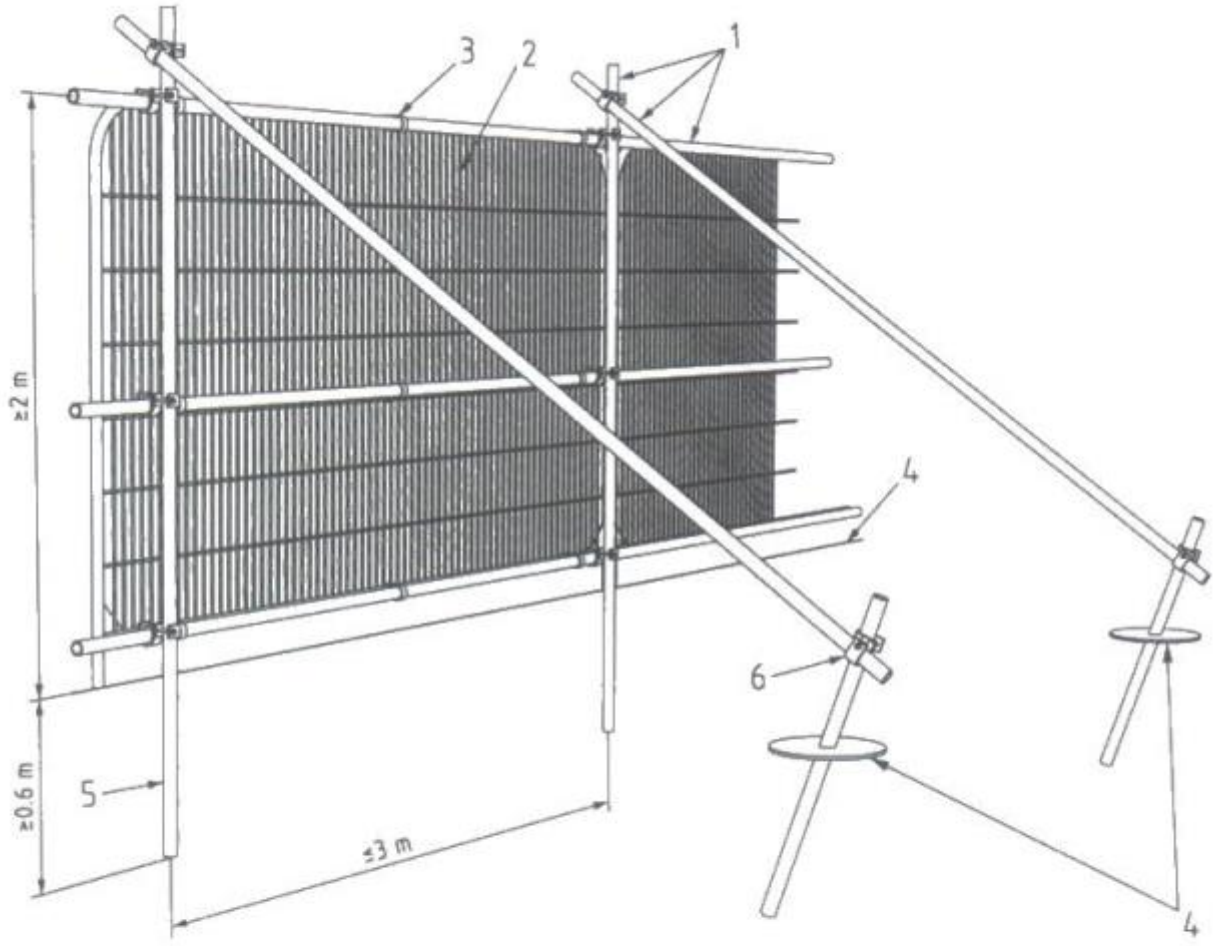
Protective barriers in accordance with BS5837:2012 and the enclosed drawing (Figure 2) will be installed in the locations indicated on the TPP under the supervision of the Arboricultural Consultant. The protective barriers will remain in situ until the completion of the construction work and final site landscaping.

No materials that are likely to have an adverse effect on tree health, such as oil, cement and bitumen will be stored or discharged within the protective barriers. No fires will be lit within 15m of the crown spread of retained trees and concrete will not be mixed or transported within 10m of the trunk of any tree.

8. **EXCAVATION WITHIN THE ROOT PROTECTON AREAS (RPAs)**

No excavations are proposed within the RPAs of any tree to be retained.

Figure 2 **Default specification for protective barrier**



Key

1 Standard scaffold poles

2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels

3 Panels secured to uprights and cross-members with wire ties

4 Ground level

5 Uprights driven into the ground until secure (minimum depth 0.6 m)

6 Standard scaffold clamps

Appendix B – Construction Phase Plan

Construction Phase Plan

CLIENT:

GHR Developments Ltd

PROJECT: **Virginia Park Remediation**

AT: **Virginia Park, Caerphilly**

CONTRACT NUMBER: **PC0091**

REFERENCE: **N/A**

DATE: **21.11.2019**

Head Office: Prichard Remediation
Earthmover's House
Unit 16
Llantrisant Business Park
Llantrisant
South Wales
CF72 8LF

Tel: 01443 226170
Website: www.prichardholdings.co.uk
Email: info@prichardholdings.co.uk

Principal Contractor: **Prichard Remediation Limited**

Contractor's Registered Office Address:
Prichard Remediation Ltd,
Earthmover's House, Unit 16, Llantrisant Business Park, Llantrisant, South Wales, UK, CF72 8LF

	Prepared By				**Approved By**			
Rev	Name (Print)	Position	Signature	Date	Name (Print)	Position	Signature	Date
01	M. Williams	Contracts Manager		21.11.19	T Pritchard	Managing Director		21.11.19

GHR Developments Ltd
Foxhill
Park Road
Penarth
CF64 3BD

Review and Acceptance by: _____ (Signature)
On behalf of GHR Developments

Name (Print):

Position:

Date:

1. Project Description

Location	Virginia Park Golf Course, Caerphilly
Reason for Works	Remediation of site
Project reference	
Client	GHR Developments
Principal Designer	Integral Geotechnique
Principal Contractor	Prichard Remediation Ltd, Earthmovers House Unit 16, Llantrisant Business Park, Llantrisant CF72 8LF Telephone: 01443 226170, Website: www.prichardholdings.co.uk Meyrick Williams, Contracts Manager, 07495 761174
Start date and end date:	February 2020 – 72 weeks

Tom Prichard Contracting Contacts:

Name	Position	Contact Number
Tom Prichard	Managing Director	01443 226170
Meyrick Williams	Contracts Manager	Mobile 07945 761174
Chris Goodfield	Contracts Manager	Mobile 07917 583628
Gaynor Williams	Health & Safety Consultant	Mobile 07970 778482
Martin Jones	Health & Safety Manager	Mobile 07931 808268
Jason Austin	Project Manager	Mobile 07837 929819
Frank O'Kelly	Site Supervisor	Mobile 07943 377952
Sean Stokes	Operations Manager	Mobile 07495 761152

2. Project Scope

GHR Developments wish to remediate the former golf course and landfill site at Virginia Park, Caerphilly to provide a clean, safe development plateau ready for housing development by Bellway homes.
The remediation work is required due to the volumes of compressible peat and landfill wastes beneath the site.

2.1 Setting up Site Compound and Fencing

Prichard's will use the existing driving range and storage area for the compound, office and welfare facility. The existing car park will be retained and used by the site team and visitors.

Prichard's will fence off the northern boundary of the site, where tree protection is required to the specification written in Treescene's tree management plan. The remainder of the site boundary will be fenced off using heras fence panels.

All plant is fitted with a serviceable flashing beacon which will be used whenever transiting the site. This ensures that all site users can see the plant movements.

When not in use, all plant / equipment will be left in a safe and secure condition, and where practical, keys lodged in the Prichard`s site vehicle.

2.2 Delivery of materials

Deliveries will be made during site hours (08:00hrs to 18:00hrs) but are subject to review as per site working times and on arrival the gateman will escort all deliveries.

Prichard's will establish a vehicle entrance next to the site compound and will provide and maintain a haulage route through this access for site vehicles.

On arrival, the driver will inform the Site Supervisor of the delivery. Traffic controls will be in place to prevent drivers proceeding directly onto site.

All delivery drivers will adhere to site rules regarding PPE.

The delivery will be escorted to the site entrance in accordance with the site Traffic Management plan, through the traffic cones and to the access route onto site.

On leaving, the same actions will be carried out.

A site speed limit will be in force on site but additional care and attention is required whilst operating around other site traffic.

All reversing vehicles on site will be supervised by a Banksman once unloaded / loaded the wagon will be escorted back to the site main exit point.

The process will be repeated for each delivery / collection.

All delivery consignment notes will be signed by Prichard's Banksman/Supervisor.

Transport will turn off engines when stationary and will not park up outside of the site boundary or car park during operations.

Segregation of site personnel from moving plant and lorries will be through physical barrier

fencing. Tool Box Talk will be given to ensure the safe passage
of operatives and reducing the exposure to moving plant as far as reasonably practicable.

2.3 Confirmation of Services

Services exist across the site and Prichard's will locate and clearly mark out on site the locations of all live services.

2.4 Ecological Constraints

Prichard's will be responsible for an ecologist to walk the site prior to any vegetation clearance to confirm there are no nesting birds present.

Pre-Start Ecologist Tool Box Talk (if Required)

General consideration to be given especially for nesting birds during the site clearance, if anything is identified as a concern it is to be reported to Site supervisor.

2.5 The Works

Figure 1 shows a development layout of the site with the houses in the 'Development area' and the southern public open space 'POS'. The sub-surface in the development area comprises of topsoil underlain by made ground, landfill waste and peat deposits above the natural ground.

The POS area sub-surface comprises of topsoil underlain by made ground, landfill material on top of the natural ground.

The purpose of the remediation operations is to remove all of the peat underlying the development area and transport this via site haul routes to the POS area, then remove the made ground, landfill materials and some of the natural ground excavated from the POS area to be deposited in the development area to build up the site levels.

The landfill wastes will be processed to remove any oversize or unsuitable materials before it is placed and compacted in engineered fill layers in the ground.

The POS area is currently part of a floodplain, so the site operations will be careful to avoid raising the site levels in this area.

If there is a deficit of material available to fill the development area, then materials will be imported to site and placed.

The methodology and sequencing of works will be shown in more detail in the Method Statements and Risk Assessments, which will be carried out for each individual site operation. A materials management plan will be prepared for the material movements around the site and to take into account any imported material.

2.5.6 Environmental Impact

The normal working hours identified will be adhered to working the following hours of operation

08.00 to 18.00 Monday to Friday
08.00 to 13.00 Saturday

Plant and equipment being utilised on this project are within a three-year age period and will be low carbon emission machinery.

Spills and leaks are to be reported immediately to the Project Manager or Project Supervisor and cleaned up promptly.

Diesel delivery to the site during the operations will be made from a double bunded mobile diesel bowser, this operation will be carried out with spillage kits nearby.

2.5.5 Environmental Monitoring

Dust and PM10 monitoring will be carried out at 8 locations across the site for the duration of the site works, this monitoring will also include for asbestos as well as dust deposition. Noise and vibration monitoring will also be carried out at periodic intervals at targeted locations throughout the project.

2.6 Disposal of waste

Prichard's will remove all vegetation to our own fully licensed recycling site, Llantrisant Recycling Centre. All oversize processed landfill wastes will be removed offsite to Project Black Recycling in Cardiff (part of Prichard Holdings) where it will be subject to further recycling or disposal. Records of all waste movements will be stored in the site file and go towards the site waste management document for the project. Skip bins will be stored on site to contain any wastes produced during the processing operations.

2.7 Off hire of plant

On completion of the earthworks the Prichard's supervisor will confirm all work is completed satisfactory and all plant and equipment can be inspected, off hired and returned to the storage yard or to another site.

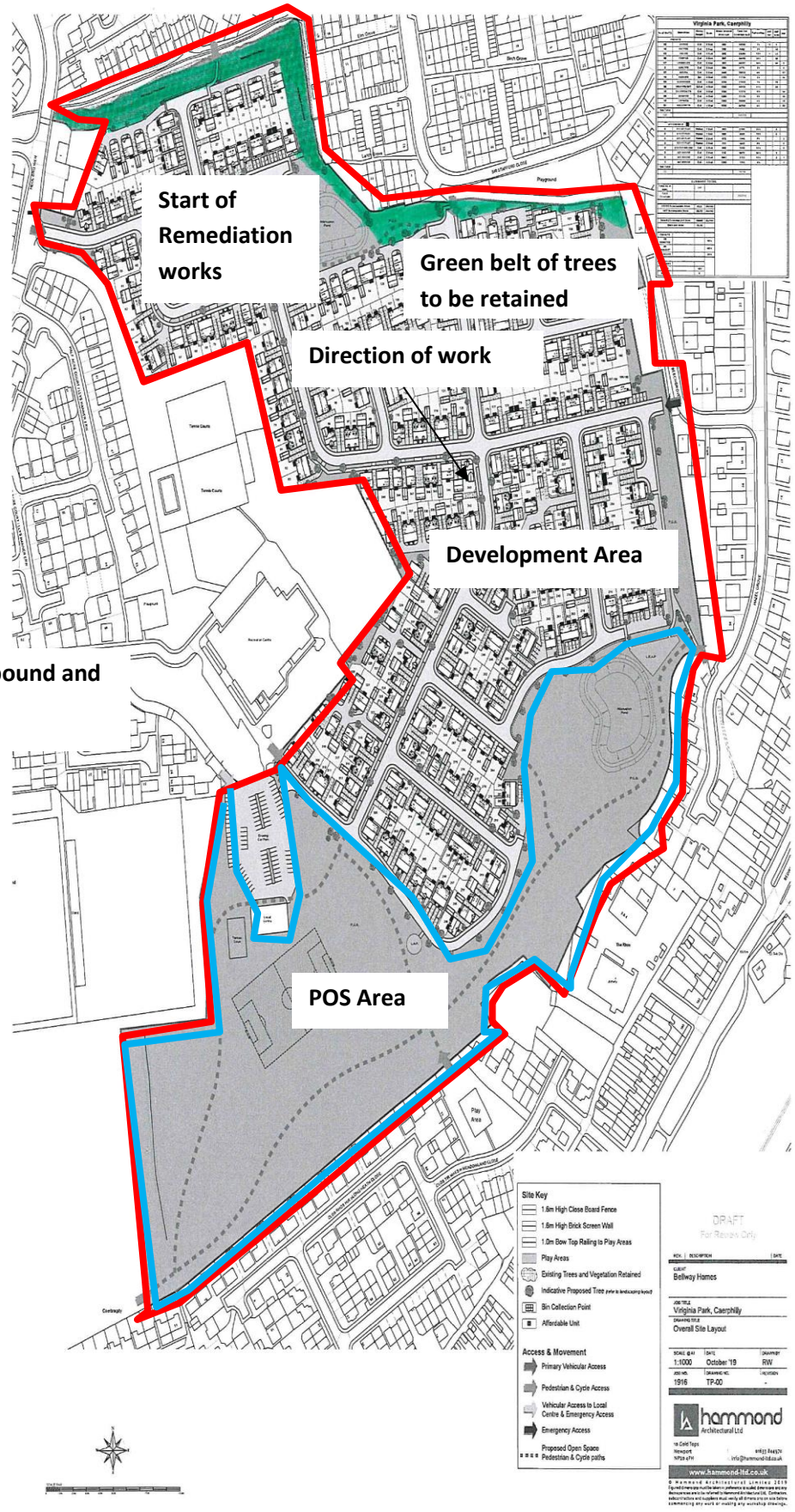


Figure 1: Development plan of the site.

3. Management of the Work

Management structure & responsibilities	The operations will be supervised by a suitably trained and qualified SSSTS Site Supervisor and Project Manager.
Health & safety goals & their management	The aim to have no RIDDOR incidents and no incidents. Near misses will be reported to ensure they do not elevate to more serious issues.
Regular liaison between parties on site	Regular liaison shall take place with the client and Prichard's to ensure matters of health and safety on site are regularly discussed and in particular the movement and delivery with heavy vehicles.
Consultation with the workforce	A team of between 10 – 20 operatives will be working on site with SSSTS supervisor present. Staff engagement is paramount to a good safety regime where feedback can be gained from the operatives on how we the employer are performing regular topics of engagement should be although not limited to; 1) General Site Safety 2) Development of RAMS 3) PPE provided and effectiveness 4) Welfare conditions and cleanliness 5) Training needs analysis-Gap Analysis 6) Day to Today Operations and Conditions Feedback should be recorded and issued to the Managing Director.
The exchange of design information	GHR / Integral Geotechnique are to provide Prichard's with any updated designs and information.
Handling design changes during the project	In the event change from what has being considered and tendered and instructed works will cease immediately in the area and photographic detail taken. GHR will be instructed accordingly and offered the opportunity to review the area of operation, time plant and labour will be recorded if financial compensation is considered required.
The selection and control of contractors	Prichard's do not envisage using any sub-contractors throughout this project, as all the resources and capabilities to carry out the works are already in place in house.

The exchange of health and safety information between contractors	All relevant site documentation will be held at site for review located within the site vehicle and will be made available by the site supervisor upon request. Prichard's health and safety advisor will visit the site regularly to ensure operations are being carried out safely.

Site security

Warning signs will be posted to all elevations of the site warning of works in progress

The site will be secured by the existing entrance gate will be fully fenced around the perimeter; signage will also be displayed across this fencing.

Signs located at the site entrance will contain all contact information for the site supervisor and project manager who can be contacted 24 / 7 to deal with any issue throughout the works.

Security will be in place using camera systems placed strategically around the site to provide alerts if any suspicious activity is identified.

Site induction

Prichard's project manager will be responsible for inducting all site personnel, visitors and other relevant parties. Copies of all CSCS/ CPCS cards will be retained on site and all personnel will sign onto an induction register.

On-site training

All work will be undertaken by qualified competent persons with experience of the type of work described above, and in all cases in full accordance with safety procedures specified in the company's health and safety Policy.

The work activities described within this RAMS and all associated safety measures are not to be deviated from in any way. If, for any reason, the controls cannot be implemented in full or should the described process be found inadequate for providing a safe working environment, the affected activities must cease until the activity has been assessed.

Welfare facilities and first aid

Welfare facilities will be provided on site by Prichard's and will consist of a site office, welfare cabin, stores, drying facilities and sufficient first aid and firefighting equipment. An emergency assembly point will be identified around the compound area and will be shown to all personnel during the site induction.

Accidents Investigation

The reporting and investigation of accidents and incidents including near misses. In the event of an accident occurring the site supervisor will:

- Call the emergency services as necessary.
- Inform the company Health and Safety Manager Martin Jones and Managing Director Tom Prichard.
- Assess whether the casualty can be moved.
- The Supervisor / Appointed First Aider will administer first aid as appropriate and then contact the emergency services.
- Investigate the incident, after the casualty has been treated,
- The emergency services may require site-specific information
- All interested parties will be advised and kept informed of all developments.

Risk Assessments/Method Statements
All risk will be detailed on individual RAMS documents for each site task.

Site rules

- A designated Smoking Point will be established on site but smoking IS NOT permitted inside ANY vehicle and a bin for cigarettes will be provided.
- No person under the influence of drugs or alcohol shall be permitted on site, and any prescribed drugs that are likely to affect personal performance shall be reported to the site manager
- Noise to be kept to minimum levels
- Behaviour standards to be maintained in line with the client's standards
- Damage or interruption to adjacent properties services shall be avoided if at all possible, where necessary shall be of short duration and only after giving neighbours suitable warning period and making alternative arrangements should they be required
- Highway shall not be blocked nor left with surface contaminants and the safety of pedestrians maintained at all times
- Access for contractor's vehicles will be via a gated entrance and parking will be in a specified hard standing area close to that point and the work
- Where possible all waste is to be recycled
- Site shall be secured against unauthorised access always; appropriate warning signage to be displayed.
- Regular reports on progress to be provided to the client to include details of incidents and near misses
- Emergency plan to be prepared to cover fire, accident, unexpected incident or uncovering of previously unidentified asbestos
- All personnel to be authorised to work on site and must be signed in.
- All personnel to be inducted is the site rules
- Only authorised equipment to be used.
- No Horseplay.
- All incidents e.g. spills, accidents, near misses etc must be reported to the site supervisor who will then inform the Contracts Manager.
- A first aid kit is in the site office-welfare area and can also be found in company vehicles. ALL accidents must be reported to the First Aider.
- Where welfare facilities have been provided please treat them with respect
- Fire extinguishers are provided. In the unfortunate event that there is a fire, use the fire extinguisher only if safe to do so and if you comfortable in using it. DO NOT use the fire extinguishers for any other purpose.
- All appropriate PPE must be worn.

Fire and emergency procedures.

A & E Unit

University Hospital Wales
Heath Park Way,
Cardiff, CF14 4XW

Tel: 02920 747747

Or

Royal Gwent Hospital

Cardiff Road

Newport NP20 2UB

Tel: 01633 234234

Suitable and sufficient firefighting equipment will be located in company vehicle.

All electrical equipment has been inspected and tested.

The muster point in case of fire or an emergency will be identified during induction, away from the road to ensure safe access to emergency personnel.

Smoking or any type of naked flames is not permitted on site.

Smoking is permitted in designated smoking areas ONLY.

Emergency Action

In the event of a FIRE the following actions are required:

- Priority is to ensure that in the event of an emergency situation, all personnel can be evacuated immediately to a safe area muster point.
- ALL operatives on hearing the alarm (verbal/audible) are to immediately evacuate the premises by using the fire exits furthest away from the fire.
- The site supervisor will contact the emergency and then proceed to power down all site equipment.
- The site supervisor will perform a roll call, report to the emergency services when arriving and inform them if anyone is missing and provide any additional information that may be required.

4. Arrangements for controlling significant site risks

Should the method or works alter significantly the Method Statement will be amended and re-submitted for approval prior to works proceeding.

The Prichard`s site manager will check hourly, to ensure the works are progressing safely and in compliance with the Method Statement. Manager visit will take place at pre-start stage to hand the works over to the supervisor.

Auditors will be on site unannounced during the works.

4.1 Safety risks:	
Delivery and removal of materials (including waste) and work equipment taking account of any risks to the public, for example during access to or egress from the site	Any deliveries and removals shall be by Prichard's own transport. Site access will be inspected on a regular basis to ensure that members of the general public or other unauthorised persons cannot gain access to the works; signage will also be erected on fencing to ensure the persons are aware of the dangers of our site operations No plant or equipment is to be operated outside of the site boundary, with all work being carried out from within the site.
Dealing with services - water, electricity and gas, including overhead power lines and temporary electrical installations	Prichard's site supervisor shall issue permits for all excavation work, which will refer to the identified services and service plan. All known services will be located and marked out on site.
Accommodating adjacent land use	The adjacent residential homes will have a letter drop informing them of the development and containing contact details for the site supervisor. Environmental monitoring will take place around the site boundary as per the Local Authorities requirements
Stability of structures whilst carrying out construction work, including temporary structures and existing unstable structures	The batters will be constructed with care and in a safe manner to prevent any risk of collapse.
Preventing falls	Working at height – there is not expected to be any working at height required for the works Good house keeping
Work with or near fragile materials	No fragile materials are expected on the project.
Control of lifting operations	Where applicable all lifting, equipment has been LOLER inspected by competent external personnel. All vehicles have a full-service history.
Maintenance of plant and equipment	All equipment is checked at the beginning of the day and before use.

Work on excavations and work where there are poor ground conditions	RAMS will be produced and adhered to, measures will be put in place to control poor ground conditions.
Work on wells, underground earthworks and tunnels	Not applicable
Work on or near water where there is a risk of drowning	Not applicable
Work involving diving	Not applicable
Work in a caisson or compressed air working	Not applicable
Work involving explosives	Not applicable
Traffic routes and segregation of vehicles and pedestrians	A banksman will be present at all times with moving plant and to ensure other site operatives are aware and kept at a safe distance from the moving plant. A Traffic Management Plan will be in place.
Storage of materials (particularly hazardous materials) and work equipment	All materials will be stockpiled and kept separate on site throughout the works.
Any other significant safety risks	Slips trips and falls - good housekeeping will be maintained where possible Clean as you go maintained with all walk routes kept clear at all times. In the event areas are found to be obstructed works will cease until the area is cleared.
4.2 Health risks, including:	
The removal of asbestos	Asbestos has been identified on site, care will be taken during all excavations and if any suspicious materials are encountered control measures will be put in place.
Dealing with contaminated land	The existing site materials are to be viewed as contaminated and therefore during the regrading works all site operatives will be provided with suitable respiratory protective equipment should they need it.
Manual handling	There will be machines on site to lift anything that is deemed too heavy for manual handling (See Section 7)
Use of hazardous substances, particularly where there is a need for health monitoring	Dust levels will be kept to a minimum by using best practice techniques and if necessary, if dust becomes an issue, then dust suppression methods in the form of a towable bowser shall be employed to dampen down the site.

Reducing noise and vibration	All plant and equipment used on site will be silenced as per manufacturer's designs. We have a fleet of up to date plant and machinery that is regularly maintained and carefully selected so as to be the most appropriate for the works being carried out taking into account also the surrounding environment. Works will be carried out by trained and competent operatives using best practice techniques to minimize noise and environmental impact. Works will be planned where practicable so as to leave structures nearest to sensitive receptors intact for as long as possible to provide additional acoustic shielding from the works. Machines are inspected daily to ensure amongst other things that noise suppression devises are in place and intact. Operators are not permitted to allow machines to sit idling when works are not in progress and nor will machines be operated outside of the working hours unless authorised to do so by the client.
Work with ionising radiation	Not applicable
Exposure to UV radiation (from the sun)	All personnel will be dressed in company shirts and/or coveralls at all times. Sunscreen will be provided to the site time for use during hot spells.
Any other significant health risks	Needle stick injury or vermin – signs of rat infestation, bird activity or needle use will be checked prior to work commencing; if any of the signs are recognised work must stop until all necessary precautions have been put in place e.g. additional PPE.

The risk assessment may be found in Section 10 but the control measures have been incorporated into these RAMS.

5. Equipment

The following plant and equipment will be required for this project:

- 20t / 30t Excavators
- 14t Excavator
- 4 x Articulated dump trucks.
- 2 x Dozers
- Rollers
- Screens
- 8w Tipper wagons

All plant and equipment will be delivered and removed from site as per 'Delivery and Collection of Plant /Equipment' Risk Assessment. (See Section 10)

All plant will be offloaded on level, stable ground with an acute awareness of any overhead and buried services and where there is sufficient space by a trained, competent person. The securing straps of the low loader are then released, the ramp lowered to the ground and the machinery off loaded.

All plant is fitted with a serviceable flashing beacon which will be used whenever transiting he site. This ensures that all pedestrians can see the oncoming traffic.

When not in use, all plant / equipment will be left in a safe and secure condition, and where practical, keys lodged in the Prichard`s site vehicle.

Transport will turn off engines when stationary.

6. Traffic Management

The site will strictly adhere to the traffic management plan; a copy will be held in the site vehicle/welfare facilities for reference, any interested parties will be furnished with this document for their review prior to visiting site.

The site supervisor will regularly inspect the approach roads to ensure that access and highways will be kept clean and debris free of site contamination mud and dust.

The banksman will be responsible for the checking of all vehicles leaving site to ensure that wheels are clean. If not then the wheels of the vehicle will be clean prior to the vehicle being allowed to leave site. A road sweeper will be employed when required.

The Site supervisor will have overall control of all traffic movements to and from site.

In the event that access and egress points change re-induction to site operatives will be undertaken accordingly.

All vehicular movements on site will be overseen by a dedicated Banksman who will remain outside of the turning circle of plant and machinery at all times

Deliveries to site will be restricted to between 08.00- 18:00 Monday to Friday.

All Prichard's employees and delivery drivers will be advised on the local road systems busy times of day will be avoided for deliveries and consideration given to residents in the local area.

7. Personal Protective Equipment

PPE as a minimum for this project is:

Hard hat

Steel toe cap and midsole boots

Hi Visibility vest / Jacket

Safety Glasses

Safety Gloves.

Appendix C – Method Statement and Risk Assessment

Risk and Method Statement

CLIENT:

GHR Developments Ltd

PROJECT: **Virginia Park Remediation**

AT: **Virginia Park, Caerphilly**

CONTRACT NUMBER: **PC0091**

REFERENCE: **N/A**

DATE: **27.11.2019**

Head Office: Prichard Remediation
Earthmover's House
Unit 16
Llantrisant Business Park
Llantrisant
South Wales
CF72 8LF

Tel: 01443 226170
Website: www.prichardholdings.co.uk
Email: info@prichardholdings.co.uk

CONTENTS

In accordance with the Construction (Design and Management) Regulations 2015

Amendment History

Date	Version	Reason for amendment	Compiled by
November 2019	1	New Document	M Williams

1. Project Description

Location	Virginia Park Golf Course, Caerphilly
Reason for Works	Remediation of site
Project reference	
Client	GHR Developments
Principal Designer	Integral Geotechnique
Principal Contractor	Prichard Remediation Ltd, Earthmovers House Unit 16, Llantrisant Business Park, Llantrisant CF72 8LF Telephone: 01443 226170, Website: www.tomprichardcontracting.co.uk Meyrick Williams, Contracts Manager, 07495 761174
Start date and end date:	February 2020 – 72 weeks

Tom Prichard Contracting Contacts:

Name	Position	Contact Number
Tom Prichard	Managing Director	01443 226170
Meyrick Williams	Contracts Manager	Mobile 07945 761174
Chris Goodfield	Contracts Manager	Mobile 07917 583628
Jason Austin	Project Manager	Mobile 07837 929819
Martin Jones	Health & Safety Manager	Mobile 07931 808268
Sean Stokes	Operations Manager	Mobile 07495 761152

2. Project Scope

GHR Developments wish to remediate the former golf course and landfill site at Virginia Park, Caerphilly to provide a clean, safe development plateau ready for housing development by Bellway homes.
The remediation work is required due to the volumes of compressible peat and landfill wastes beneath the site.

2.1 Delivery of plant

All plant is fitted with a serviceable flashing beacon which will be used whenever transiting the site. This ensures that all site users can see the plant movements.

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All delivery drivers will adhere to site rules regarding PPE.

The delivery will be escorted to the site entrance in accordance with the site Traffic Management plan, through the traffic cones and to the access route onto site.

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Pre-Start Ecologist Tool Box Talk (if Required)

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Figure 1 shows a development layout of the site with the houses in the 'Development area' and the southern public open space 'POS'. The sub-surface in the development area comprises of topsoil underlain by made ground, landfill waste and peat deposits above the natural ground.

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The purpose of the remediation operations is to remove all of the peat underlying the development area and transport this via site haul routes to the POS area, then remove the made ground, landfill materials and some of the natural ground excavated from the POS area to be deposited in the development area to build up the site levels.

The landfill wastes will be processed to remove any oversize or unsuitable materials before it is placed and compacted in engineered fill layers in the ground.

The POS area is currently part of a floodplain, so the site operations will be careful to avoid raising the site levels in this area.

If there is a deficit of material available to fill the development area, then materials will be imported to site and placed.

2.5.1 – Vegetation Clearance and Site Fencing

During the initial setup phase of the works on site a site wide clearance will take place to remove any vegetation or unsuitable material. A recent aerial view of the site is shown in Figure 2 and a plan of the site overview scope of works is shown in Figure 1. A green belt of trees will be retained along the northern boundary of the site and will be protected in line with the prepared management plan by Treescene. The remainder of the trees within the site boundary will be felled and removed from site prior to the commencement of the works. The vegetation will be retained until works begin in the specific areas, this vegetation will then be removed as required and kept on site with the topsoil.

The northern boundary shall be fenced according to the tree management plan, and the remainder of the site boundary shall be fenced off using Heras fencing and sufficient measures to protect against wind.

2.5.2 – Earthworks

An overview of the earthworks operation is shown in Figure 3. There will be two operations being carried out simultaneously at either end of the site, which will work their way towards each other. Figure 4 shows a close up of the operation in the northern (development area) of the site. Here the works will start with a site strip of the topsoil in sections, which will be stockpiled and retained on site for future use. The made ground materials will then also be excavated and stockpiled separately for reuse. The landfill waste materials generally follow this. These materials will be excavated and processed over a screen to remove any oversize and unsuitable materials, this will produce two separate stockpiles. A Roll on roll off bin will be kept on site to store the unsuitable waste materials to be taken offsite.
The peat deposits underlay the landfill wastes, these will be excavated and loaded into articulated dump trucks and sent to the southern (POS) area of the site via a haul route constructed by Prichard's.

To control the water across the site it is envisaged that settlement lagoons will be constructed in the eastern part of the development area, water will be pumped from the excavations using a 4" pump to allow it to re-enter the groundwater system further down from the site. The pump and sump hole will move with the earthworks operation.

Figure 5 shows the operations taking place in the POS area of the site. Here the existing topsoil will be excavated and stockpiled for future use. The made ground will then be excavated and loaded into dump trucks and sent up to the development area. The landfill wastes will also get sent to the development area gang to be processed and placed into the excavation. The existing natural clay will also be excavated where possible and sent up to the development area. these materials will be replaced with the peat deposits being brought down from the development gang.

The levels in the POS area will be governed by the existing floodplain levels, a full level plan is to be produced by the site designers.

2.5.6 Environmental Impact

The normal working hours identified will be adhered to working the following hours of operation

08.00 to 18.00 Monday to Friday
08.00 to 13.00 Saturday

Plant and equipment being utilised on this project are within a three-year age period and will be low carbon emission machinery.

Spills and leaks are to be reported immediately to the Project Manager or Project Supervisor and cleaned up promptly.

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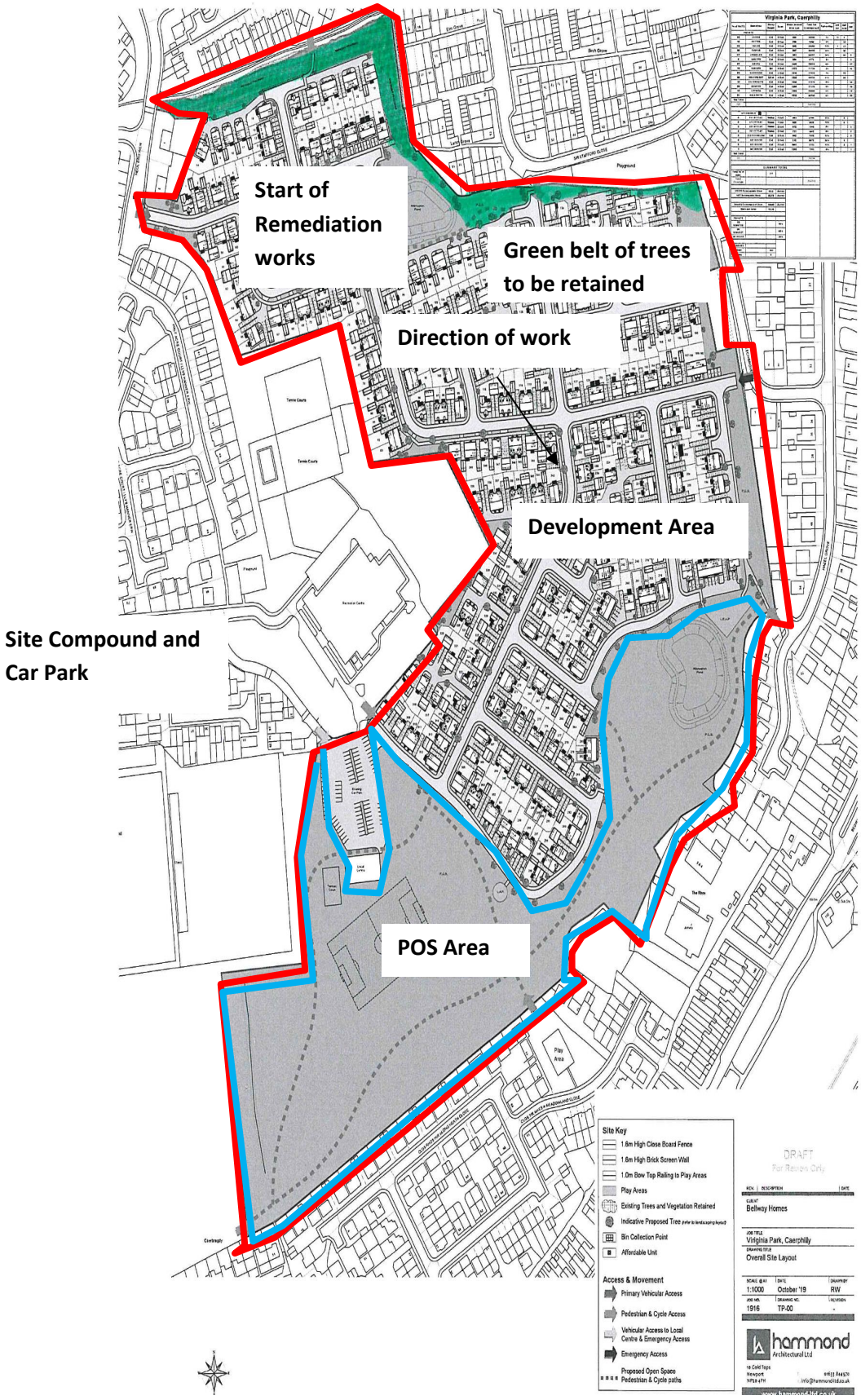

Figure 1: Overview of the scope of works, showing the Development and POS areas of the site and the direction of works.

Figure 2: Aerial view of the site showing the vegetation clearance required.

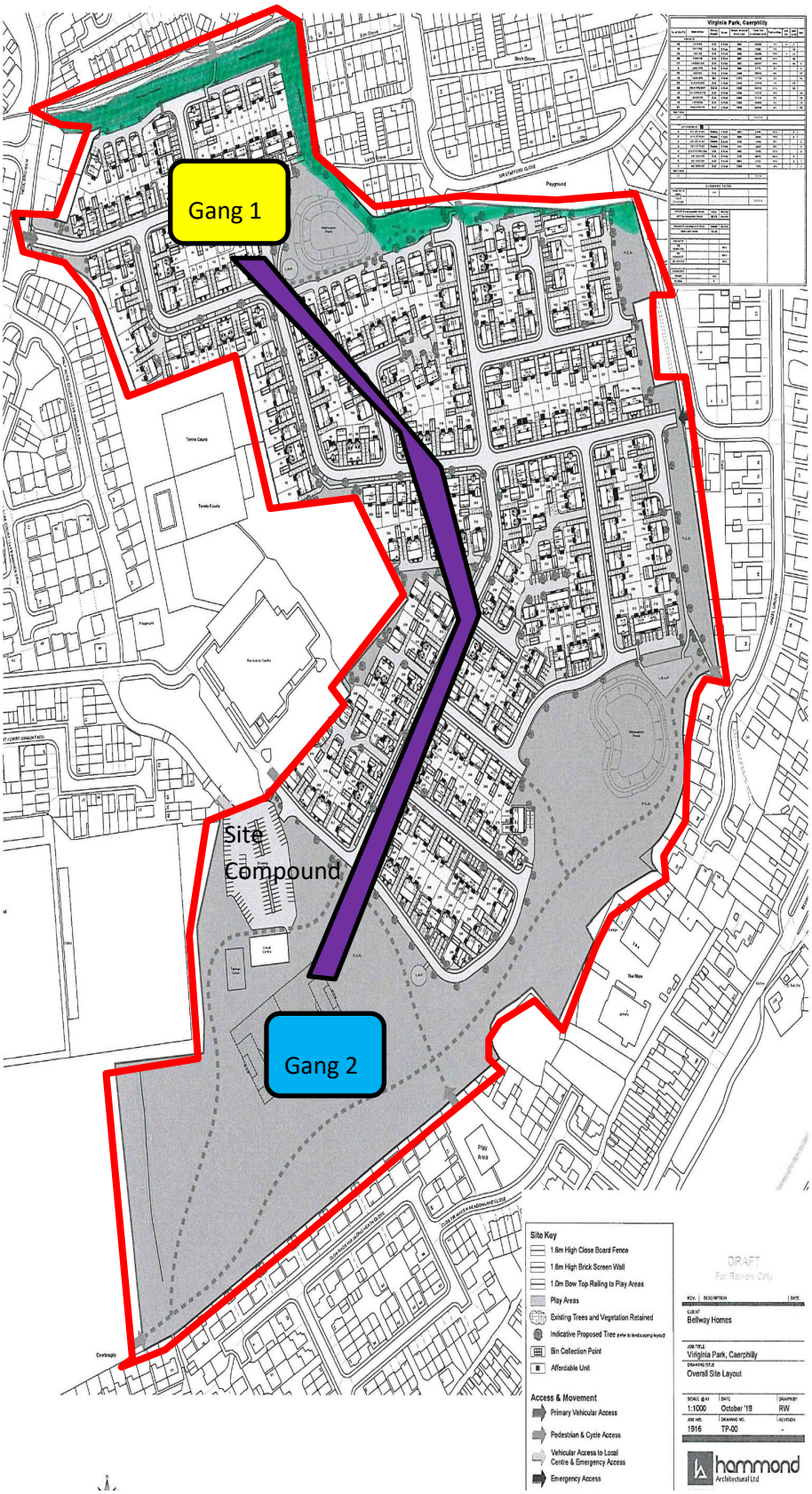

Figure 3: Overview of the sites showing indicative locations for the two main work operations and the connectivity between.

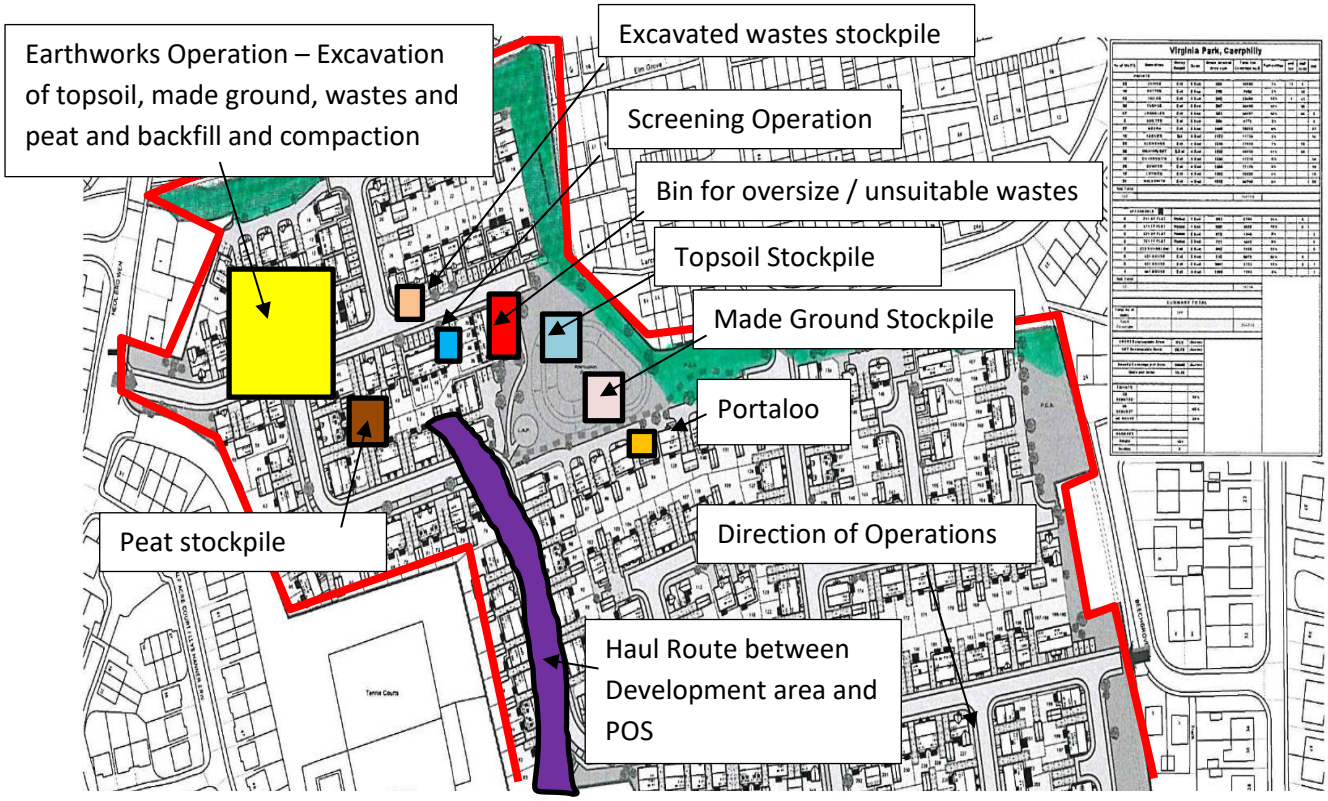

Figure 4: Indicative plan of the site operations in the development area and material handling / storage.

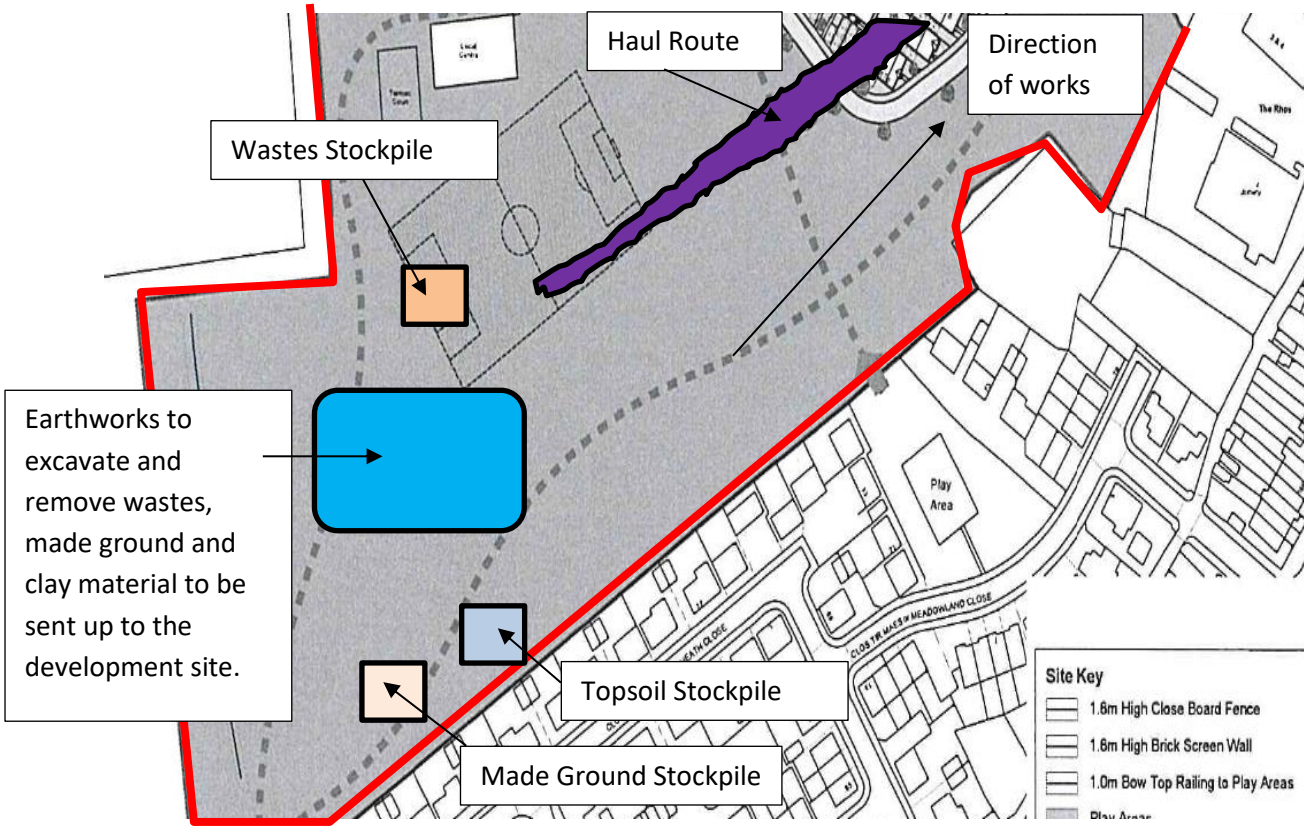

Figure 5: Indicitive overview plan of the operations being carried at in the Public Open Space end of the site.

3. Management of the Work

Management structure & responsibilities	The operations will be supervised by a suitably trained and qualified SSSTS Site Supervisor.
Health & safety goals & their management	The aim to have no RIDDOR incidents and no incidents. Near misses will be reported to ensure they do not elevate to more serious issues.
Regular liaison between parties on site	Regular liaison shall take place with the client and Prichard's to ensure matters of health and safety on site are regularly discussed and in particular the movement and delivery with heavy vehicles.
Consultation with the workforce	Regular liaison shall take place with the client and Prichard's to ensure matters of health and safety on site are regularly discussed and in particular the movement and delivery with heavy vehicles.
The exchange of design information	A team of between 10 – 20 operatives will be working on site with SSSTS supervisor present. Staff engagement is paramount to a good safety regime where feedback can be gained from the operatives on how we the employer are performing regular topics of engagement should be although not limited to; 1) General Site Safety 2) Development of RAMS 3) PPE provided and effectiveness 4) Welfare conditions and cleanliness 5) Training needs analysis-Gap Analysis 6) Day to Today Operations and Conditions Feedback should be recorded and issued to the Managing Director.
Handling design changes during the project	GHR / Integral Geotechnique are to provide Prichard's with any updated designs and information.
The selection and control of contractors	In the event change from what has being considered and tendered and instructed works will cease immediately in the area and photographic detail taken. GHR will be instructed accordingly and offered the opportunity to review the area of operation, time plant and labour will be recorded if financial compensation is considered required.
The exchange of health and safety information between contractors	All relevant site documentation will be held at site for review located within the site vehicle and will be made available by the site supervisor upon request.

	Prichard's health and safety advisor will visit the site regularly to ensure operations are being carried out safely.

Site security

Warning signs will be posted to all elevations of the site warning of works in progress

The site will be secured by the existing entrance gate will be fully fenced around the perimeter; signage will also be displayed across this fencing.

Signs located at the site entrance will contain all contact information for the site supervisor and project manager who can be contacted 24 / 7 to deal with any issue throughout the works.

Security will be in place using camera systems placed strategically around the site to provide alerts if any suspicious activity is identified.

Site induction

Prichard's project manager will be responsible for inducting all site personnel, visitors and other relevant parties. Copies of all CSCS/ CPCS cards will be retained on site and all personnel will sign onto an induction register.

On-site training

All work will be undertaken by qualified competent persons with experience of the type of work described above, and in all cases in full accordance with safety procedures specified in the company's health and safety Policy.

The work activities described within this RAMS and all associated safety measures are not to be deviated from in any way. If, for any reason, the controls cannot be implemented in full or should the described process be found inadequate for providing a safe working environment, the affected activities must cease until the activity has been assessed.

Welfare facilities and first aid

Welfare facilities will be provided on site by Prichard's and will consist of a site office, welfare cabin, stores, drying facilities and sufficient first aid and firefighting equipment. An emergency assembly point will be identified around the compound area and will be shown to all personnel during the site induction.

Accidents Investigation

The reporting and investigation of accidents and incidents including near misses. In the event of an accident occurring the site supervisor will:

- Call the emergency services as necessary.
- Inform the company Health and Safety Manager Martin Jones and Managing Director Tom Prichard.
- Assess whether the casualty can be moved.
- The Supervisor / Appointed First Aider will administer first aid as appropriate and then contact the emergency services.
- Investigate the incident, after the casualty has been treated,
- The emergency services may require site-specific information

All interested parties will be advised and kept informed of all developments.

Risk Assessments/Method Statements

All risk will be detailed on attached risk assessment. The risk assessment may be found in Section 10

Site rules

- A designated Smoking Point will be established on site but smoking IS NOT permitted inside ANY vehicle and a bin for cigarettes will be provided.
- No person under the influence of drugs or alcohol shall be permitted on site, and any prescribed drugs that are likely to affect personal performance shall be reported to the site manager
- Noise to be kept to minimum levels
- Behaviour standards to be maintained in line with the client's standards
- Damage or interruption to adjacent properties services shall be avoided if at all possible, where necessary shall be of short duration and only after giving neighbours suitable warning period and making alternative arrangements should they be required
- Highway shall not be blocked nor left with surface contaminants and the safety of pedestrians maintained at all times
- Access for contractor's vehicles will be via a gated entrance and parking will be in a specified hard standing area close to that point and the work
- Where possible all waste is to be recycled
- Site shall be secured against unauthorised access always; appropriate warning signage to be displayed.
- Regular reports on progress to be provided to the client to include details of incidents and near misses
- Emergency plan to be prepared to cover fire, accident, unexpected incident or uncovering of previously unidentified asbestos
- All personnel to be authorised to work on site and must be signed in.
- All personnel to be inducted is the site rules
- Only authorised equipment to be used.
- No Horseplay.
- All incidents e.g. spills, accidents, near misses etc must be reported to the site supervisor who will then inform the Contracts Manager.
- A first aid kit is in the site office-welfare area and can also be found in company vehicles. ALL accidents must be reported to the First Aider.
- Where welfare facilities have been provided please treat them with respect
- Fire extinguishers are provided. In the unfortunate event that there is a fire, use the fire extinguisher only if safe to do so and if you comfortable in using it. DO NOT use the fire extinguishers for any other purpose.
- All appropriate PPE must be worn.

Fire and emergency procedures.

A & E Unit

University Hospital Wales
Heath Park Way,
Cardiff, CF14 4XW

Tel: 02920 747747

Or

Royal Gwent Hospital

Cardiff Road

Newport NP20 2UB

Tel: 01633 234234

Suitable and sufficient firefighting equipment will be located in company vehicle.

All electrical equipment has been inspected and tested.

The muster point in case of fire or an emergency will be identified during induction, away from the road to ensure safe access to emergency personnel.

Smoking or any type of naked flames is not permitted on site.

Smoking is permitted in designated smoking areas ONLY.

Emergency Action

In the event of a FIRE the following actions are required:

- Priority is to ensure that in the event of an emergency situation, all personnel can be evacuated immediately to a safe area muster point.
- ALL operatives on hearing the alarm (verbal/audible) are to immediately evacuate the premises by using the fire exits furthest away from the fire.
- The site supervisor will contact the emergency and then proceed to power down all site equipment.
- The site supervisor will perform a roll call, report to the emergency services when arriving and inform them if anyone is missing and provide any additional information that may be required.

4. Arrangements for controlling significant site risks

Should the method or works alter significantly the Method Statement will be amended and re-submitted for approval prior to works proceeding.

The Prichard`s site manager will check hourly, to ensure the works are progressing safely and in compliance with the Method Statement. Manager visit will take place at pre-start stage to hand the works over to the supervisor.

Auditors will be on site unannounced during the works.

4.1 Safety risks:	
Delivery and removal of materials (including waste) and work equipment taking account of any risks to the public, for example during access to or egress from the site	Any deliveries and removals shall be by Prichard's own transport. Site access will be inspected on a regular basis to ensure that members of the general public or other unauthorised persons cannot gain access to the works; signage will also be erected on fencing to ensure the persons are aware of the dangers of our site operations No plant or equipment is to be operated outside of the site boundary, with all work being carried out from within the site.
Dealing with services - water, electricity and gas, including overhead power lines and temporary electrical installations	Prichard's site supervisor shall issue permits for all excavation work, which will refer to the identified services and service plan. All known services will be located and marked out on site.
Accommodating adjacent land use	The adjacent residential homes will have a letter drop informing them of the development and containing contact details for the site supervisor. Environmental monitoring will take place around the site boundary as per the Local Authorities requirements
Stability of structures whilst carrying out construction work, including temporary structures and existing unstable structures	The batters will be constructed with care and in a safe manner to prevent any risk of collapse.
Preventing falls	Working at height – there is not expected to be any working at height required for the works Good house keeping
Work with or near fragile materials	No fragile materials are expected on the project.
Control of lifting operations	Where applicable all lifting, equipment has been LOLER inspected by competent external personnel. All vehicles have a full-service history.
Maintenance of plant and equipment	All equipment is checked at the beginning of the day and before use.
Work on excavations and work where there are poor ground conditions	Not applicable

Work on wells, underground earthworks and tunnels	Care to be taken during excavations through the perched water, or where groundwater is to be encountered.
Work on or near water where there is a risk of drowning	Not applicable
Work involving diving	Not applicable
Work in a caisson or compressed air working	Not applicable
Work involving explosives	Not applicable
Traffic routes and segregation of vehicles and pedestrians	A banksman will be present at all times with moving plant and to ensure other site operatives are aware and kept at a safe distance from the moving plant. A Traffic Management Plan will be in place.
Storage of materials (particularly hazardous materials) and work equipment	All materials will be stockpiled and kept separate on site throughout the works.
Any other significant safety risks	Slips trips and falls - good housekeeping will be maintained where possible Clean as you go maintained with all walk routes kept clear at all times. In the event areas are found to be obstructed works will cease until the area is cleared.
4.2 Health risks, including:	
The removal of asbestos	Asbestos has been identified on site, care will be taken during all excavations and if any suspicious materials are encountered control measures will be put in place.
Dealing with contaminated land	The existing site materials are to be viewed as contaminated and therefore during the regrading works all site operatives will be provided with suitable respiratory protective equipment should they need it.
Manual handling	There will be machines on site to lift anything that is deemed too heavy for manual handling (See Section 7)
Use of hazardous substances, particularly where there is a need for health monitoring	Dust levels will be kept to a minimum by using best practice techniques and if necessary, if dust becomes an issue, then dust suppression methods in the form of a towable bowser shall be employed to dampen down the site.
Reducing noise and vibration	All plant and equipment used on site will be silenced as per manufacturer's designs. We have a fleet of up to date plant and machinery that is regularly maintained and carefully selected so as to be the most appropriate for the

	works being carried out taking into account also the surrounding environment. Works will be carried out by trained and competent operatives using best practice techniques to minimize noise and environmental impact. Works will be planned where practicable so as to leave structures nearest to sensitive receptors intact for as long as possible to provide additional acoustic shielding from the works. Machines are inspected daily to ensure amongst other things that noise suppression devises are in place and intact. Operators are not permitted to allow machines to sit idling when works are not in progress and nor will machines be operated outside of the working hours unless authorised to do so by the client.
Work with ionising radiation	Not applicable
Exposure to UV radiation (from the sun)	All personnel will be dressed in company shirts and/or coveralls at all times. Sunscreen will be provided to the site time for use during hot spells.
Any other significant health risks	Needle stick injury or vermin – signs of rat infestation, bird activity or needle use will be checked prior to work commencing; if any of the signs are recognised work must stop until all necessary precautions have been put in place e.g. additional PPE.

The risk assessment may be found in Section 10 but the control measures have been incorporated into these RAMS.

5. Equipment

The following plant and equipment will be required for this project:

- 20t / 30t Excavators
- 14t Excavator
- 4 x Articulated dump trucks.
- 2 x Dozers
- Rollers
- Screens
- 8w Tipper wagons

All plant and equipment will be delivered and removed from site as per 'Delivery and Collection of Plant /Equipment' Risk Assessment. (See Section 10)

All plant will be offloaded on level, stable ground with an acute awareness of any overhead and buried services and where there is sufficient space by a trained, competent person. The securing straps of the low loader are then released, the ramp lowered to the ground and the machinery off loaded.

All plant is fitted with a serviceable flashing beacon which will be used whenever transiting he site. This ensures that all pedestrians can see the oncoming traffic.

When not in use, all plant / equipment will be left in a safe and secure condition, and where practical, keys lodged in the Prichard`s site vehicle.

Transport will turn off engines when stationary.

6. Traffic Management

The site will strictly adhere to the traffic management plan; a copy will be held in the site vehicle/welfare facilities for reference, any interested parties will be furnished with this document for their review prior to visiting site.

The site supervisor will regularly inspect the approach roads to ensure that access and highways will be kept clean and debris free of site contamination mud and dust.

The banksman will be responsible for the checking of all vehicles leaving site to ensure that wheels are clean. If not then the wheels of the vehicle will be clean prior to the vehicle being allowed to leave site. A road sweeper will be employed when required.

The Site supervisor will have overall control of all traffic movements to and from site.

In the event that access and egress points change re-induction to site operatives will be undertaken accordingly.

All vehicular movements on site will be overseen by a dedicated Banksman who will remain outside of the turning circle of plant and machinery at all times

Deliveries to site will be restricted to between 08.00- 18:00 Monday to Friday.

All Prichard's employees and delivery drivers will be advised on the local road systems busy times of day will be avoided for deliveries and consideration given to residents in the local area.

7. Manual Handling Assessment

A: Assessment (Answer the following questions)

1. Does the operation involve a significant risk of injury? (If No the assessment need go no further)
2. If Yes, can the operation be avoided, mechanised or level of the risk reduced? If yes implement
3. If No record steps in B) HAZARD CHECKLIST and review;
4. Has the risk of injury been eliminated or reduced to an acceptable level?
5. If Yes, the assessment is complete. If No, review activities to reduce risk further.

B: HAZARD CHECKLIST (Answer all questions YES or NO)		
The Task - does it involve:	**Y/N**	**CONTROLS**
1. Holding the load away from the trunk?	N	
2. Twisting the trunk?	N	
3. Poor posture i.e. stooping/stretching?	N	
4. Strenuous pushing or pulling?	N	
5. Excessive lifting or lowering?	N	
6. Repetitive handling?	N	
7. Excessive carrying distances?	N	
The Load - is it:		
8. Heavy?	N	
9. Bulky or unwieldy?	N	
10. Difficult to grasp?	N	
11. Unstable, or contents likely to shift?	N	
12. Potentially harmful e.g. Hot, sharp?	N	
The Working Environment - are there:		
13. Constraints on posture?	N	
14. Uneven or unstable floors?	N	
15. Variations in floor levels/work surface?	Y	
16. Extremes of temperature, humidity?	N	
17. Poor lighting conditions?	N	
18. Excessive noise levels or air	N	
Individual Capabilities - does the job:		
19. Require unusual capabilities i.e.	N	
20. Require special information/training?	Y	Tool box talks in file for earthworks, plant checklists and maintenance.
21. Involve handlers who are pregnant?	N	
22. Involve handlers with health problems?	N	
Other Factors: -		
Are there any protective clothing or items being worn that may increase the risk of injury from Manual Handling Operations?	N	

8. Personal Protective Equipment

PPE is used as a last resort however they are often provided as a precaution e.g. Weils disease, sharps, vehicle movements etc. PPE as a minimum for this work is, hard hat, toe protected work boots, hi viz vest, gloves, overalls, safety glasses and ear protection if required.

9. Record of Briefing

Drivers/Operatives Name:	Signature:	Briefed By:	Date:

Section 10: Risk Assessment

STAGE OF PROJECT	HAZARD	CONSEQUENCE	HAZARD EFFECT	PERSONNEL AT RISK			RISK LEVEL			CONTROL MEASURES	RISK LEVEL		
				Prichard`s Employees	Other contractors	Others e.g. trespassers	Severity	Probability	Risk Level		Severity	Probability	Risk
Deliveries and Collection of Plant/ Equipment	Narrow Roads	Collision with other vehicles and/or pedestrians	Injury, death	Y	Y	Y	3	3	9	Reduce speed. Due care and attention especially during busy periods.	3	1	3
	Unloading	Sprain/strain	Sprain or strain. Long term disability	Y	Y	Y	2	3	6	Mechanical aids to take material to work face; otherwise team lift. Plan route. Certification for lifting equipment to be provided.	2	1	2
	Unloading	Falling materials/equipment	Injury, death	Y	Y	Y	3	3	9	Established parking/delivery area; Cordon area off; Banksman supervision of all deliveries; Due care and attention.	3	1	3
	Vehicles manoeuvring	Collision with other vehicles/ pedestrians	Injury, death	Y	Y	Y	2	3	6	Reduce speed. Due care and attention especially during busy periods.	2	1	2
	Overhead services	Electrocution	Injury, death	Y	Y	Y	3	3	9	None on site.	2	1	2
	Fuel spill	Environmental impact	Pollution	Y	Y	Y	2	2	4	Competent delivery vehicle drivers; care and attention	2	1	2
Site operations	Buried services	Explosion/ Electrocution	Injury, death	Y	Y	Y	3	3	9	Prichard's supervisor to issue site wide permit for services. Operatives should carry out CAT scans prior to excavating below ground level.	1	2	2
	Noise	Complaints	Injury, long term ill health effects	Y	Y	Y	2	2	4	Use limited to core hours and not Saturday afternoon or Sundays (all day); hearing protection to be worn during periods of excessive noise (i.e. >85dbA)	2	1	2
	Vibration	Complaints	Injury, long term ill health effects	Y	Y	Y	2	2	4	Use limited to core hours and not Saturday afternoon or Sundays (all day);	2	1	2
	Inhalable Dust	Inhalation	Long term ill health	Y	Y	Y	3	2	6	Dust to be controlled by suppression; dust to be monitored throughout operations.	2	1	2

	Vermin	Weils disease/ Leptospirosis	Long term ill health	Y	Y	Y	3	2	6	Any evidence of rat activity to be reported to the site supervisor; good hygiene; gloves	2	1	2
	Needle stick	Hepatitis	Injury, long term ill health effects	Y	Y	Y	3	3	9	Any evidence of needles sticks to be reported to the site supervisor; do not handle with hands, use hand tools to collect; good hygiene; gloves	2	1	2
	Vehicles manoeuvring	Collision with other vehicles/ pedestrians	Injury, death	Y	Y	Y	2	3	6	Reduce speed. Due care and attention especially during busy periods. Banksman used at all times. Traffic management plan.	2	1	2
	Diesel fumes when refuelling	Inhalation/skin contact	Long term ill health	Y	Y		3	2	6	Used in the open air so well ventilated; gloves; spill kits retained on site	2	1	2
Site Level	Road	Trespassers accessing site	Injury / Fatalities			Y	3	2	6	Site team to remain vigilant during operational hours for any signs of trespassing. Warning signs to be in place around the site.	3	1	3
	Noise	Noise	N/A	Y	Y	Y	2	2	4	Use limited to core hours and not Saturday afternoon or Sundays (all day); hearing protection to be worn during periods of excessive noise (i.e. >85dbA)	2	1	2
	Inhalable Dust	Inhalation	N/A	Y	Y	Y	3	2	6	Dust to be controlled by suppression; dust masks available for particularly dry days when suppression is difficult to maintain and during existing site regrade operations.	2	1	2
	Adverse weather conditions	Sub-zero temperatures or heatwaves	N/A	Y	Y		2	2	4	Mandatory work wear. Regular breaks, heating systems in the welfare cabin and plant. Sunscreen provided to site operatives to protect against UV rays. Regular water breaks.	2	1	2

Appendix D – Traffic Management Plan

TRAFFIC MANAGEMENT PLAN

Contract number: PC0091

Site: Virginia Park Remediation

Version no.	Date	Drafted by	Signed by	Checked by	Signed by
001	13/07/2020	MW	MW	JA	JA

Introduction

This Traffic Management Plan has been prepared for the remediation project to be carried out at the former Virginia Park golf course in Caerphilly by Prichard's, commencing in Spring 2020.

The aim of this traffic management plan is to lay out the requirements and provisions to be implemented in the process of achieving the most efficient and safe movement of vehicles during the remediation works at Dow with particular reference to the Health and Safety of the Prichard's workforce, Local residents and businesses and staff and visitors to the project.

The Traffic Plan is a working document reflecting the responses of the management team to a variety of issues affecting the flow of traffic around the area of the site. Whilst this document reflects the planning and agreement to date there may be issues that arise between the writing of this document and the implementation of the plans. No alterations to the enclosed plans will be made without consultation with the Site Manager and those affected by any changes. Alterations to the above plan will be put into effect to improve the performance of the general aims and objectives of the plan itself, that being the safe and efficient movement of vehicles in and around the boundary of the site and the access road.

INDEX

1. THE PROPOSED WORKS

The scope of works includes the remediation of the existing golf course land. The bulk of site activity will remain within the site boundaries for the first year of the project, but as the works progress there will be more wagon movements into and out of the site.

During the first year It is anticipated that there will be approximately:

20 – 40 wagon loads of vegetation to go offsite.
50 wagon loads of processed landfill waste for disposal offsite.

During the second year it is anticipated that there will be approximately:

4,800 wagon movements with imported soils.

The working hours of the site will be 08:00 – 18:00 Monday to Friday and 09:00 – 13:00 on Saturday.

2. SITE

The full address is as follows:

Virginia Park Golf Course

Caerphilly

CF83 3SW

The site entrance is located off a right hand turn before the leisure centre. As shown in Figure 2.

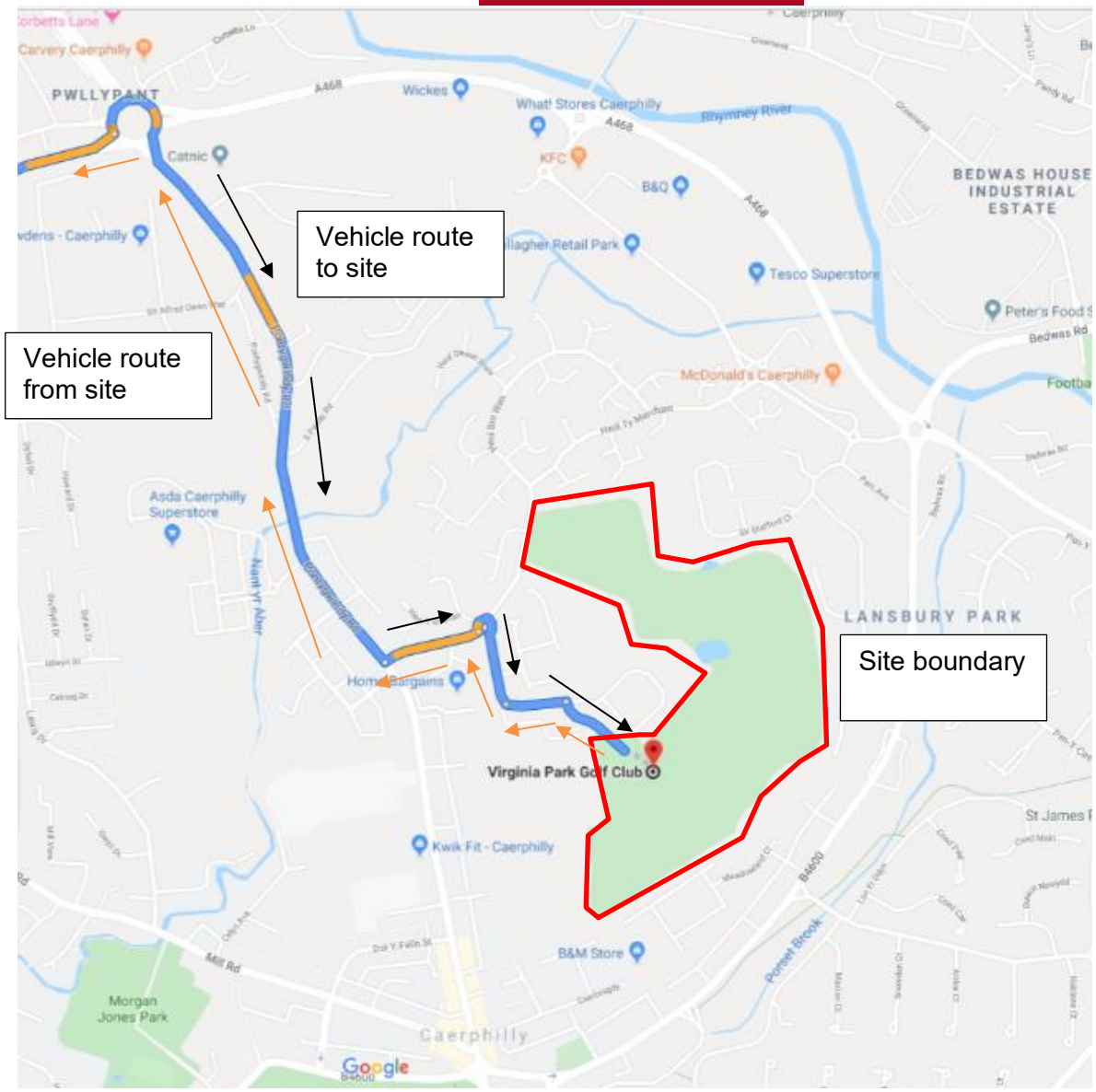

Figure 1: Vehicle Route from the A468 to and from the site at Virginia Park.

Figure 2: Streetview of the entrance to the site access road off the leisure centre access road.

Figure 3: Plan of the site showing the site compound and car parking.

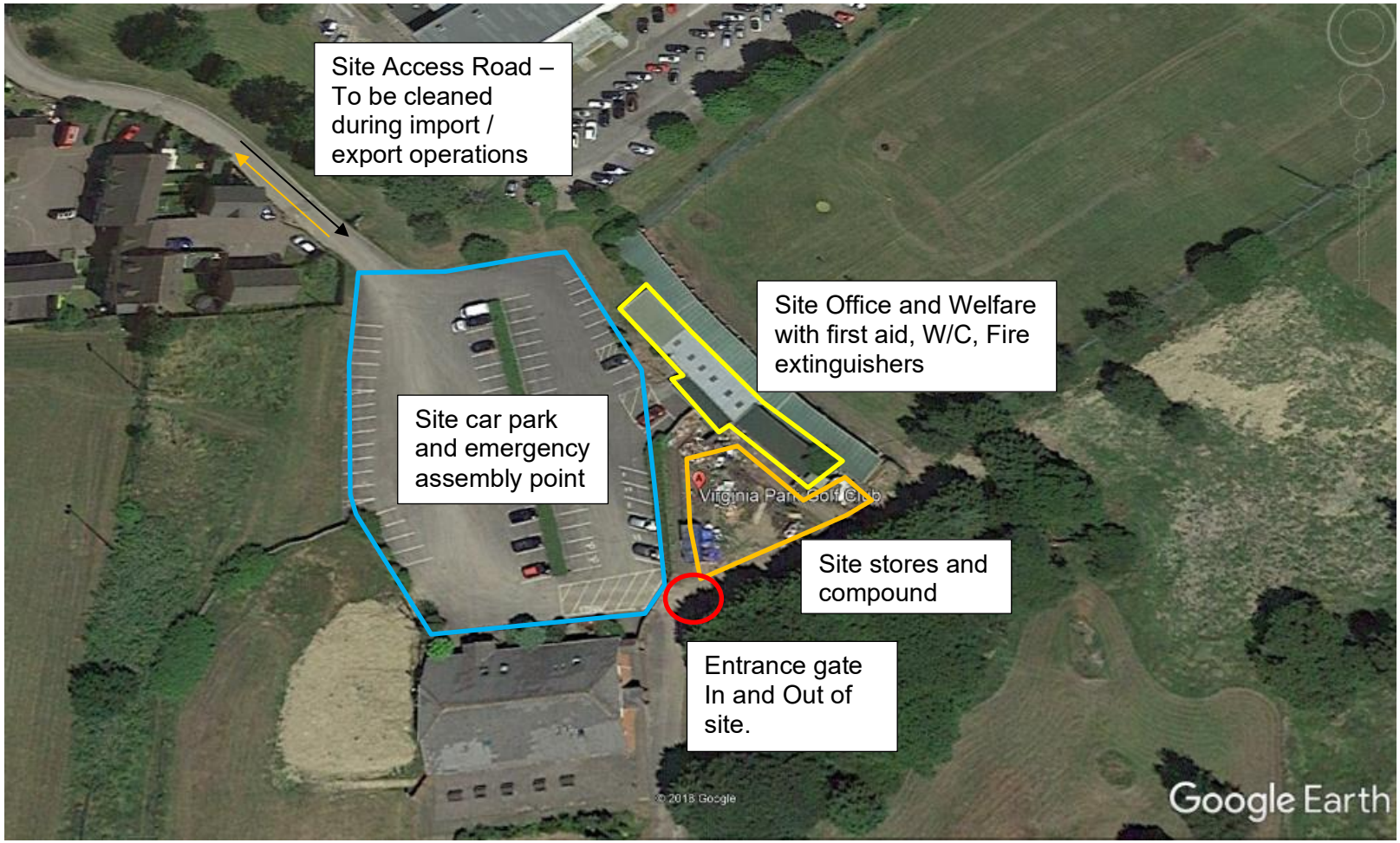

Figure 4: Detailed plan of the site compound, parking and access arrangements.

3. VEHICLE ACCESS ONTO SITE AND CAR PARKS

Figure 1 shows the route which all construction vehicles will take off the A468 in Caerphilly to head to and from the site entrance at Virginia Park.

Figure 3 shows the site boundary with car park and site compound locations identified, with Figure 4 showing a more detailed plan showing the entrance onto site and the access road, which will be cleaned during periods of import and export of materials.

Prichard's will site a gate man on the formed site entrance to direct deliveries into the site. When on site the vehicles will follow designated haul routes around the site, which will consist of stoned up areas.

No Vehicles will be allowed to wait or idle in nearby residential areas. This includes all wagons, site personnel vehicles and anyone waiting for the site to open up in a morning.

A site wide speed limit of 5mph shall be enforced within the site boundary to reduce the potential for dust to be created by the site activities.
A speed limit for all deliveries of 15mph shall be put in place along the site entrance road to reduce the risk for any accidents or dust creation.

4. EMERGENCY ACCESS ONTO THE SITE

In the case of an emergency the relevant service can enter the site via the Prichard's delivery entrance.

5. CAR PARKING AREAS AND CAPACITIES

No cars are to be parked on the site, unless they are a fitter's vehicle or such. All staff and visitors will park in the car parking areas shown on Figure 4.

6. DROP OFF POINT

There is not expected to be a requirement for a drop off point for any persons as part of this operations.

7. DISABLED SPACES

Disabled spaces will be provided in the main site car park.

8. PARKING OF PLANT

Plant will be parked near to the site compound and will come back to refuel at nights.

9. ROAD CLOSURES

No road closures are expected throughout this contract. The entrance road will be kept clean by use of a road sweeper when required. No vehicles are to be left parked on the site entrance road to cause any blockage for any emergency services.

10. VEHICLE ROUTING

Vehicles on site will follow a route of designated haul roads, which will be identified as the site works commence and progress.

11. ROUTE SIGNAGE

Prichard's will locate signage at the temporary access to inform all delivery drivers of where to enter the site. All unloading activities on site will be directed by one of the site team.

12. PEDESTRIAN ACCESS

Pedestrian access will be through the site entrance gate and there will be a designated pedestrian route on site adjacent to the site haulage routes.

13. PUBLICITY FOR PLAN

This plan will be given to all delivery drivers.

14. COMMUNICATION

The site supervisor will liaise directly with the Prichard's transport manger to discuss any transport arrangements for each day/ the site team will have a briefing each morning to discuss the days operations.

15. ROAD CLEANING

Road sweeping will be carried out during wet conditions on the site access road to prevent any debris getting out onto the main roads.

16. BREAKDOWN / TOW AWAY SERVICES

Any breakdowns on site will be resolved by Prichard's fitter's or breakdown service.

17. CRIME PREVENTION

The site will be secured by Heras fence panels when deliveries are not being made.

APPENDIX B

LABORATORY GEOTECHNICAL TEST RESULTS

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 53435

Client Ref: **12476**
Client PO: **12476/TD**

Report Date: **26-04-2021**

Client **Integral Geotechnique (Wales) Limited**
7 Beddau Way
Castlegate Business Park
Caerphilly
Cardiff
CF83 2AX

Contract Title: **Virginia Park, Caerphilly**
For the attention of: **Tony Dixon**

Date Received: **12-04-2021**
Date Completed: **26-04-2021**

Test Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	5
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	5
PSD Wet Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	5
CBR: Remoulded Specimen and tested at top only BS 1377:1990 - Part 4 : 7 - * UKAS	5
Samples Received - @ Non Accredited Test	10
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager)
Shaun Jones (Laboratory manager) - Wayne Honey (Administrative/Quality Assistant)

GEO Site & Testing Services Ltd
Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

GSTL	NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377 : Part 2 : 1990 Method 5)	
Contract Number	53435	
Site Name	Virginia Park, Caerphilly	
Date Tested	23/04/2021	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
1 & 2		B	0.10	-		Brown clayey/silty fine to coarse sandy fine to coarse GRAVEL
3 & 4		B	0.10	-		Grey clayey/silty fine to coarse sandy fine to coarse GRAVEL
5 & 6		B	0.10	-		Grey clayey/silty fine to coarse sandy fine to coarse GRAVEL
7 & 8		B	0.10	-		Brown fine to coarse gravelly clayey/silty fine to coarse SAND
9 & 10		B	0.10	-		Grey clayey/silty fine to coarse gravelly fine to coarse SAND
				-		
				-		
				-		
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Operators	Checked	26/04/2021	Richard John (Advanced Testing Manager)
Clayton Jenkins	Approved	26/04/2021	Paul Evans (Quality/Technical Manager)

UKAS TESTING
2788

GSTL	NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377 : Part 2 : 1990 Method 5)	
Contract Number	**53435**	
Project Location	**Virginia Park, Caerphilly**	
Date Tested	**23/04/2021**	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
1 & 2		B	0.10	-		45	59	31	28	42	MH High Plasticity
3 & 4		B	0.10	-		33	58	35	23	43	MH High Plasticity
5 & 6		B	0.10	-		15	42	31	11	47	MI Intermediate Plasticity
7 & 8		B	0.10	-		36	85	40	45	70	MV Very High Plasticity
9 & 10		B	0.10	-		32	56	38	18	51	MH High Plasticity
				-							
				-							
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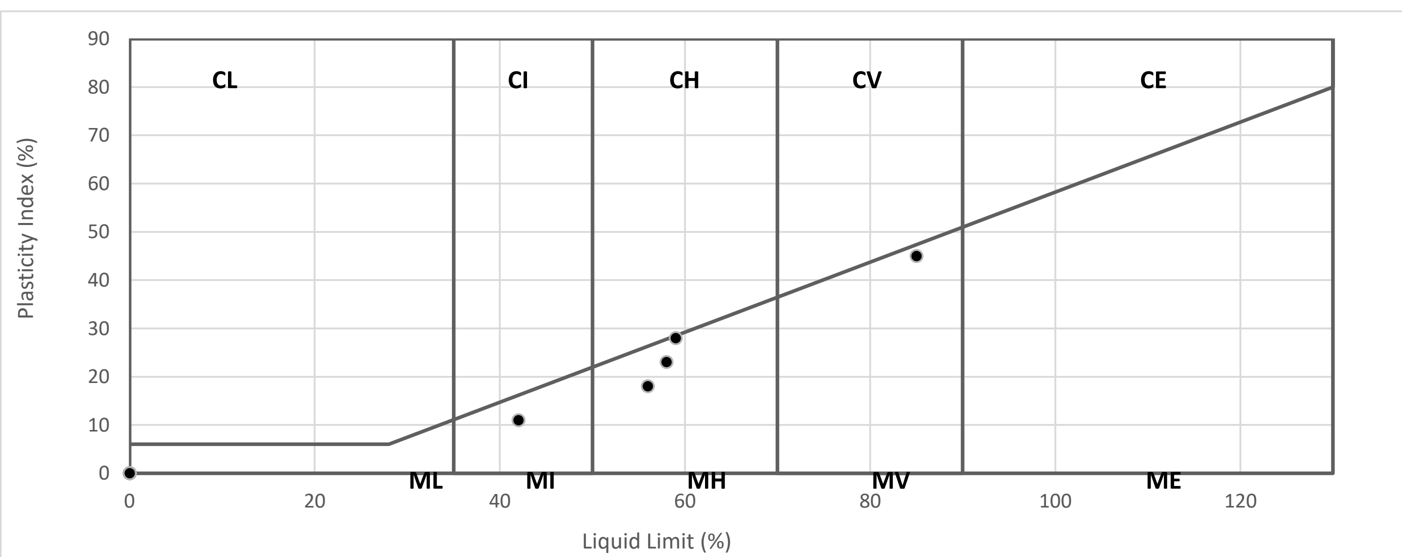
				-							

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

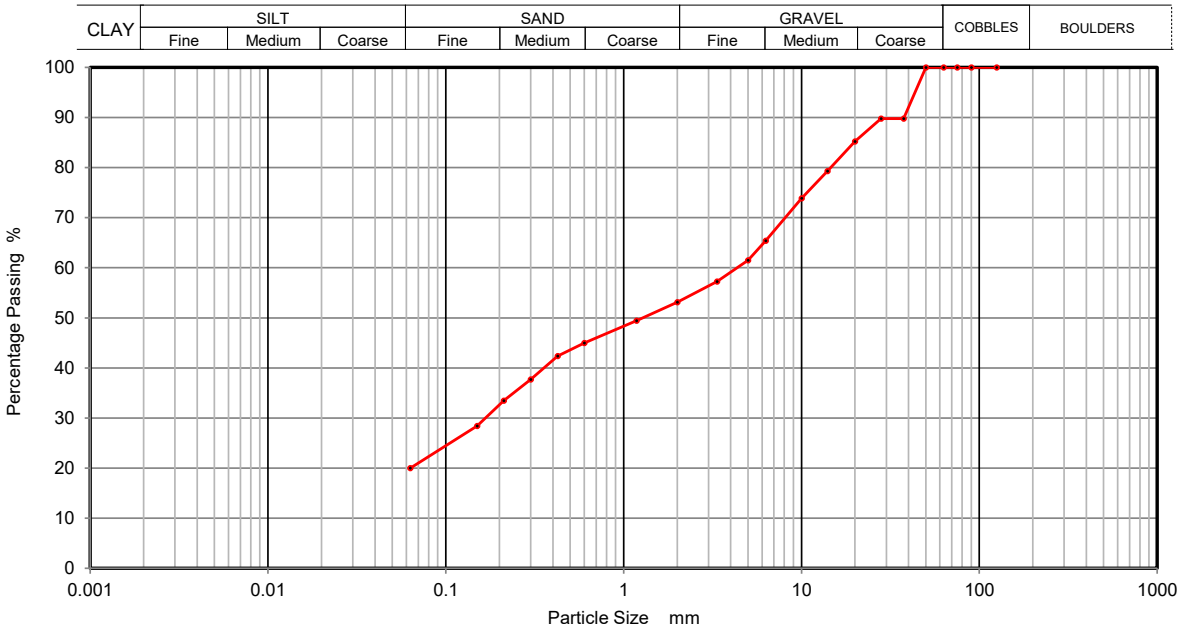
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:1999+A2:2010



Operators	Checked	26/04/2021	Richard John (Advanced Testing Manager)
Clayton Jenkins	Approved	26/04/2021	Paul Evans (Quality/Technical Manager)

UKAS TESTING 2788

GSTL	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	53435
		Borehole/Pit No.	1 & 2
Site Name	Virginia Park, Caerphilly	Sample No.	
Soil Description	Brown clayey/silty fine to coarse sandy fine to coarse GRAVEL	Depth Top	0.10
		Depth Base	
Date Tested	23/04/2021	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	90		
28	90		
20	85		
14	79		
10	74		
6.3	65		
5	62		
3.35	57		
2	53		
1.18	49		
0.6	45		
0.425	42		
0.3	38		
0.212	33		
0.15	28		
0.063	20		

Sample Proportions	% dry mass
Cobbles	0
Gravel	47
Sand	33
Silt and Clay	20

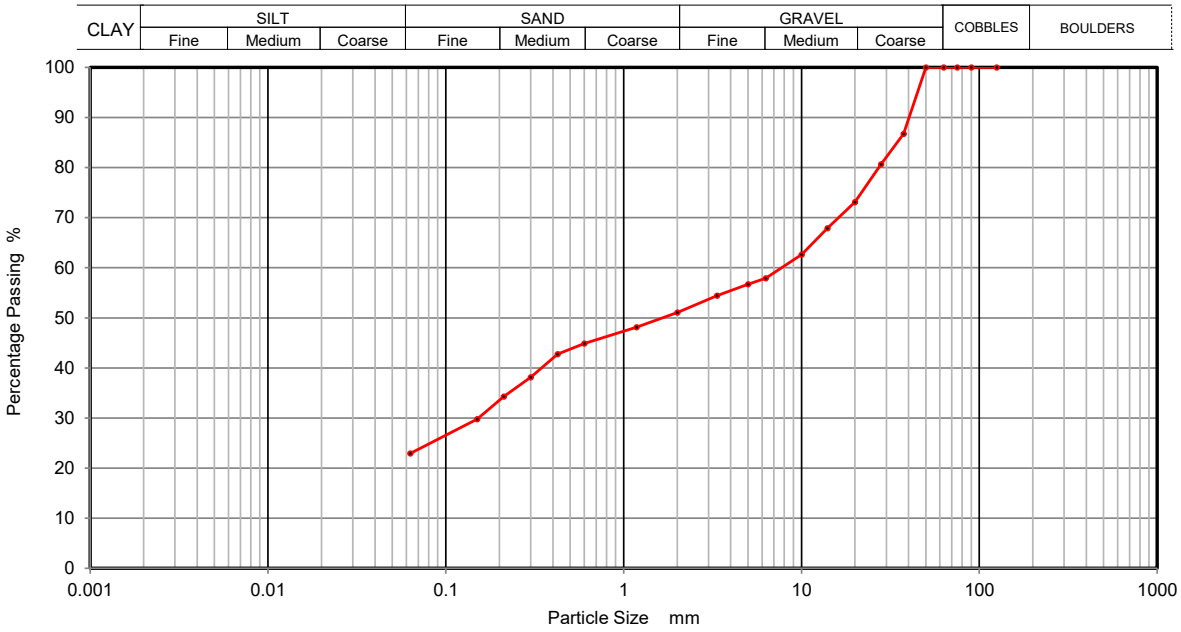
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	25/04/2021	Richard John	
David	Approved	26/04/2021	Paul Evans	D P Evans

UKAS TESTING
2788

GSTL	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	53435
		Borehole/Pit No.	3 & 4
Site Name	Virginia Park, Caerphilly	Sample No.	
Soil Description	Grey clayey/silty fine to coarse sandy fine to coarse GRAVEL	Depth Top	0.10
		Depth Base	
Date Tested	23/04/2021	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	87		
28	81		
20	73		
14	68		
10	63		
6.3	58		
5	57		
3.35	54		
2	51		
1.18	48		
0.6	45		
0.425	43		
0.3	38		
0.212	34		
0.15	30		
0.063	23		

Sample Proportions	% dry mass
Cobbles	0
Gravel	49
Sand	28
Silt and Clay	23

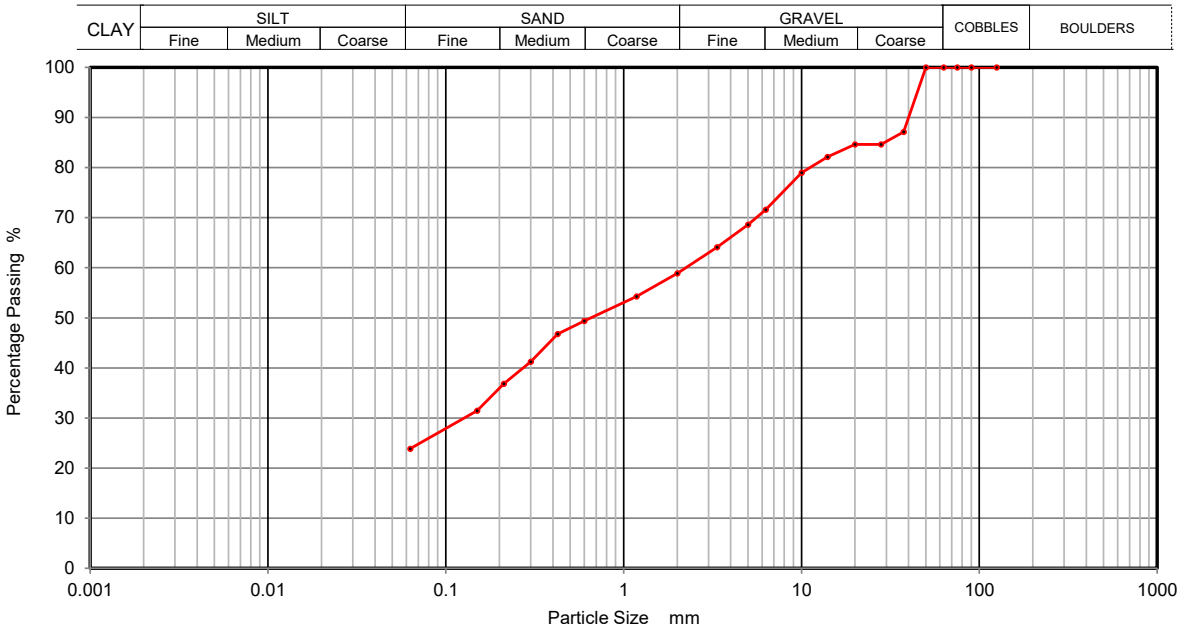
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	25/04/2021	Richard John	
David	Approved	26/04/2021	Paul Evans	D P Evans

UKAS TESTING
2788

GSTL	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	53435
		Borehole/Pit No.	5 & 6
Site Name	Virginia Park, Caerphilly	Sample No.	
Soil Description	Grey clayey/silty fine to coarse sandy fine to coarse GRAVEL	Depth Top	0.10
		Depth Base	
Date Tested	23/04/2021	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	87		
28	85		
20	85		
14	82		
10	79		
6.3	72		
5	69		
3.35	64		
2	59		
1.18	54		
0.6	49		
0.425	47		
0.3	41		
0.212	37		
0.15	31		
0.063	24		

Sample Proportions	% dry mass
Cobbles	0
Gravel	41
Sand	35
Silt and Clay	24

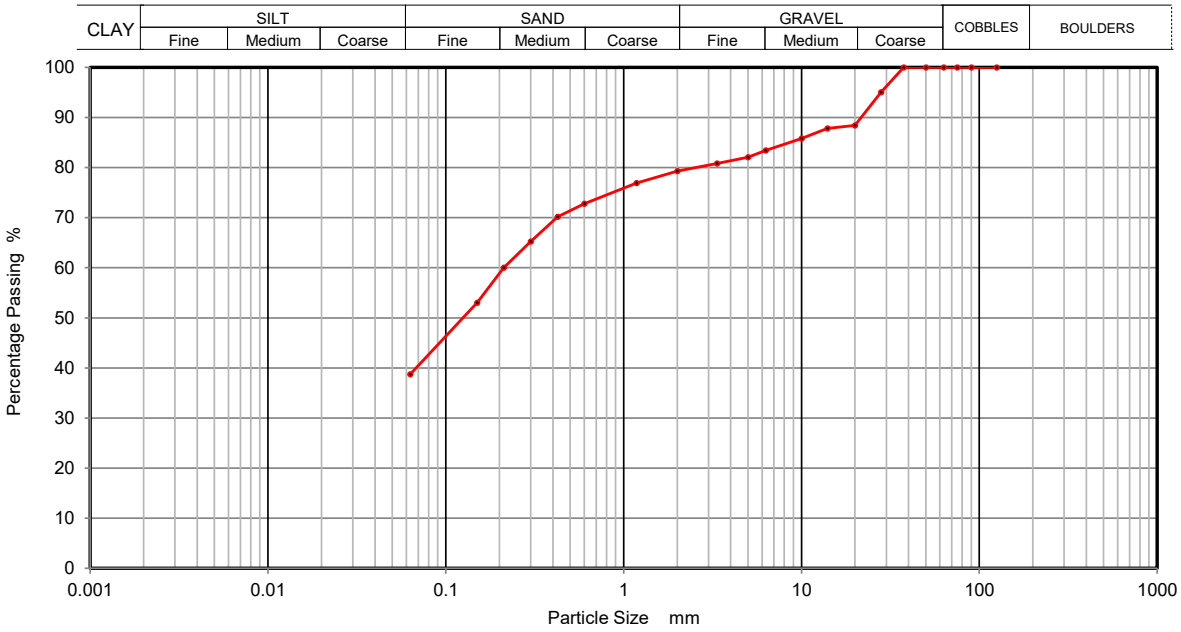
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	25/04/2021	Richard John	
David	Approved	26/04/2021	Paul Evans	D P Evans

UKAS TESTING
2788

GSTL	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	53435
		Borehole/Pit No.	7 & 8
Site Name	Virginia Park, Caerphilly	Sample No.	
Soil Description	Brown fine to coarse gravelly clayey/silty fine to coarse SAND	Depth Top	0.10
		Depth Base	
Date Tested	23/04/2021	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	95		
20	88		
14	88		
10	86		
6.3	83		
5	82		
3.35	81		
2	79		
1.18	77		
0.6	73		
0.425	70		
0.3	65		
0.212	60		
0.15	53		
0.063	39		

Sample Proportions	% dry mass
Cobbles	0
Gravel	21
Sand	40
Silt and Clay	39

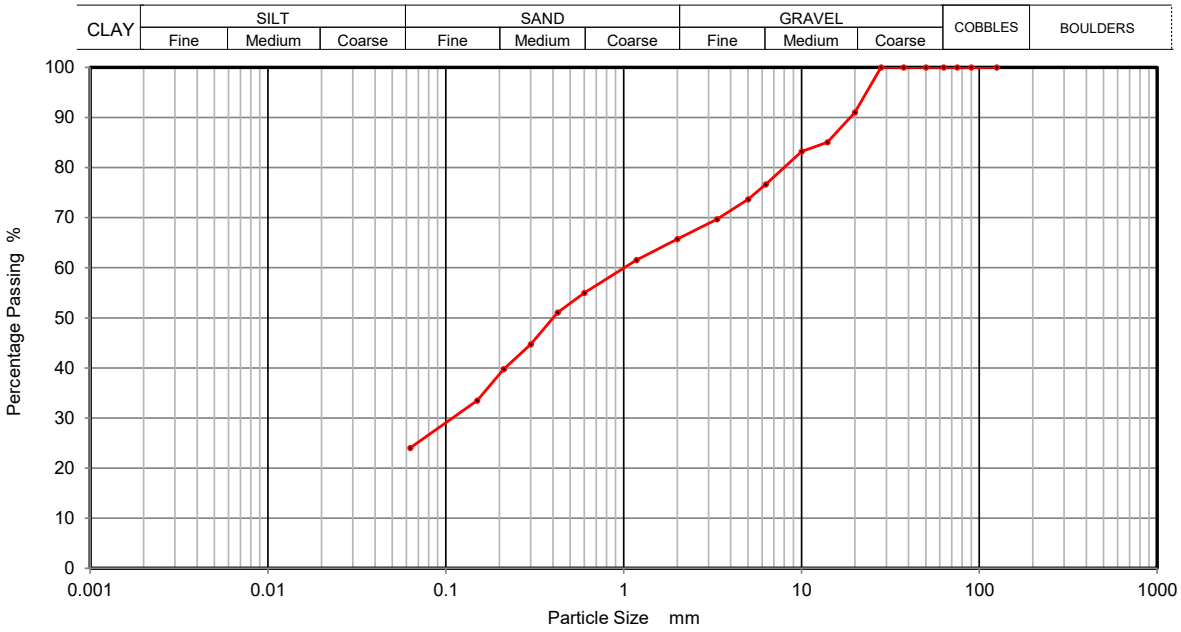
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	25/04/2021	Richard John	
David	Approved	26/04/2021	Paul Evans	D P Evans

UKAS TESTING
2788

GSTL	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	53435
		Borehole/Pit No.	9 & 10
Site Name	Virginia Park, Caerphilly	Sample No.	
Soil Description	Grey clayey/silty fine to coarse gravelly fine to coarse SAND	Depth Top	0.10
		Depth Base	
Date Tested	23/04/2021	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	91		
14	85		
10	83		
6.3	77		
5	74		
3.35	70		
2	66		
1.18	62		
0.6	55		
0.425	51		
0.3	45		
0.212	40		
0.15	33		
0.063	24		

Sample Proportions	% dry mass
Cobbles	0
Gravel	34
Sand	42
Silt and Clay	24

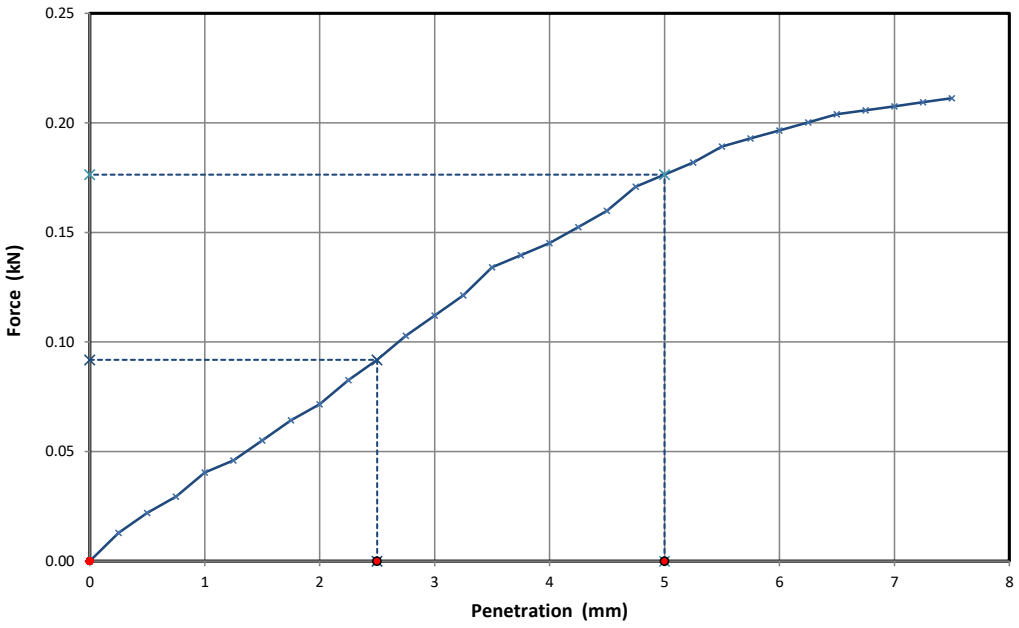
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	25/04/2021	Richard John	
David	Approved	26/04/2021	Paul Evans	D P Evans

UKAS TESTING 2788

GSTL	California Bearing Ratio BS 1377: Part 4: 1990 Clause 7	Contract Number	53435
		Borehole/Pit No.	1 & 2
Site Name	Virginia Park, Caerphilly	Sample No.	
		Depth Top	0.10
Compaction Method	2.5 Kg Rammer	Depth Base	
Retained 20mm (%)	15	Sample Type	B
Date Tested	22/04/2021		



Initial Sample Conditions	
Moisture Content (%)	28
Moisture Top (%)	28
Moisture Bottom (%)	
Bulk Density (Mg/m3)	1.72
Dry Density (Mg/m3)	1.34

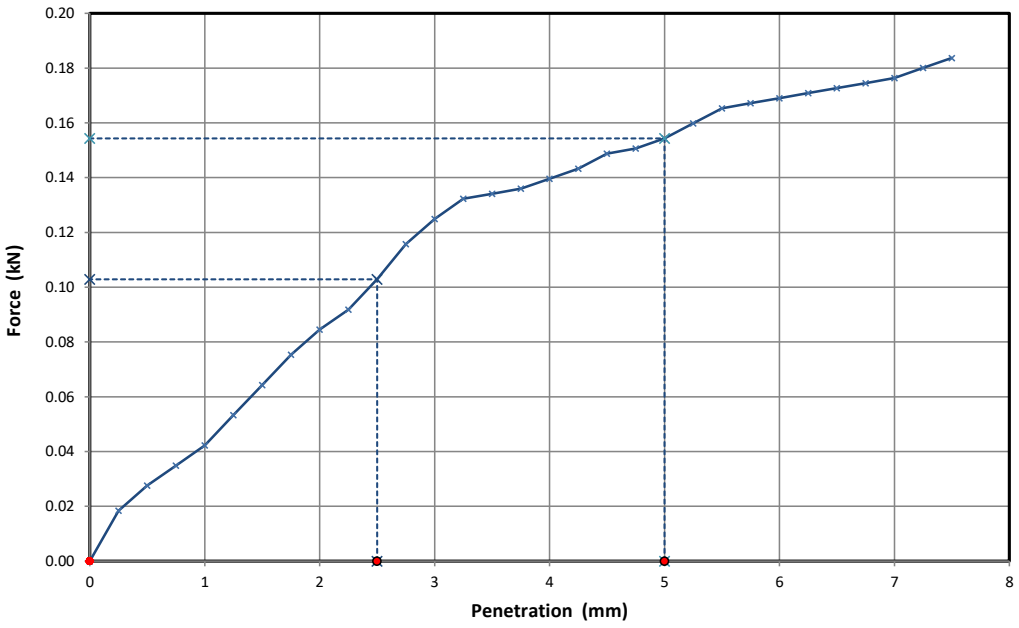
Specified Testing Parameters	
Surcharge (Kg)	2
Soaking Time (hours)	N/A
Swelling (mm)	N/A
Remarks	

CBR Test Values			
2.5mm Top	0.7	2.5mm Bottom	
5mm Top	0.88	5mm Bottom	
CBR Value %	**0.88**	**CBR Value %**	

Operators	Checked	25/04/2021	Richard John	
Conal	Approved	26/04/2021	Paul Evans	

UKAS TESTING 2788

GSTL	California Bearing Ratio BS 1377: Part 4: 1990 Clause 7	Contract Number	53435
		Borehole/Pit No.	3 & 4
Site Name	Virginia Park, Caerphilly	Sample No.	
		Depth Top	0.10
Compaction Method	2.5 Kg Rammer	Depth Base	
Retained 20mm (%)	27	Sample Type	B
Date Tested	22/04/2021		



Initial Sample Conditions	
Moisture Content (%)	22
Moisture Top (%)	22
Moisture Bottom (%)	
Bulk Density (Mg/m3)	1.69
Dry Density (Mg/m3)	1.39

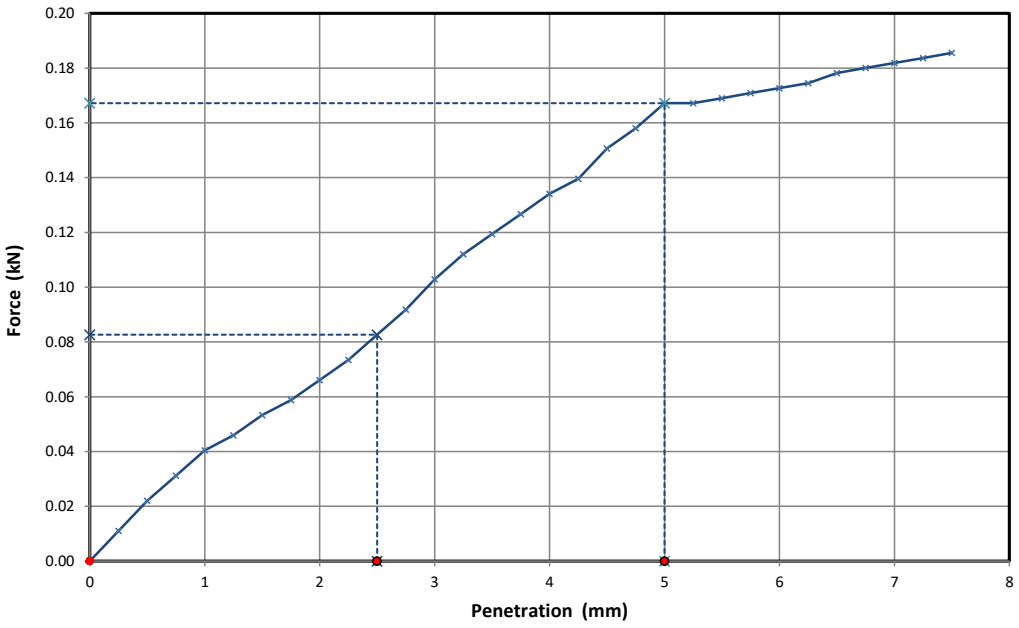
Specified Testing Parameters	
Surcharge (Kg)	2
Soaking Time (hours)	N/A
Swelling (mm)	N/A
Remarks	

CBR Test Values			
2.5mm Top	0.78	2.5mm Bottom	
5mm Top	0.77	5mm Bottom	
CBR Value %	**0.78**	**CBR Value %**	

Operators	Checked	25/04/2021	Richard John	
Conal	Approved	26/04/2021	Paul Evans	

UKAS TESTING 2788

GSTL	California Bearing Ratio BS 1377: Part 4: 1990 Clause 7	Contract Number	53435
		Borehole/Pit No.	5 & 6
Site Name	Virginia Park, Caerphilly	Sample No.	
		Depth Top	0.10
Compaction Method	2.5 Kg Rammer	Depth Base	
Retained 20mm (%)	15	Sample Type	B
Date Tested	22/04/2021		



Initial Sample Conditions	
Moisture Content (%)	20
Moisture Top (%)	20
Moisture Bottom (%)	
Bulk Density (Mg/m3)	1.69
Dry Density (Mg/m3)	1.40

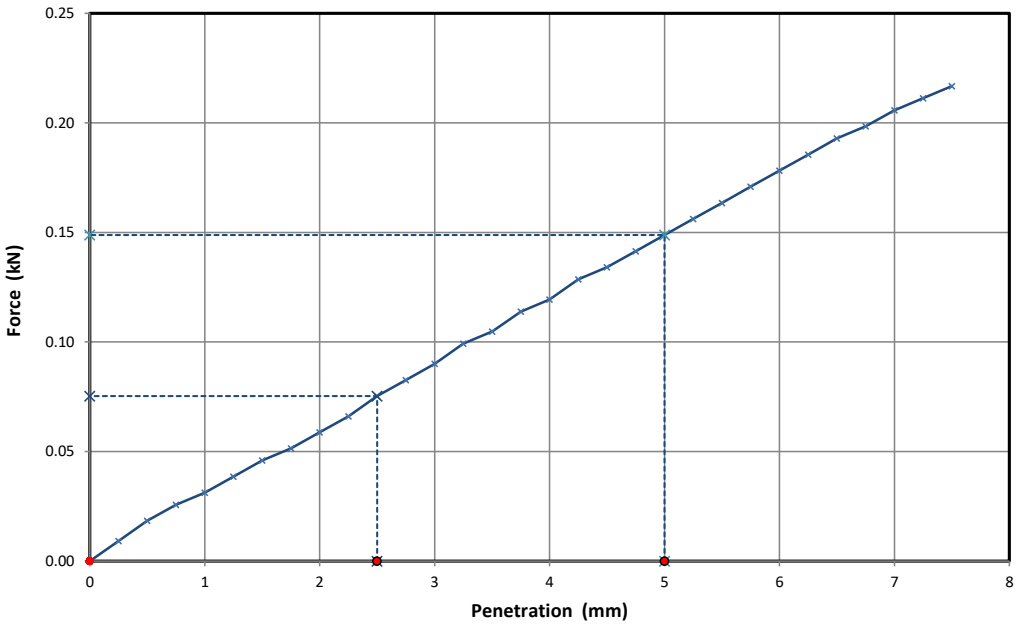
Specified Testing Parameters	
Surcharge (Kg)	2
Soaking Time (hours)	N/A
Swelling (mm)	N/A
Remarks	

CBR Test Values			
2.5mm Top	0.63	2.5mm Bottom	
5mm Top	0.84	5mm Bottom	
CBR Value %	**0.84**	**CBR Value %**	

Operators	Checked	25/04/2021	Richard John	
Conal	Approved	26/04/2021	Paul Evans	

UKAS TESTING 2788

GSTL	California Bearing Ratio BS 1377: Part 4: 1990 Clause 7	Contract Number	53435
		Borehole/Pit No.	7 & 8
Site Name	Virginia Park, Caerphilly	Sample No.	
		Depth Top	0.10
Compaction Method	2.5 Kg Rammer	Depth Base	
Retained 20mm (%)	12	Sample Type	B
Date Tested	22/04/2021		



Initial Sample Conditions	
Moisture Content (%)	51
Moisture Top (%)	51
Moisture Bottom (%)	
Bulk Density (Mg/m3)	1.69
Dry Density (Mg/m3)	1.12

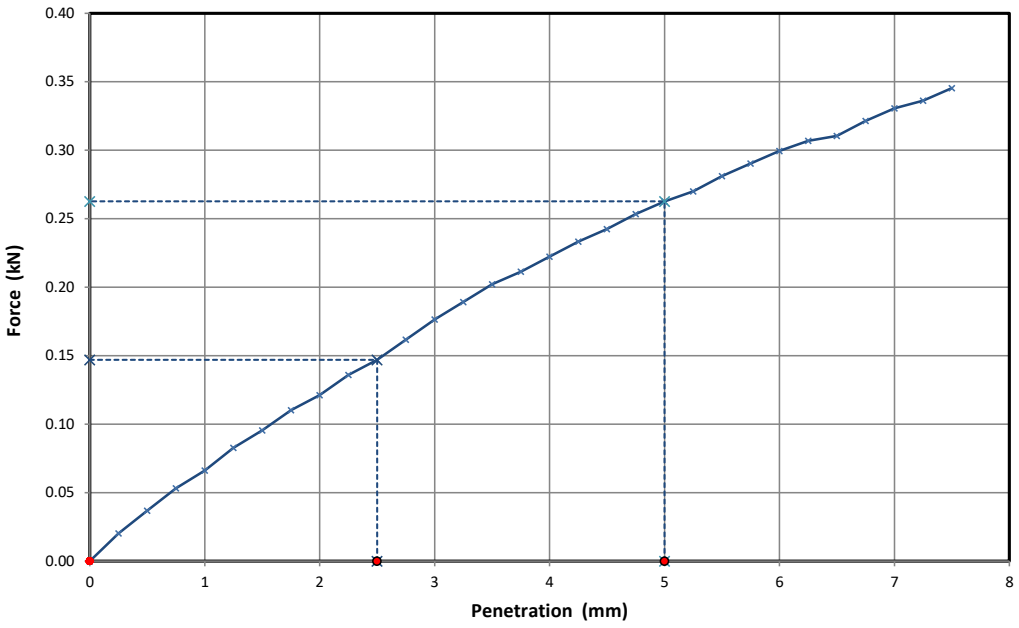
Specified Testing Parameters	
Surcharge (Kg)	2
Soaking Time (hours)	N/A
Swelling (mm)	N/A
Remarks	

CBR Test Values			
2.5mm Top	0.57	2.5mm Bottom	
5mm Top	0.74	5mm Bottom	
CBR Value %	**0.74**	**CBR Value %**	

Operators	Checked	25/04/2021	Richard John	
Conal	Approved	26/04/2021	Paul Evans	

UKAS TESTING 2788

GSTL	California Bearing Ratio BS 1377: Part 4: 1990 Clause 7	Contract Number	53435
		Borehole/Pit No.	9 & 10
Site Name	Virginia Park, Caerphilly	Sample No.	
		Depth Top	0.10
Compaction Method	2.5 Kg Rammer	Depth Base	
Retained 20mm (%)	9	Sample Type	B
Date Tested	22/04/2021		



Initial Sample Conditions	
Moisture Content (%)	30
Moisture Top (%)	30
Moisture Bottom (%)	
Bulk Density (Mg/m3)	1.65
Dry Density (Mg/m3)	1.27

Specified Testing Parameters	
Surcharge (Kg)	2
Soaking Time (hours)	N/A
Swelling (mm)	N/A
Remarks	

CBR Test Values			
2.5mm Top	1.1	2.5mm Bottom	
5mm Top	1.3	5mm Bottom	
CBR Value %	**1.3**	**CBR Value %**	

Operators	Checked	25/04/2021	Richard John	
Conal	Approved	26/04/2021	Paul Evans	

UKAS TESTING 2788

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:	IG	**Site Name:**	Phase 1A, Virginia Park
Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH	**Job Number:**	D22227
		Date Received:	13/05/2022
		Job Coordinator:	G Llewellyn
Contact Name:	**Gary**		
Contact Number:			

Item No.	Tests Undertaken	Number of Tests
1.1	Moisture Contents	10
1.2	Atterberg limits	10
1.3	PSD Wet Seive	10
1.4	4.5Kg Compaction OMC/MDD	10

RESULTS ISSUED 23/5/22

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

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27922		

Site Ref / Hole ID:	B1	**Depth (m):**	0.15
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slighty gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	18 May 2022

Test Results

Moisture Content (%)	14.5

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*K Lester*	19/05/2022	**MC**
			K Lester, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

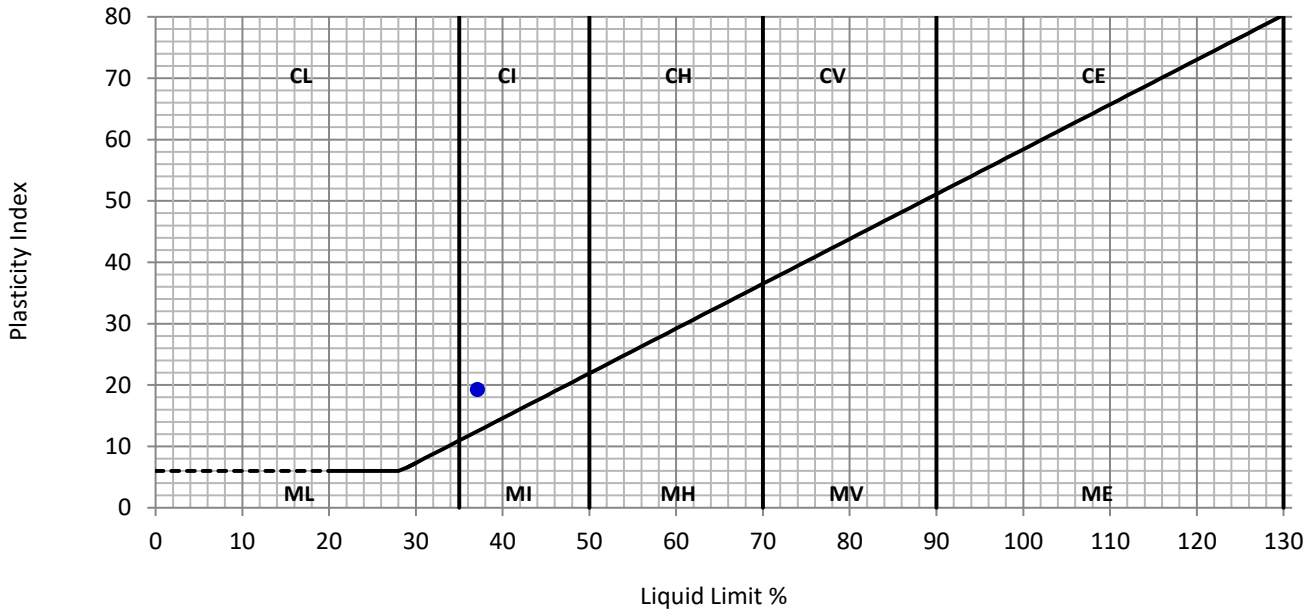
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27922		

Site Ref / Hole ID:	B1	**Depth (m):**	0.15
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slighty gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Liquid Limit	37	%
Plastic Limit	18	%
Plasticity Index	19	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	43	%



Remarks:

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

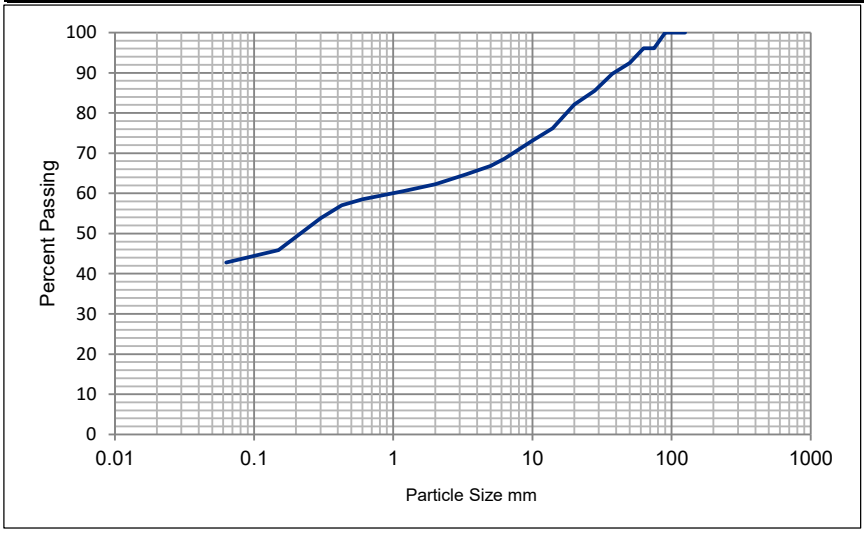
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27922		

Site Ref / Hole ID:	B1	**Depth (m):**	0.15
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slighty gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	96
63	96
50	92
37.5	90
28	86
20	82
14	76
10	73
6.3	69
5.0	67
3.35	65
2.00	62
1.18	61
0.600	59
0.425	57
0.300	54
0.212	50
0.150	46
0.063	43

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	4	N/A	D_{60} / D_{10}
Gravel	34		
Sand	19	**Dry mass of sample, kg**	
Silt / Clay	43	21.5	N/A

Remarks:

QA Ref.	Apex Testing Solutions		Approver	Date	Fig
BS1377 - 4 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Lester	19/05/2022	**PSD**
			K Lester, Senior Technician		

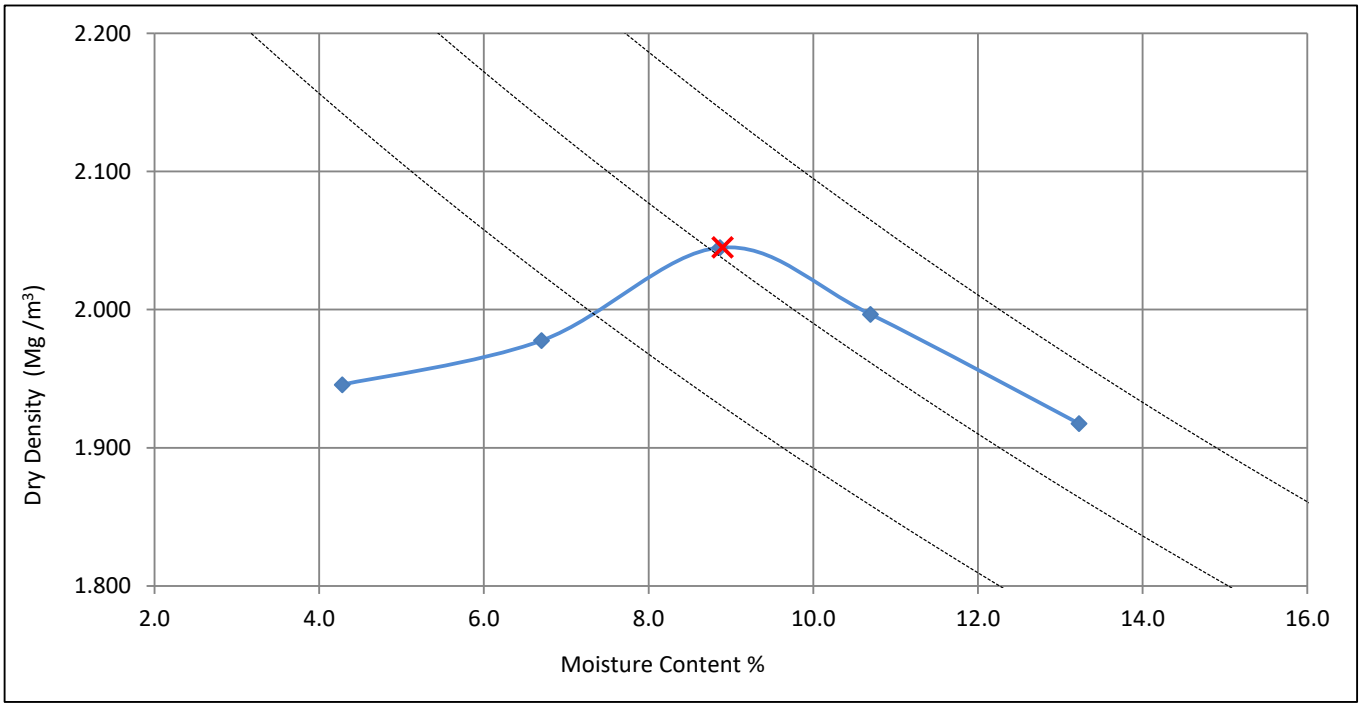
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27922		

Site Ref / Hole ID:	B1	**Depth (m):**	0.15
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	28 March 2022	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	29 March 2022	**Date Tested:**	18 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m^3	2.65	assumed
Material > 37.5mm	10	%
Material < 37.5mm > 20mm	8	%

Derived Parameters ×	
Maximum Dry Density, Mg/m^3	2.05
Optimum Moisture Content %	8.9

Remarks: Natural Moisture Content 14.5%

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: *G Llewellyn* G Llewellyn, Senior Technician	Date: 23/05/2022	Fig. **COMP**

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27923		

Site Ref / Hole ID:	B2	**Depth (m):**	1.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	18 May 2022

Test Results

Moisture Content (%)	12.7

Remarks:

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

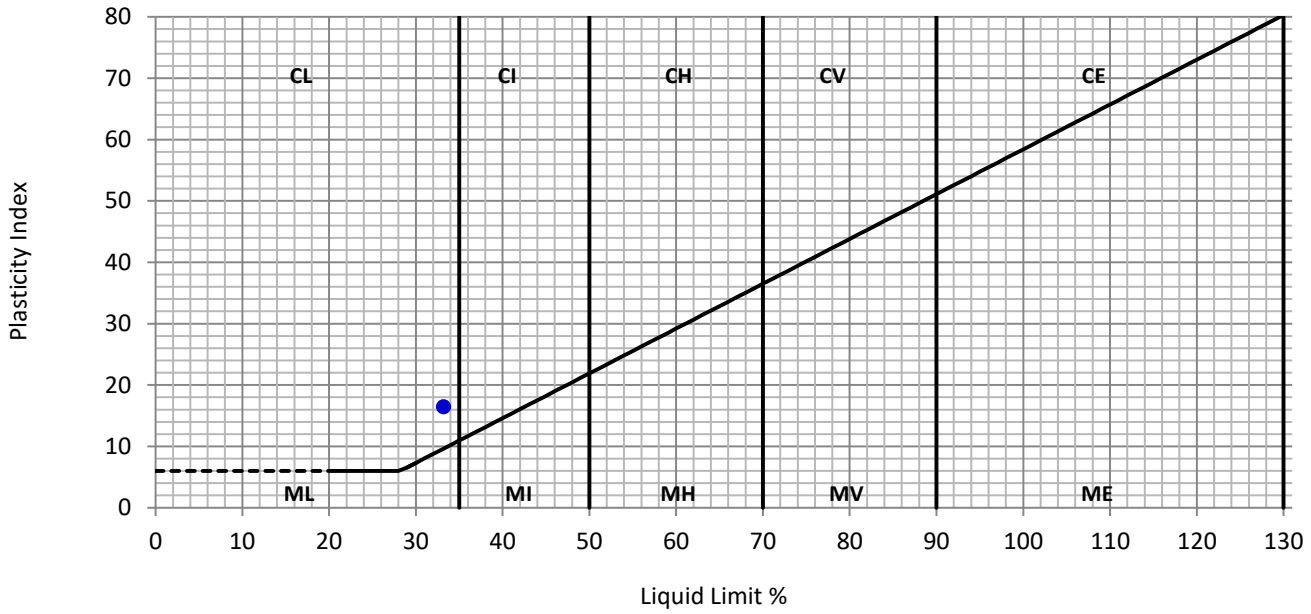
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27923		

Site Ref / Hole ID:	B2	**Depth (m):**	1.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	18 May 2022

Test Results

Liquid Limit	33	%
Plastic Limit	17	%
Plasticity Index	16	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	46	%



Remarks:

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

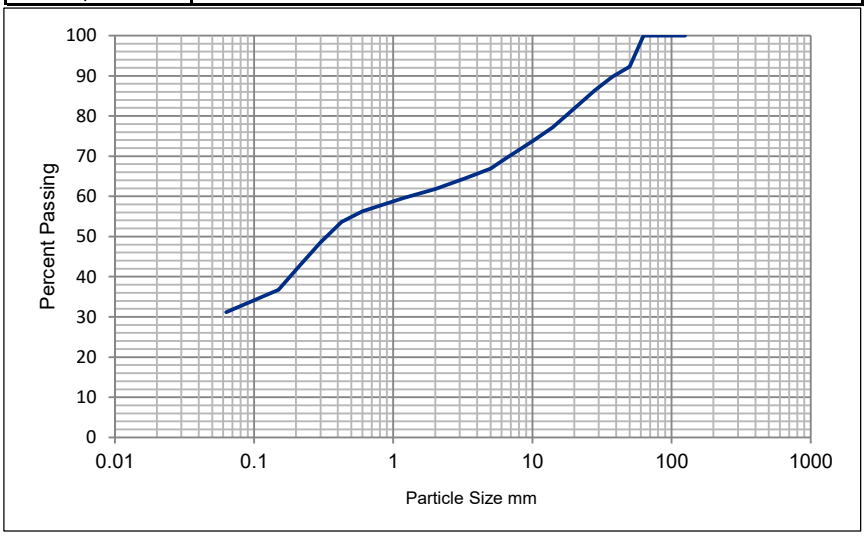
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27923		

Site Ref / Hole ID:	B2	**Depth (m):**	1.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	92
37.5	90
28	86
20	82
14	77
10	74
6.3	69
5.0	67
3.35	65
2.00	62
1.18	60
0.600	56
0.425	54
0.300	49
0.212	43
0.150	37
0.063	31

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	38		
Sand	31	**Dry mass of sample, kg**	
Silt / Clay	31	18.4	N/A

Remarks:

QA Ref.	**Apex Testing Solutions**	UKAS TESTING	Approver	Date	Fig
BS1377 - 4 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*K Lester* K Lester, Senior Technician	23/05/2022	**PSD**

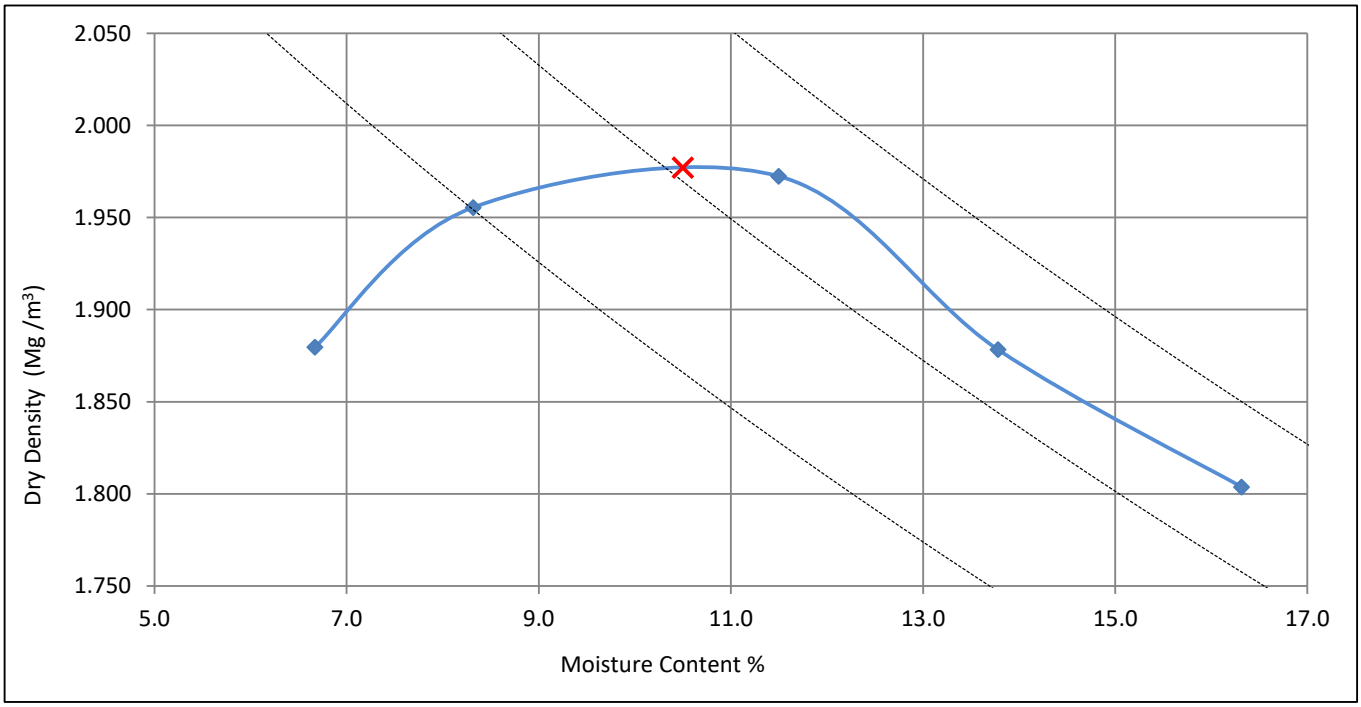
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27923		

Site Ref / Hole ID:	B2	**Depth (m):**	1.00m
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	28 March 2022	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	29 March 2022	**Date Tested:**	21 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m^3	2.65	assumed
Material > 37.5mm	10	%
Material < 37.5mm > 20mm	8	%

Derived Parameters ×	
Maximum Dry Density, Mg/m^3	1.98
Optimum Moisture Content %	10.5

Remarks: Natural Moisture Content 12.7%

Apex Testing Solutions
Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096
7771

Approver: G Llewellyn — G Llewellyn, Senior Technician

Date: 23/05/2022

Fig. COMP

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27924		

Site Ref / Hole ID:	B3	**Depth (m):**	0.75
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	16 May 2022

Test Results

Moisture Content (%)	14.2

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*K Lester*	23/05/2022	**MC**
			K Lester, Senior Technician		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

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

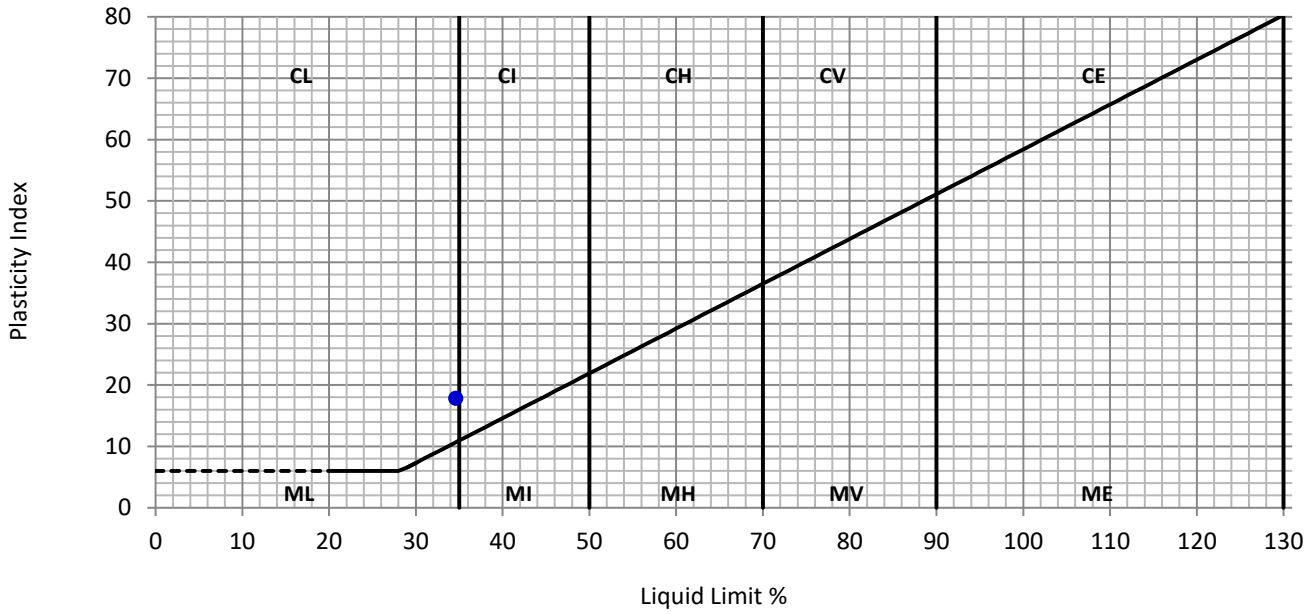
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27924		

Site Ref / Hole ID:	B3	**Depth (m):**	0.75
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Liquid Limit	35	%
Plastic Limit	17	%
Plasticity Index	18	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	47	%



Remarks:

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

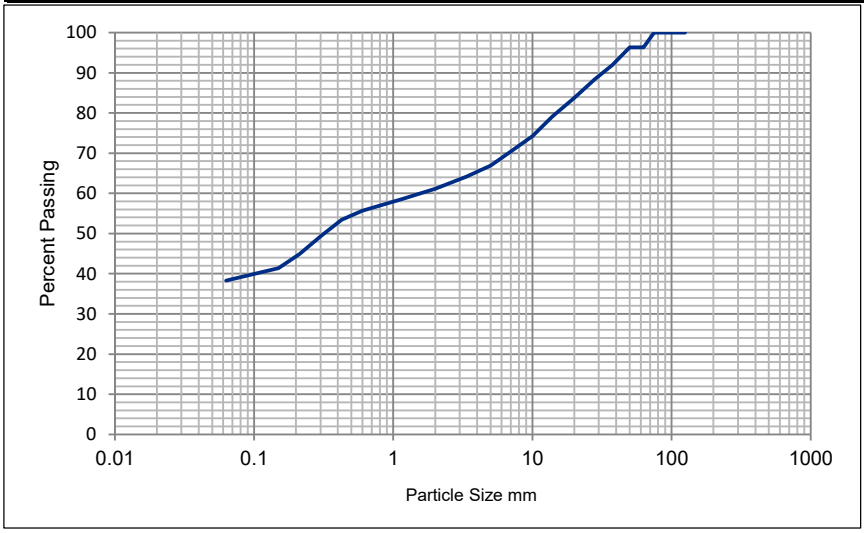
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27924		

Site Ref / Hole ID:	B3	**Depth (m):**	0.75
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	96
50	96
37.5	92
28	88
20	84
14	79
10	74
6.3	69
5.0	67
3.35	64
2.00	61
1.18	59
0.600	56
0.425	53
0.300	49
0.212	45
0.150	41
0.063	38

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	4	N/A	D_{60} / D_{10}
Gravel	35		
Sand	23	**Dry mass of sample, kg**	
Silt / Clay	38	19.2	N/A

Remarks:

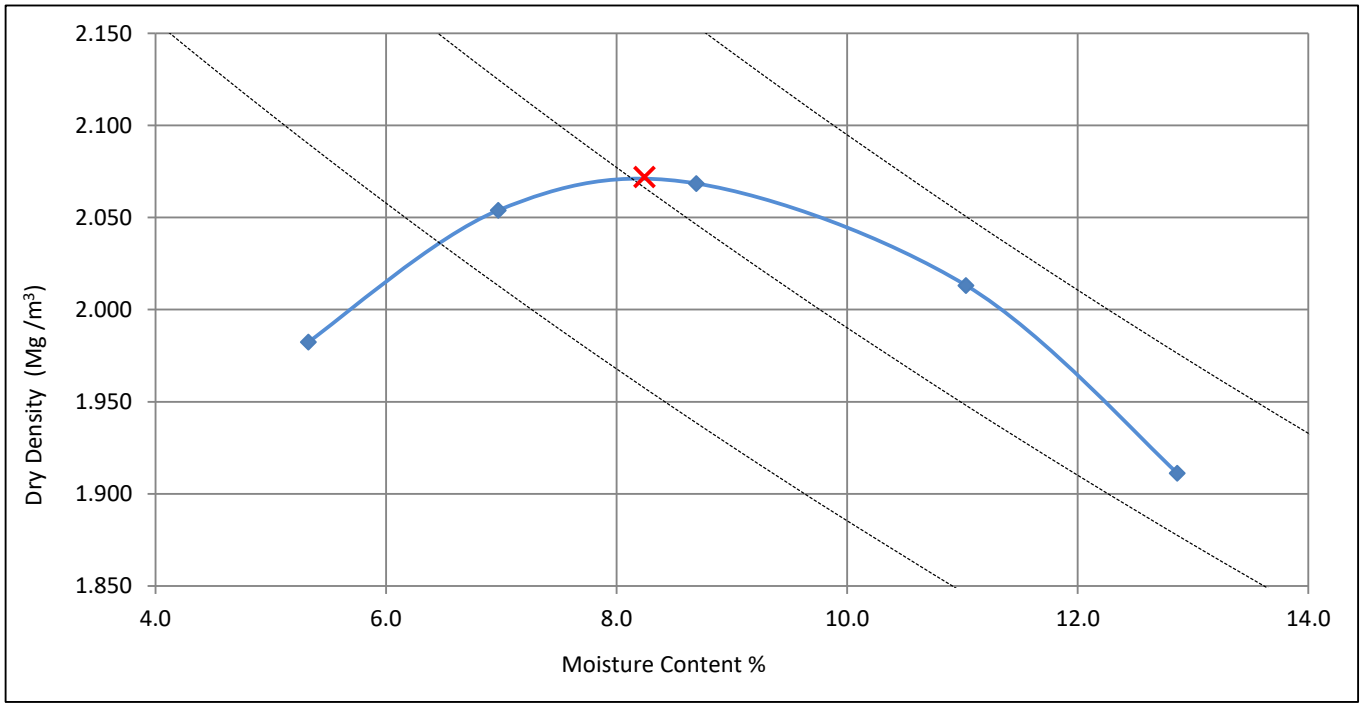
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27924		

Site Ref / Hole ID:	B3	**Depth (m):**	0.75m
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy gravelly CLAY
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m³	2.65	assumed
Material > 37.5mm	8	%
Material < 37.5mm > 20mm	8	%

Derived Parameters ×	
Maximum Dry Density, Mg/m³	2.07
Optimum Moisture Content %	8.2

Remarks: Natural Moisture Content 14.2%

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: *G Llewellyn* G Llewellyn, Senior Technician	Date: 23/05/2022	Fig. **COMP**

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27925		

Site Ref / Hole ID:	B4	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	16 May 2022

Test Results

Moisture Content (%)	11.8

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*K Lester*	23/05/2022	**MC**
			K Lester, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

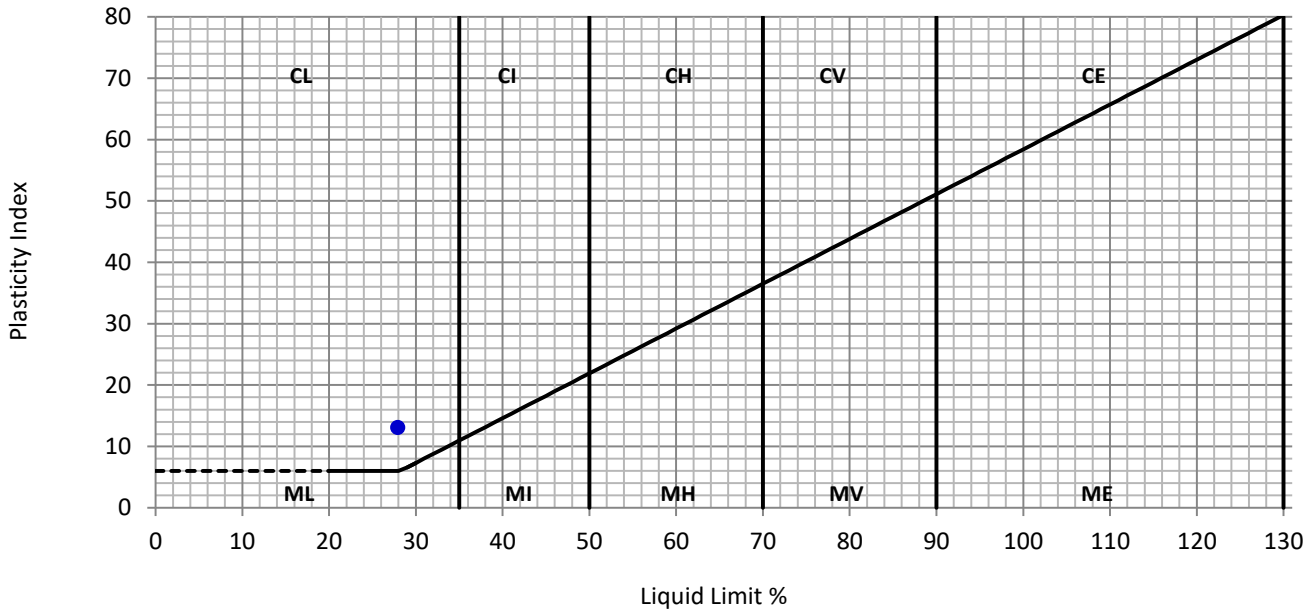
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27925		

Site Ref / Hole ID:	B4	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	21 May 2022

Test Results

Liquid Limit	28	%
Plastic Limit	15	%
Plasticity Index	13	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	47	%



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: K Lester K Lester, Senior Technician	Date: 23/05/2022	Fig. **ATT**

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

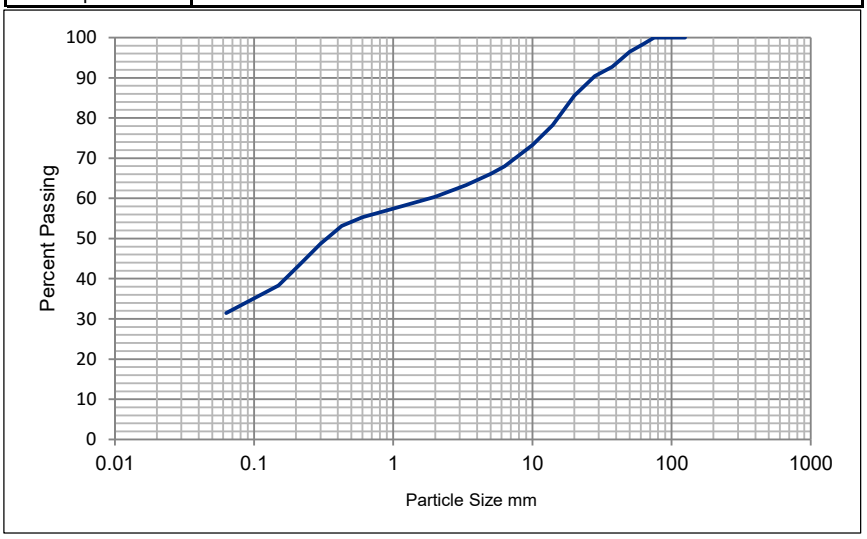
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27925		

Site Ref / Hole ID:	B4	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	98
50	96
37.5	93
28	90
20	86
14	78
10	73
6.3	68
5.0	66
3.35	63
2.00	60
1.18	58
0.600	55
0.425	53
0.300	49
0.212	43
0.150	38
0.063	31

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	2	N/A	D_{60} / D_{10}
Gravel	38		
Sand	29	**Dry mass of sample, kg**	
Silt / Clay	31	21.5	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 K Lester K Lester, Senior Technician	Date 23/05/2022	Fig **PSD**

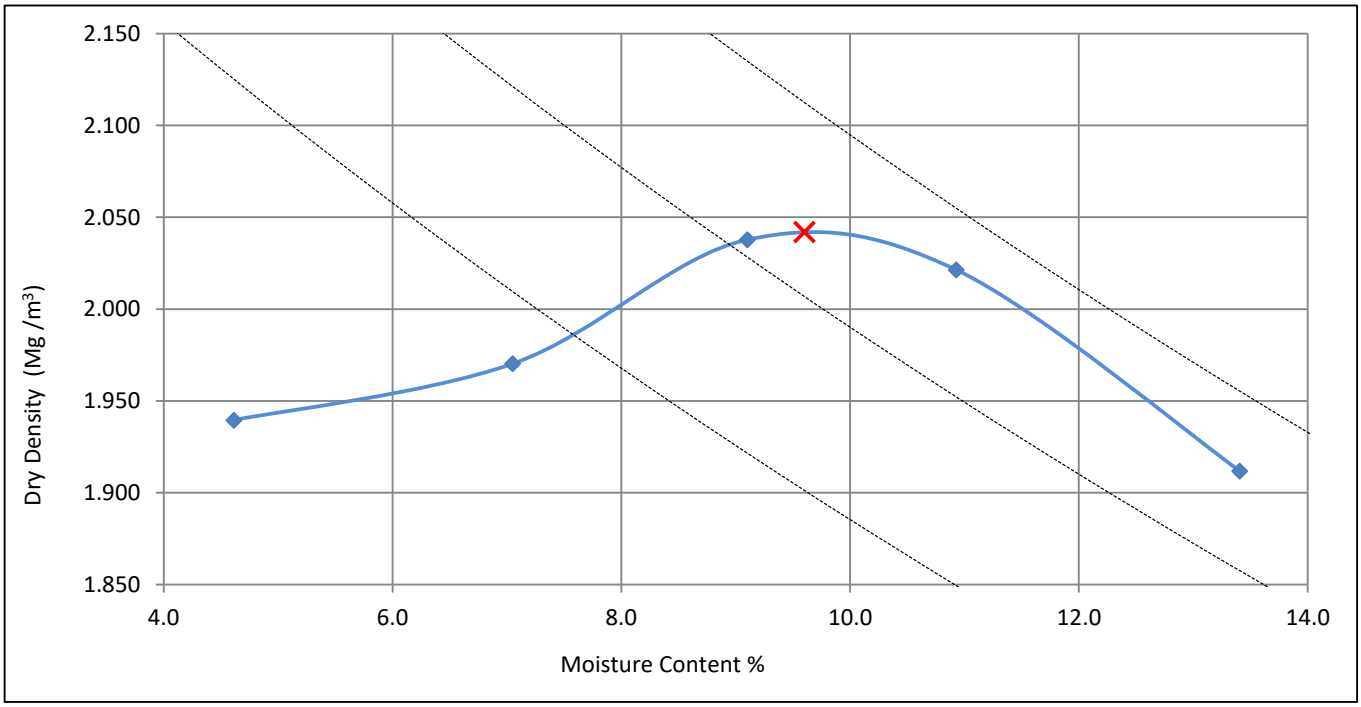
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27925		

Site Ref / Hole ID:	B4	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	20 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m³	2.65	assumed
Material > 37.5mm	7	%
Material < 37.5mm > 20mm	7	%

Derived Parameters ×	
Maximum Dry Density, Mg/m³	2.04
Optimum Moisture Content %	9.6

Remarks: Natural Moisture Content 11.8%

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: *G Llewellyn* G Llewellyn, Senior Technician	Date: 23/05/2022	Fig. **COMP**

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27926		

Site Ref / Hole ID:	B4	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	18 May 2022

Test Results

Moisture Content (%)	10.1

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*K Lester*	19/05/2022	**MC**
			K Lester, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

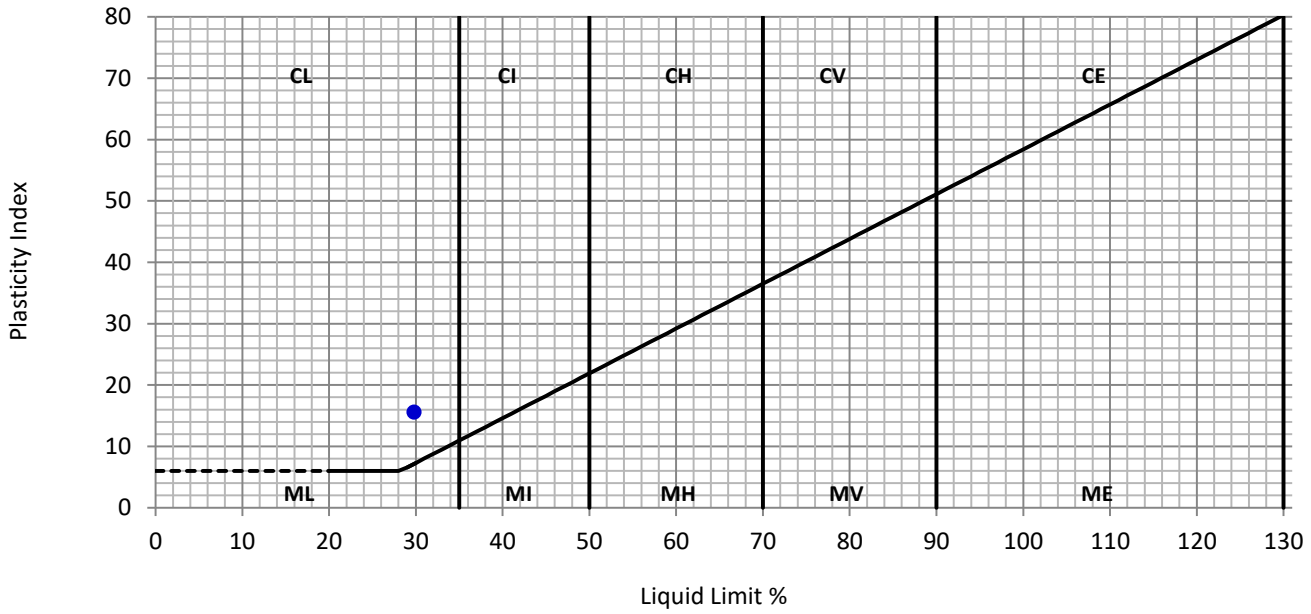
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27926		

Site Ref / Hole ID:	B4	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Liquid Limit	30	%
Plastic Limit	14	%
Plasticity Index	16	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	54	%



Remarks:

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

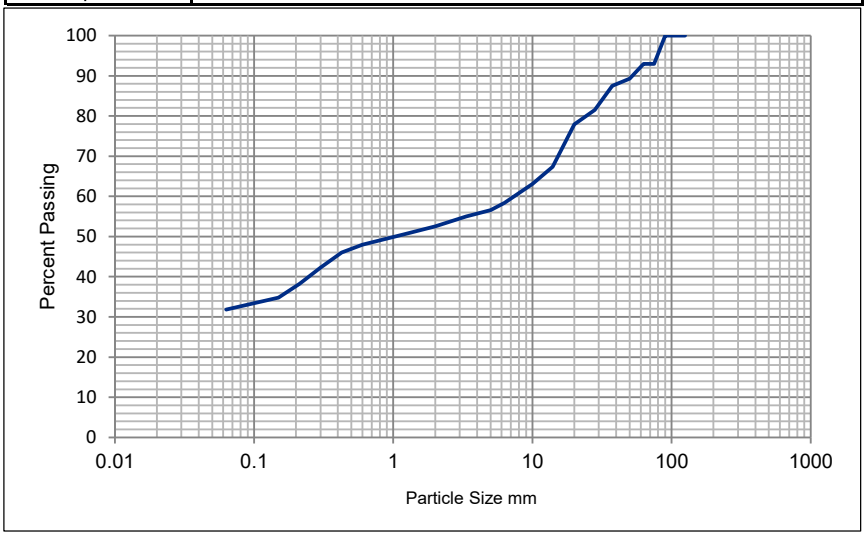
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27926		

Site Ref / Hole ID:	B4	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	93
63	93
50	89
37.5	87
28	81
20	78
14	67
10	63
6.3	58
5.0	57
3.35	55
2.00	53
1.18	51
0.600	48
0.425	46
0.300	42
0.212	38
0.150	35
0.063	32

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	7	N/A	D_{60} / D_{10}
Gravel	40		
Sand	21	**Dry mass of sample, kg**	
Silt / Clay	32	22.4	N/A

Remarks:

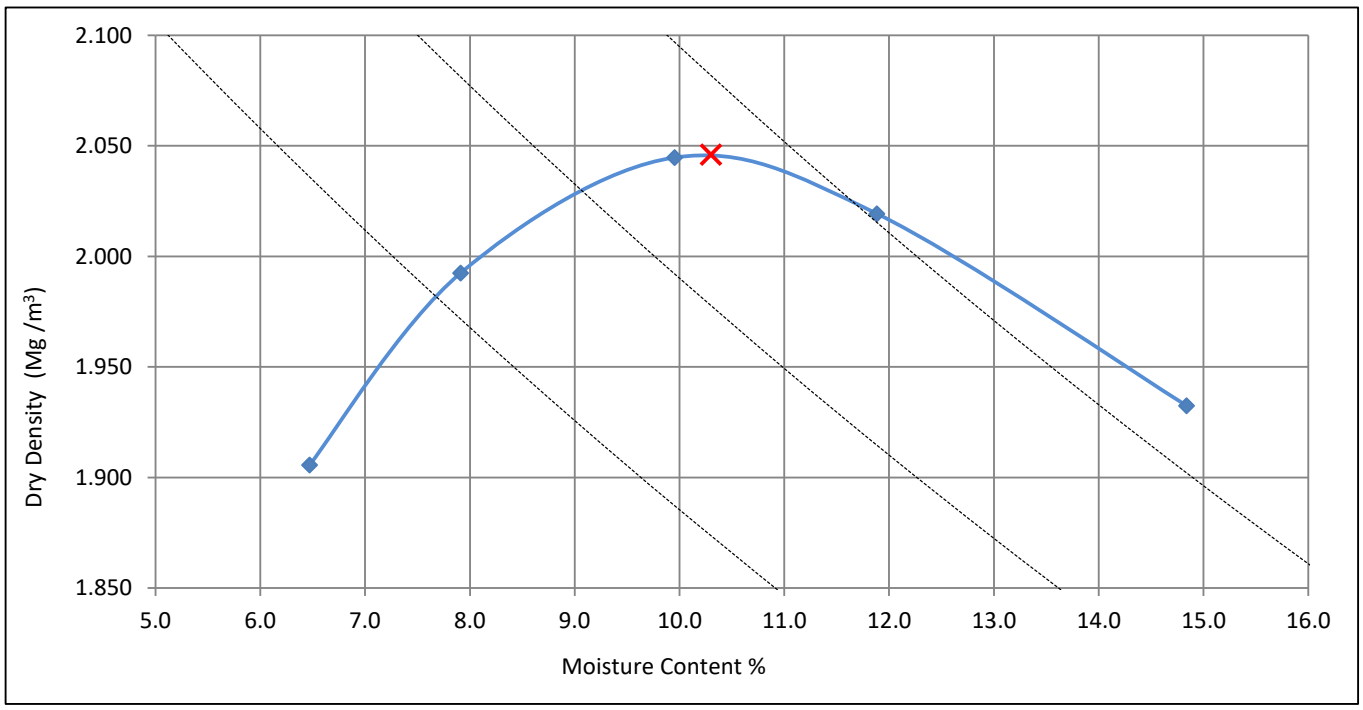
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27926		

Site Ref / Hole ID:	B5	**Depth (m):**	1.00m
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown very sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	21 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m^3	2.65	assumed
Material > 37.5mm	13	%
Material < 37.5mm > 20mm	9	%

Derived Parameters ×	
Maximum Dry Density, Mg/m^3	2.05
Optimum Moisture Content %	10.3

Remarks: Natural Moisture Content 11.6%

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: *G Llewellyn* G Llewellyn, Senior Technician	Date: 23/05/2022	Fig. **COMP**

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27927		

Site Ref / Hole ID:	B6	**Depth (m):**	2.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	18 May 2022

Test Results

Moisture Content (%)	23.0

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Lester	23/05/2022	**MC**
			K Lester, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

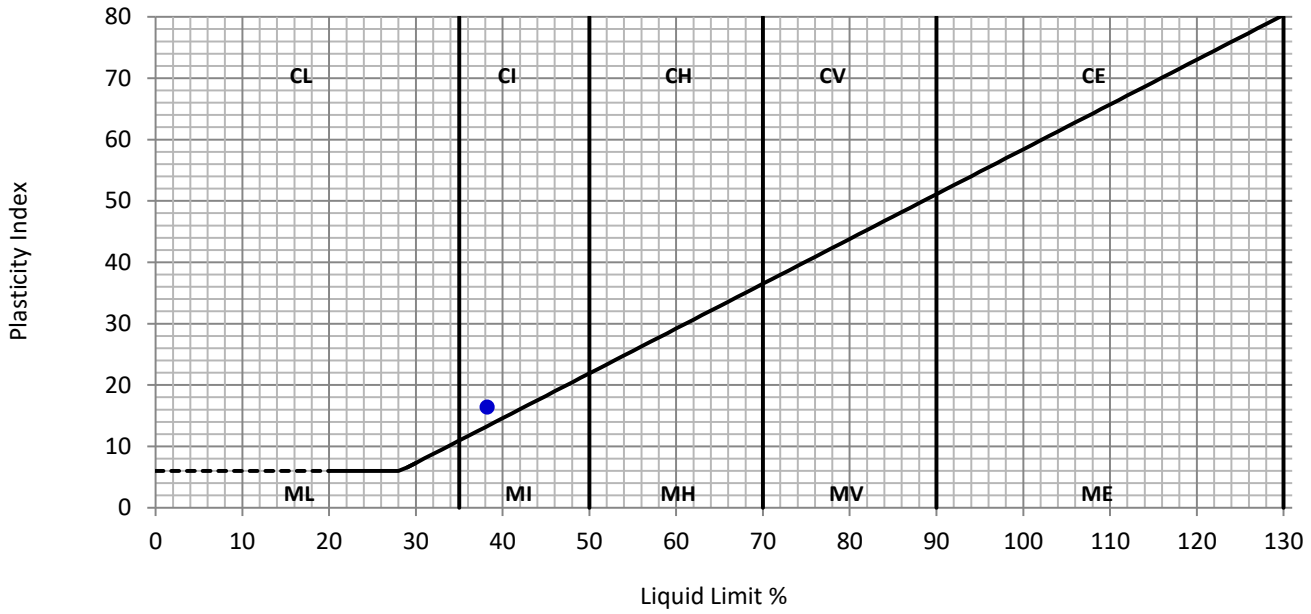
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27927		

Site Ref / Hole ID:	B6	**Depth (m):**	2.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Liquid Limit	38	%
Plastic Limit	22	%
Plasticity Index	16	%

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



Remarks:

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

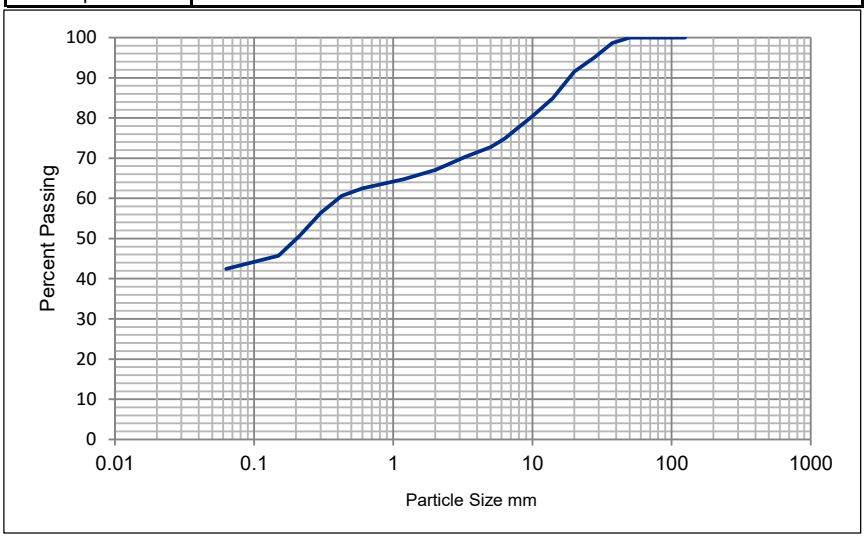
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27927		

Site Ref / Hole ID:	B6	**Depth (m):**	2.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	99
28	95
20	92
14	85
10	80
6.3	75
5.0	73
3.35	70
2.00	67
1.18	65
0.600	62
0.425	61
0.300	56
0.212	51
0.150	46
0.063	42

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	33		
Sand	25	**Dry mass of sample, kg**	
Silt / Clay	42	15.3	N/A

Remarks:

QA Ref.	Apex Testing Solutions		Approver	Date	Fig
BS1377 - 4 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Lester	23/05/2022	**PSD**
			K Lester, Senior Technician		

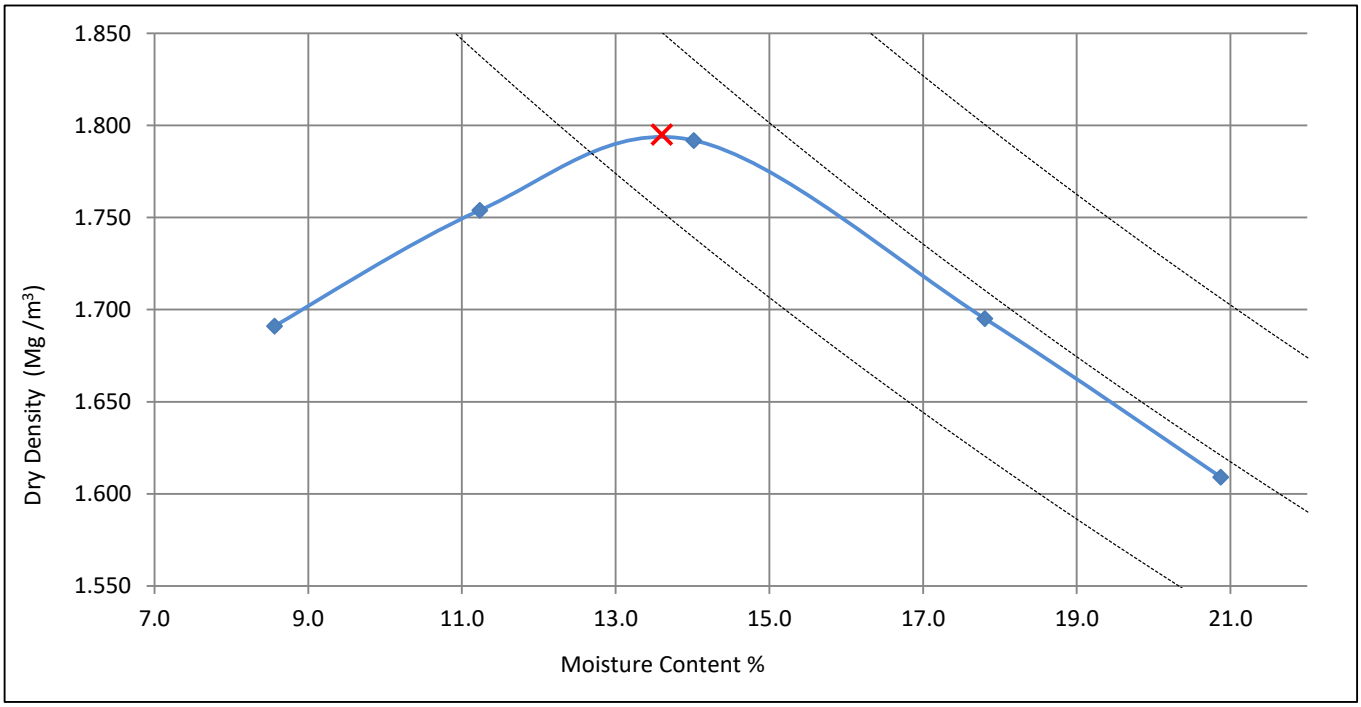
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27927		

Site Ref / Hole ID:	B6	**Depth (m):**	2.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly sandy slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	21 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m³	2.65	assumed
Material > 37.5mm	1	%
Material < 37.5mm > 20mm	7	%

Derived Parameters ×	
Maximum Dry Density, Mg/m³	1.80
Optimum Moisture Content %	13.6

Remarks: Natural Moisture Content 23.0%

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27928		

Site Ref / Hole ID:	B7	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	16 May 2022

Test Results

Moisture Content (%)	28.9

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*K Lester*	23/05/2022	**MC**
			K Lester, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

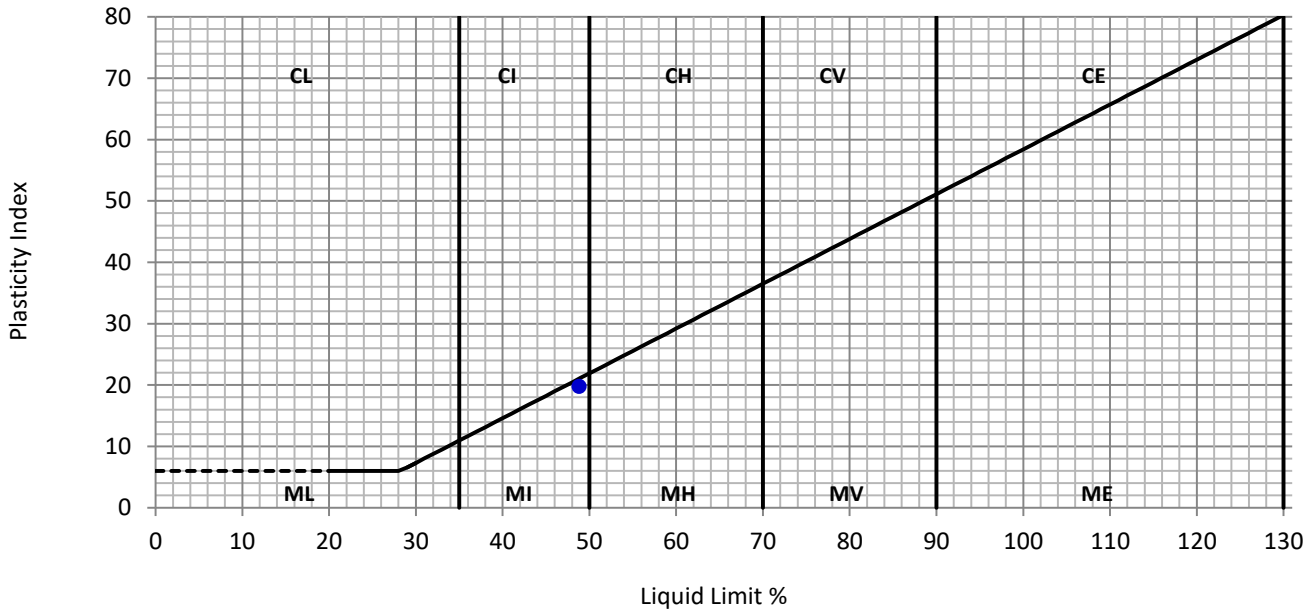
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27928		

Site Ref / Hole ID:	B7	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Liquid Limit	49	%
Plastic Limit	29	%
Plasticity Index	20	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	56	%



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	*K Lester*	23/05/2022	**ATT**
	7771	K Lester, Senior Technician		

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

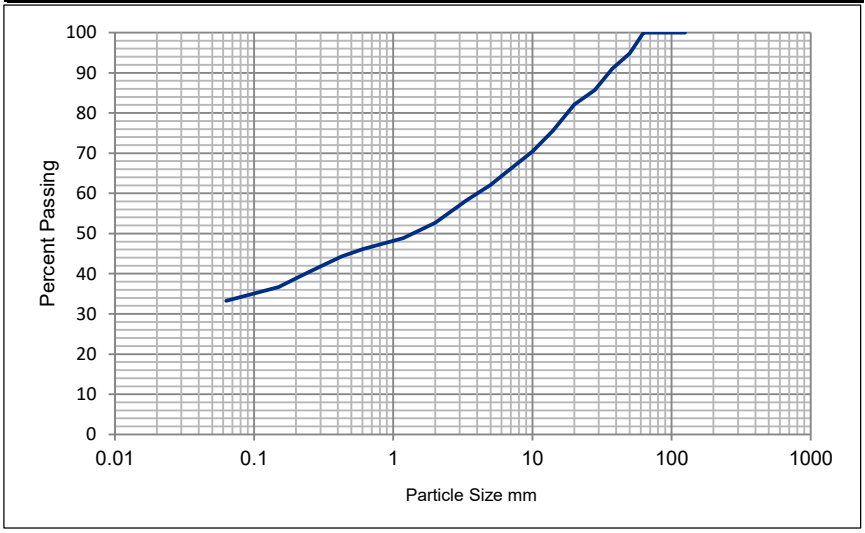
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27928		

Site Ref / Hole ID:	B7	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	95
37.5	91
28	86
20	82
14	76
10	70
6.3	65
5.0	62
3.35	58
2.00	53
1.18	49
0.600	46
0.425	44
0.300	42
0.212	39
0.150	37
0.063	33

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	47		
Sand	19	**Dry mass of sample, kg**	
Silt / Clay	33	15.4	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 K Lester K Lester, Senior Technician	Date 23/05/2022	Fig **PSD**

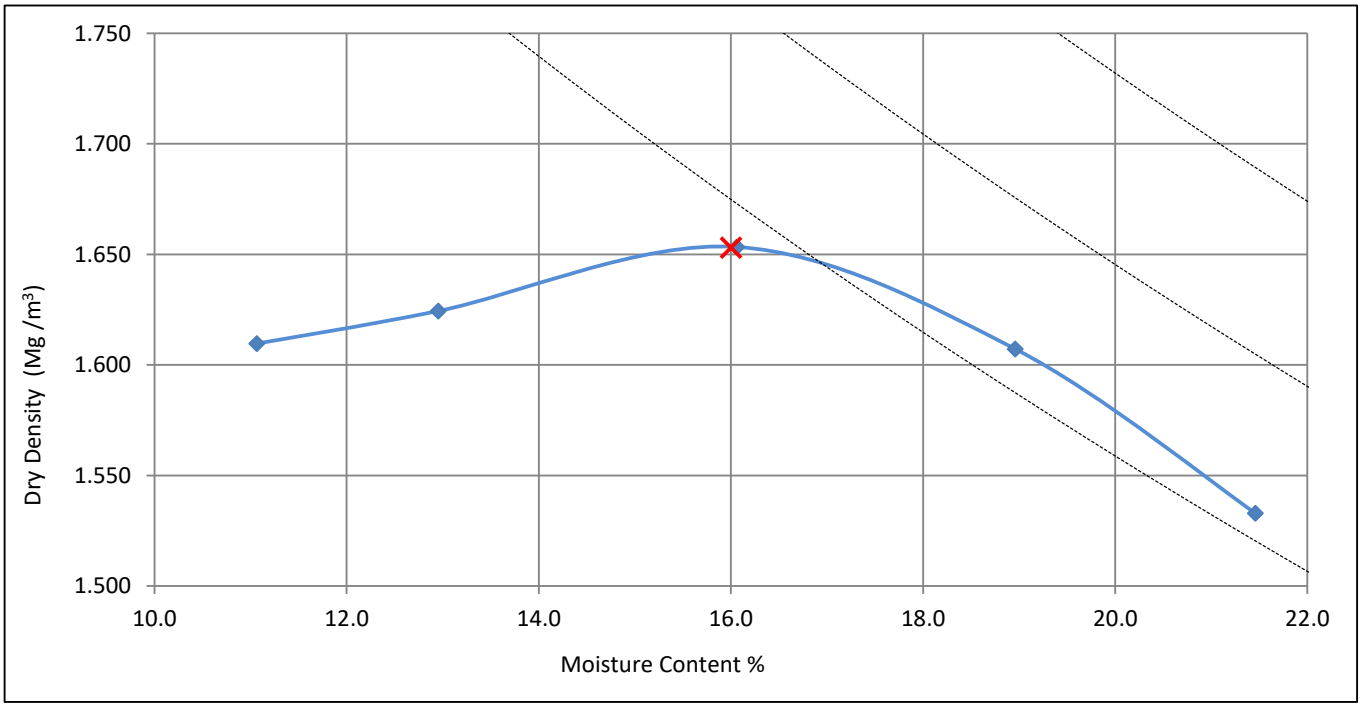
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27928		

Site Ref / Hole ID:	B7	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark Brown sandy very clayey GRAVEL
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	21 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m³	2.65	assumed
Material > 37.5mm	9	%
Material < 37.5mm > 20mm	9	%

Derived Parameters ×	
Maximum Dry Density, Mg/m³	1.65
Optimum Moisture Content %	16.0

Remarks: Natural Moisture Content 28.9%

QA Ref.	Apex Testing Solutions	Approver	Date	Fig.
BS1377 - 4	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ	A Grogan	23/05/2022	COMP
Rev. 2.0	Tel: 01656 746762 Fax: 01656 749096 — 7771	A Grogan, Laboratory Manager		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27929		

Site Ref / Hole ID:	B8	**Depth (m):**	1.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown slightly snady slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	16 May 2022

Test Results

Moisture Content (%)	25.5

Remarks:

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

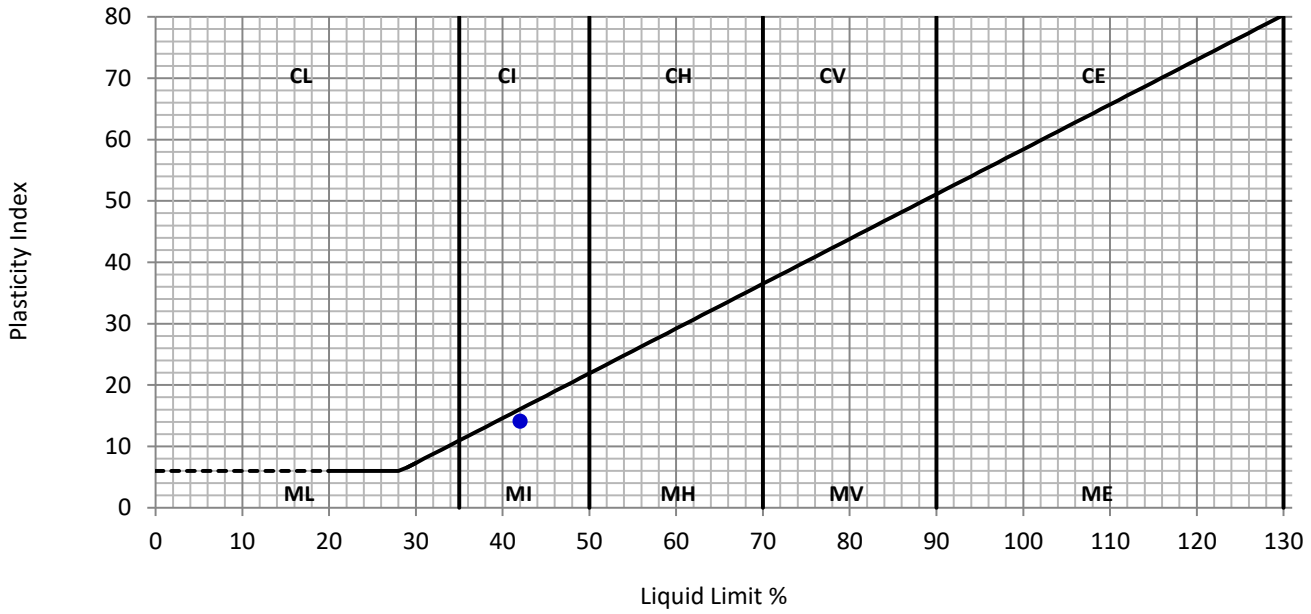
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27929		

Site Ref / Hole ID:	B8	**Depth (m):**	1.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown slightly snady slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Liquid Limit	42	%
Plastic Limit	28	%
Plasticity Index	14	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	48	%



Remarks:

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

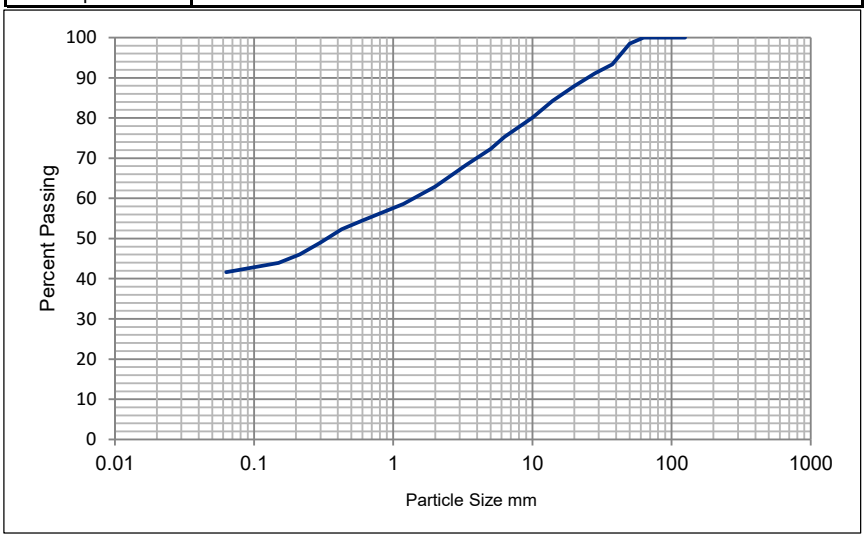
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27929		

Site Ref / Hole ID:	B8	**Depth (m):**	1.00
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown slightly snady slightly gravelly CLAY
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	19 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	98
37.5	93
28	91
20	88
14	84
10	80
6.3	75
5.0	72
3.35	68
2.00	63
1.18	59
0.600	55
0.425	52
0.300	49
0.212	46
0.150	44
0.063	42

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



#######

Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	37		
Sand	21	**Dry mass of sample, kg**	
Silt / Clay	42	17.0	23/05/2022

Remarks:

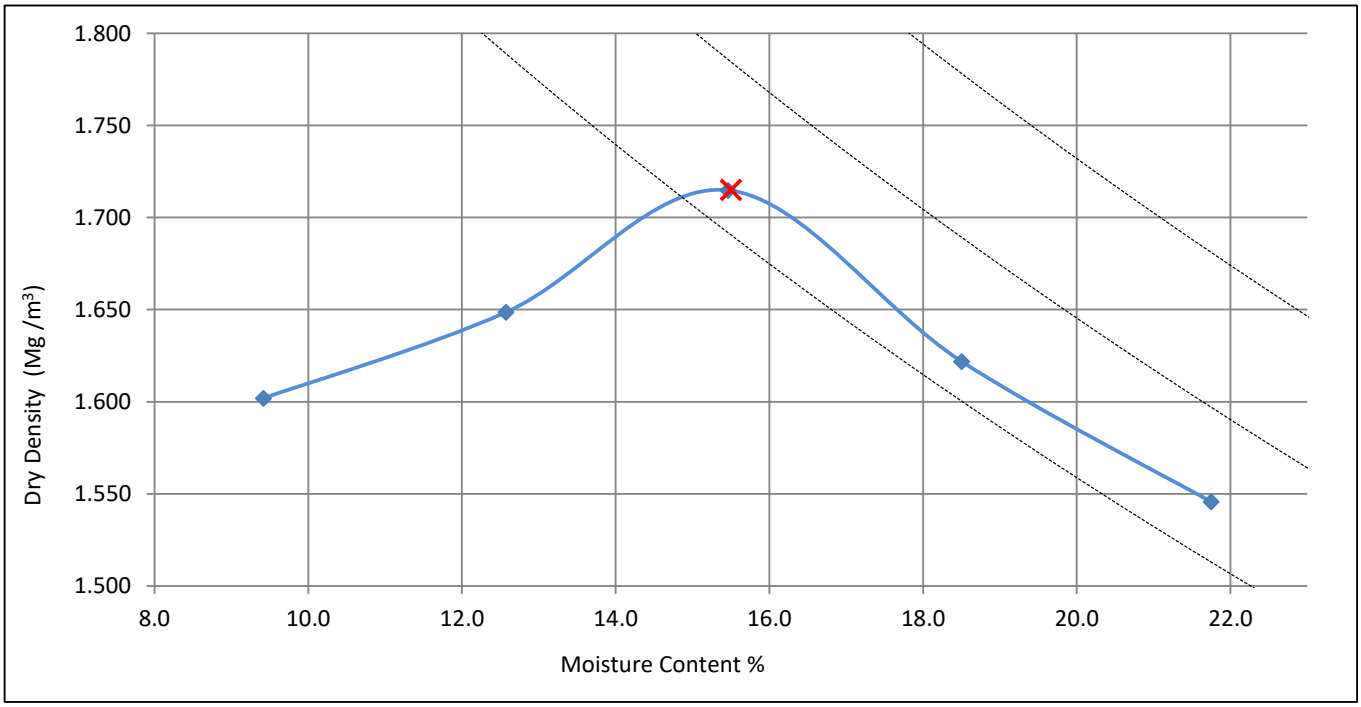
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27929		

Site Ref / Hole ID:	B8	**Depth (m):**	1.00m
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark Brown slightly sandy gravelly CLAY
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	21 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m³	2.65	assumed
Material > 37.5mm	7	%
Material < 37.5mm > 20mm	5	%

Derived Parameters ×	
Maximum Dry Density, Mg/m³	1.72
Optimum Moisture Content %	15.5

Remarks: Natural Moisture Content 25.5%

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig.
BS1377 - 4	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ	*A Grogan*	23/05/2022	**COMP**
Rev. 2.0	Tel: 01656 746762 Fax: 01656 749096 — 7771	A Grogan, Laboratory Manager		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27930		

Site Ref / Hole ID:	B9	**Depth (m):**	1.80
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown very clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	16 May 2022

Test Results

Moisture Content (%)	22.4

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*G Llewellyn*	23/05/2022	**MC**
			G Llewellyn, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

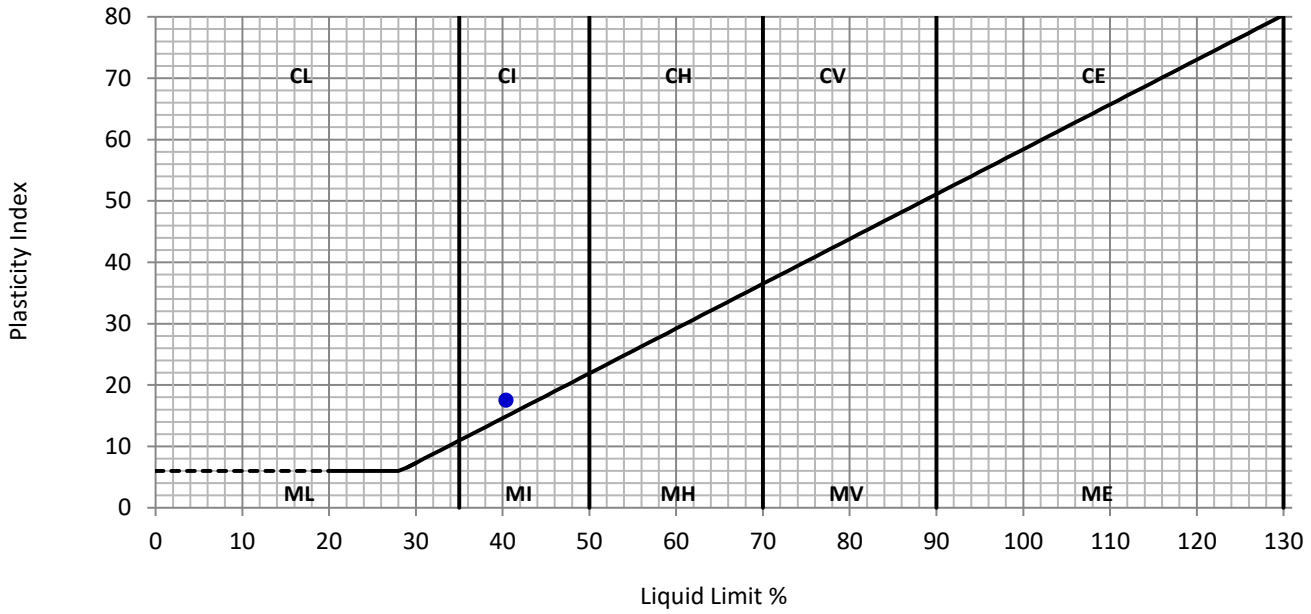
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27930		

Site Ref / Hole ID:	B9	**Depth (m):**	1.80
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown very clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	21 May 2022

Test Results

Liquid Limit	40	%
Plastic Limit	23	%
Plasticity Index	17	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	51	%



Remarks:

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

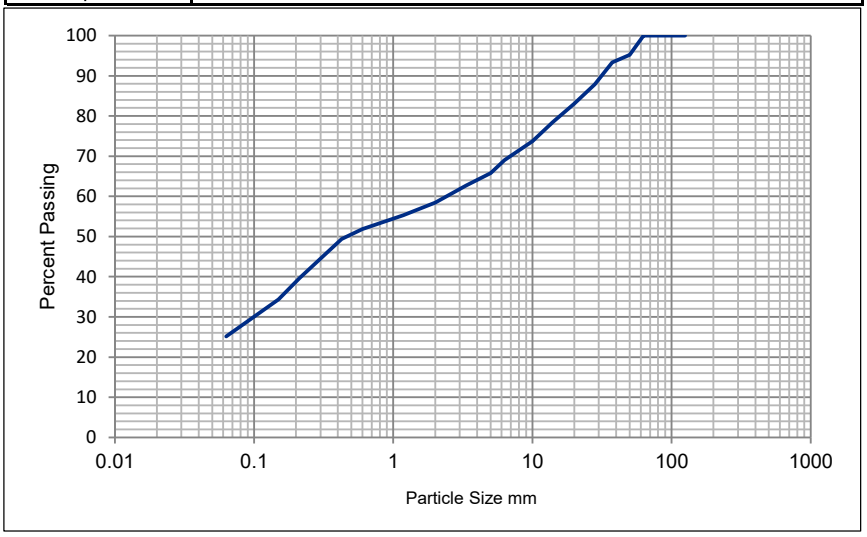
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27930		

Site Ref / Hole ID:	B9	**Depth (m):**	1.80
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark brown very clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	18 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	95
37.5	93
28	88
20	83
14	78
10	74
6.3	69
5.0	66
3.35	63
2.00	58
1.18	55
0.600	52
0.425	49
0.300	45
0.212	40
0.150	34
0.063	25

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	42		
Sand	33	**Dry mass of sample, kg**	
Silt / Clay	25	14.4	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 G Llewellyn	Date 23/05/2022	Fig **PSD**
			G Llewellyn, Senior Technician		

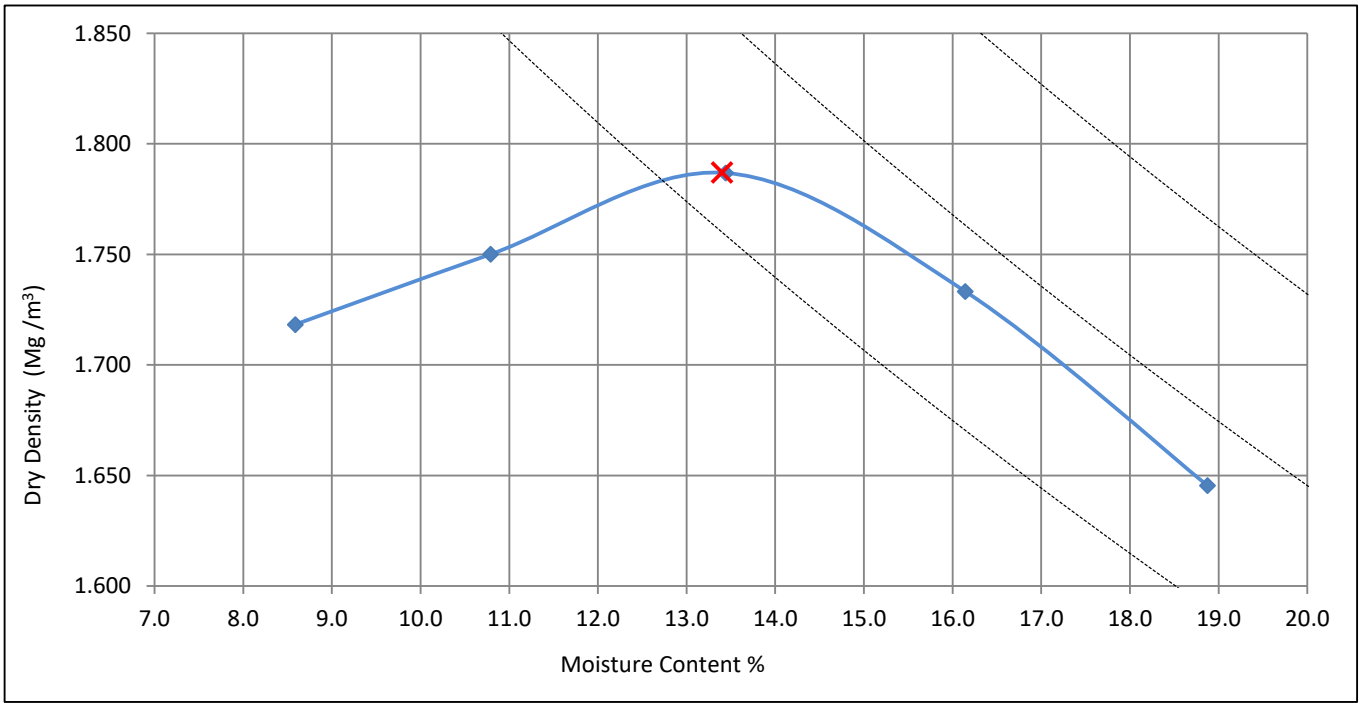
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27930		

Site Ref / Hole ID:	B9	**Depth (m):**	1.80
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark Brown very clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m³	2.65	assumed
Material > 37.5mm	7	%
Material < 37.5mm > 20mm	10	%

Derived Parameters ×	
Maximum Dry Density, Mg/m³	1.79
Optimum Moisture Content %	13.4

Remarks: Natural Moisture Content 22.4%

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27931		

Site Ref / Hole ID:	B10	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark Brown clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	16 May 2022

Test Results

Moisture Content (%)	24.7

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
EN ISO 17892-1:2014 E	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	*K Lester*	23/05/2022	**MC**
			K Lester, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

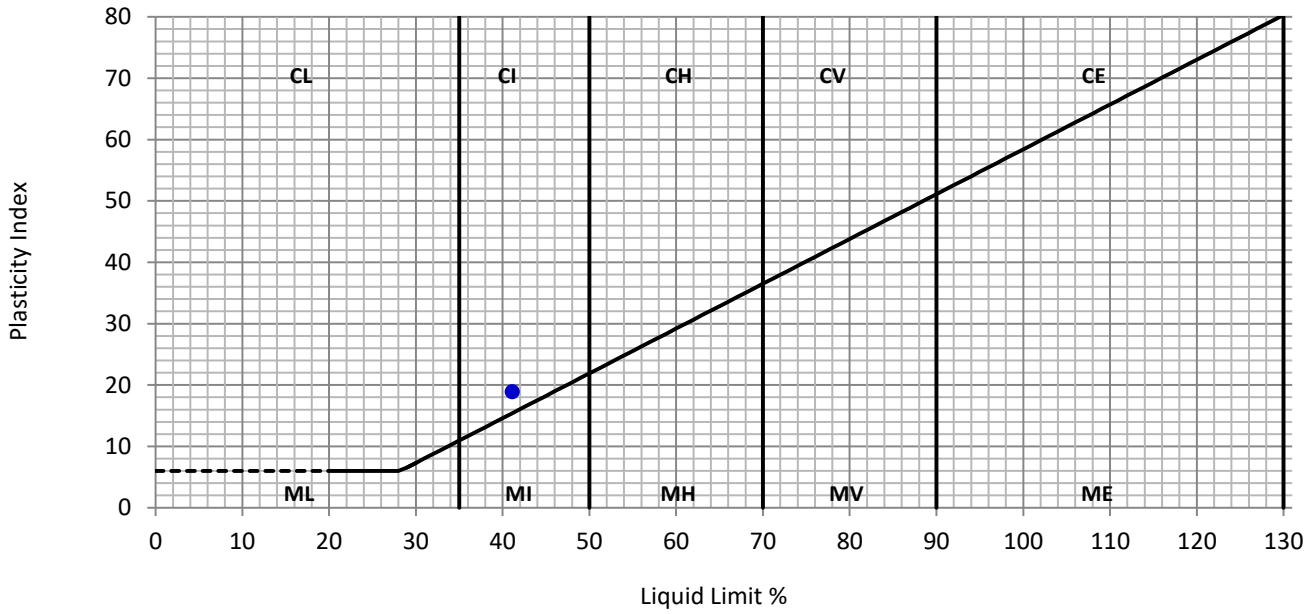
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park Caerphilly	**Address:**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27931		

Site Ref / Hole ID:	B10	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark Brown clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	ISO 17892/BS1377
Date Received:	13 May 2022	**Date Tested:**	21 May 2022

Test Results

Liquid Limit	41	%
Plastic Limit	22	%
Plasticity Index	19	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	64	%



Remarks:

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

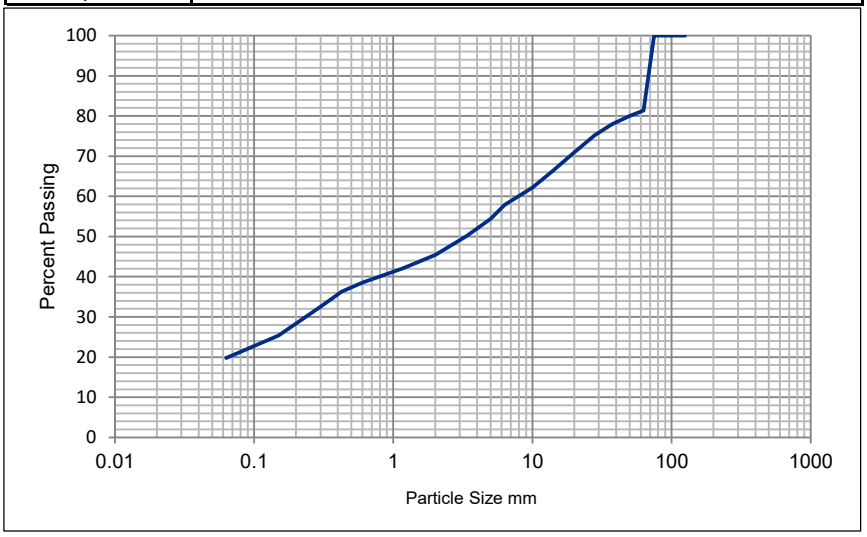
Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	12476 - Phase 1A, Virginia Park C	**Address**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX
ATS Sample No:	27931		

Site Ref / Hole ID:	B10	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark Brown clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Unknown
Date Sampled:	Unknown	**Material Supplier:**	Unknown
Sampled By:	Gary	**Specification:**	**ISO 17892/BS1377**
Date Received:	13 May 2022	**Date Tested:**	23 May 2022

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	81
50	80
37.5	78
28	75
20	71
14	66
10	62
6.3	58
5.0	54
3.35	50
2.00	45
1.18	42
0.600	39
0.425	36
0.300	33
0.212	29
0.150	25
0.063	20

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	19	N/A	D_{60} / D_{10}
Gravel	36		
Sand	26	**Dry mass of sample, kg**	
Silt / Clay	20	15.2	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	7771	Approver K Lester K Lester, Senior Technician	Date 23/05/2022	Fig **PSD**

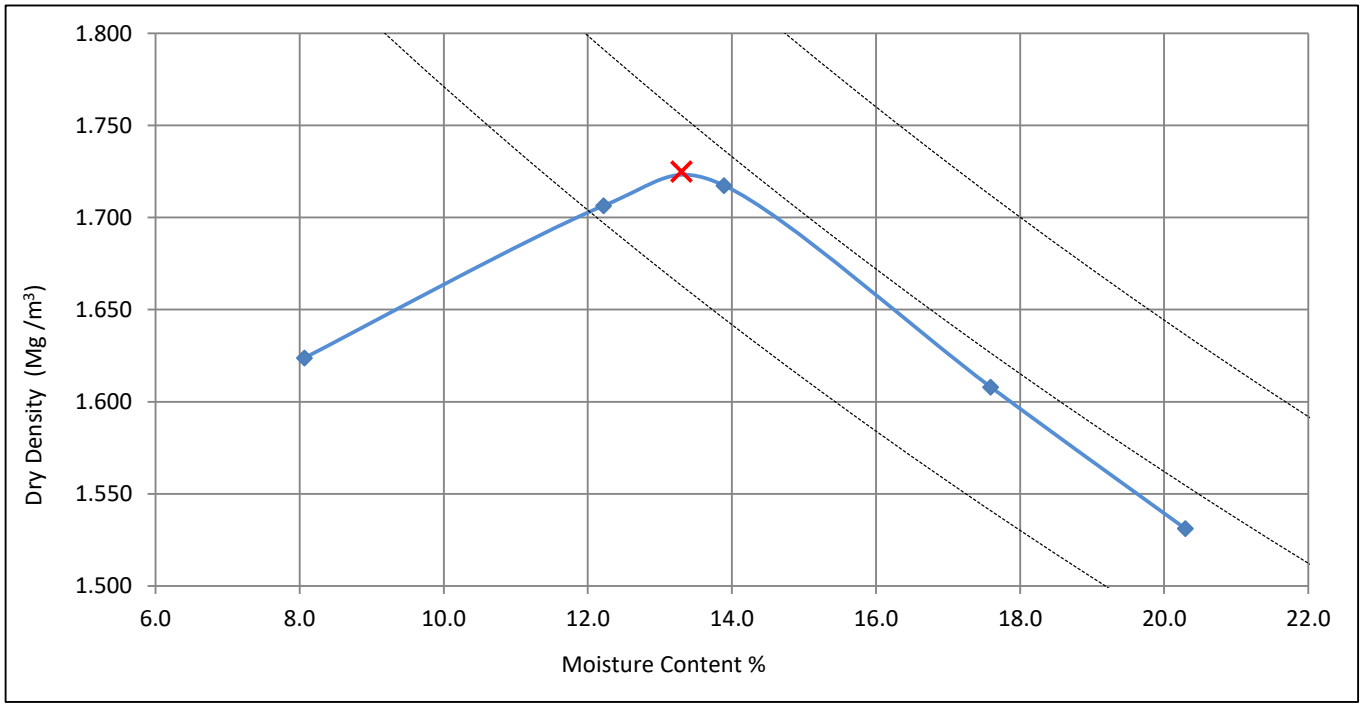
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990: Clause 3.4

Project No:	D22227	**Client:**	Integral Geotechnique
Project Name:	Phase 1A Virginia Park, Caerphilly	**Address:**	Integral House 7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH
ATS Sample No:	27931		

Site Ref / Hole ID:	B10	**Depth (m):**	1.50m
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark Brown clayey very sandy GRAVEL
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	13 May 2022	**Date Tested:**	19 May 2022



Test Method:	BS 1377: part 4: 1990: clause 3.5, 4.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, single specimen tested

Particle Density, Mg/m³	2.45	assumed
Material > 37.5mm	22	%
Material < 37.5mm > 20mm	7	%

Derived Parameters ×	
Maximum Dry Density, Mg/m³	1.73
Optimum Moisture Content %	13.3

Remarks: Natural Moisture Content 24.7%

QA Ref.	Apex Testing Solutions	Approver	Date	Fig.
BS1377 - 4	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ	G Llewellyn	23/05/2022	COMP
Rev. 2.0	Tel: 01656 746762 Fax: 01656 749096 — 7771	G Llewellyn, Senior Technician		

Results Summary

Apex Testing Solutions Limited
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CF33 6BZ

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

Reporting Details		**Key Information**	
Company Name:	IG	**Site Name:**	Phase 1A, Virginia Park(3)
Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 8PH	**Job Number:**	D22227
		Date Received:	21/06/2022
		Job Coordinator:	G Llewellyn
Contact Name:	**Gary**		
Contact Number:			

Item No.	Tests Undertaken	Number of Tests
1.1	Moisture Contents	8

RESULTS ISSUED 22/6/22

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.

SUMMARY OF EARTHWORKS RESULTS

Project No: D22227 Schedule 3

Project Name: Phase 1A Virginia Park

Client: IG

7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 8PH

Site Reference	Sample				SRD	PSD	PL	W	CV	OM	DD	HV	Remarks
	ATS Sample No	Date Sampled	Type	Sampled by	%	Classification	%	%		%	Mg/m3	Kpa	
MC1	28399	21/06/2022	D	GNS				17.7					
MC2	28400	21/06/2022	D	GNS				17.4					
MC3	28401	21/06/2022	D	GNS				15.5					
MC4	28402	21/06/2022	D	GNS				18.6					
MC5	28403	21/06/2022	D	GNS				15.6					
MC6	28404	21/06/2022	D	GNS				17.1					
MC7	28405	21/06/2022	D	GNS				13.9					
MC8	28406	21/06/2022	D	GNS				16.4					

General Notes:

Key :

W	Natural moisture Content	DD	Maximum dry density	PSD	SHW Classification
CV	Moisture Condition value	HV	Hand Vane shear strength	SRD	Relative Compaction
OM	Optimum Moisture content	PL	Plastic Limit		

QA Ref.

Apex Testing Solutions
Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096

Approver: Andrew Grogan
Andrew Grogan, Laboratory Manager

Date: 22/06/2022

Table. **WC1**

APPENDIX C

IN SITU TESTING: PLATE TEST RESULTS

Plate Load Test (Settlement vs Time) - Field Record

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P1	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m^2)	3	**Sheet no.**	1 of 1
Surface description	Compact site won materials		

			Gauge Readings (Settlement mm)			
Loading Stage	**Bearing Pressure (kN/m^2)**	**Time (mins)**	**Gauge 1 (Front Left)**	**Gauge 2 (Back)**	**Gauge 3 (Front Right)**	**Average Settlement (mm)**
1	50	0	0.90	0.90	0.90	0.90
		1	1.14	1.12	1.10	1.12
		2	1.24	1.22	1.19	1.22
		3	1.29	1.27	1.25	1.27
		4	1.34	1.31	1.30	1.32
		5	1.37	1.33	1.34	1.35
		6	1.40	1.37	1.38	1.38
		7	1.44	1.41	1.40	1.42
		8	1.46	1.43	1.43	1.44
		9	1.48	1.43	1.45	1.45
		10	1.50	1.45	1.45	1.47
2	100	11	2.75	2.71	2.79	2.75
		12	2.83	2.81	2.88	2.84
		13	2.87	2.84	2.91	2.87
		14	2.90	2.84	2.95	2.90
		15	2.92	2.84	2.99	2.92
		16	2.95	2.87	3.00	2.94
		17	2.96	2.88	3.01	2.95
		18	2.97	2.88	3.02	2.96
		19	2.98	2.88	3.03	2.96
		20	2.99	2.88	3.04	2.97
3	150	21	4.31	4.19	4.48	4.33
		22	4.39	4.25	4.55	4.40
		23	4.44	4.30	4.60	4.45
		24	4.48	4.36	4.63	4.49
		25	4.50	4.37	4.66	4.51
		26	4.53	4.41	4.69	4.54
		27	4.55	4.43	4.71	4.56
		28	4.57	4.43	4.73	4.58
		29	4.59	4.46	4.74	4.60
		30	4.60	4.48	4.74	4.61
Off Load	0	31	3.00	3.09	2.92	3.00
		32	2.93	3.00	2.84	2.92
		33	2.89	2.98	2.79	2.89
		34	2.85	2.94	2.75	2.85
		35	2.83	2.92	2.74	2.83

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Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P1	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m^2)	3	**Sheet no.**	1 of 2
Surface description	Compact site won materials		

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm)			Average Settlement (mm)	Total Average Settlement (mm)
			Gauge 1	Gauge 2	Gauge 3		
1	50	0	0.90	0.90	0.90	0.90	
		1	1.14	1.12	1.10	1.12	
		2	1.24	1.22	1.19	1.22	
		3	1.29	1.27	1.25	1.27	
		4	1.34	1.31	1.30	1.32	
		5	1.37	1.33	1.34	1.35	
		6	1.40	1.37	1.38	1.38	
		7	1.44	1.41	1.40	1.42	
		8	1.46	1.43	1.43	1.44	
		9	1.48	1.43	1.45	1.45	
		10	1.50	1.45	1.45	1.47	1.47
2	100	11	2.75	2.71	2.79	2.75	
		12	2.83	2.81	2.88	2.84	
		13	2.87	2.84	2.91	2.87	
		14	2.90	2.84	2.95	2.90	
		15	2.92	2.84	2.99	2.92	
		16	2.95	2.87	3.00	2.94	
		17	2.96	2.88	3.01	2.95	
		18	2.97	2.88	3.02	2.96	
		19	2.98	2.88	3.03	2.96	
		20	2.99	2.88	3.04	2.97	2.97
3	150	21	4.31	4.19	4.48	4.33	
		22	4.39	4.25	4.55	4.40	
		23	4.44	4.30	4.60	4.45	
		24	4.48	4.36	4.63	4.49	
		25	4.50	4.37	4.66	4.51	
		26	4.53	4.41	4.69	4.54	
		27	4.55	4.43	4.71	4.56	
		28	4.57	4.43	4.73	4.58	
		29	4.59	4.46	4.74	4.60	
		30	4.60	4.48	4.74	4.61	4.61
Off Load	0	31	3.00	3.09	2.92	3.00	
		32	2.93	3.00	2.84	2.92	
		33	2.89	2.98	2.79	2.89	
		34	2.85	2.94	2.75	2.85	
		35	2.83	2.92	2.74	2.83	2.83

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm)			Average Settlement (mm)	Total Average Settlement (mm)
			Gauge 1	Gauge 2	Gauge 3		

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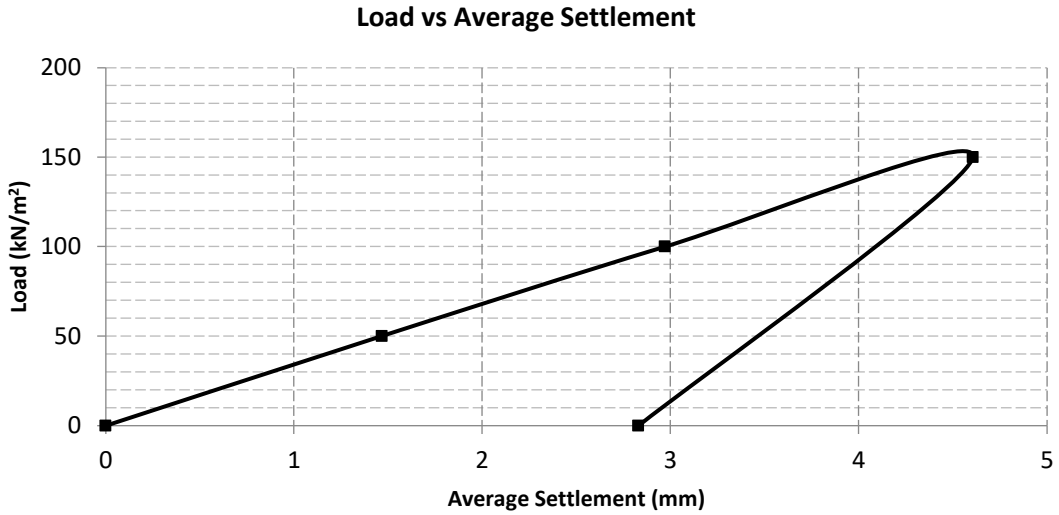
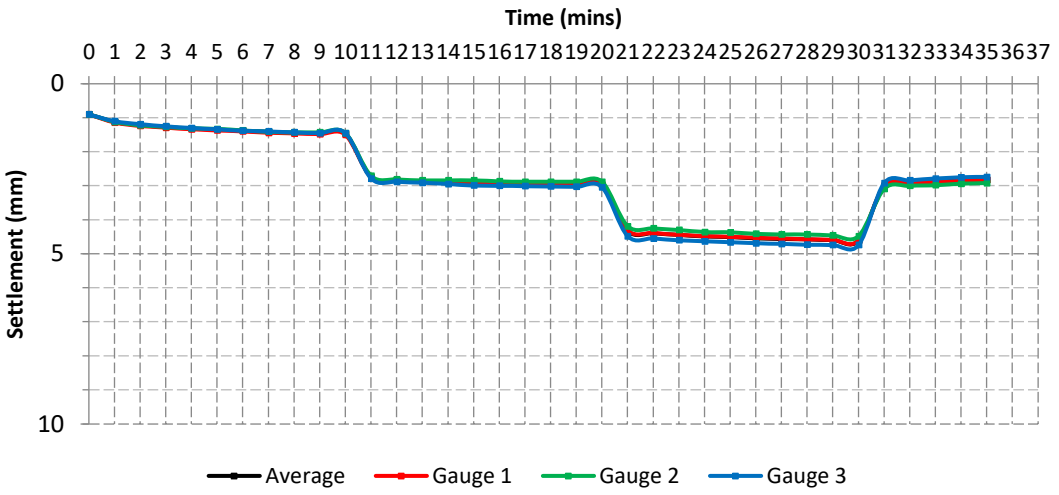
Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P1	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m²)	3	**Sheet no.**	2 of 2
Surface description	Compact site won materials		





Notes: Test carried out in general accordance with BS 1377: Part 9 1990

Plate Load Test (Settlement vs Time) - Field Record

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P2	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m^2)	3	**Sheet no.**	1 of 1
Surface description	Compact site won materials		

			Gauge Readings (Settlement mm)			
Loading Stage	**Bearing Pressure (kN/m^2)**	**Time (mins)**	**Gauge 1 (Front Left)**	**Gauge 2 (Back)**	**Gauge 3 (Front Right)**	**Average Settlement (mm)**
1	50	0	1.42	1.06	0.69	1.06
		1	1.71	1.32	0.87	1.30
		2	1.79	1.40	0.92	1.37
		3	1.84	1.46	0.97	1.42
		4	1.88	1.51	1.00	1.46
		5	1.92	1.56	1.04	1.51
		6	1.95	1.59	1.07	1.54
		7	1.97	1.61	1.08	1.55
		8	1.99	1.63	1.09	1.57
		9	2.00	1.64	1.11	1.58
		10	2.01	1.65	1.12	1.59
2	100	11	4.90	4.32	3.08	4.10
		12	5.12	4.54	3.24	4.30
		13	5.21	4.63	3.31	4.38
		14	5.33	4.75	3.41	4.50
		15	5.37	4.79	3.44	4.53
		16	5.40	4.81	3.46	4.56
		17	5.43	4.84	3.48	4.58
		18	5.45	4.86	3.49	4.60
		19	5.46	4.88	3.51	4.62
		20	5.47	4.88	3.52	4.62
3	150	21	8.45	7.68	5.99	7.37
		22	8.83	8.05	6.31	7.73
		23	8.96	8.18	6.42	7.85
		24	9.07	8.27	6.53	7.96
		25	9.20	8.39	6.61	8.07
		26	9.23	8.45	6.64	8.11
		27	9.27	8.49	6.67	8.14
		28	9.30	8.52	6.70	8.17
		29	9.32	8.54	6.71	8.19
		30	9.34	8.56	6.72	8.21
Off Load	0	31	5.60	5.61	3.62	4.94
		32	5.44	5.47	6.50	5.80
		33	5.33	5.38	6.43	5.71
		34	5.26	5.30	6.37	5.64
		35	5.22	5.26	3.34	4.61

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Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P2	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m^2)	3	**Sheet no.**	1 of 2
Surface description	Compact site won materials		

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm) Gauge 1	Gauge 2	Gauge 3	Average Settlement (mm)	Total Average Settlement (mm)
1	50	0	1.42	1.06	0.69	1.06	
		1	1.71	1.32	0.87	1.30	
		2	1.79	1.40	0.92	1.37	
		3	1.84	1.46	0.97	1.42	
		4	1.88	1.51	1.00	1.46	
		5	1.92	1.56	1.04	1.51	
		6	1.95	1.59	1.07	1.54	
		7	1.97	1.61	1.08	1.55	
		8	1.99	1.63	1.09	1.57	
		9	2.00	1.64	1.11	1.58	
		10	2.01	1.65	1.12	1.59	1.59
2	100	11	4.90	4.32	3.08	4.10	
		12	5.12	4.54	3.24	4.30	
		13	5.21	4.63	3.31	4.38	
		14	5.33	4.75	3.41	4.50	
		15	5.37	4.79	3.44	4.53	
		16	5.40	4.81	3.46	4.56	
		17	5.43	4.84	3.48	4.58	
		18	5.45	4.86	3.49	4.60	
		19	5.46	4.88	3.51	4.62	
		20	5.47	4.88	3.52	4.62	4.62
3	150	21	8.45	7.68	5.99	7.37	
		22	8.83	8.05	6.31	7.73	
		23	8.96	8.18	6.42	7.85	
		24	9.07	8.27	6.53	7.96	
		25	9.20	8.39	6.61	8.07	
		26	9.23	8.45	6.64	8.11	
		27	9.27	8.49	6.67	8.14	
		28	9.30	8.52	6.70	8.17	
		29	9.32	8.54	6.71	8.19	
		30	9.34	8.56	6.72	8.21	8.21
Off Load	0	31	5.60	5.61	3.62	4.94	
		32	5.44	5.47	6.50	5.80	
		33	5.33	5.38	6.43	5.71	
		34	5.26	5.30	6.37	5.64	
		35	5.22	5.26	3.34	4.61	4.61

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm) Gauge 1	Gauge 2	Gauge 3	Average Settlement (mm)	Total Average Settlement (mm)

Intégral Géotechnique

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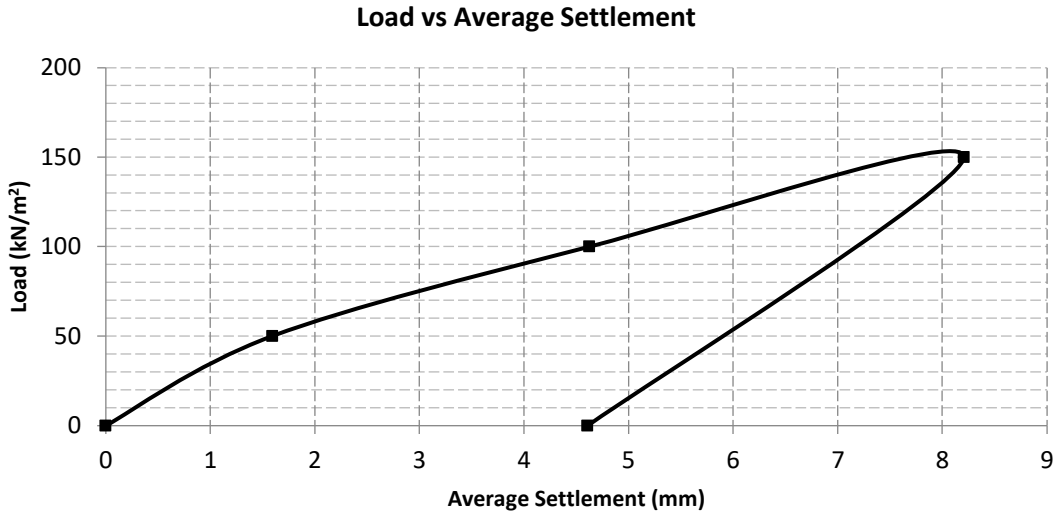
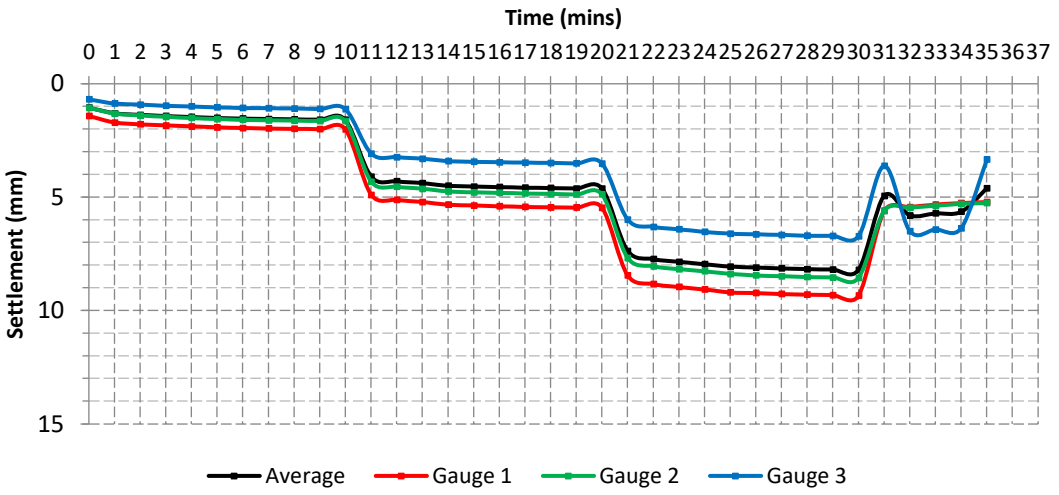
Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P2	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m²)	3	**Sheet no.**	2 of 2
Surface description	Compact site won materials		





Notes: Test carried out in general accordance with BS 1377: Part 9 1990

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Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P5	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m^2)	3	**Sheet no.**	1 of 2
Surface description	Compact site won materials		

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm) Gauge 1	Gauge 2	Gauge 3	Average Settlement (mm)	Total Average Settlement (mm)
1	50	0	0.85	0.47	0.99	0.77	
		1	1.00	0.54	1.11	0.88	
		2	1.02	0.54	1.11	0.89	
		3	1.03	0.54	1.11	0.89	
		4	1.07	0.57	1.11	0.92	
		5	1.07	0.57	1.11	0.92	
		6	1.08	0.57	1.11	0.92	
		7	1.08	0.57	1.11	0.92	0.92
2	100	8	2.49	1.68	2.44	2.20	
		9	2.52	1.71	2.46	2.23	
		10	2.54	1.72	2.48	2.25	
		11	2.57	1.73	2.50	2.27	
		12	2.58	1.75	2.50	2.28	
		13	2.59	1.76	2.51	2.29	
		14	2.60	1.76	2.51	2.29	
		15	2.60	1.76	2.51	2.29	
		16	2.60	1.76	2.51	2.29	
		17	2.60	1.77	2.51	2.29	2.29
3	150	18	4.19	3.18	4.00	3.79	
		19	4.29	3.24	4.10	3.88	
		20	4.33	3.27	4.14	3.91	
		21	4.37	3.31	4.16	3.95	
		22	4.39	3.33	4.18	3.97	
		23	4.40	3.33	4.19	3.97	
		24	4.41	3.34	4.19	3.98	
		25	4.42	3.35	4.19	3.99	
		26	4.42	3.35	4.19	3.99	
		27	4.42	3.36	4.19	3.99	
		28	4.43	3.36	4.19	3.99	
		29	4.43	3.36	4.19	3.99	
		30	4.43	3.37	4.19	4.00	4.00
Off Load	0	31	2.56	1.70	2.25	2.17	
		32	2.45	1.62	2.14	2.07	
		33	2.39	1.57	2.08	2.01	
		34	2.34	1.53	2.02	1.96	
		35	2.31	1.51	2.00	1.94	1.94

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm) Gauge 1	Gauge 2	Gauge 3	Average Settlement (mm)	Total Average Settlement (mm)

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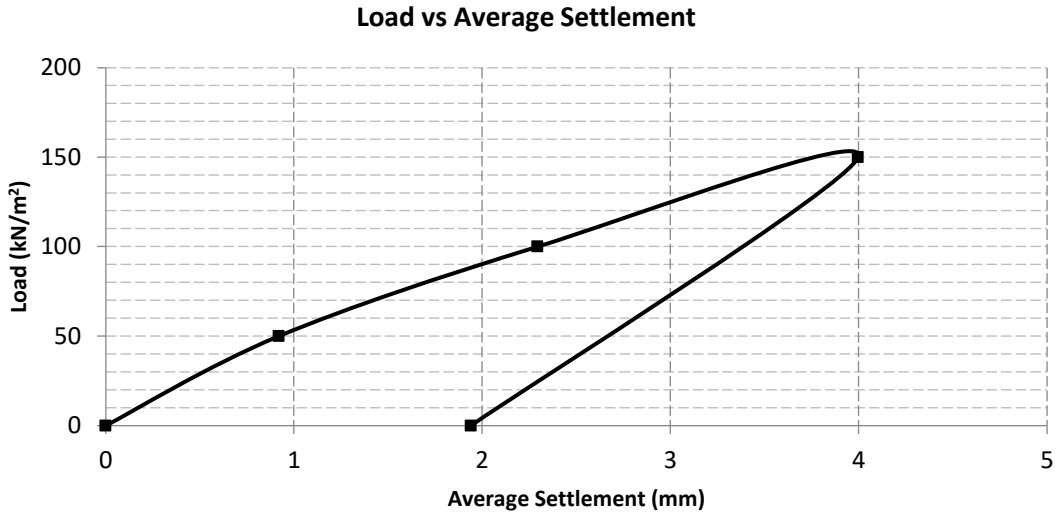
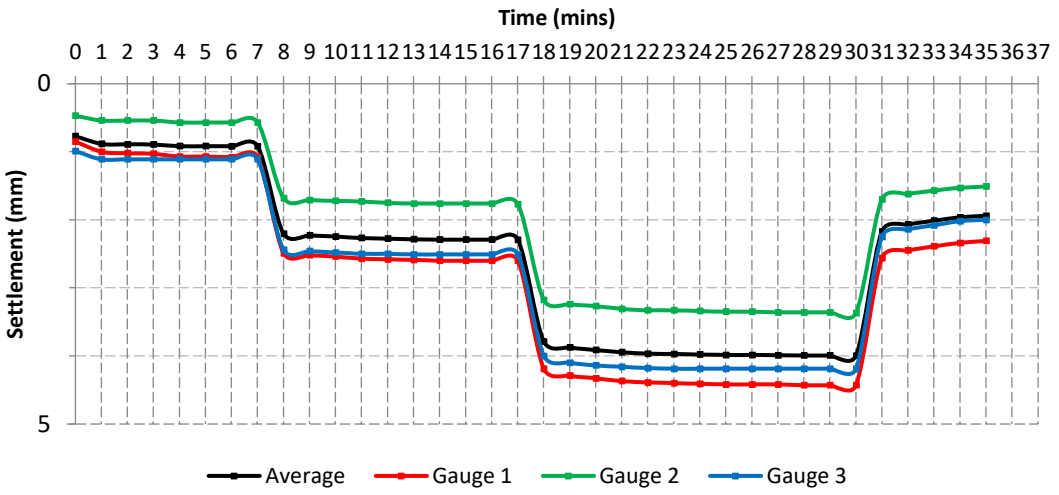
Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P5	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m²)	3	**Sheet no.**	2 of 2
Surface description	Compact site won materials		





Notes: Test carried out in general accordance with BS 1377: Part 9 1990

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Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P6	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m^2)	3	**Sheet no.**	1 of 2
Surface description	Compact site won materials		

			Gauge Readings (Settlement mm)				
Loading Stage	**Bearing Pressure (kN/m^2)**	**Time (mins)**	**Gauge 1**	**Gauge 2**	**Gauge 3**	**Average Settlement (mm)**	**Total Average Settlement (mm)**
1	50	0	1.30	1.69	1.09	1.36	
		1	1.54	1.94	1.37	1.62	
		2	1.62	1.99	1.42	1.68	
		3	1.65	2.02	1.43	1.70	
		4	1.67	2.03	1.45	1.72	
		5	1.68	2.04	1.46	1.73	
		6	1.69	2.05	1.46	1.73	
		7	1.69	2.05	1.46	1.73	
		8	1.70	2.06	1.47	1.74	1.74
2	100	9	4.28	4.85	3.93	4.35	
		10	4.39	4.93	4.03	4.45	
		11	4.43	4.97	4.05	4.48	
		12	4.44	4.99	4.07	4.50	
		13	4.46	5.00	4.08	4.51	
		14	4.48	5.02	4.08	4.53	
		15	4.49	5.02	4.09	4.53	
		16	4.49	5.02	4.10	4.54	
		17	4.50	5.03	4.10	4.54	4.54
3	150	18	7.14	7.77	6.64	7.18	
		19	7.39	8.02	6.85	7.42	
		20	7.45	8.07	6.90	7.47	
		21	7.46	8.08	6.91	7.48	
		22	7.48	8.10	6.93	7.50	
		23	7.50	8.11	6.95	7.52	
		24	7.51	8.12	6.96	7.53	
		25	7.53	8.13	6.97	7.54	
		26	7.54	8.14	6.97	7.55	
		27	7.55	8.15	6.97	7.56	7.56
Off Load	0	28	4.54	4.86	3.95	4.45	
		29	4.41	4.73	3.83	4.32	
		30	4.32	4.62	3.75	4.23	
		31	4.27	4.57	3.69	4.18	
		32	4.23	4.55	3.68	4.15	4.15

			Gauge Readings (Settlement mm)				
Loading Stage	**Bearing Pressure (kN/m^2)**	**Time (mins)**	**Gauge 1**	**Gauge 2**	**Gauge 3**	**Average Settlement (mm)**	**Total Average Settlement (mm)**

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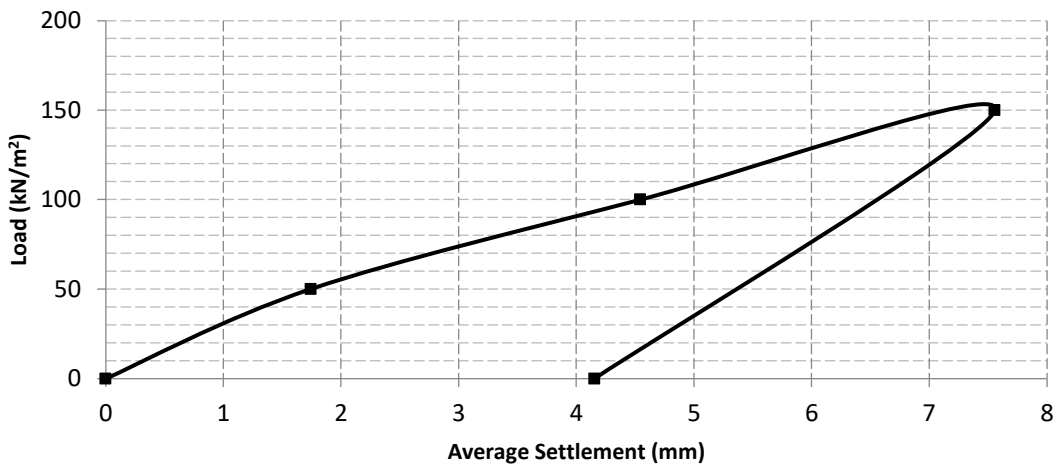
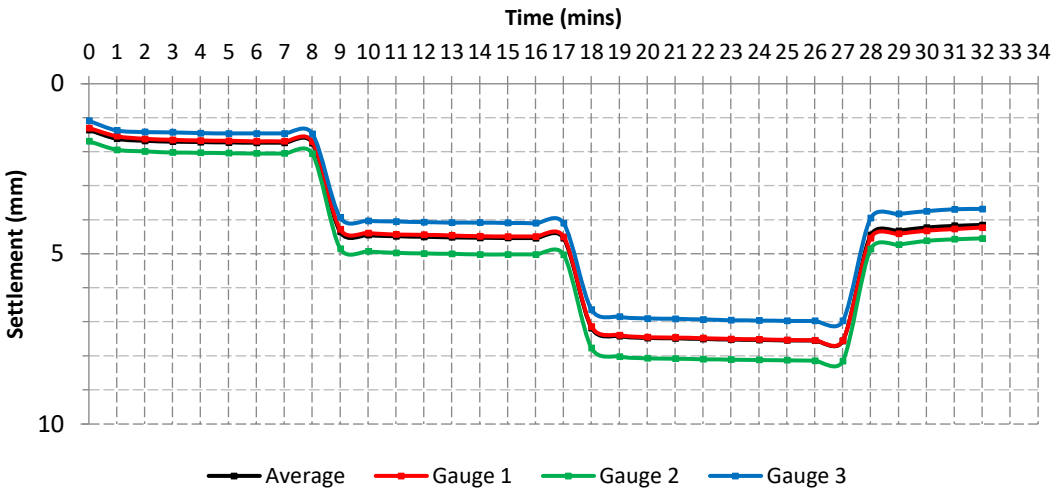
Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P6	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m²)	3	**Sheet no.**	2 of 2
Surface description	Compact site won materials		





Notes: Test carried out in general accordance with BS 1377: Part 9 1990

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Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P8	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m^2)	3	**Sheet no.**	1 of 2
Surface description	Compact site won materials		

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm) Gauge 1	Gauge 2	Gauge 3	Average Settlement (mm)	Total Average Settlement (mm)
1	50	0	1.51	1.53	0.25	1.10	
		1	2.33	2.28	1.01	1.87	
		2	2.37	2.30	1.01	1.89	
		3	2.39	2.33	1.01	1.91	
		4	2.40	2.36	1.01	1.92	
		5	2.42	2.37	1.01	1.93	
		6	2.40	2.38	1.01	1.93	
		7	2.43	2.40	1.01	1.95	1.95
2	100	8	4.10	4.21	1.91	3.41	
		9	4.23	4.36	1.94	3.51	
		10	4.26	4.39	1.94	3.53	
		11	4.29	4.42	2.02	3.58	
		12	4.31	4.44	2.02	3.59	
		13	4.32	4.45	2.02	3.60	
		14	4.33	4.46	2.02	3.60	
		15	4.33	4.47	2.02	3.61	3.61
3	150	16	6.76	6.96	4.31	6.01	
		17	6.97	7.16	4.48	6.20	
		18	7.05	7.23	4.56	6.28	
		19	7.08	7.27	4.58	6.31	
		20	7.11	7.30	4.61	6.34	
		21	7.13	7.32	4.61	6.35	
		22	7.16	7.36	4.66	6.39	
		23	7.17	7.37	4.67	6.40	
		24	7.18	7.38	4.67	6.41	
		25	7.18	7.38	4.67	6.41	6.41
Off Load	0	26	3.75	4.24	1.57	3.19	
		27	3.60	4.12	1.57	3.10	
		28	3.53	4.02	1.57	3.04	
		29	3.32	3.91	0.99	2.74	
		30	3.28	3.87	0.99	2.71	2.71

Loading Stage	Bearing Pressure (kN/m^2)	Time (mins)	Gauge Readings (Settlement mm) Gauge 1	Gauge 2	Gauge 3	Average Settlement (mm)	Total Average Settlement (mm)

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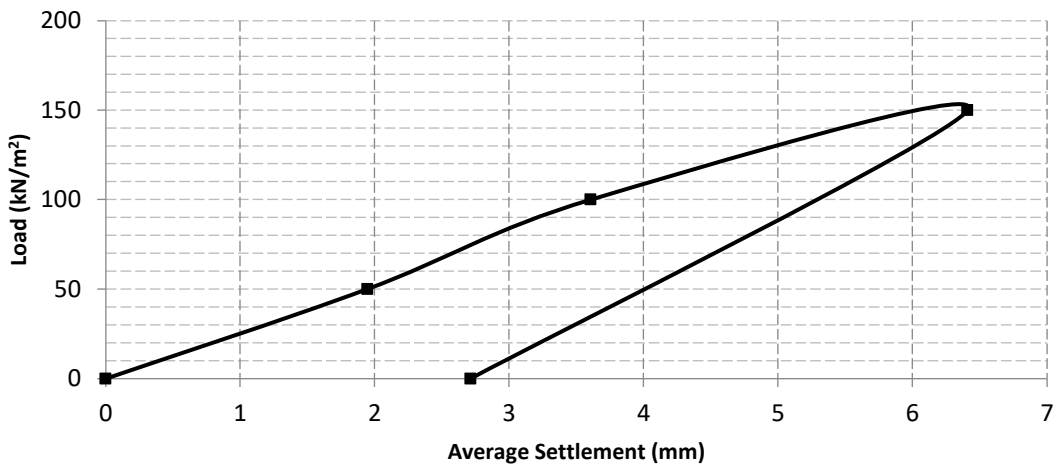
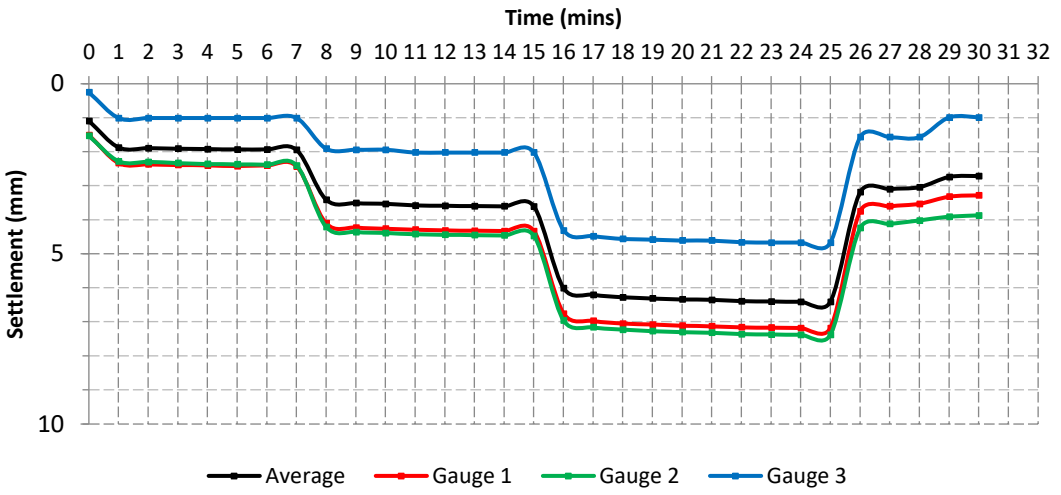
Plate Load Test Result Summary

Job Name and Number	12476 Phase 1A test area, Virginia Park		
Test Reference	P8	**Date**	07.07.22
Test Depth (m bgl)	1.0m below formation	**Operator**	B Barnett
Plate Diameter (mm)	600	**Kentledge**	EC220 EL
Seating Load (kN/m²)	3	**Sheet no.**	2 of 2
Surface description	Compact site won materials		





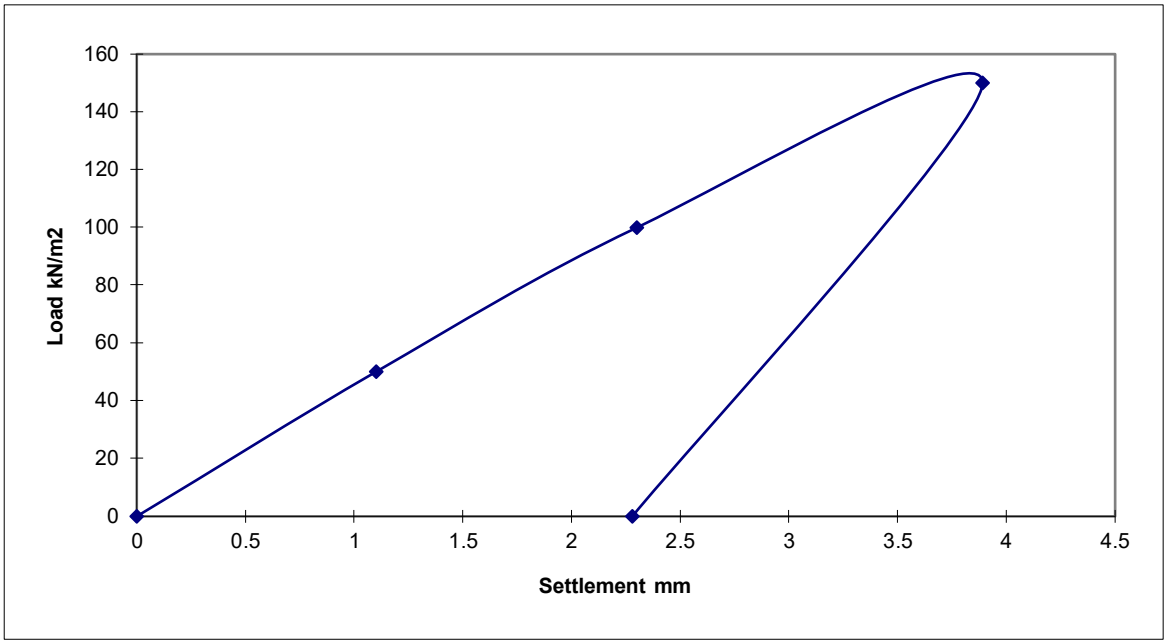
Notes: Test carried out in general accordance with BS 1377: Part 9 1990

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P9	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.10	50	5
2.30	100	13
3.89	150	27
2.28	0	32



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 18.07.22

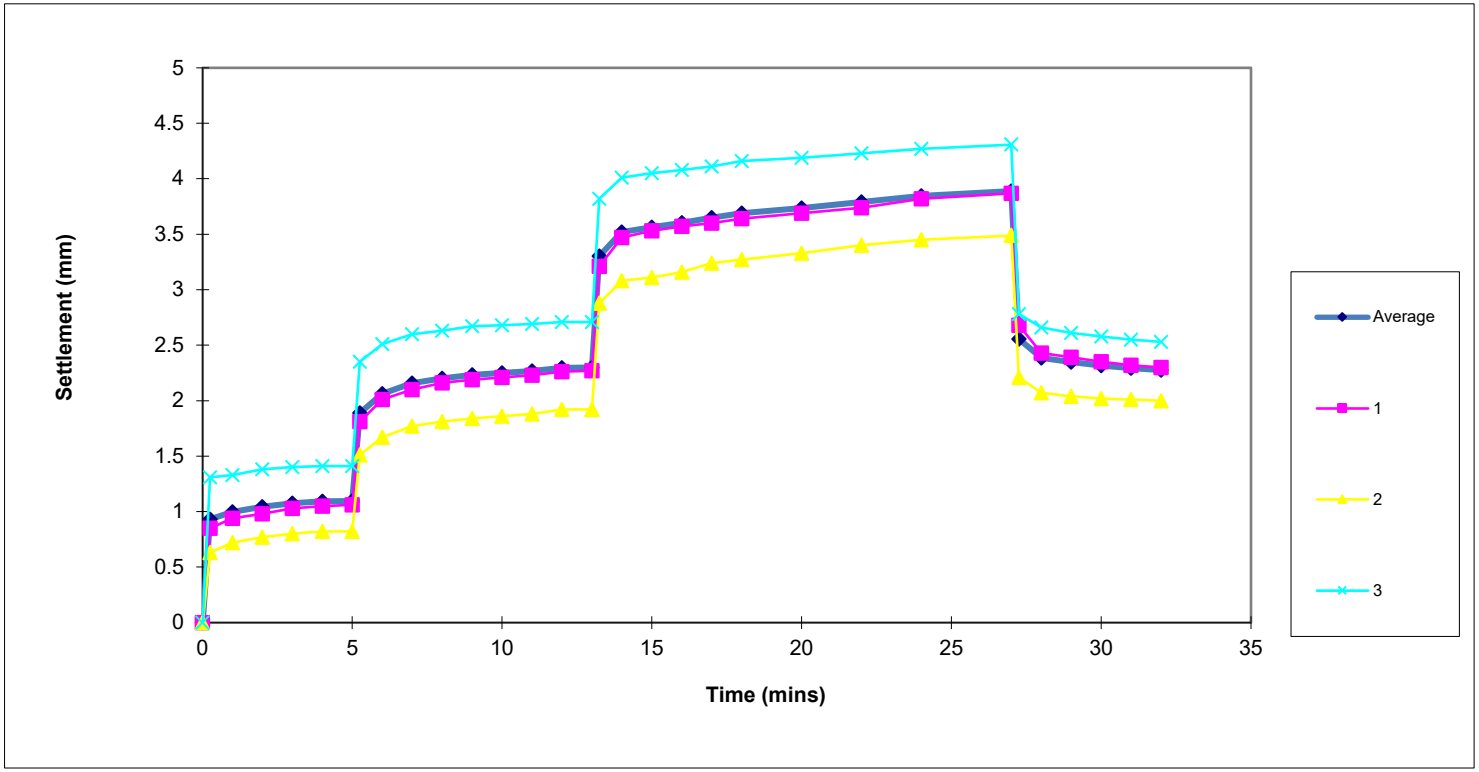
Test Reference: P9 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	0.85	0.63	1.31	0.93
	1	0.94	0.72	1.33	1.00
	2	0.98	0.77	1.38	1.04
	3	1.03	0.80	1.40	1.08
	4	1.05	0.82	1.41	1.09
	5	1.06	0.82	1.41	1.10
100kN/m^2 Load	5.25	1.81	1.51	2.35	1.89
	6	2.01	1.67	2.51	2.06
	7	2.10	1.77	2.60	2.16
	8	2.16	1.81	2.63	2.20
	9	2.19	1.84	2.67	2.23
	10	2.21	1.86	2.68	2.25
	11	2.23	1.88	2.69	2.27
	12	2.26	1.92	2.71	2.30
	13	2.27	1.92	2.71	2.30
150kN/m^2 Load	13.25	3.21	2.88	3.82	3.30
	14	3.47	3.08	4.01	3.52
	15	3.53	3.11	4.05	3.56
	16	3.57	3.16	4.08	3.60
	17	3.60	3.24	4.11	3.65
	18	3.64	3.27	4.16	3.69
	20	3.69	3.33	4.19	3.74
	22	3.74	3.40	4.23	3.79
	24	3.82	3.45	4.27	3.85
	27	3.87	3.49	4.31	3.89
0kN/m^2 Unload	27.25	2.68	2.21	2.78	2.56
	28	2.43	2.07	2.66	2.39
	29	2.39	2.04	2.61	2.35
	30	2.35	2.02	2.58	2.32
	31	2.32	2.01	2.55	2.29
	32	2.30	2.00	2.53	2.28
				]	

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P9



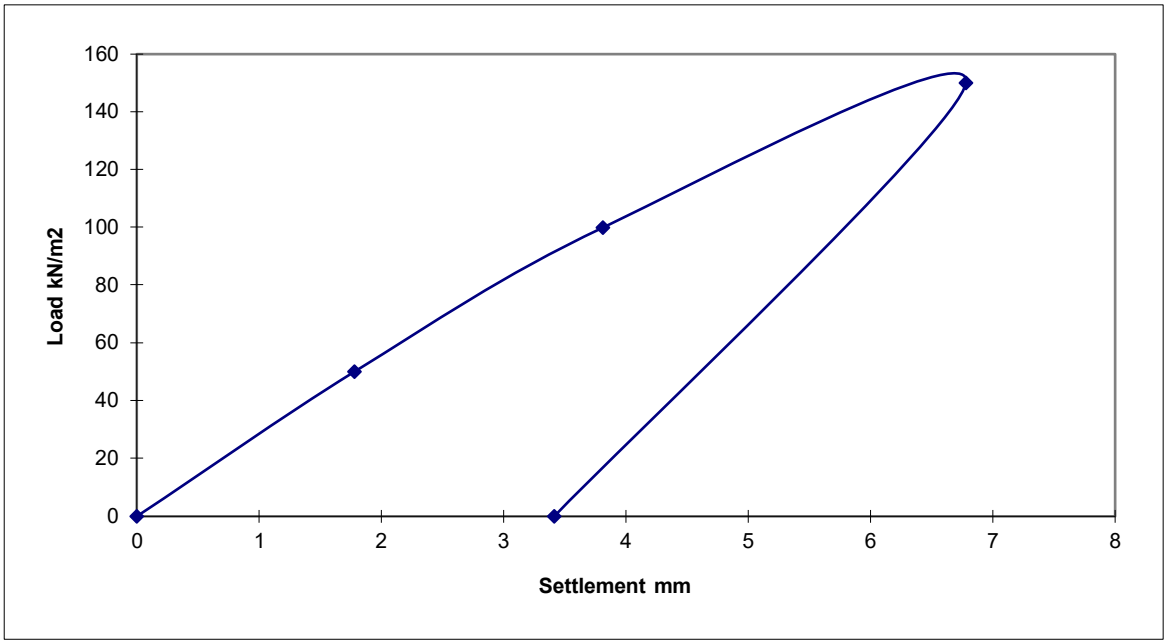
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P10	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.78	50	5
3.81	100	10
6.78	150	33
3.41	0	38



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 18.07.22

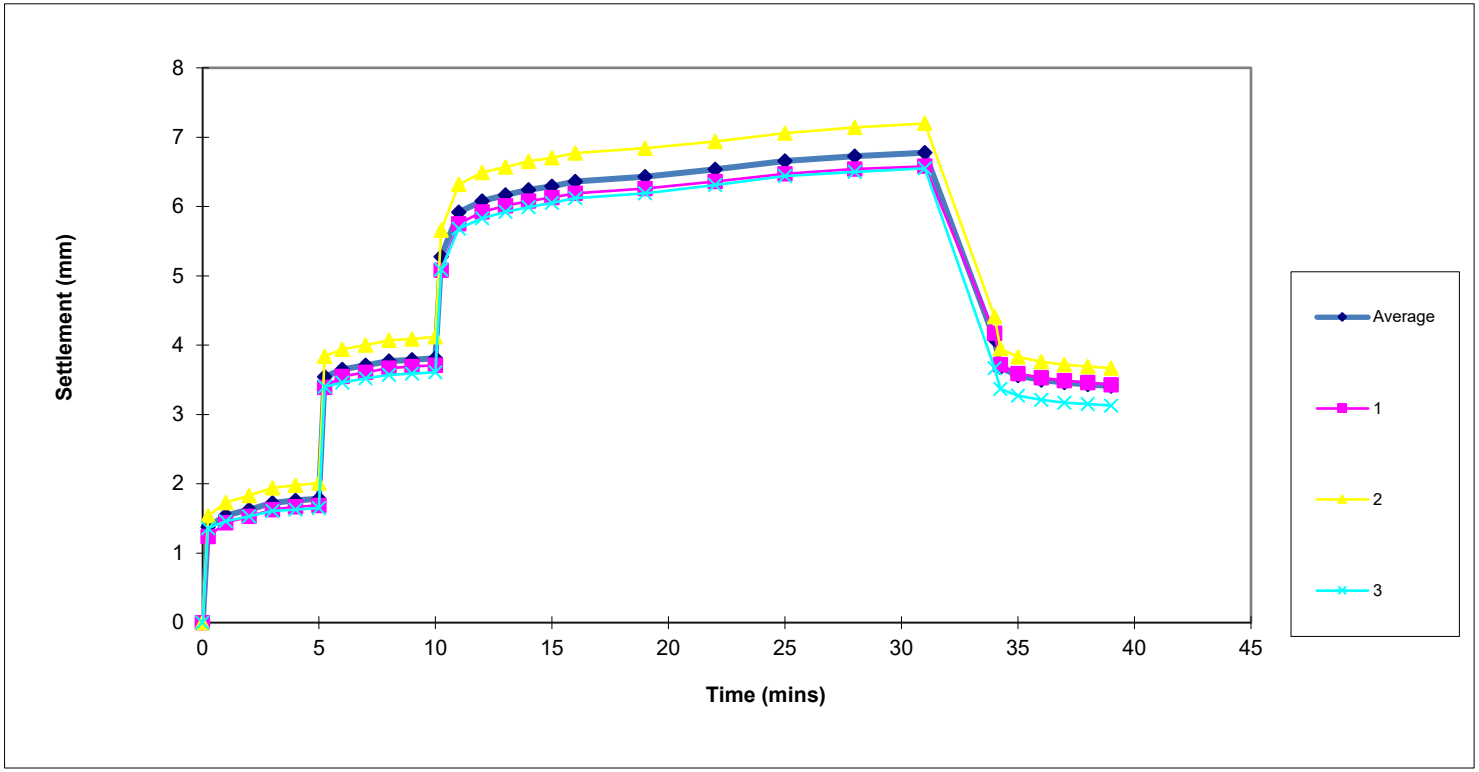
Test Reference: P10 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.24	1.54	1.36	1.38
	1	1.44	1.73	1.46	1.54
	2	1.53	1.83	1.53	1.63
	3	1.63	1.94	1.61	1.73
	4	1.67	1.98	1.63	1.76
	5	1.69	2.01	1.65	1.78
100kN/m^2 Load	5.25	3.39	3.84	3.40	3.54
	6	3.55	3.94	3.46	3.65
	7	3.61	4.00	3.52	3.71
	8	3.67	4.07	3.57	3.77
	9	3.69	4.09	3.59	3.79
	10	3.71	4.12	3.61	3.81
150kN/m^2 Load	10.25	5.08	5.66	5.09	5.28
	11	5.75	6.32	5.68	5.92
	12	5.92	6.49	5.83	6.08
	13	6.01	6.57	5.92	6.17
	14	6.08	6.65	5.99	6.24
	15	6.13	6.70	6.05	6.29
	16	6.19	6.77	6.12	6.36
	19	6.26	6.84	6.19	6.43
	22	6.36	6.94	6.31	6.54
	25	6.47	7.06	6.44	6.66
	28	6.54	7.14	6.50	6.73
	31	6.58	7.20	6.55	6.78
	34	4.17	4.41	3.67	4.08
0kN/m^2 Unload	34.25	3.72	3.95	3.37	3.68
	35	3.59	3.83	3.27	3.56
	36	3.53	3.76	3.21	3.50
	37	3.49	3.72	3.17	3.46
	38	3.46	3.69	3.15	3.43
	39	3.43	3.67	3.13	3.41

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P10



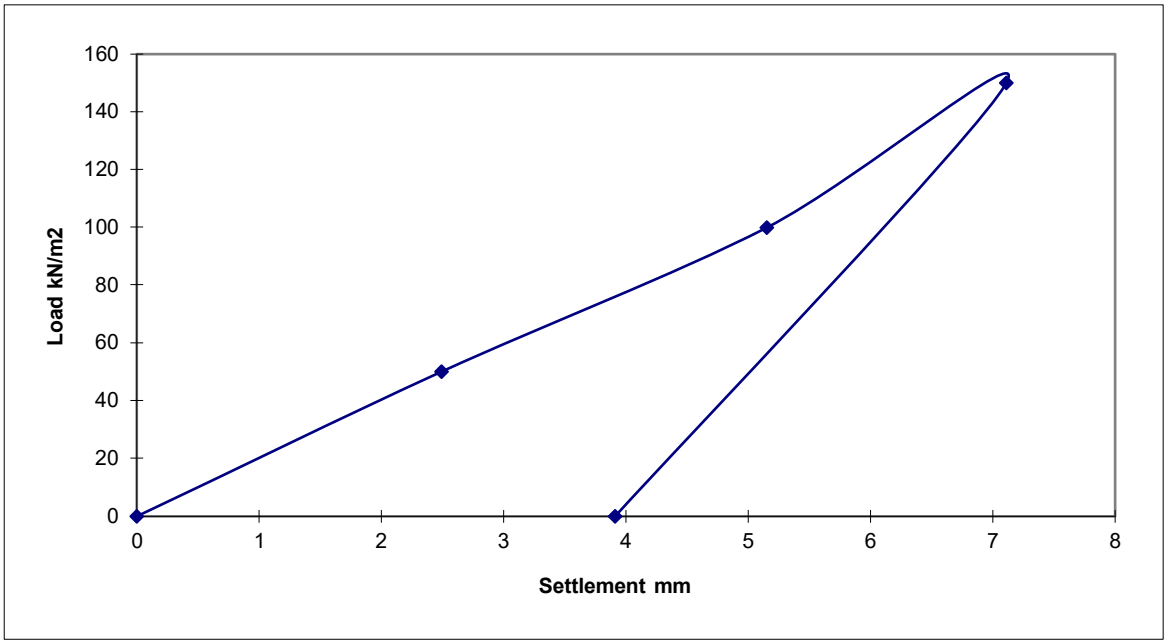
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P11	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.49	50	6
5.15	100	11
7.11	150	17
3.91	0	22



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 18.07.22

Test Reference: P11

Test Depth: Surface

Plate Diameter: 600mm

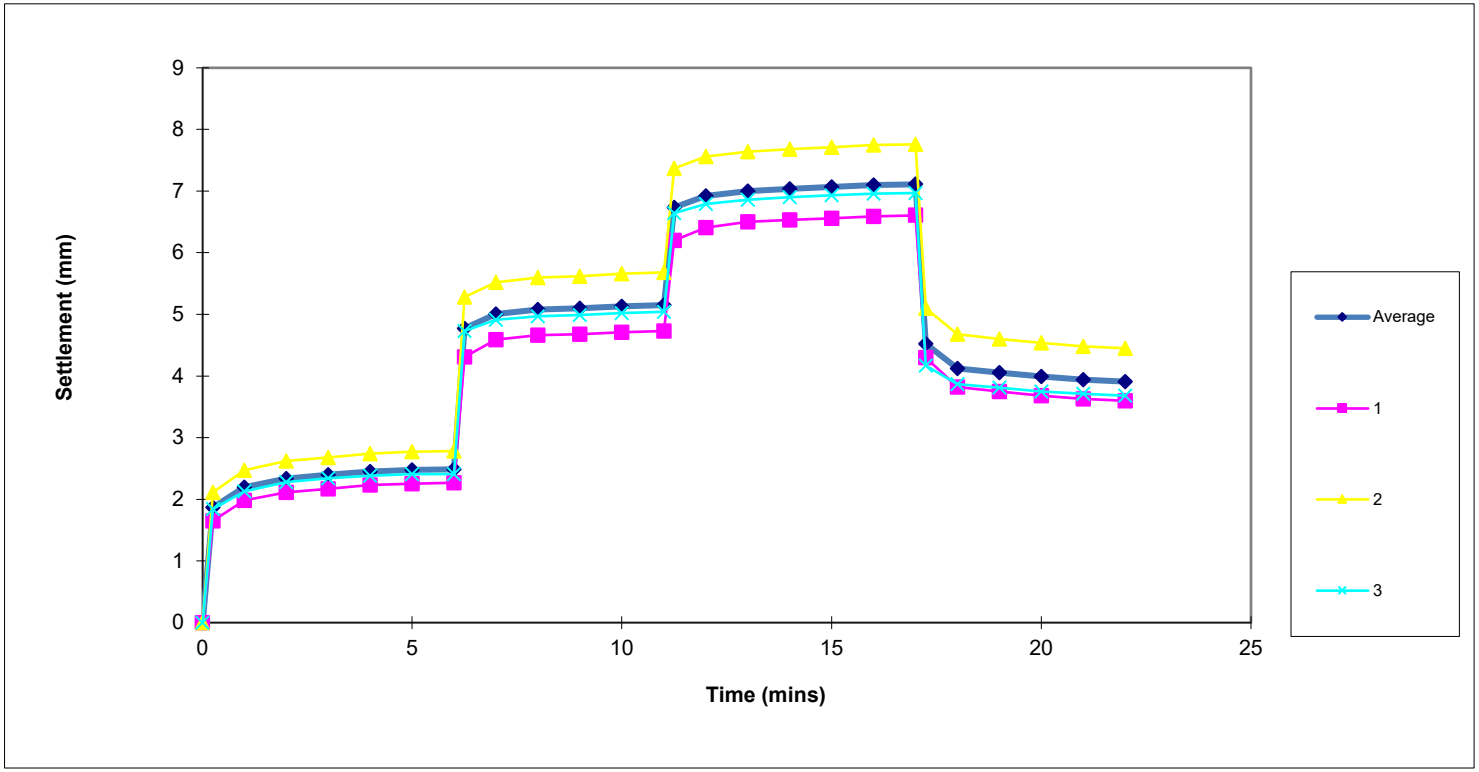
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.65	2.11	1.84	1.87
	1	1.98	2.47	2.13	2.19
	2	2.11	2.62	2.28	2.34
	3	2.17	2.68	2.34	2.40
	4	2.23	2.74	2.38	2.45
	5	2.25	2.77	2.41	2.48
	6	2.27	2.78	2.41	2.49
100kN/m^2 Load	6.25	4.31	5.28	4.73	4.77
	7	4.59	5.52	4.91	5.01
	8	4.66	5.60	4.97	5.08
	9	4.68	5.62	4.99	5.10
	10	4.71	5.66	5.02	5.13
	11	4.73	5.68	5.04	5.15
150kN/m^2 Load	11.25	6.20	7.37	6.64	6.74
	12	6.41	7.56	6.79	6.92
	13	6.50	7.64	6.86	7.00
	14	6.53	7.68	6.90	7.04
	15	6.56	7.71	6.93	7.07
	16	6.59	7.75	6.96	7.10
	17	6.61	7.76	6.97	7.11
0kN/m^2 Unload	17.25	4.30	5.10	4.17	4.52
	18	3.82	4.68	3.87	4.12
	19	3.75	4.60	3.81	4.05
	20	3.68	4.54	3.75	3.99
	21	3.63	4.48	3.71	3.94
	22	3.60	4.45	3.68	3.91

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P11



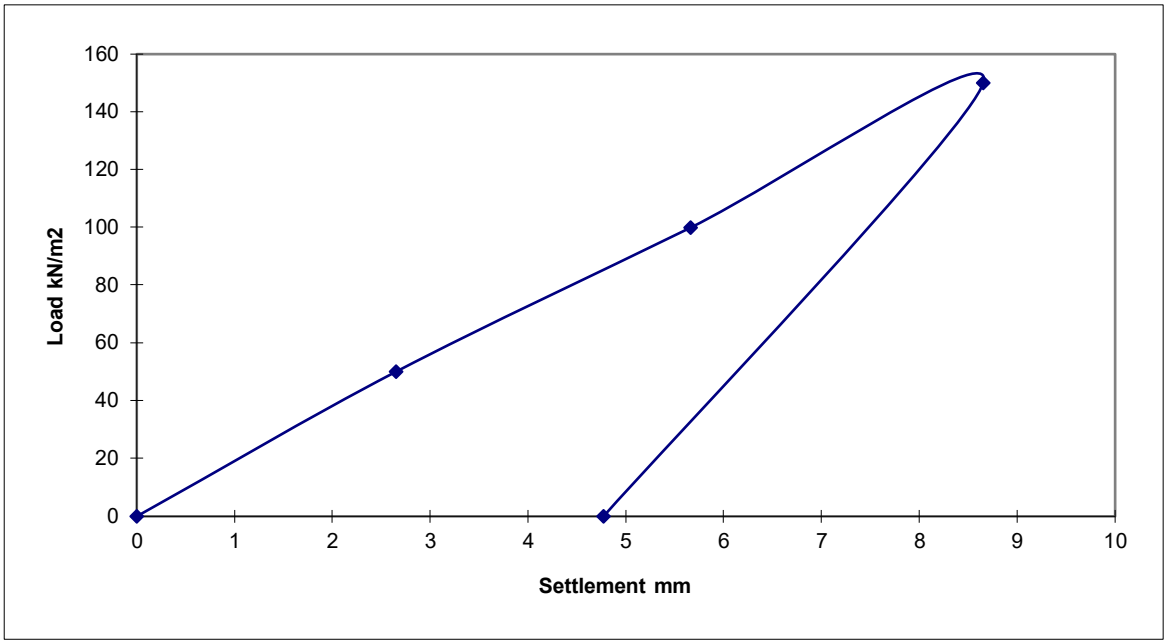
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P12	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.65	50	7
5.66	100	12
8.65	150	20
4.77	0	25



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT:
Virgainia Park, Caerphilly

Date: 18.07.22
Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 18.07.22

Test Reference: P12

Test Depth: Surface

Plate Diameter: 600mm

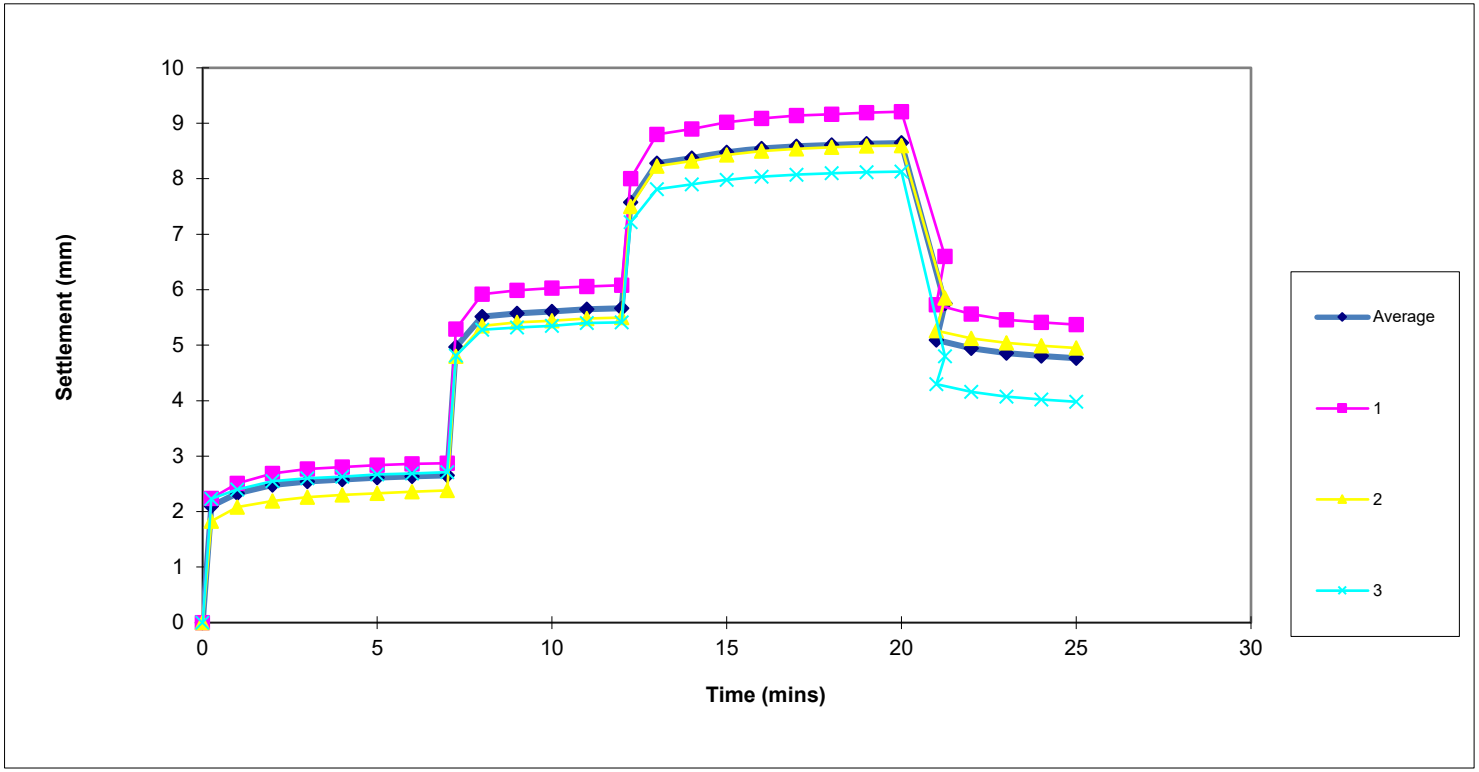
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2	0	0	0	0	0
Load	0.25	2.24	1.83	2.23	2.10
	1	2.51	2.08	2.40	2.33
	2	2.69	2.19	2.55	2.48
	3	2.77	2.26	2.60	2.54
	4	2.80	2.30	2.63	2.58
	5	2.84	2.33	2.67	2.61
	6	2.86	2.36	2.69	2.64
	7	2.87	2.38	2.71	2.65
100kN/m^2	7.25	5.29	4.80	4.81	4.97
Load	8	5.92	5.35	5.28	5.52
	9	5.99	5.41	5.32	5.57
	10	6.03	5.44	5.35	5.61
	11	6.06	5.48	5.40	5.65
	12	6.08	5.50	5.41	5.66
150kN/m^2	12.25	8.00	7.50	7.22	7.57
Load	13	8.80	8.23	7.81	8.28
	14	8.90	8.32	7.90	8.37
	15	9.02	8.43	7.98	8.48
	16	9.09	8.50	8.04	8.54
	17	9.14	8.54	8.07	8.58
	18	9.16	8.57	8.10	8.61
	19	9.19	8.59	8.12	8.63
	20	9.21	8.60	8.13	8.65
0kN/m^2	21.25	6.60	5.85	4.80	5.75
Unload	21	5.73	5.26	4.30	5.10
	22	5.56	5.12	4.16	4.95
	23	5.46	5.04	4.07	4.86
	24	5.41	4.99	4.02	4.81
	25	5.37	4.95	3.98	4.77

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P12



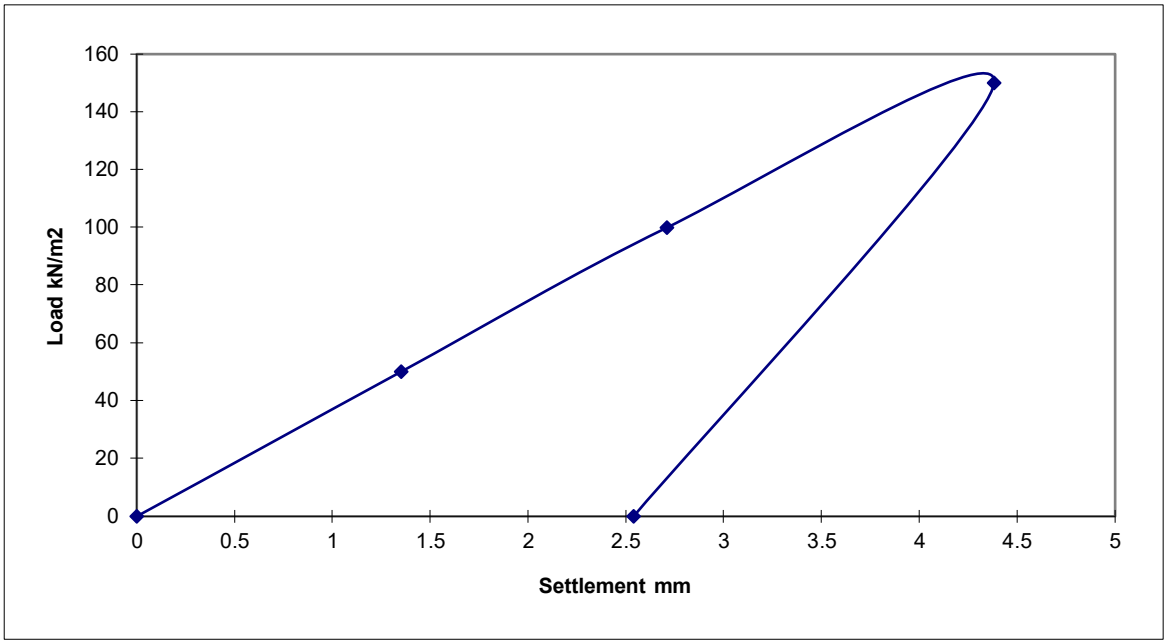
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P13	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.35	50	6
2.71	100	11
4.38	150	18
2.54	0	23



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 18.07.22

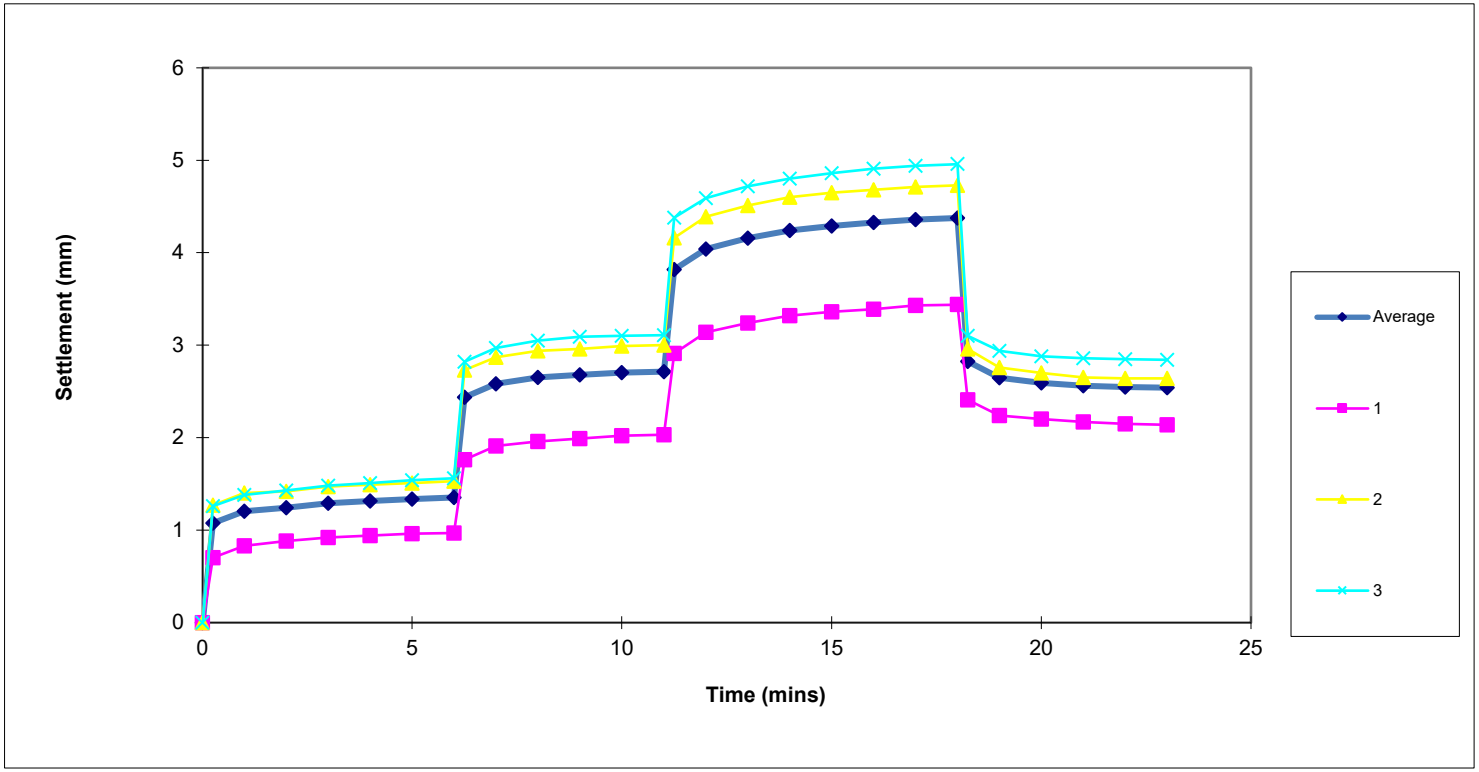
Test Reference: P13 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	0.70	1.27	1.26	1.08
	1	0.83	1.40	1.38	1.20
	2	0.88	1.42	1.43	1.24
	3	0.92	1.47	1.48	1.29
	4	0.94	1.49	1.51	1.31
	5	0.96	1.51	1.54	1.34
	6	0.97	1.53	1.56	1.35
100kN/m^2 Load	6.25	1.76	2.73	2.82	2.44
	7	1.91	2.87	2.97	2.58
	8	1.96	2.94	3.05	2.65
	9	1.99	2.96	3.09	2.68
	10	2.02	2.99	3.10	2.70
	11	2.03	3.00	3.11	2.71
150kN/m^2 Load	11.25	2.91	4.16	4.38	3.82
	12	3.14	4.39	4.59	4.04
	13	3.24	4.51	4.72	4.16
	14	3.32	4.60	4.80	4.24
	15	3.36	4.65	4.86	4.29
	16	3.39	4.68	4.91	4.33
	17	3.43	4.71	4.94	4.36
	18	3.44	4.73	4.96	4.38
0kN/m^2 Unload	18.25	2.41	2.96	3.10	2.82
	19	2.24	2.76	2.94	2.65
	20	2.20	2.70	2.88	2.59
	21	2.17	2.65	2.86	2.56
	22	2.15	2.64	2.85	2.55
	23	2.14	2.64	2.84	2.54

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P13



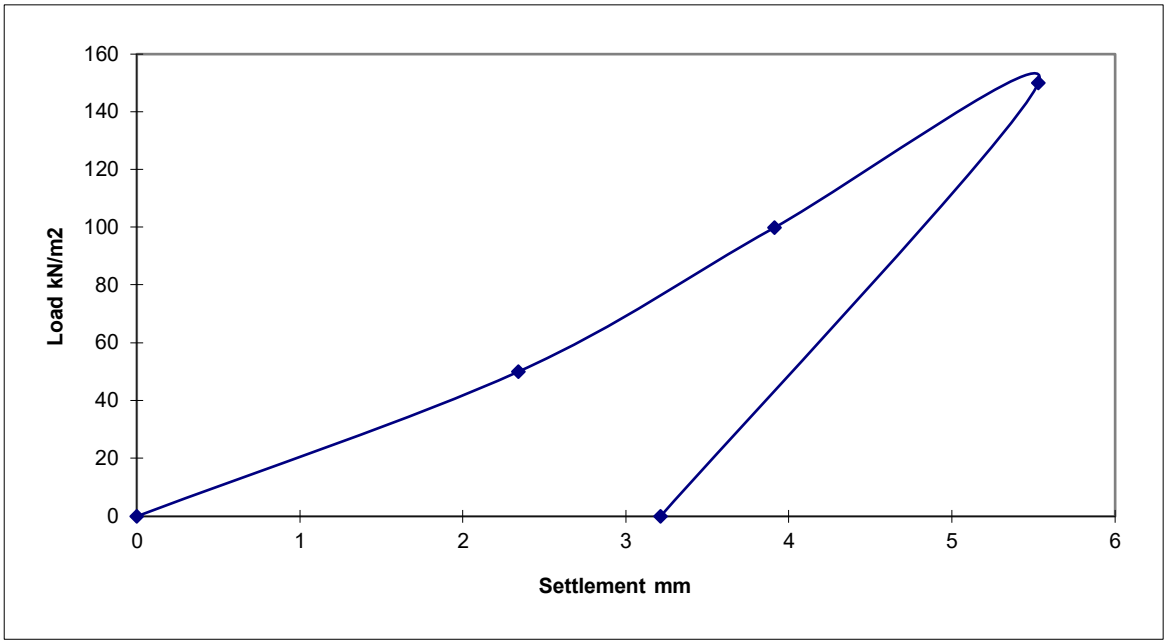
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P14	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.34	50	5
3.91	100	11
5.53	150	17
3.21	0	22



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 18.07.22

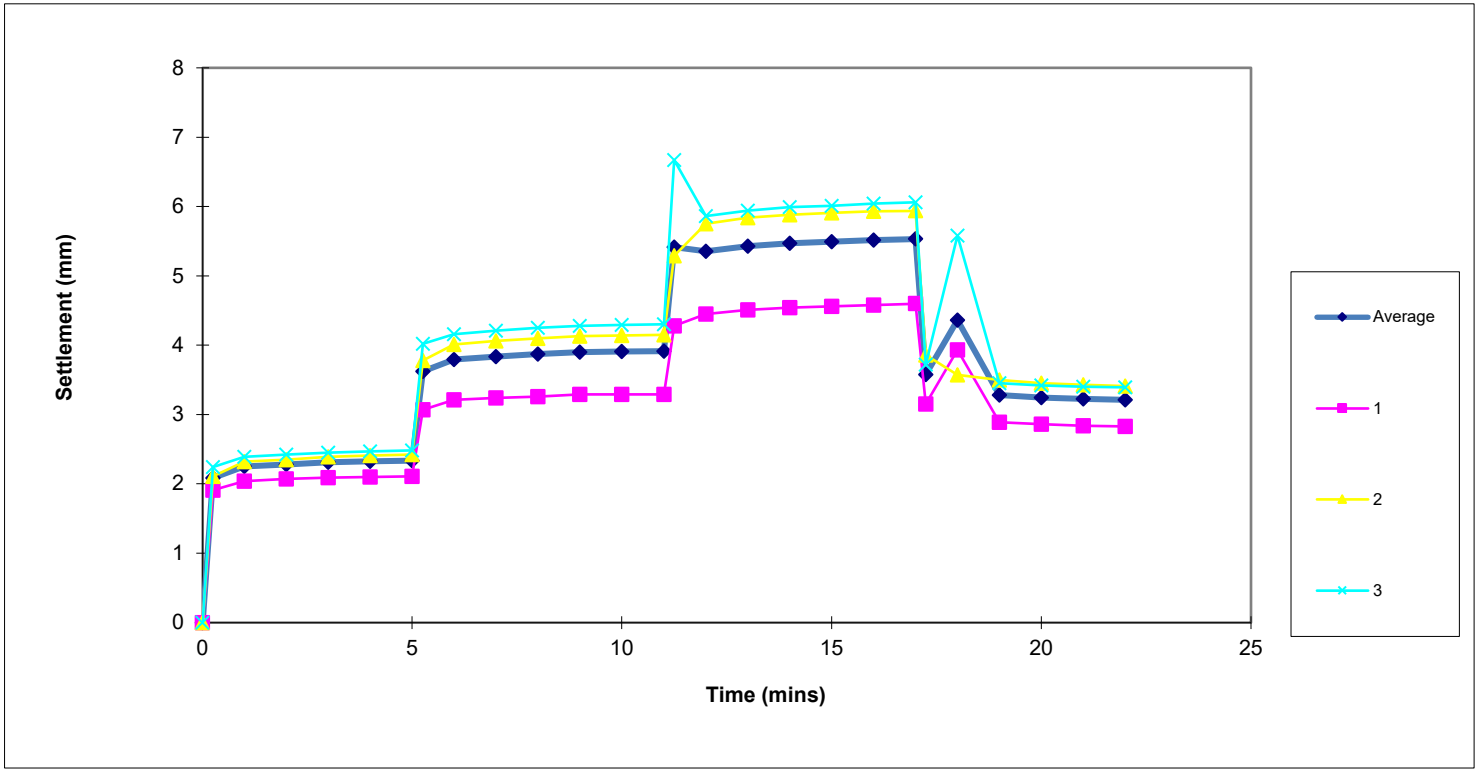
Test Reference: P14 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.91	2.11	2.24	2.09
	1	2.04	2.32	2.39	2.25
	2	2.07	2.35	2.42	2.28
	3	2.09	2.39	2.45	2.31
	4	2.10	2.41	2.47	2.33
	5	2.11	2.42	2.48	2.34
100kN/m^2 Load	5.26	3.07	3.78	4.02	3.62
	6	3.21	4.01	4.16	3.79
	7	3.24	4.06	4.21	3.84
	8	3.26	4.10	4.25	3.87
	9	3.29	4.13	4.28	3.90
	10	3.29	4.14	4.29	3.91
	11	3.29	4.15	4.30	3.91
150kN/m^2 Load	11.25	4.28	5.29	6.67	5.41
	12	4.45	5.75	5.86	5.35
	13	4.51	5.84	5.94	5.43
	14	4.54	5.88	5.99	5.47
	15	4.56	5.91	6.01	5.49
	16	4.58	5.93	6.04	5.52
	17	4.60	5.94	6.06	5.53
0kN/m^2 Unload	17.25	3.15	3.86	3.72	3.58
	18	3.93	3.57	5.58	4.36
	19	2.89	3.50	3.45	3.28
	20	2.86	3.45	3.42	3.24
	21	2.84	3.43	3.40	3.22
	22	2.83	3.41	3.39	3.21

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P14



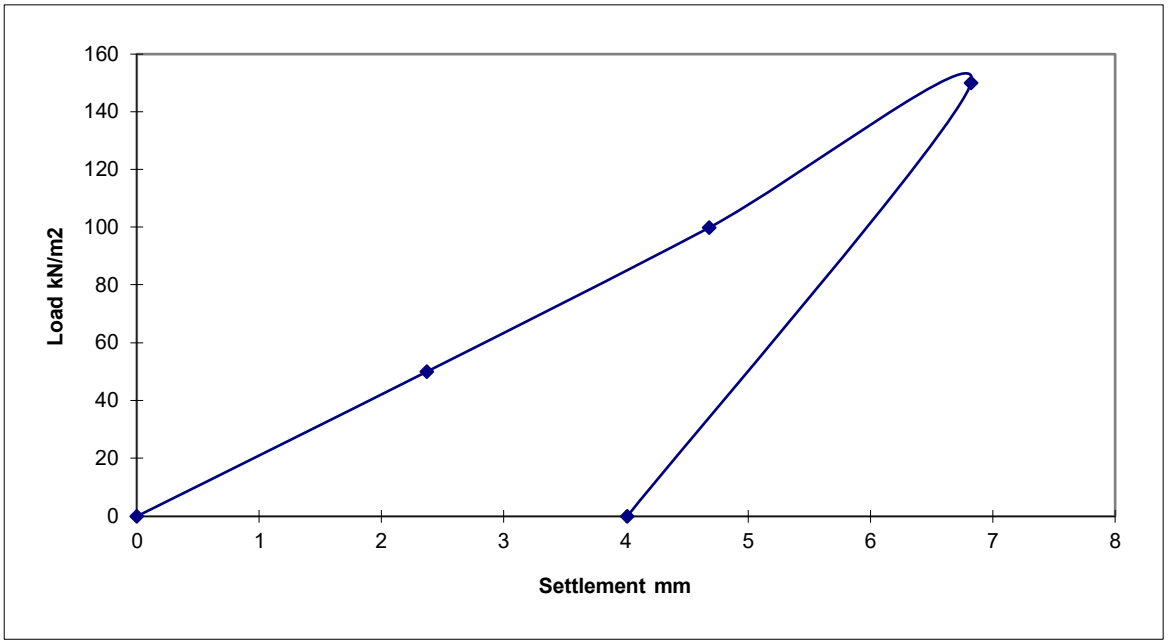
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P15	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.37	50	5
4.68	100	11
6.82	150	19
4.01	0	24



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 18.07.22

Test Reference: P15

Test Depth: Surface

Plate Diameter: 600mm

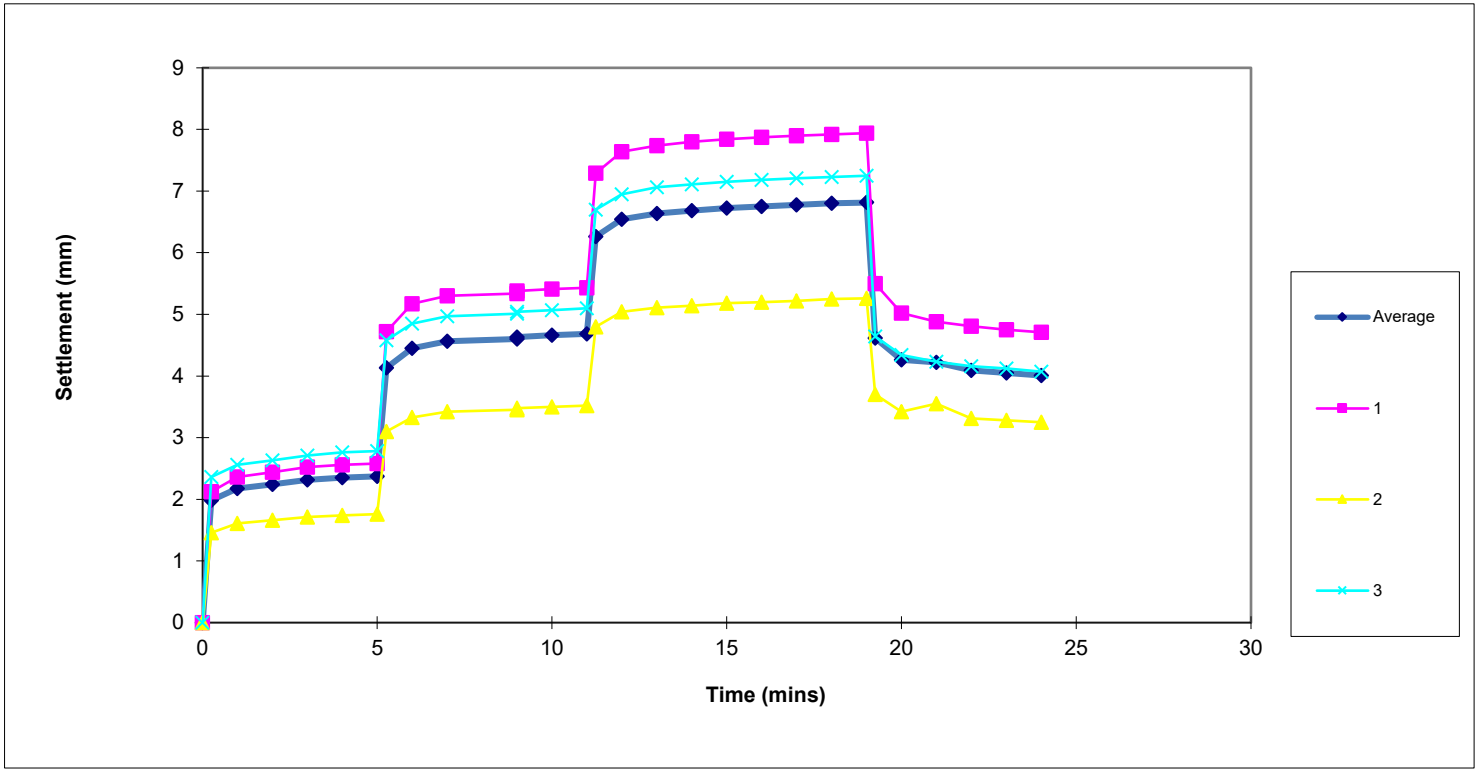
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.12	1.46	2.36	1.98
	1	2.36	1.61	2.56	2.18
	2	2.44	1.66	2.63	2.24
	3	2.52	1.71	2.71	2.31
	4	2.56	1.74	2.76	2.35
	5	2.58	1.76	2.78	2.37
100kN/m^2 Load	5.26	4.72	3.10	4.58	4.13
	6	5.17	3.33	4.85	4.45
	7	5.30	3.42	4.97	4.56
	9	5.34	3.45	5.01	4.60
	9	5.38	3.48	5.04	4.63
	10	5.41	3.50	5.07	4.66
	11	5.43	3.52	5.10	4.68
150kN/m^2 Load	11.25	7.29	4.80	6.70	6.26
	12	7.64	5.04	6.95	6.54
	13	7.74	5.11	7.06	6.64
	14	7.80	5.14	7.11	6.68
	15	7.84	5.18	7.15	6.72
	16	7.87	5.20	7.18	6.75
	17	7.90	5.22	7.21	6.78
	18	7.92	5.25	7.23	6.80
	19	7.94	5.26	7.25	6.82
0kN/m^2 Unload	19.25	5.50	3.70	4.64	4.61
	20	5.02	3.42	4.34	4.26
	21	4.88	3.55	4.23	4.22
	22	4.81	3.31	4.16	4.09
	23	4.75	3.28	4.12	4.05
	24	4.71	3.25	4.07	4.01

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P15



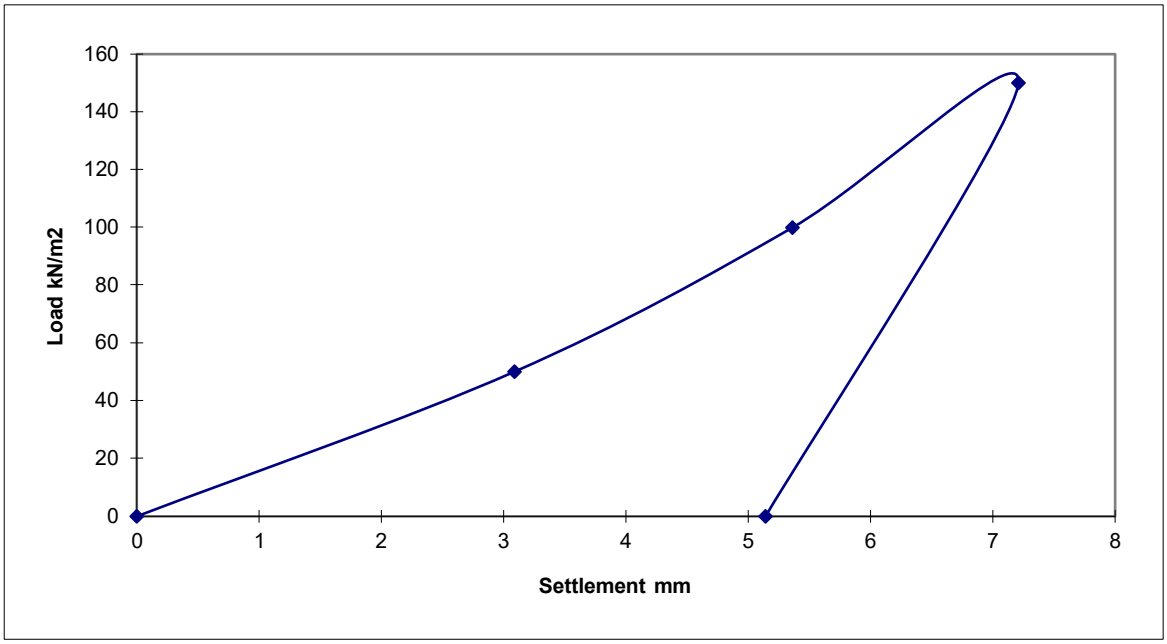
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P16	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.09	50	7
5.36	100	12
7.21	150	22
5.14	0	27



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 18.07.22

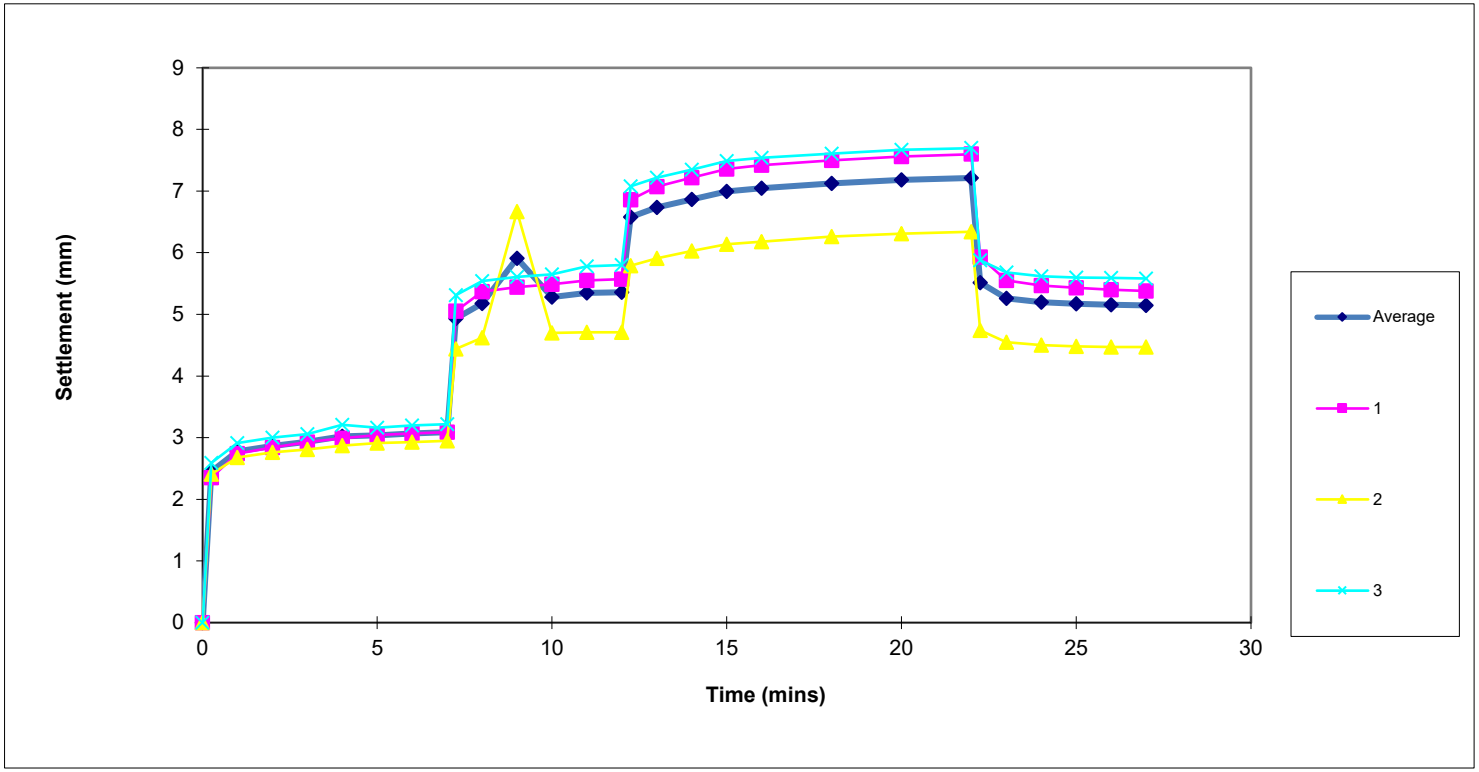
Test Reference: P16 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.35	2.41	2.59	2.45
	1	2.74	2.68	2.91	2.78
	2	2.84	2.76	3.00	2.87
	3	2.93	2.81	3.06	2.93
	4	2.99	2.87	3.21	3.02
	5	3.04	2.91	3.16	3.04
	6	3.07	2.93	3.20	3.07
	7	3.09	2.95	3.22	3.09
100kN/m^2 Load	7.25	5.05	4.44	5.31	4.93
	8	5.37	4.62	5.54	5.18
	9	5.44	6.67	5.61	5.91
	10	5.49	4.70	5.65	5.28
	11	5.55	4.71	5.78	5.35
	12	5.57	4.71	5.80	5.36
150kN/m^2 Load	12.25	6.86	5.79	7.08	6.58
	13	7.07	5.91	7.22	6.73
	14	7.22	6.03	7.35	6.87
	15	7.36	6.14	7.49	7.00
	16	7.42	6.18	7.54	7.05
	18	7.50	6.26	7.61	7.12
	20	7.56	6.31	7.67	7.18
	22	7.60	6.34	7.70	7.21
0kN/m^2 Unload	22.25	5.93	4.74	5.88	5.52
	23	5.55	4.55	5.68	5.26
	24	5.47	4.50	5.62	5.20
	25	5.43	4.48	5.60	5.17
	26	5.40	4.47	5.59	5.15
	27	5.38	4.47	5.58	5.14

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P16



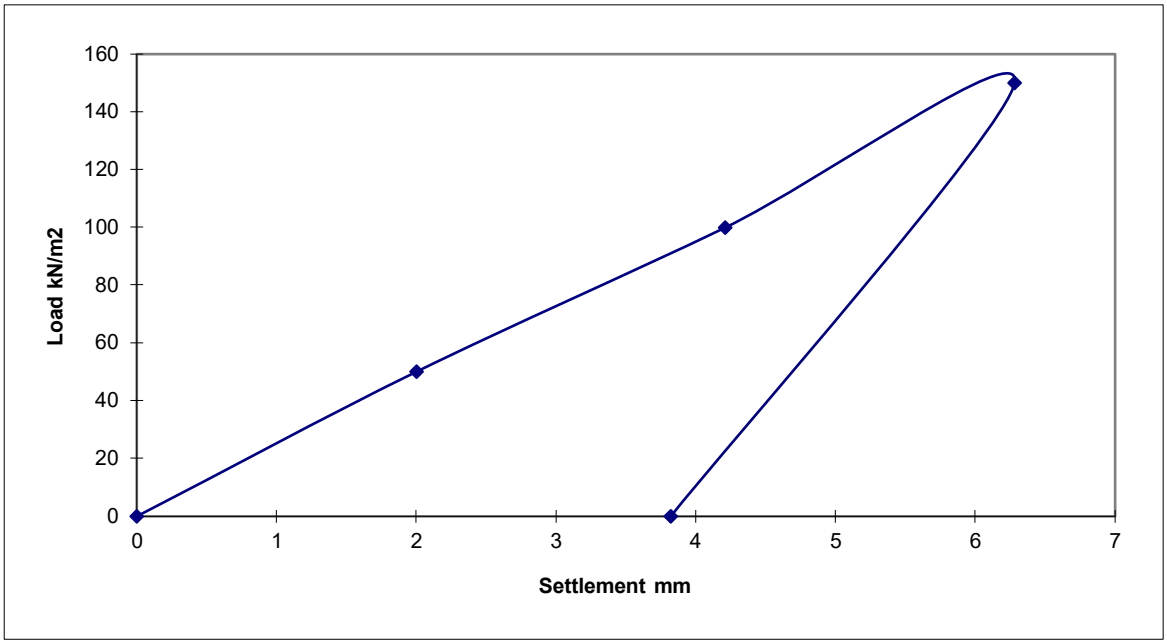
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P17	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.00	50	7
4.21	100	15
6.28	150	22
3.82	0	27



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 18.07.22

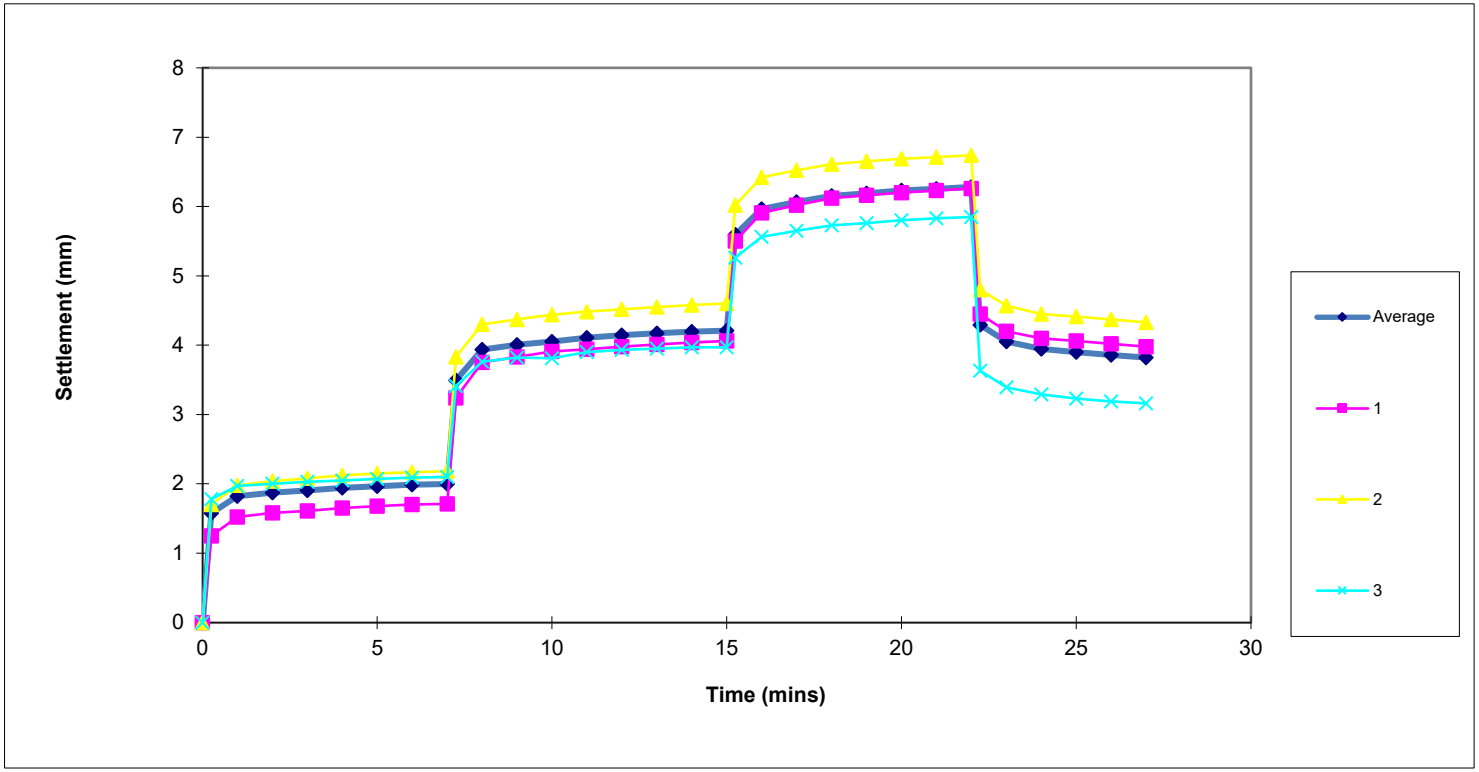
Test Reference: P17 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.25	1.70	1.78	1.58
	1	1.52	1.98	1.97	1.82
	2	1.58	2.04	2.00	1.87
	3	1.61	2.08	2.03	1.91
	4	1.65	2.12	2.05	1.94
	5	1.68	2.15	2.07	1.97
	6	1.70	2.17	2.09	1.99
	7	1.71	2.18	2.10	2.00
100kN/m^2 Load	7.25	3.24	3.83	3.41	3.49
	8	3.75	4.30	3.76	3.94
	9	3.83	4.37	3.82	4.01
	10	3.91	4.44	3.81	4.05
	11	3.94	4.48	3.90	4.11
	12	3.98	4.52	3.93	4.14
	13	4.01	4.55	3.95	4.17
	14	4.04	4.58	3.97	4.20
	15	4.06	4.60	3.97	4.21
150kN/m^2 Load	15.25	5.50	6.02	5.26	5.59
	16	5.91	6.42	5.56	5.96
	17	6.02	6.52	5.65	6.06
	18	6.12	6.61	5.73	6.15
	19	6.16	6.65	5.76	6.19
	20	6.20	6.69	5.80	6.23
	21	6.23	6.71	5.83	6.26
	22	6.26	6.74	5.85	6.28
0kN/m^2 Unload	22.25	4.45	4.80	3.63	4.29
	23	4.20	4.57	3.39	4.05
	24	4.10	4.45	3.29	3.95
	25	4.06	4.41	3.23	3.90
	26	4.02	4.37	3.19	3.86
	27	3.98	4.33	3.16	3.82

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P17



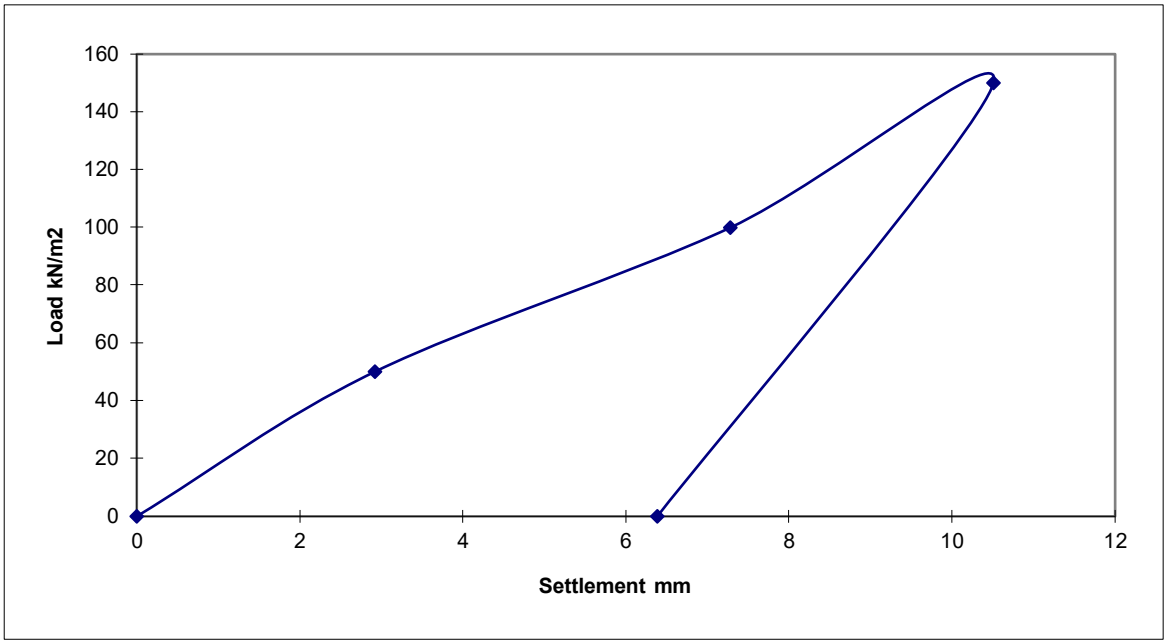
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P18	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.92	50	7
7.28	100	15
10.51	150	30
6.38	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 18.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 18.07.22

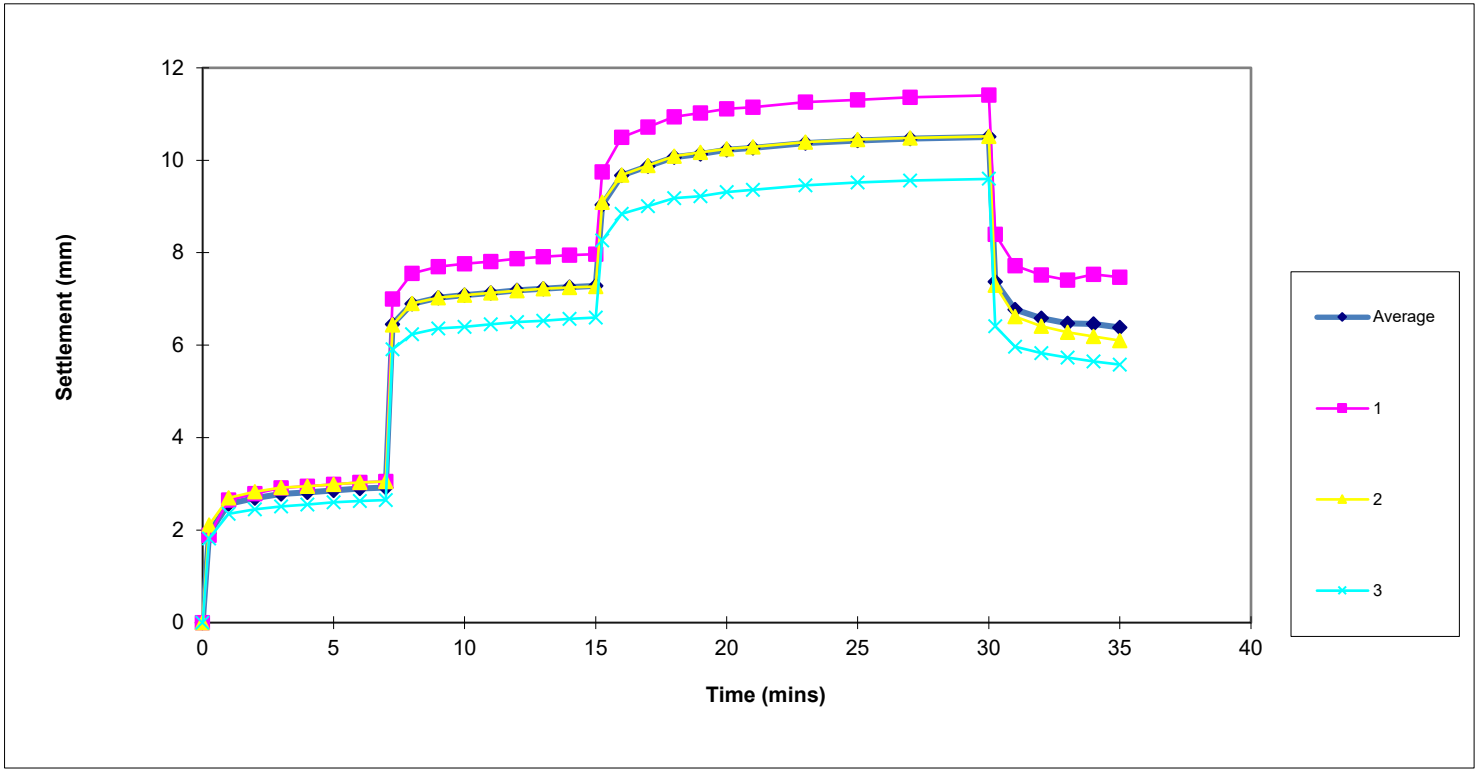
Test Reference: P18 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.89	2.11	1.82	1.94
	1	2.65	2.70	2.35	2.57
	2	2.79	2.83	2.45	2.69
	3	2.91	2.92	2.51	2.78
	4	2.95	2.95	2.55	2.82
	5	2.99	2.99	2.60	2.86
	6	3.03	3.03	2.63	2.90
	7	3.05	3.05	2.65	2.92
100kN/m^2 Load	7.25	7.00	6.44	5.91	6.45
	8	7.55	6.90	6.24	6.90
	9	7.70	7.03	6.36	7.03
	10	7.76	7.08	6.40	7.08
	11	7.81	7.13	6.45	7.13
	12	7.87	7.18	6.50	7.18
	13	7.91	7.22	6.53	7.22
	14	7.95	7.25	6.57	7.26
	15	7.97	7.27	6.60	7.28
150kN/m^2 Load	15.25	9.75	9.09	8.27	9.04
	16	10.50	9.68	8.84	9.67
	17	10.72	9.89	9.01	9.87
	18	10.94	10.09	9.18	10.07
	19	11.02	10.17	9.22	10.14
	20	11.11	10.25	9.31	10.22
	21	11.15	10.29	9.36	10.27
	23	11.26	10.39	9.46	10.37
	25	11.31	10.45	9.52	10.43
	27	11.36	10.48	9.56	10.47
	30	11.41	10.52	9.60	10.51
0kN/m^2 Unload	30.25	8.40	7.30	6.41	7.37
	31	7.72	6.62	5.97	6.77
	32	7.52	6.41	5.83	6.59
	33	7.41	6.28	5.73	6.47
	34	7.53	6.19	5.65	6.46
	35	7.47	6.10	5.58	6.38

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P18



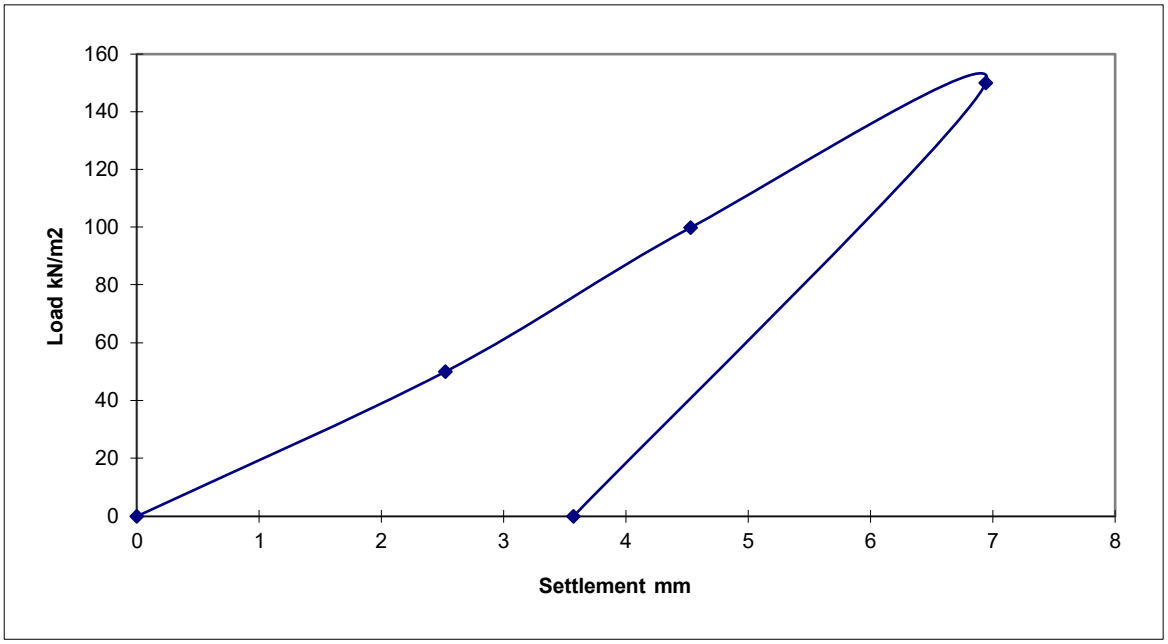
Contract:	Date:
Virginia Park, Caerphilly	18.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P20	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.52	50	10
4.53	100	16
6.94	150	30
3.57	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 22.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 22.07.22

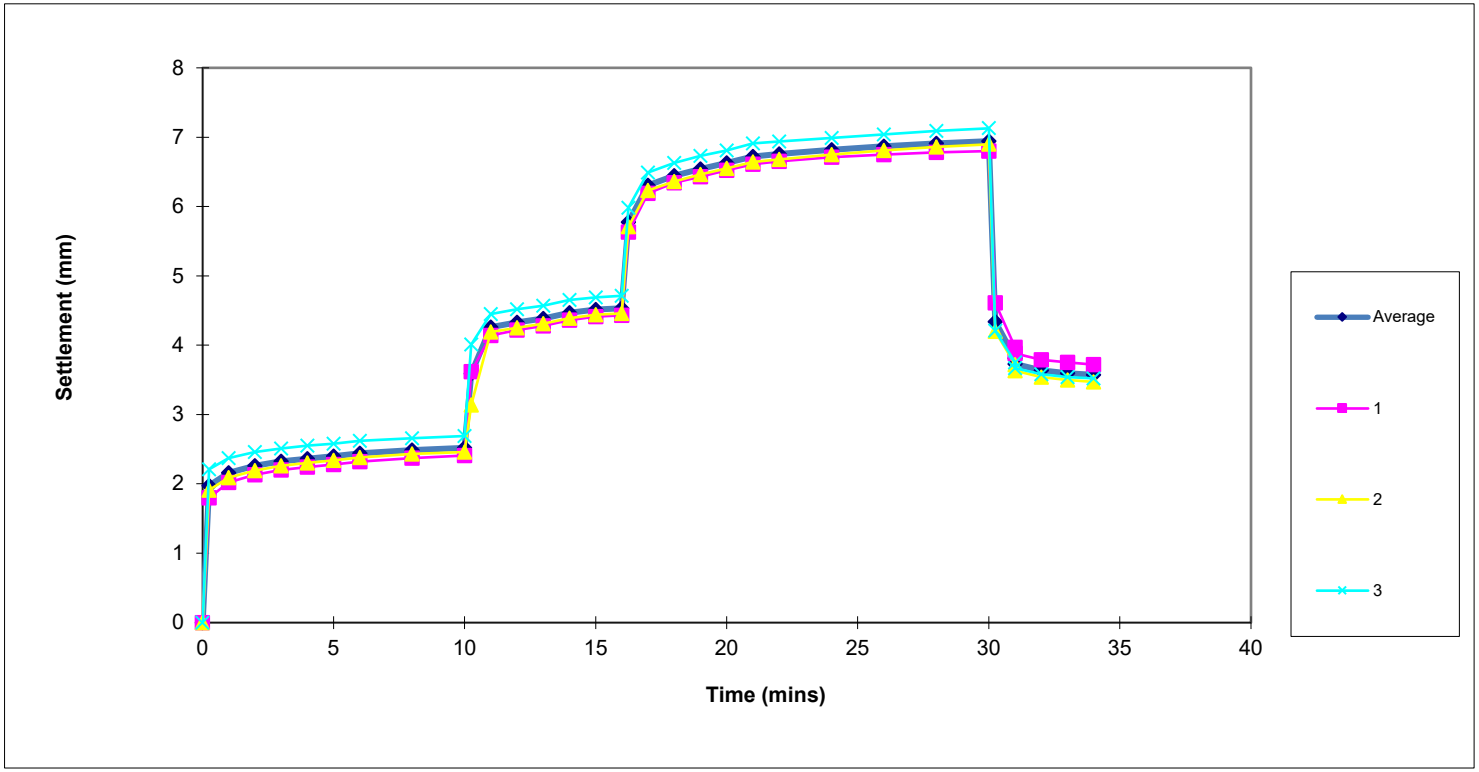
Test Reference: P20 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.80	1.91	2.21	1.97
	1	2.02	2.09	2.37	2.16
	2	2.13	2.19	2.46	2.26
	3	2.20	2.26	2.51	2.32
	4	2.24	2.30	2.55	2.36
	5	2.28	2.34	2.58	2.40
	6	2.32	2.38	2.62	2.44
	8	2.37	2.43	2.66	2.49
	10	2.41	2.46	2.69	2.52
100kN/m^2 Load	10.25	3.62	3.14	4.01	3.59
	11	4.14	4.19	4.45	4.26
	12	4.22	4.25	4.52	4.33
	13	4.28	4.31	4.57	4.39
	14	4.36	4.39	4.65	4.47
	15	4.41	4.44	4.69	4.51
	16	4.43	4.46	4.71	4.53
150kN/m^2 Load	16.25	5.63	5.71	5.98	5.77
	17	6.19	6.23	6.49	6.30
	18	6.34	6.36	6.63	6.44
	19	6.43	6.46	6.73	6.54
	20	6.52	6.55	6.81	6.63
	21	6.61	6.64	6.91	6.72
	22	6.65	6.68	6.94	6.76
	24	6.71	6.75	6.99	6.82
	26	6.75	6.81	7.04	6.87
	28	6.78	6.86	7.09	6.91
	30	6.80	6.90	7.13	6.94
0kN/m^2 Unload	30.25	4.61	4.20	4.21	4.34
	31	3.97	3.72	3.75	3.81
	31	3.88	3.63	3.67	3.73
	32	3.79	3.54	3.58	3.64
	33	3.75	3.50	3.54	3.60
	34	3.72	3.47	3.52	3.57

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P20



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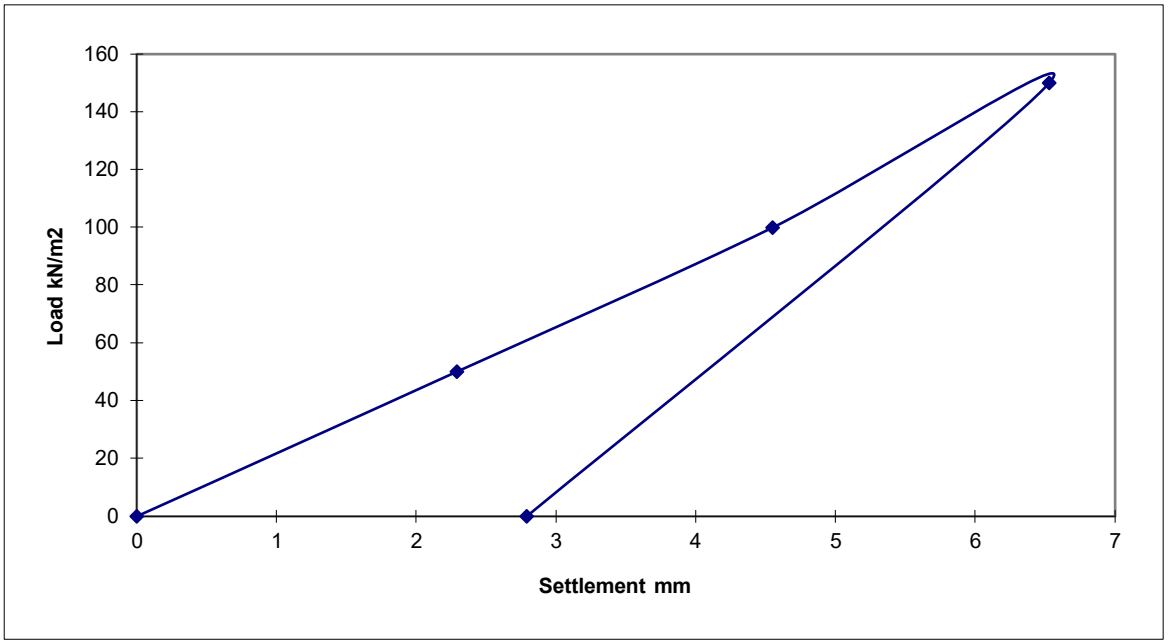
SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P21	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.29	50	8
4.55	100	14
6.53	150	25
2.79	0	30



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 22.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 22.07.22

Test Reference: P21

Test Depth: Surface

Plate Diameter: 600mm

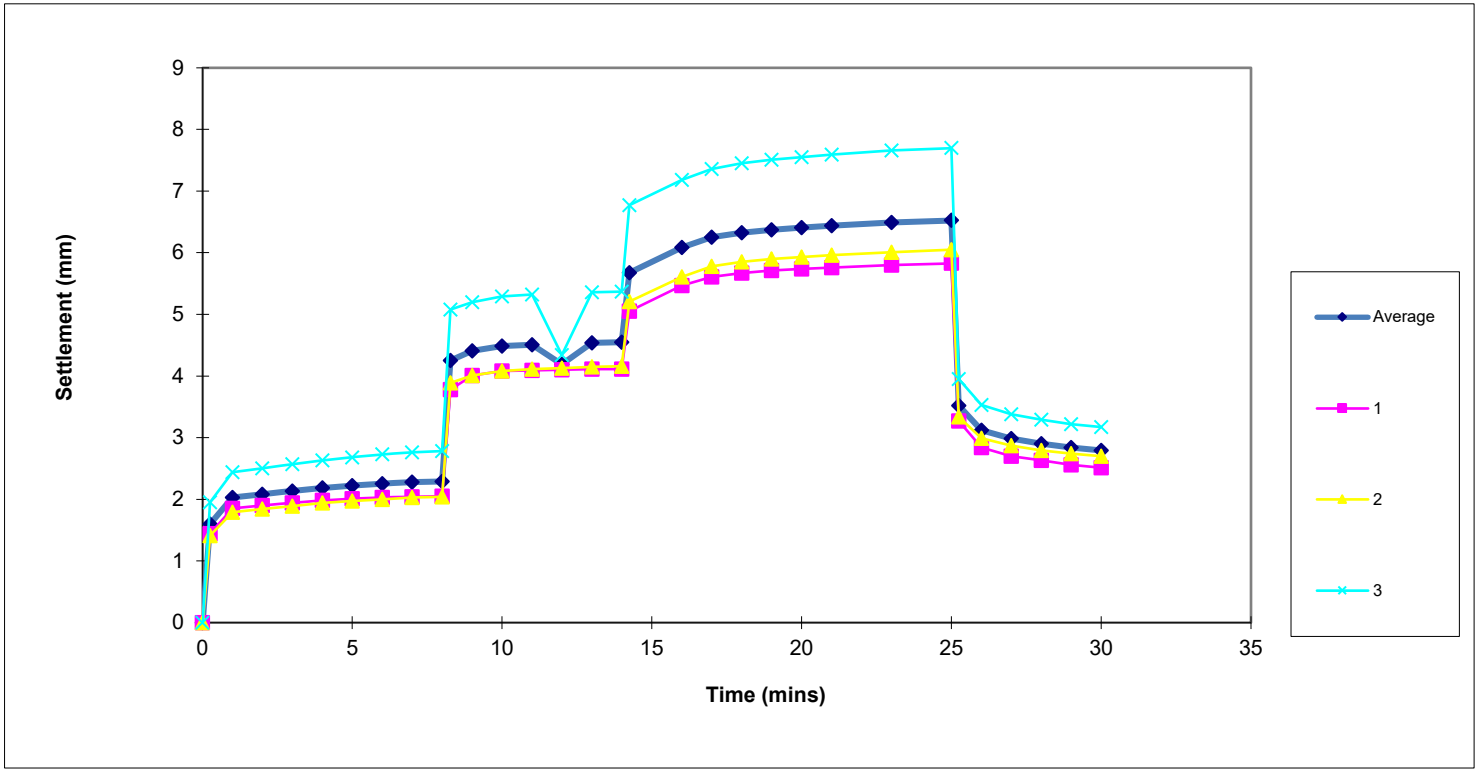
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2	0	0	0	0	0
Load	0.25	1.44	1.41	1.95	1.60
	1	1.85	1.79	2.44	2.03
	2	1.90	1.84	2.50	2.08
	3	1.94	1.89	2.57	2.13
	4	1.98	1.94	2.63	2.18
	5	2.01	1.97	2.68	2.22
	6	2.03	2.00	2.73	2.25
	7	2.04	2.03	2.76	2.28
	8	2.05	2.04	2.78	2.29
100kN/m^2	8.28	3.78	3.89	5.08	4.25
Load	9	4.01	4.01	5.20	4.41
	10	4.08	4.08	5.29	4.48
	11	4.09	4.11	5.32	4.51
	12	4.10	4.13	4.34	4.19
	13	4.11	4.15	5.36	4.54
	14	4.11	4.16	5.37	4.55
150kN/m^2	14.25	5.05	5.21	6.77	5.68
Load	16	5.47	5.61	7.18	6.09
	17	5.61	5.78	7.36	6.25
	18	5.67	5.85	7.45	6.32
	19	5.71	5.90	7.51	6.37
	20	5.74	5.93	7.55	6.41
	21	5.76	5.96	7.59	6.44
	23	5.80	6.01	7.66	6.49
	25	5.83	6.05	7.70	6.53
0kN/m^2	25.25	3.27	3.34	3.95	3.52
Unload	26	2.84	2.99	3.53	3.12
	27	2.70	2.87	3.38	2.98
	28	2.63	2.79	3.29	2.90
	29	2.56	2.74	3.22	2.84
	30	2.51	2.70	3.17	2.79

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P21



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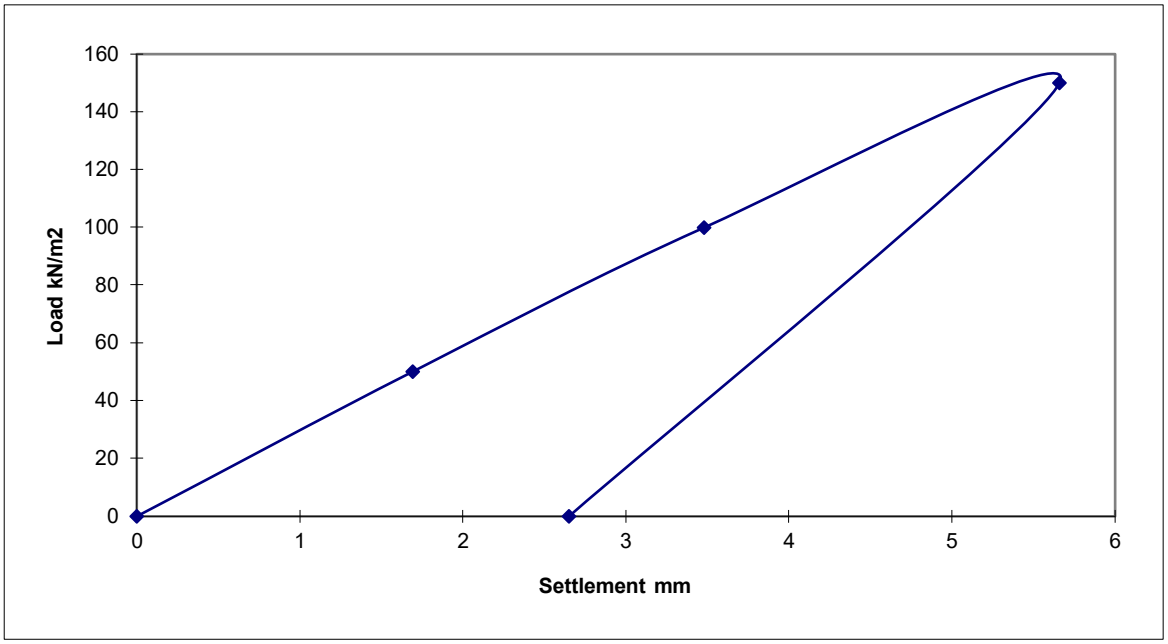
SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P26	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.69	50	10
3.48	100	20
5.66	150	30
2.65	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT:
Virgainia Park, Caerphilly

Date: 22.07.22
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SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 22.07.22

Test Reference: P26

Test Depth: Surface

Plate Diameter: 600mm

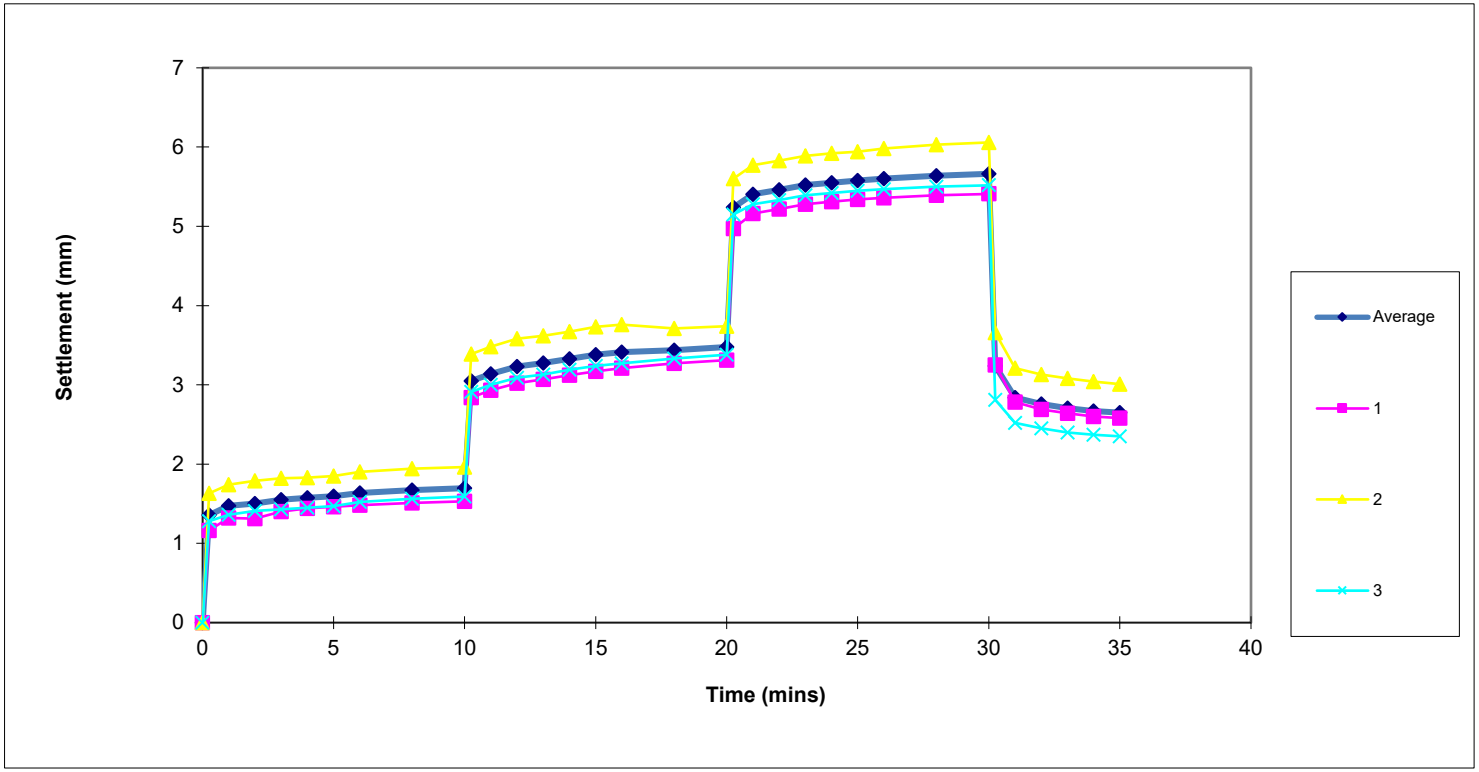
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.16	1.63	1.28	1.36
	1	1.32	1.74	1.36	1.47
	2	1.31	1.79	1.41	1.50
	3	1.40	1.82	1.43	1.55
	4	1.44	1.83	1.45	1.57
	5	1.46	1.85	1.47	1.59
	6	1.48	1.90	1.52	1.63
	8	1.51	1.94	1.56	1.67
	10	1.53	1.96	1.59	1.69
100kN/m^2 Load	10.25	2.84	3.39	2.91	3.05
	11	2.93	3.48	3.00	3.14
	12	3.02	3.58	3.09	3.23
	13	3.07	3.62	3.13	3.27
	14	3.12	3.67	3.19	3.33
	15	3.17	3.73	3.24	3.38
	16	3.21	3.76	3.27	3.41
	18	3.27	3.71	3.33	3.44
	20	3.31	3.74	3.38	3.48
150kN/m^2 Load	20.25	4.97	5.60	5.15	5.24
	21	5.16	5.77	5.28	5.40
	22	5.22	5.83	5.33	5.46
	23	5.28	5.89	5.39	5.52
	24	5.31	5.92	5.42	5.55
	25	5.34	5.94	5.45	5.58
	26	5.36	5.98	5.47	5.60
	28	5.39	6.03	5.50	5.64
	30	5.41	6.06	5.52	5.66
0kN/m^2 Unload	30.25	3.25	3.66	2.81	3.24
	31	2.78	3.21	2.52	2.84
	32	2.69	3.13	2.45	2.76
	33	2.64	3.08	2.40	2.71
	34	2.60	3.04	2.37	2.67
	35	2.58	3.01	2.35	2.65

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P26



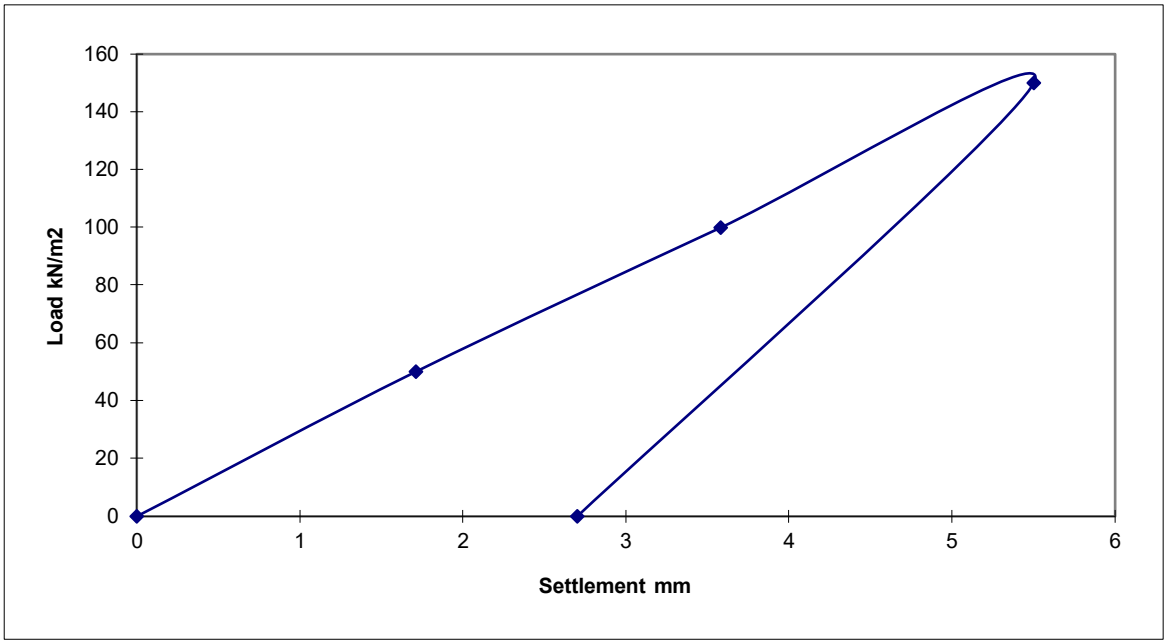
Contract:	Date:
Virginia Park, Caerphilly	22.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P27	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.71	50	5
3.58	100	10
5.50	150	20
2.70	0	25



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 22.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 22.07.22

Test Reference: P27

Test Depth: Surface

Plate Diameter: 600mm

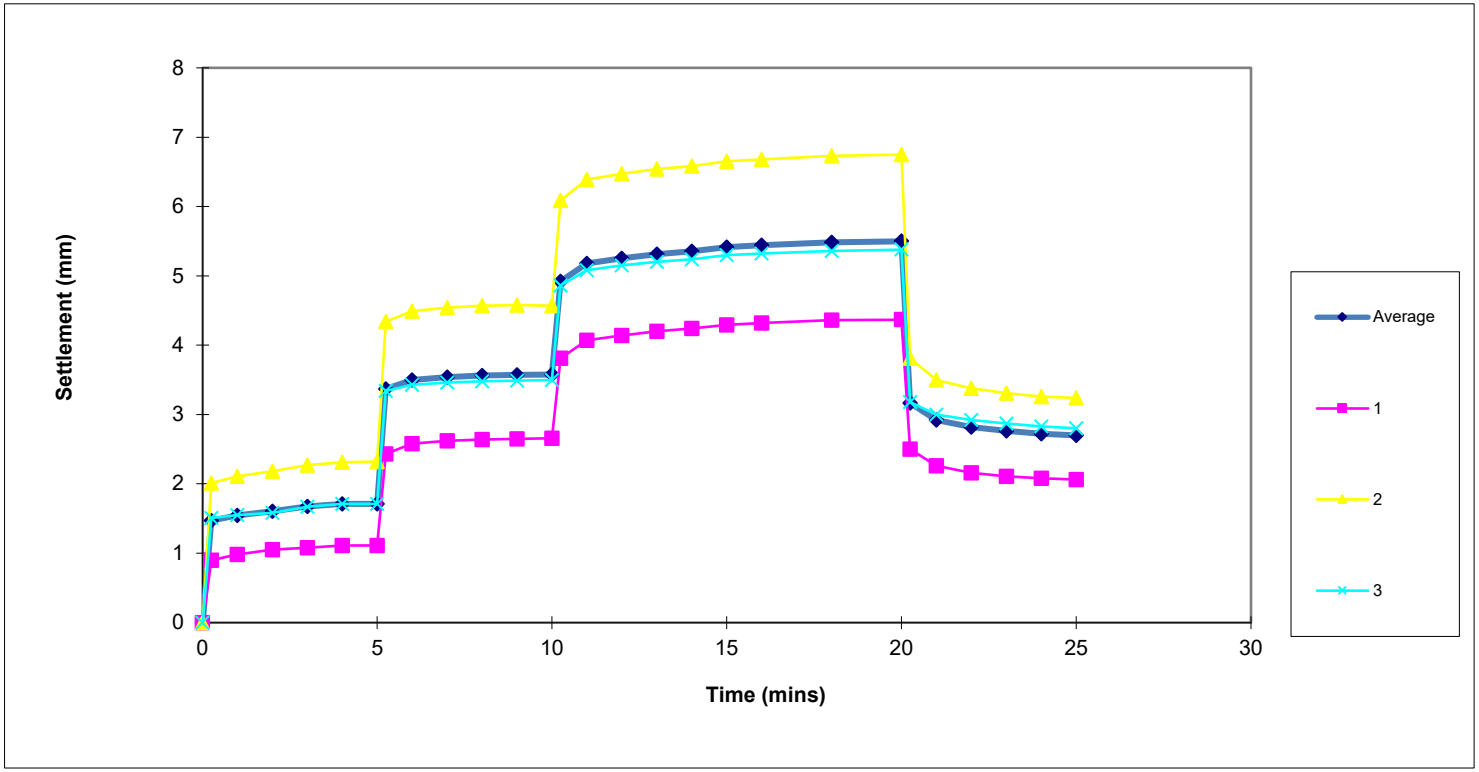
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	0.90	2.01	1.51	1.47
	1	0.98	2.11	1.55	1.55
	2	1.05	2.18	1.58	1.60
	3	1.08	2.27	1.67	1.67
	4	1.11	2.31	1.71	1.71
	5	1.11	2.32	1.71	1.71
100kN/m^2 Load	5.25	2.43	4.34	3.34	3.37
	6	2.58	4.49	3.43	3.50
	7	2.62	4.54	3.46	3.54
	8	2.64	4.57	3.48	3.56
	9	2.65	4.58	3.49	3.57
	10	2.66	4.57	3.50	3.58
150kN/m^2 Load	10.25	3.81	6.09	4.86	4.92
	11	4.07	6.39	5.08	5.18
	12	4.14	6.47	5.15	5.25
	13	4.20	6.54	5.20	5.31
	14	4.24	6.58	5.24	5.35
	15	4.29	6.65	5.30	5.41
	16	4.32	6.68	5.32	5.44
	18	4.36	6.73	5.36	5.48
	20	4.37	6.75	5.38	5.50
0kN/m^2 Unload	20.25	2.50	3.81	3.18	3.16
	21	2.26	3.50	3.00	2.92
	22	2.16	3.38	2.92	2.82
	23	2.11	3.31	2.87	2.76
	24	2.08	3.26	2.83	2.72
	25	2.06	3.24	2.80	2.70

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P27



Contract:	Date:
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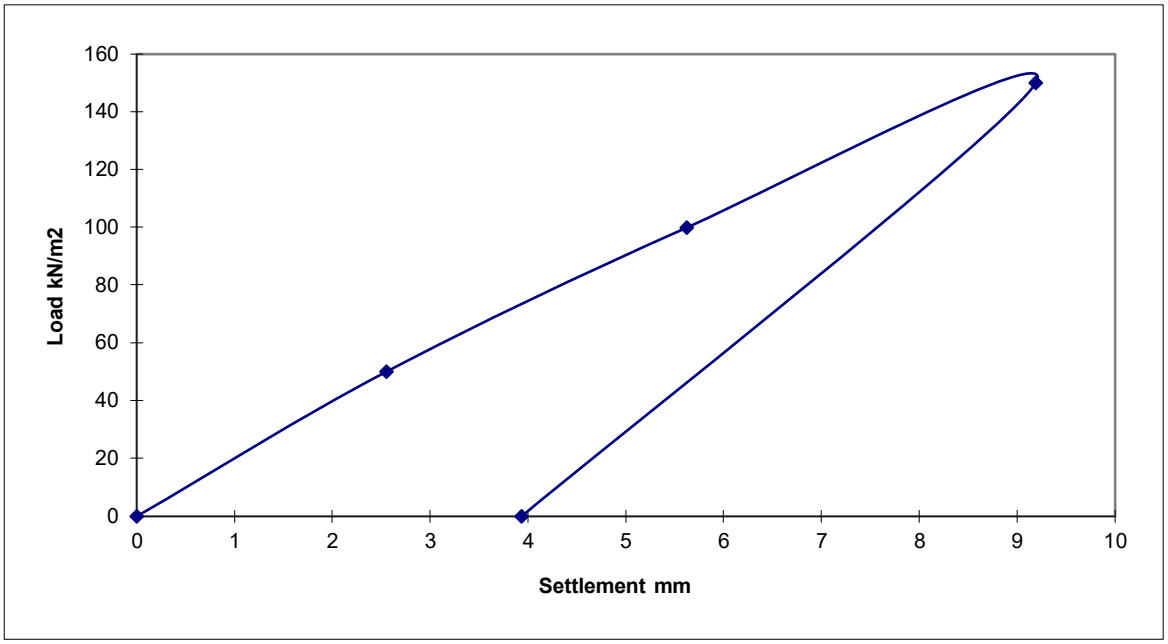
SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P28	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.55	50	10
5.62	100	20
9.19	150	30
3.93	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 22.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 22.07.22

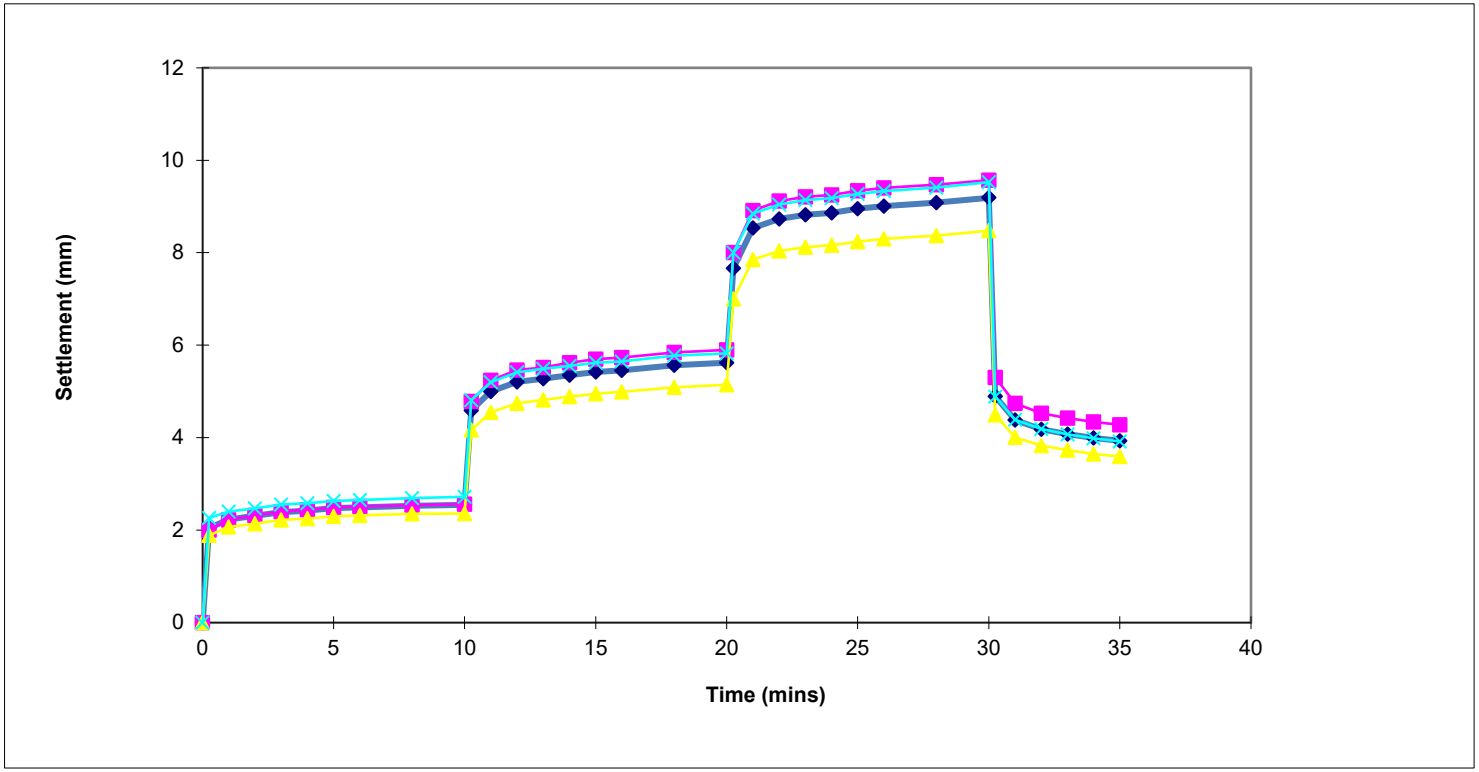
Test Reference: P28 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.00	1.89	2.26	2.05
	1	2.22	2.07	2.40	2.23
	2	2.32	2.14	2.47	2.31
	3	2.40	2.22	2.55	2.39
	4	2.44	2.25	2.58	2.42
	5	2.49	2.30	2.63	2.47
	6	2.51	2.32	2.65	2.49
	8	2.54	2.35	2.69	2.53
	10	2.56	2.36	2.72	2.55
100kN/m^2 Load	10.25	4.78	4.17	4.81	4.59
	11	5.24	4.55	5.20	5.00
	12	5.46	4.74	5.41	5.20
	13	5.52	4.82	5.49	5.28
	14	5.62	4.89	5.55	5.35
	15	5.70	4.95	5.62	5.42
	16	5.73	4.99	5.65	5.46
	18	5.84	5.09	5.77	5.57
	20	5.90	5.14	5.82	5.62
150kN/m^2 Load	20.25	8.00	7.00	8.00	7.67
	21	8.91	7.85	8.85	8.54
	22	9.12	8.04	9.04	8.73
	23	9.21	8.12	9.14	8.82
	24	9.25	8.16	9.18	8.86
	25	9.34	8.24	9.27	8.95
	26	9.40	8.30	9.33	9.01
	28	9.47	8.37	9.41	9.08
	30	9.57	8.48	9.53	9.19
0kN/m^2 Unload	30.25	5.30	4.49	4.89	4.89
	31	4.74	4.01	4.39	4.38
	32	4.53	3.83	4.19	4.18
	33	4.42	3.73	4.07	4.07
	34	4.34	3.65	3.99	3.99
	35	4.28	3.59	3.92	3.93

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P28



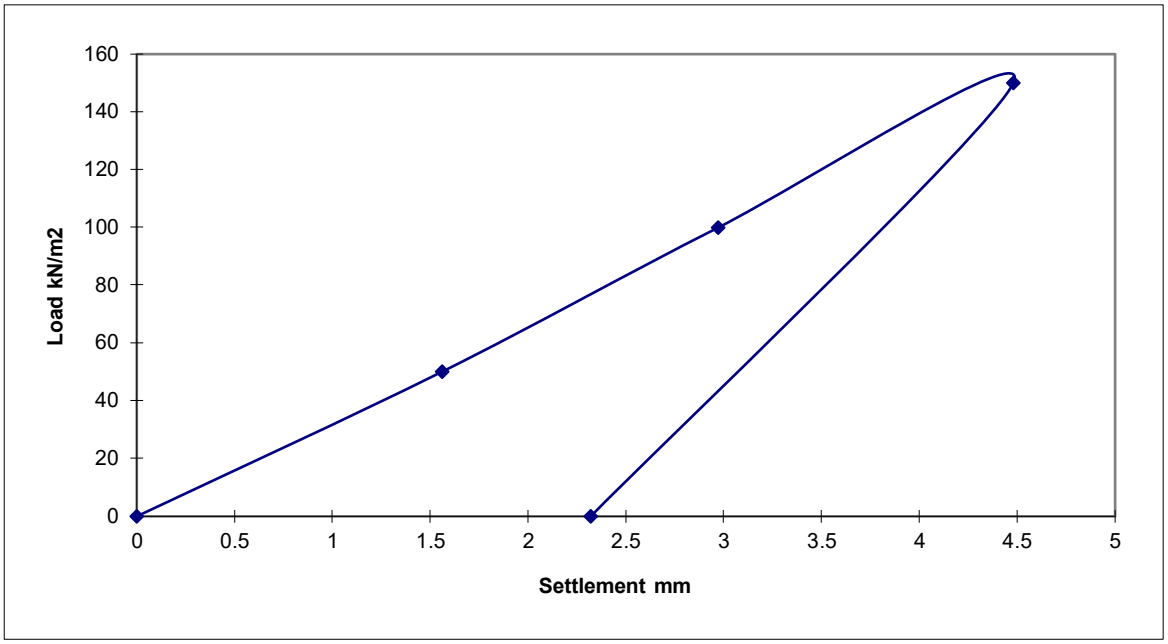
Contract:	Date:
Virginia Park, Caerphilly	22.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P29	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.56	50	5
2.97	100	12
4.48	150	19
2.32	0	24



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 22.07.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 22.07.22

Test Reference: P29

Test Depth: Surface

Plate Diameter: 600mm

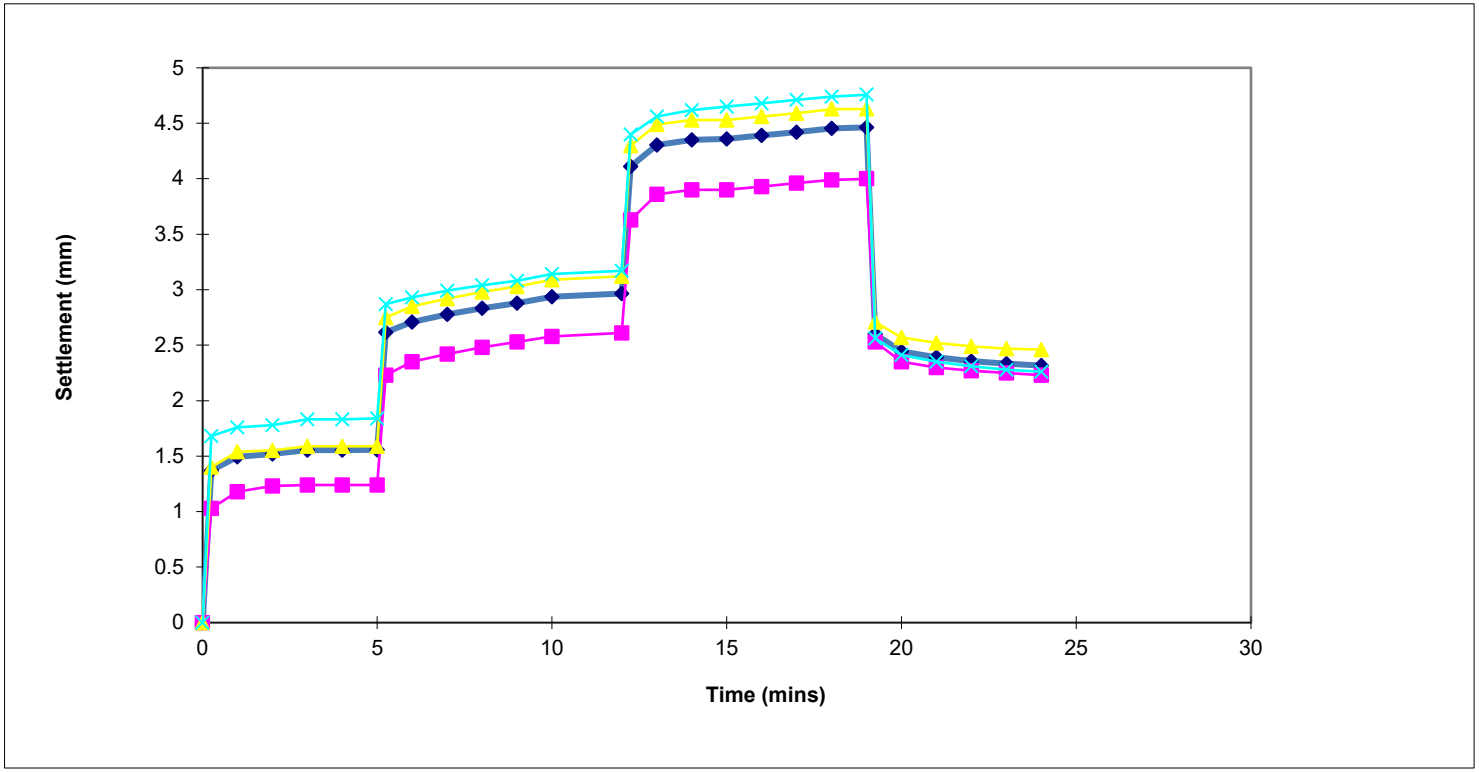
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.03	1.40	1.68	1.37
	1	1.18	1.54	1.76	1.49
	2	1.23	1.55	1.78	1.52
	3	1.24	1.59	1.83	1.55
	4	1.24	1.59	1.83	1.55
	5	1.24	1.59	1.84	1.56
100kN/m^2 Load	5.25	2.23	2.75	2.87	2.62
	6	2.35	2.85	2.93	2.71
	7	2.42	2.92	2.99	2.78
	8	2.48	2.98	3.04	2.83
	9	2.53	3.03	3.08	2.88
	10	2.58	3.09	3.14	2.94
	12	2.61	3.12	3.17	2.97
150kN/m^2 Load	12.25	3.63	4.30	4.40	4.11
	13	3.86	4.49	4.56	4.30
	14	3.90	4.53	4.62	4.35
	15	3.90	4.53	4.65	4.36
	16	3.93	4.56	4.68	4.39
	17	3.96	4.59	4.71	4.42
	18	3.99	4.63	4.74	4.45
	19	4.00	4.63	4.76	4.46
0kN/m^2 Unload	19.25	2.53	2.71	2.56	2.60
	20	2.35	2.57	2.41	2.44
	21	2.30	2.52	2.35	2.39
	22	2.27	2.49	2.31	2.36
	23	2.25	2.47	2.28	2.33
	24	2.23	2.46	2.26	2.32

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P29



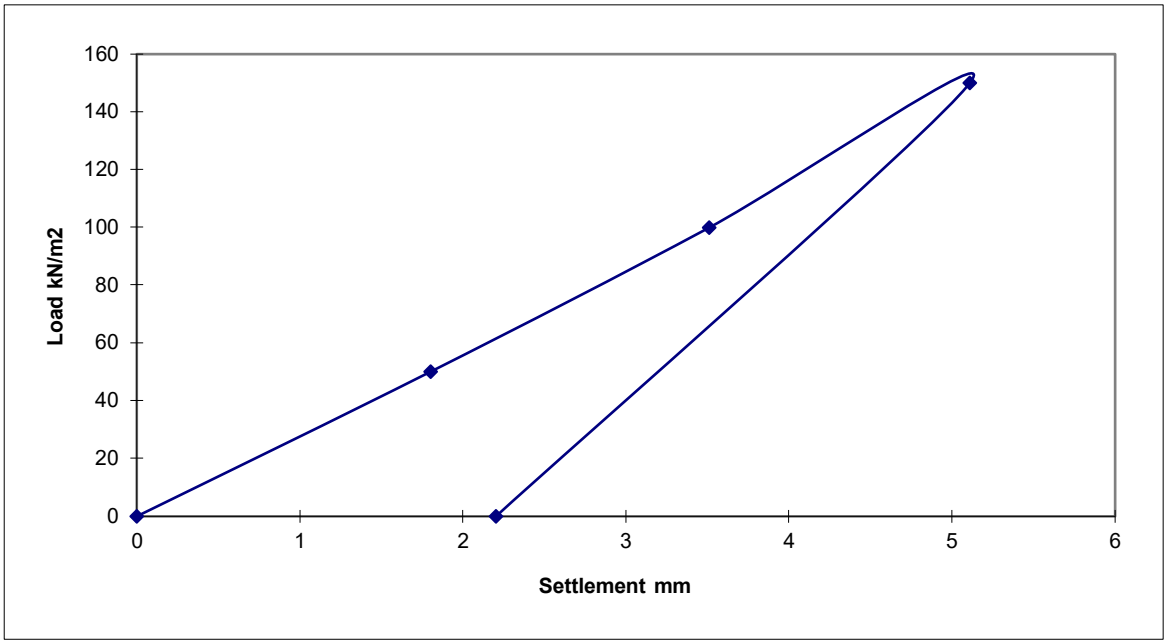
Contract:	Date:
Virginia Park, Caerphilly	22.07.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P30	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.80	50	5
3.51	100	10
5.11	150	16
2.20	0	21



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 01.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 01.08.22

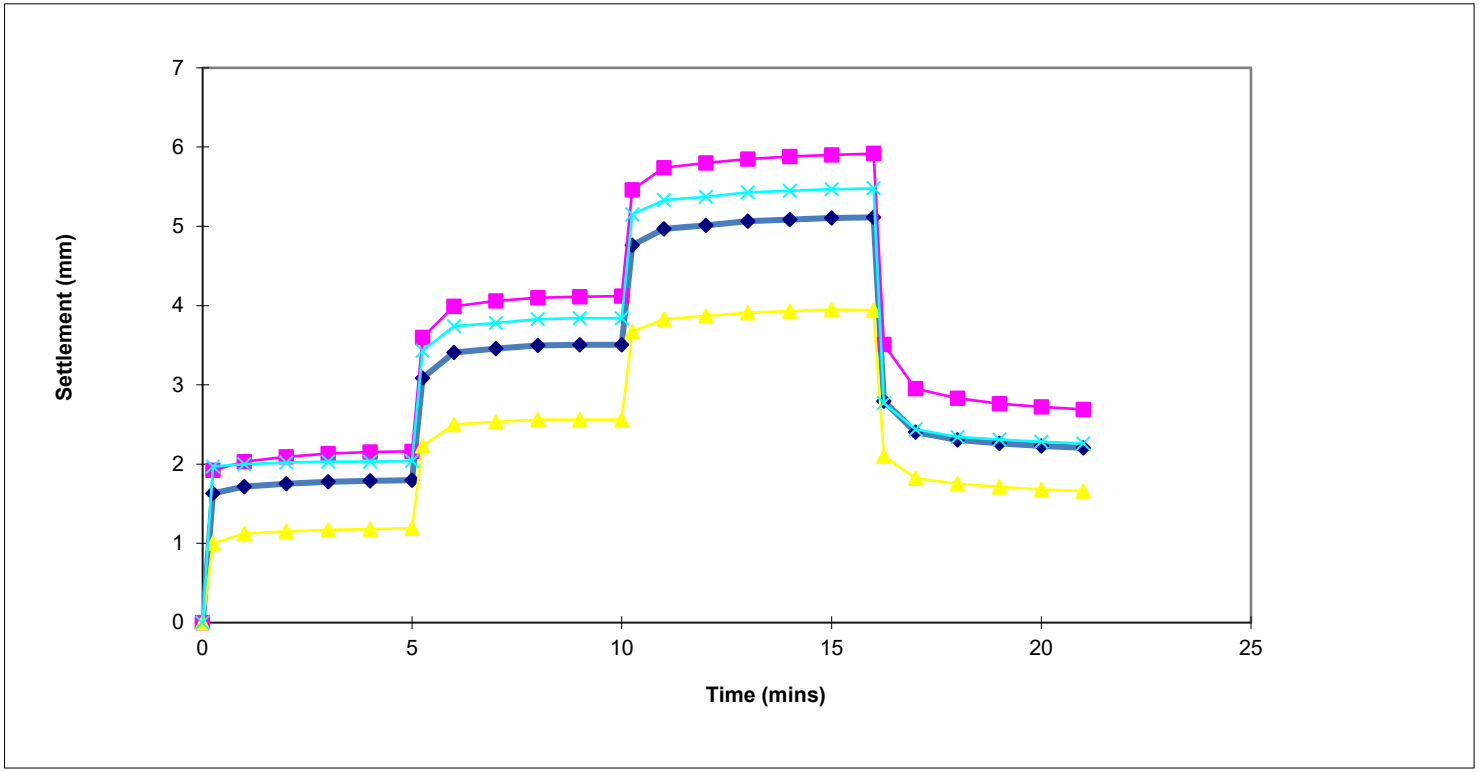
Test Reference: P30 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.92	1.00	1.97	1.63
	1	2.03	1.12	2.00	1.72
	2	2.09	1.15	2.02	1.75
	3	2.13	1.17	2.03	1.78
	4	2.15	1.18	2.03	1.79
	5	2.16	1.19	2.04	1.80
100kN/m^2 Load	5.25	3.60	2.23	3.43	3.09
	6	3.99	2.50	3.74	3.41
	7	4.06	2.53	3.78	3.46
	8	4.10	2.56	3.83	3.50
	9	4.11	2.56	3.84	3.50
	10	4.12	2.56	3.84	3.51
150kN/m^2 Load	10.25	5.46	3.67	5.15	4.76
	11	5.74	3.83	5.33	4.97
	12	5.80	3.87	5.37	5.01
	13	5.85	3.91	5.43	5.06
	14	5.88	3.93	5.45	5.09
	15	5.90	3.95	5.47	5.11
	16	5.92	3.94	5.48	5.11
0kN/m^2 Unload	16.25	3.51	2.10	2.77	2.79
	17	2.95	1.82	2.44	2.40
	18	2.83	1.75	2.34	2.31
	19	2.76	1.71	2.31	2.26
	20	2.72	1.68	2.28	2.23
	21	2.69	1.66	2.26	2.20

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P30



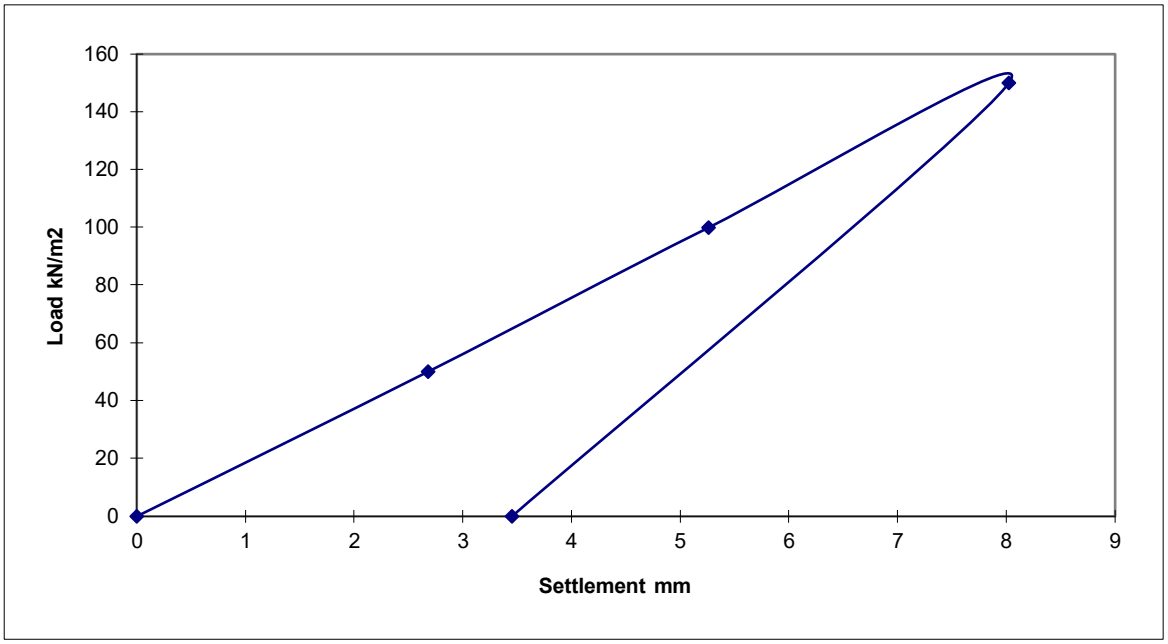
Contract:	Date:
Virginia Park, Caerphilly	01.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P32	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.68	50	10
5.26	100	15
8.02	150	20
3.45	0	25



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 01.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 01.08.22

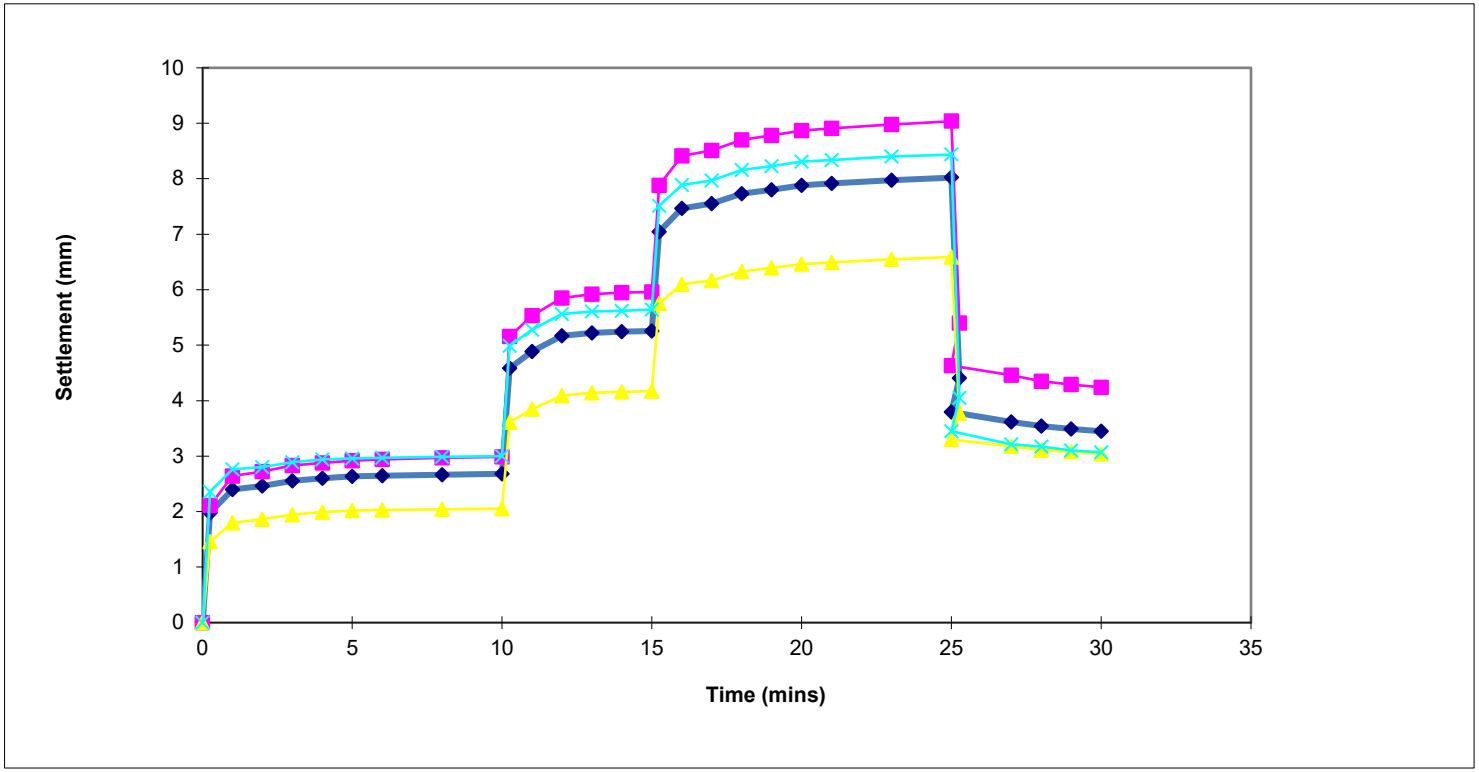
Test Reference: P32 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.11	1.46	2.36	1.98
	1	2.64	1.80	2.76	2.40
	2	2.72	1.86	2.80	2.46
	3	2.83	1.94	2.89	2.55
	4	2.88	1.99	2.94	2.60
	5	2.92	2.02	2.96	2.63
	6	2.94	2.03	2.97	2.65
	8	2.97	2.04	2.99	2.67
	10	2.99	2.05	3.00	2.68
100kN/m^2 Load	10.25	5.16	3.61	4.99	4.59
	11	5.53	3.85	5.28	4.89
	12	5.85	4.09	5.56	5.17
	13	5.92	4.14	5.61	5.22
	14	5.95	4.16	5.62	5.24
	15	5.96	4.17	5.64	5.26
150kN/m^2 Load	15.25	7.88	5.75	7.51	7.05
	16	8.41	6.10	7.89	7.47
	17	8.51	6.17	7.97	7.55
	18	8.70	6.33	8.16	7.73
	19	8.78	6.39	8.23	7.80
	20	8.87	6.46	8.31	7.88
	21	8.91	6.49	8.34	7.91
	23	8.98	6.55	8.40	7.98
	25	9.04	6.59	8.44	8.02
0kN/m^2 Unload	25.265	5.40	3.77	4.05	4.41
	25	4.63	3.30	3.45	3.79
	27	4.46	3.18	3.21	3.62
	28	4.35	3.11	3.17	3.54
	29	4.29	3.08	3.10	3.49
	30	4.24	3.04	3.07	3.45

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P32



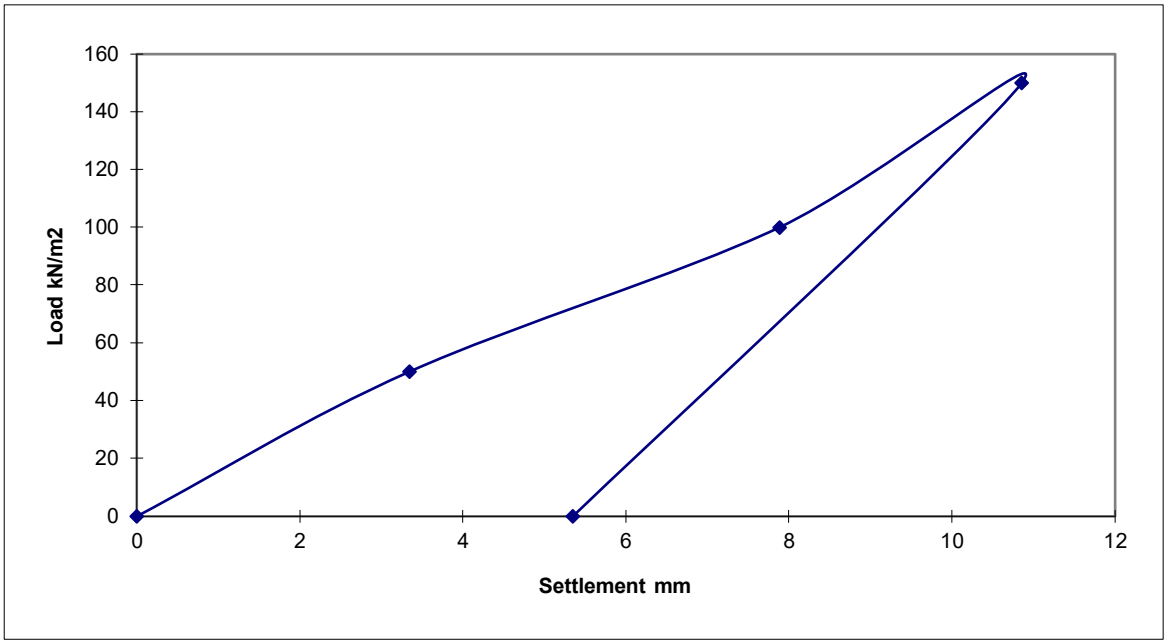
Contract:	Date:
Virginia Park, Caerphilly	01.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P33	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.34	50	10
7.88	100	20
10.85	150	30
5.35	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 01.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly | Date: 01.08.22

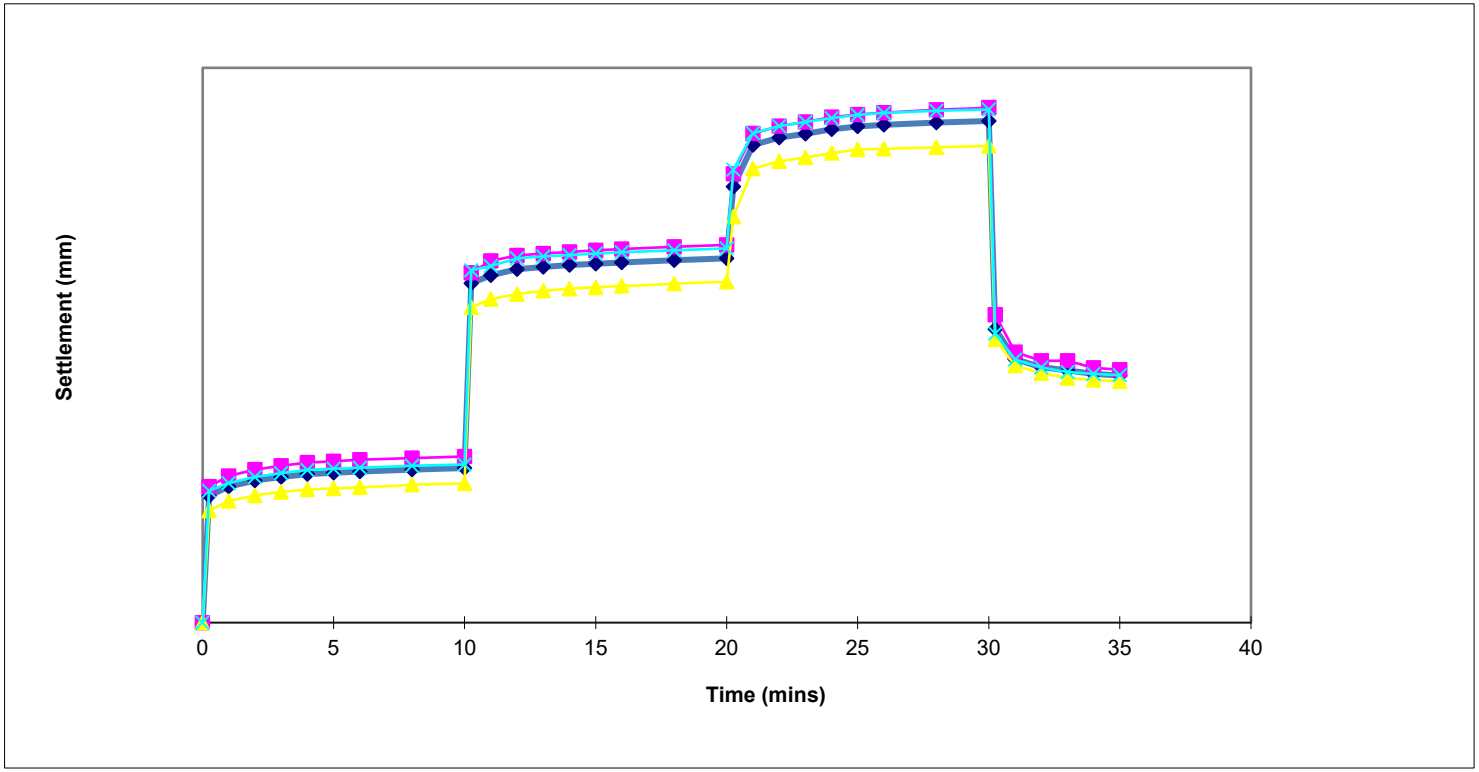
Test Reference: P33 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.94	2.42	2.85	2.74
	1	3.17	2.63	3.02	2.94
	2	3.31	2.75	3.15	3.07
	3	3.39	2.82	3.23	3.15
	4	3.46	2.88	3.30	3.21
	5	3.49	2.90	3.33	3.24
	6	3.52	2.93	3.35	3.27
	8	3.56	2.98	3.39	3.31
	10	3.59	3.01	3.42	3.34
100kN/m^2 Load	10.25	7.57	6.82	7.62	7.34
	11	7.82	7.00	7.71	7.51
	12	7.94	7.10	7.88	7.64
	13	7.98	7.18	7.92	7.69
	14	8.02	7.22	7.95	7.73
	15	8.05	7.25	7.98	7.76
	16	8.08	7.28	8.01	7.79
	18	8.13	7.33	8.05	7.84
	20	8.17	7.37	8.09	7.88
150kN/m^2 Load	20.25	9.71	8.78	9.80	9.43
	21	10.58	9.82	10.59	10.33
	22	10.74	9.98	10.74	10.49
	23	10.83	10.06	10.83	10.57
	24	10.93	10.16	10.91	10.67
	25	10.99	10.23	10.98	10.73
	26	11.03	10.25	11.02	10.77
	28	11.09	10.28	11.07	10.81
	30	11.14	10.31	11.10	10.85
0kN/m^2 Unload	30.25	6.66	6.13	6.25	6.35
	31	5.85	5.56	5.69	5.70
	32	5.66	5.39	5.52	5.52
	33	5.66	5.29	5.42	5.46
	34	5.51	5.25	5.38	5.38
	35	5.47	5.22	5.35	5.35

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P33



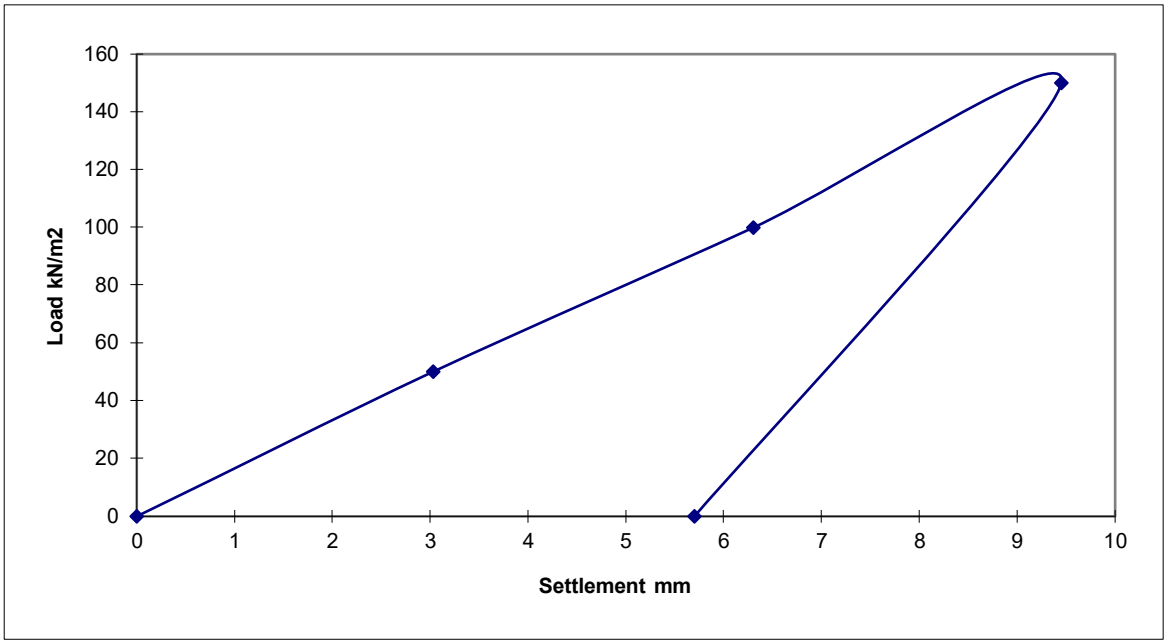
Contract:	Date:
Virginia Park, Caerphilly	01.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P40C	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.03	50	10
6.30	100	20
9.45	150	35
5.70	0	40



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virgainia Park, Caerphilly	Date: 01.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly

Date: 01.08.22

Test Reference: P40C

Test Depth: Surface

Plate Diameter: 600mm

Seating Load: 7.5kN/m^2

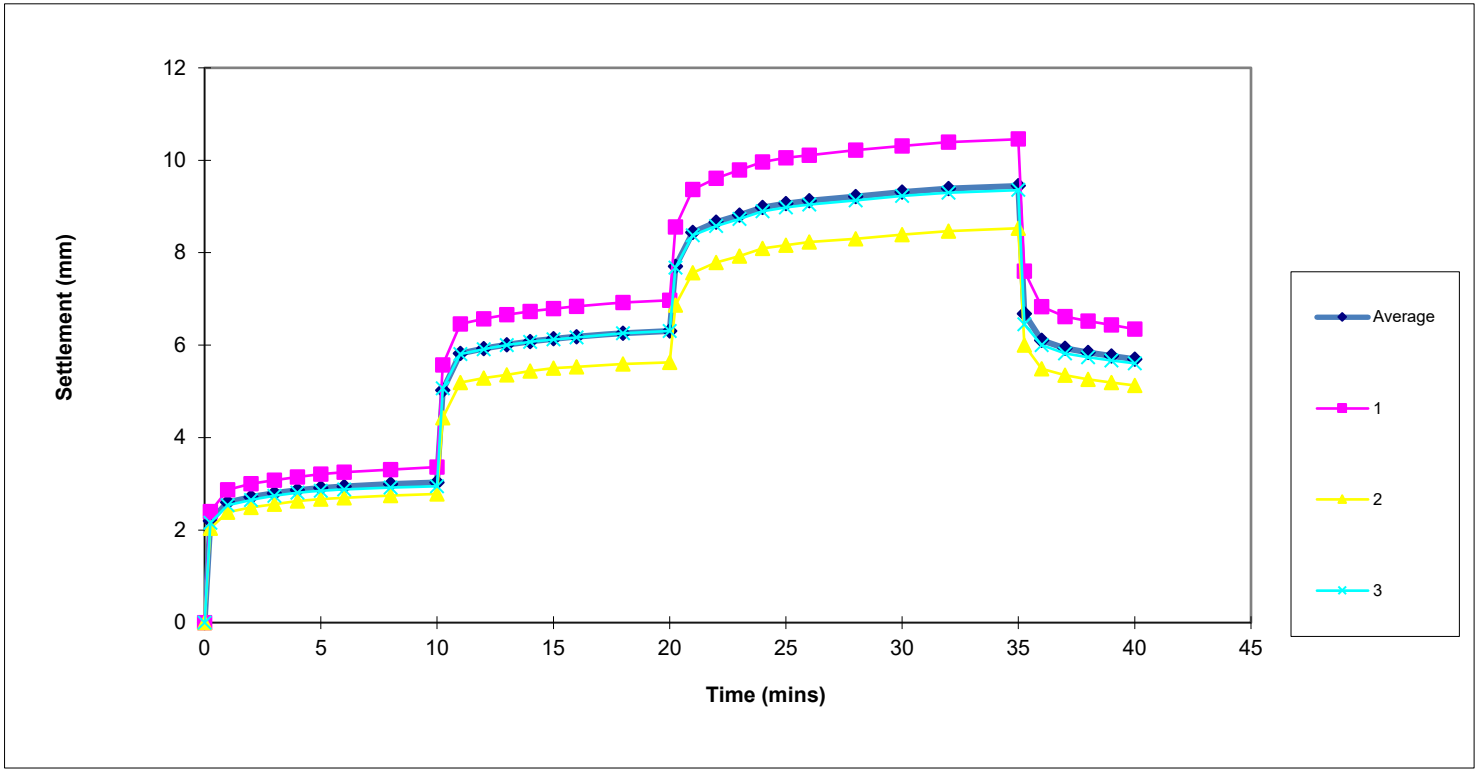
		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.40	2.04	2.16	2.20
	1	2.87	2.39	2.54	2.60
	2	3.00	2.49	2.65	2.71
	3	3.08	2.56	2.74	2.79
	4	3.15	2.63	2.81	2.86
	5	3.21	2.67	2.85	2.91
	6	3.25	2.70	2.88	2.94
	8	3.31	2.75	2.92	2.99
	10	3.36	2.78	2.95	3.03
100kN/m^2 Load	10.25	5.57	4.43	5.07	5.02
	11	6.46	5.19	5.81	5.82
	12	6.57	5.29	5.91	5.92
	13	6.66	5.36	6.00	6.01
	14	6.73	5.44	6.07	6.08
	15	6.79	5.50	6.13	6.14
	16	6.84	5.53	6.17	6.18
	18	6.92	5.59	6.26	6.26
	20	6.97	5.63	6.31	6.30
150kN/m^2 Load	20.25	8.56	6.87	7.68	7.70
	21	9.37	7.57	8.38	8.44
	22	9.61	7.79	8.58	8.66
	23	9.79	7.93	8.73	8.82
	24	9.96	8.09	8.90	8.98
	25	10.05	8.16	8.98	9.06
	26	10.11	8.23	9.04	9.13
	28	10.22	8.30	9.13	9.22
	30	10.31	8.39	9.23	9.31
	32	10.39	8.47	9.30	9.39
	35	10.46	8.53	9.36	9.45
0kN/m^2 Unload	35.25	7.60	6.00	6.45	6.68
	36	6.83	5.49	6.00	6.11
	37	6.62	5.35	5.82	5.93
	38	6.52	5.26	5.74	5.84
	39	6.44	5.19	5.67	5.77
	40	6.35	5.13	5.61	5.70

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot

Test Reference: P40C



Contract:

Virginia Park Caerphilly

Date:

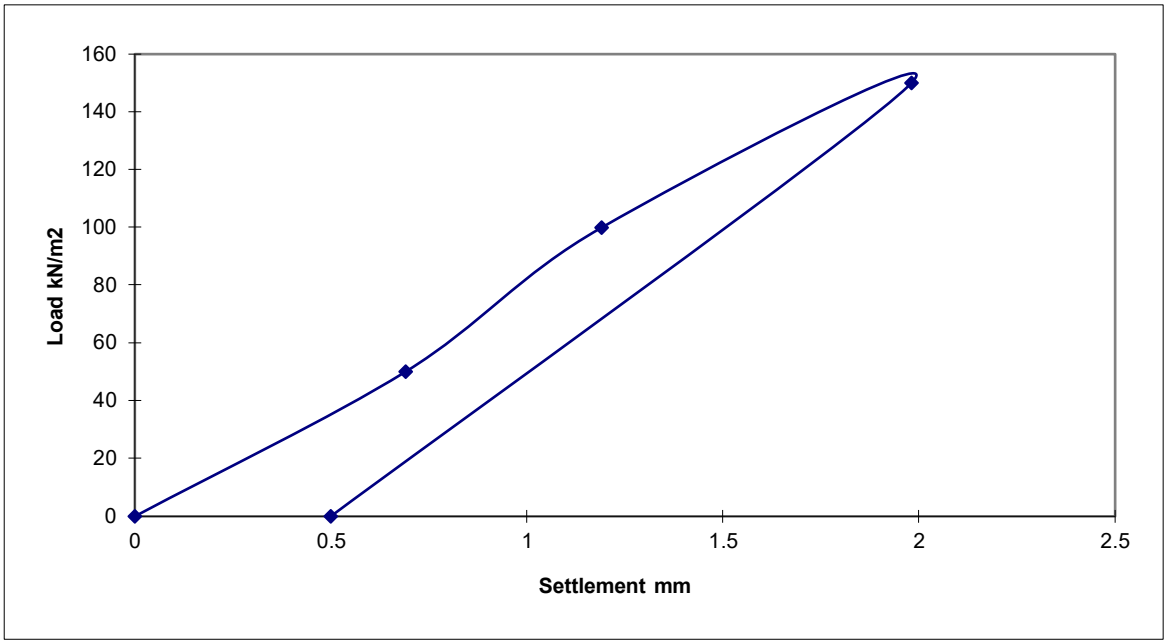
01.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P41	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
0.69	50	6
1.19	100	12
1.98	150	19
0.50	0	24



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park Caerphilly	Date: 31.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 31.08.22

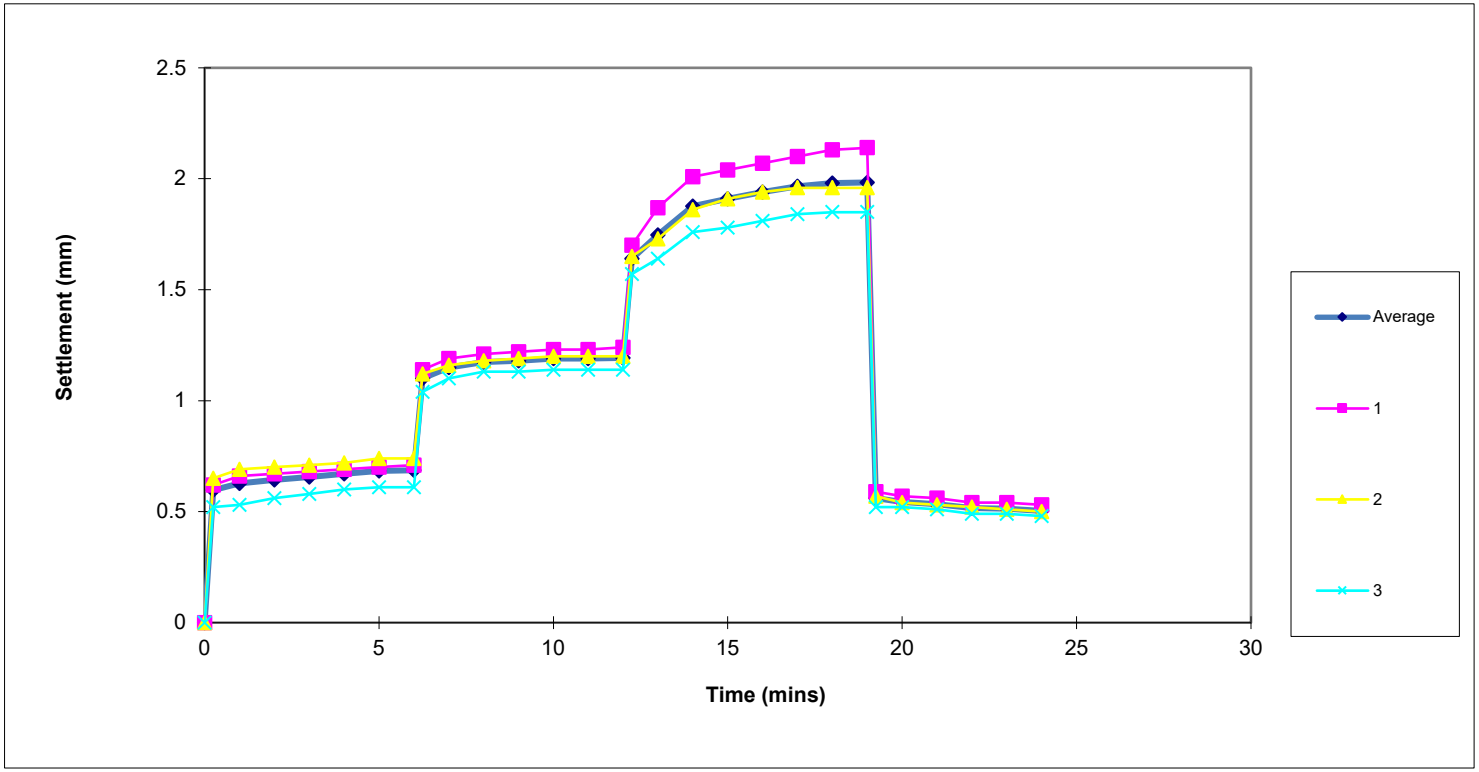
Test Reference: P41 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	0.62	0.65	0.52	0.60
	1	0.66	0.69	0.53	0.63
	2	0.67	0.70	0.56	0.64
	3	0.68	0.71	0.58	0.66
	4	0.69	0.72	0.60	0.67
	5	0.70	0.74	0.61	0.68
	6	0.71	0.74	0.61	0.69
100kN/m^2 Load	6.25	1.14	1.12	1.04	1.10
	7	1.19	1.16	1.10	1.15
	8	1.21	1.18	1.13	1.17
	9	1.22	1.19	1.13	1.18
	10	1.23	1.20	1.14	1.19
	11	1.23	1.20	1.14	1.19
	12	1.24	1.20	1.14	1.19
150kN/m^2 Load	12.25	1.70	1.65	1.57	1.64
	13	1.87	1.73	1.64	1.75
	14	2.01	1.86	1.76	1.88
	15	2.04	1.91	1.78	1.91
	16	2.07	1.94	1.81	1.94
	17	2.10	1.96	1.84	1.97
	18	2.13	1.96	1.85	1.98
	19	2.14	1.96	1.85	1.98
0kN/m^2 Unload	19.25	0.59	0.57	0.52	0.56
	20	0.57	0.54	0.52	0.54
	21	0.56	0.53	0.51	0.53
	22	0.54	0.52	0.49	0.52
	23	0.54	0.51	0.49	0.51
	24	0.53	0.50	0.48	0.50

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P41



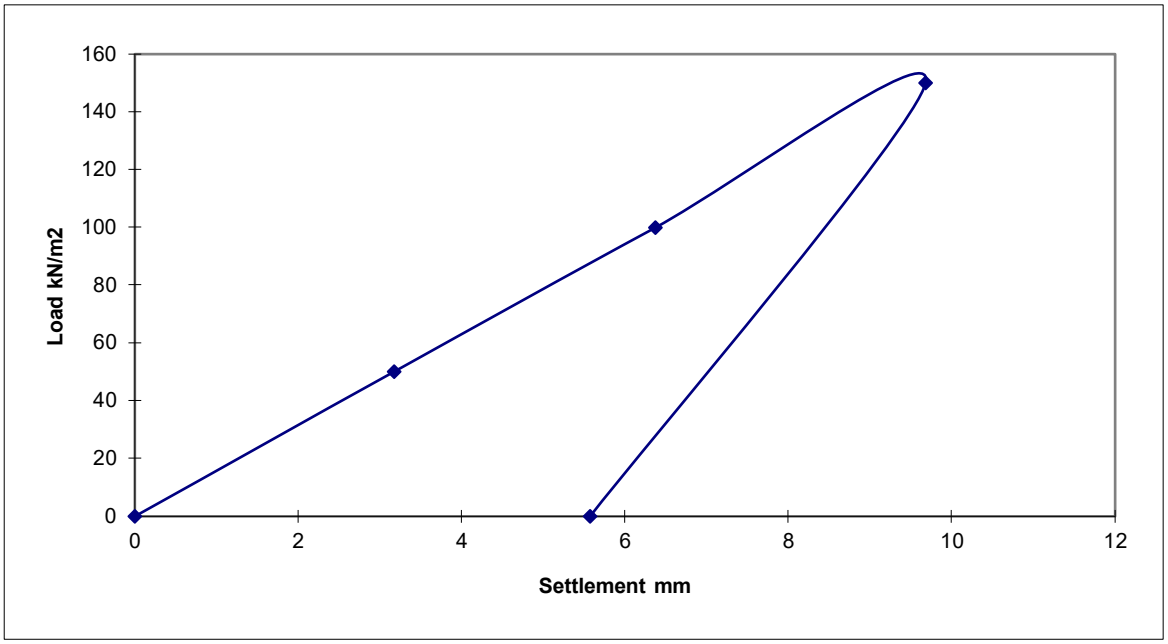
Contract:	Date:
Virginia Park Caerphilly	31.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P42	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.17	50	8
6.37	100	16
9.68	150	24
5.57	0	29



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park Caerphilly	Date: 31.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 31.08.22

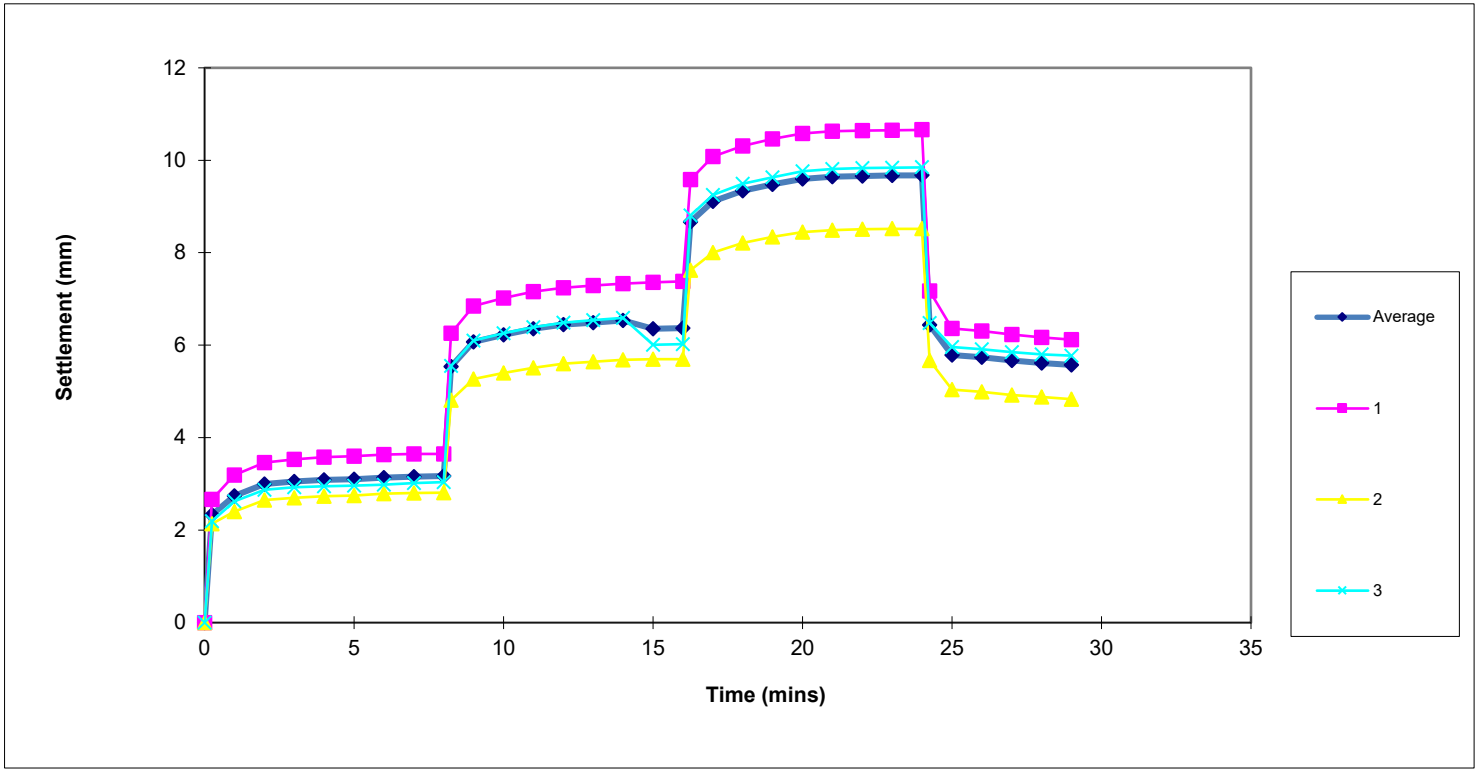
Test Reference: P42 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.67	2.14	2.19	2.33
	1	3.19	2.40	2.62	2.74
	2	3.46	2.65	2.87	2.99
	3	3.53	2.70	2.93	3.05
	4	3.58	2.73	2.95	3.09
	5	3.60	2.75	2.96	3.10
	6	3.63	2.79	2.98	3.13
	7	3.65	2.80	3.02	3.16
	8	3.65	2.81	3.04	3.17
100kN/m^2 Load	8.25	6.26	4.81	5.55	5.54
	9	6.85	5.27	6.10	6.07
	10	7.02	5.40	6.26	6.23
	11	7.16	5.51	6.39	6.35
	12	7.24	5.60	6.49	6.44
	13	7.29	5.64	6.54	6.49
	14	7.33	5.68	6.59	6.53
	15	7.36	5.70	6.01	6.36
	16	7.38	5.70	6.02	6.37
150kN/m^2 Load	16.25	9.58	7.62	8.81	8.67
	17	10.08	8.00	9.25	9.11
	18	10.31	8.21	9.49	9.34
	19	10.46	8.34	9.63	9.48
	20	10.58	8.45	9.76	9.60
	21	10.63	8.49	9.81	9.64
	22	10.64	8.51	9.83	9.66
	23	10.65	8.52	9.84	9.67
	24	10.66	8.52	9.85	9.68
0kN/m^2 Unload	24.25	7.17	5.67	6.48	6.44
	25	6.36	5.04	5.96	5.79
	26	6.31	4.99	5.91	5.74
	27	6.23	4.92	5.85	5.67
	28	6.17	4.88	5.80	5.62
	29	6.12	4.83	5.77	5.57

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P42



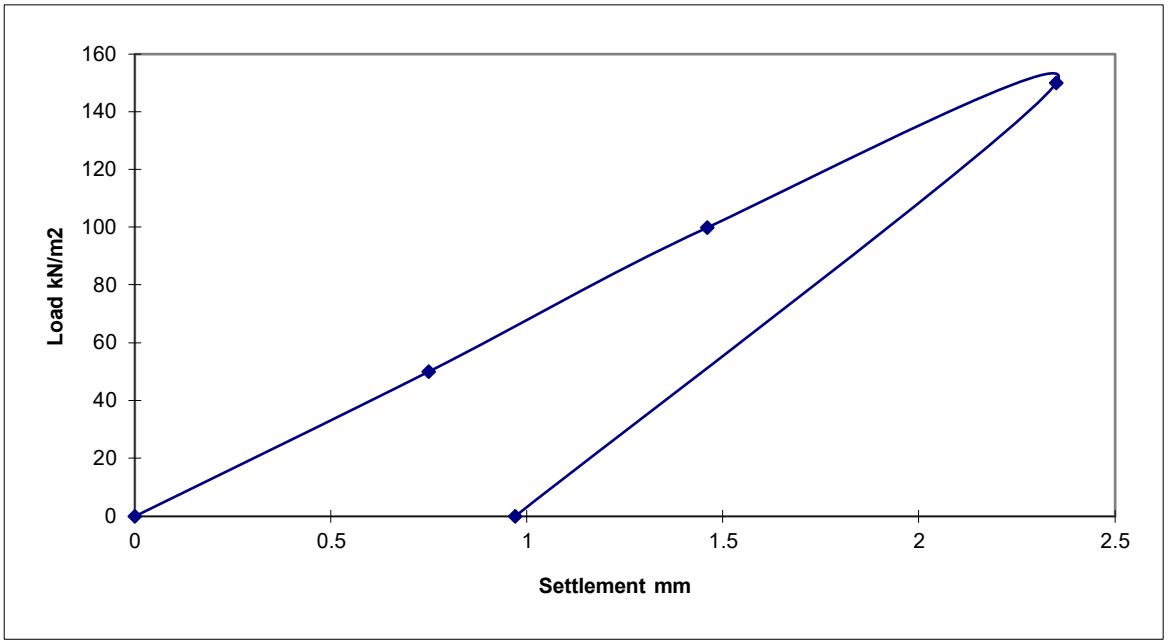
Contract:	Date:
Virginia Park Caerphilly	31.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P43	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
0.75	50	8
1.46	100	16
2.35	150	24
0.97	0	29



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT:
Virginia Park Caerphilly

Date: 31.08.22
Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 31.08.22

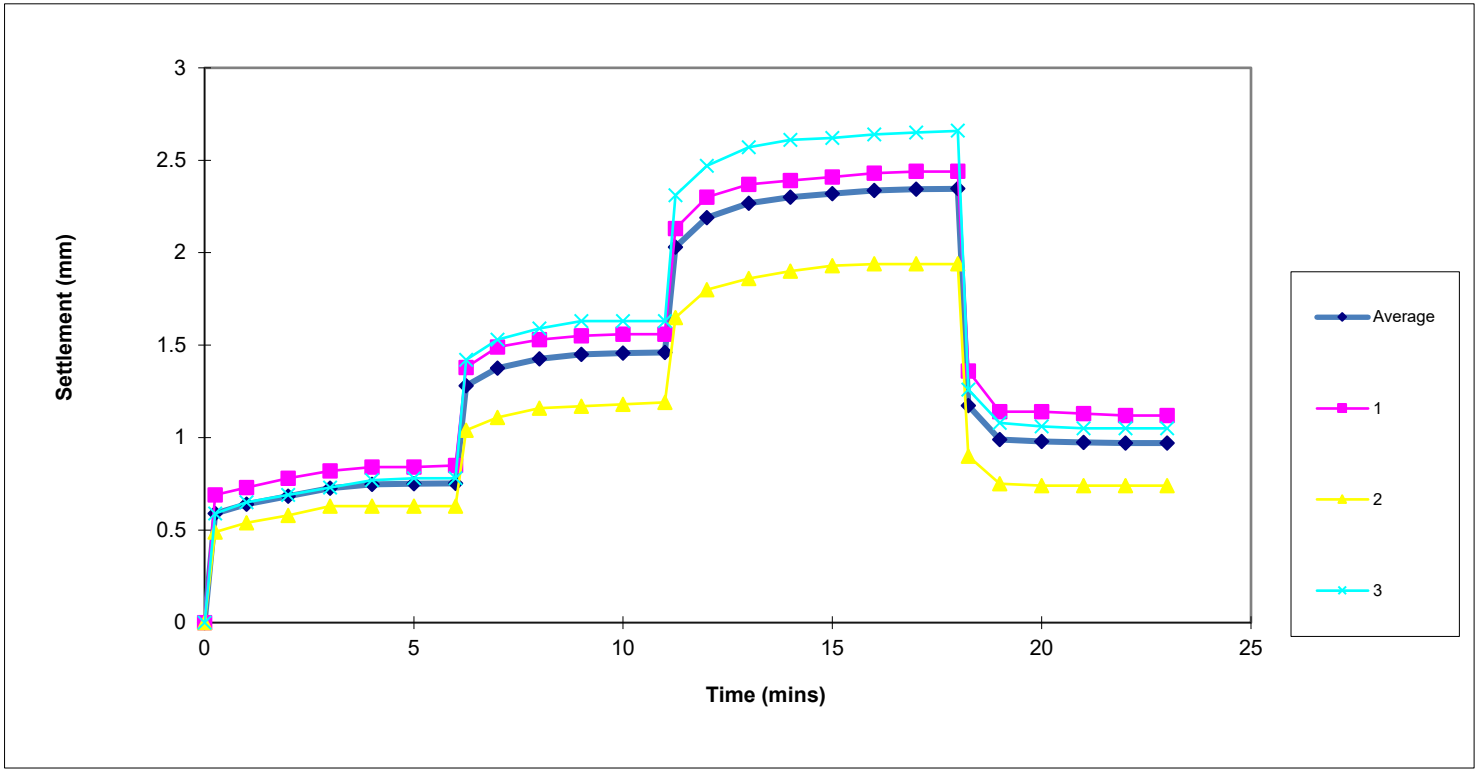
Test Reference: P43 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	0.69	0.49	0.59	0.59
	1	0.73	0.54	0.65	0.64
	2	0.78	0.58	0.69	0.68
	3	0.82	0.63	0.73	0.73
	4	0.84	0.63	0.77	0.75
	5	0.84	0.63	0.78	0.75
	6	0.85	0.63	0.78	0.75
100kN/m^2 Load	6.25	1.38	1.04	1.42	1.28
	7	1.49	1.11	1.53	1.38
	8	1.53	1.16	1.59	1.43
	9	1.55	1.17	1.63	1.45
	10	1.56	1.18	1.63	1.46
	11	1.56	1.19	1.63	1.46
150kN/m^2 Load	11.25	2.13	1.65	2.31	2.03
	12	2.30	1.80	2.47	2.19
	13	2.37	1.86	2.57	2.27
	14	2.39	1.90	2.61	2.30
	15	2.41	1.93	2.62	2.32
	16	2.43	1.94	2.64	2.34
	17	2.44	1.94	2.65	2.34
	18	2.44	1.94	2.66	2.35
0kN/m^2 Unload	18.25	1.36	0.90	1.26	1.17
	19	1.14	0.75	1.08	0.99
	20	1.14	0.74	1.06	0.98
	21	1.13	0.74	1.05	0.97
	22	1.12	0.74	1.05	0.97
	23	1.12	0.74	1.05	0.97

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P43



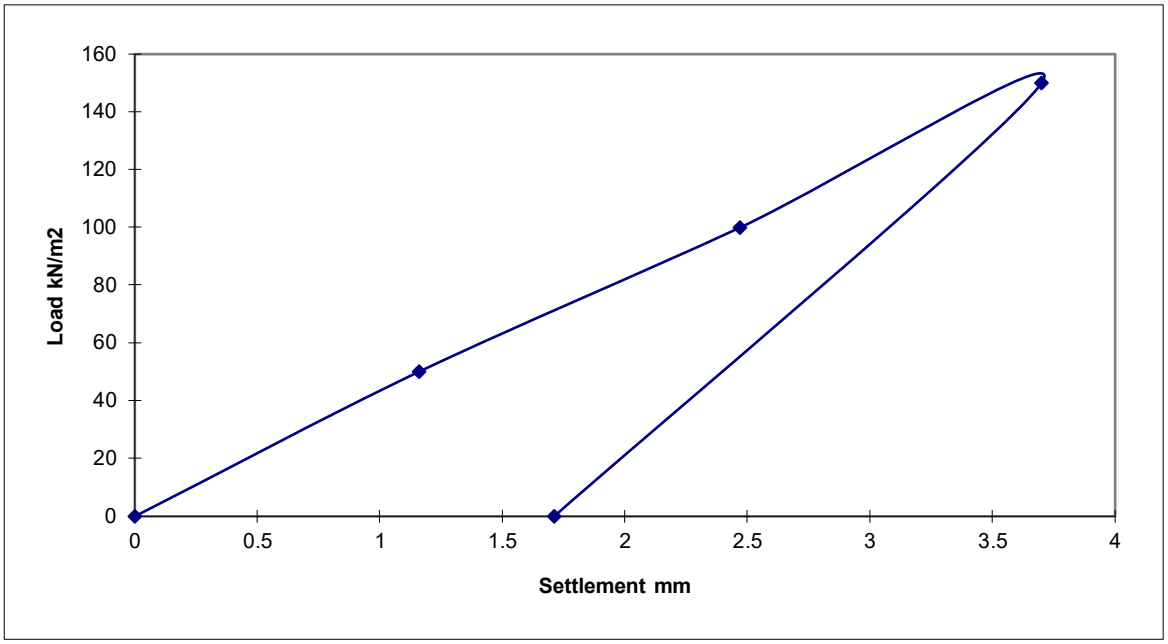
Contract:	Date:
Virginia Park Caerphilly	31.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P44	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.16	50	8
2.47	100	16
3.70	150	24
1.71	0	29



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park Caerphilly	Date: 31.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 31.08.22

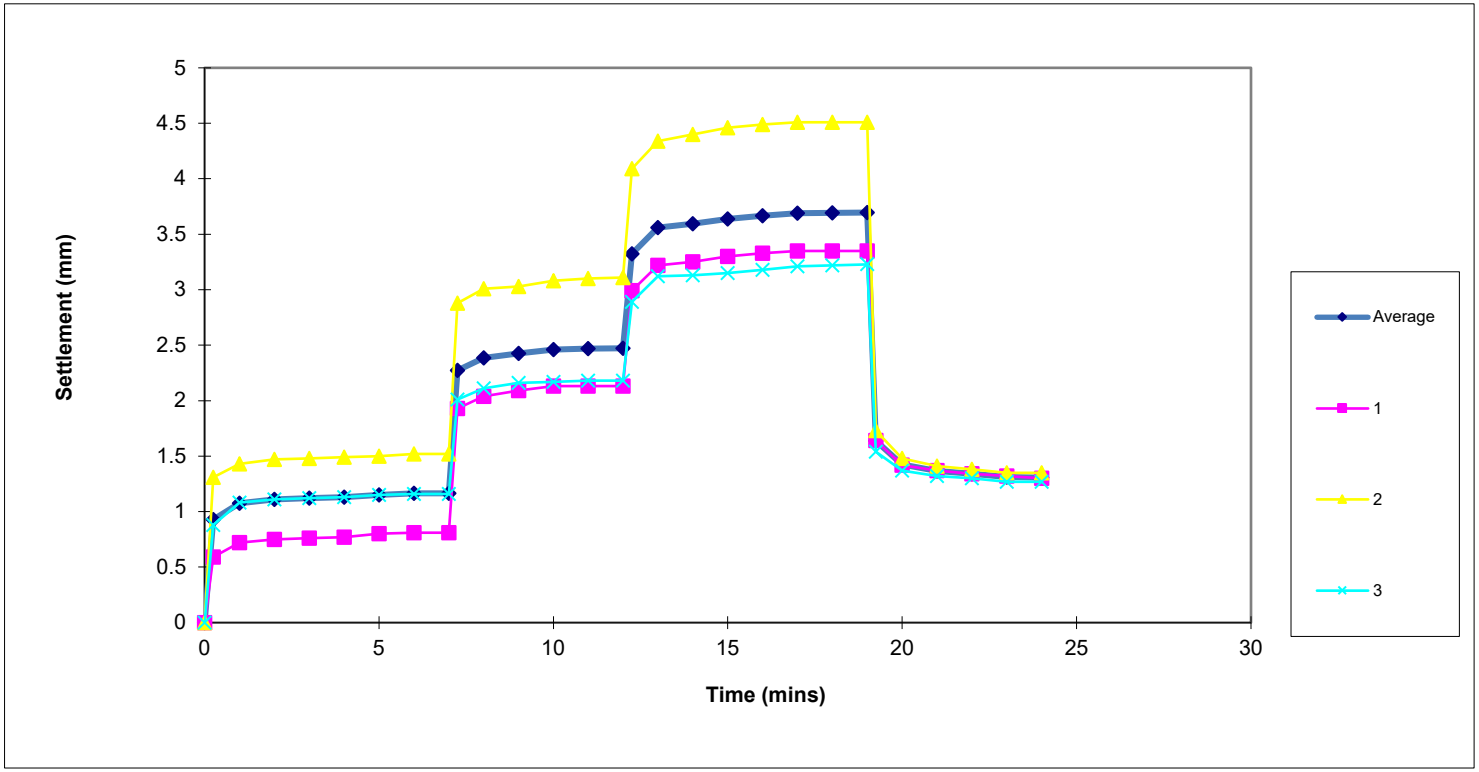
Test Reference: P44 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	0.59	1.31	0.88	0.93
	1	0.72	1.43	1.08	1.08
	2	0.75	1.47	1.11	1.11
	3	0.76	1.48	1.12	1.12
	4	0.77	1.49	1.13	1.13
	5	0.80	1.50	1.15	1.15
	6	0.81	1.52	1.16	1.16
	7	0.81	1.52	1.16	1.16
100kN/m^2 Load	7.25	1.93	2.88	2.01	2.27
	8	2.04	3.01	2.11	2.39
	9	2.09	3.03	2.16	2.43
	10	2.13	3.08	2.17	2.46
	11	2.13	3.10	2.18	2.47
	12	2.13	3.11	2.18	2.47
150kN/m^2 Load	12.25	2.99	4.09	2.89	3.32
	13	3.22	4.34	3.12	3.56
	14	3.25	4.40	3.13	3.59
	15	3.30	4.46	3.15	3.64
	16	3.33	4.49	3.18	3.67
	17	3.35	4.51	3.21	3.69
	18	3.35	4.51	3.22	3.69
	19	3.35	4.51	3.23	3.70
0kN/m^2 Unload	19.25	1.64	1.73	1.54	1.64
	20	1.42	1.48	1.37	1.42
	21	1.37	1.41	1.32	1.37
	22	1.34	1.38	1.30	1.34
	23	1.32	1.35	1.27	1.31
	24	1.30	1.35	1.27	1.31

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P44



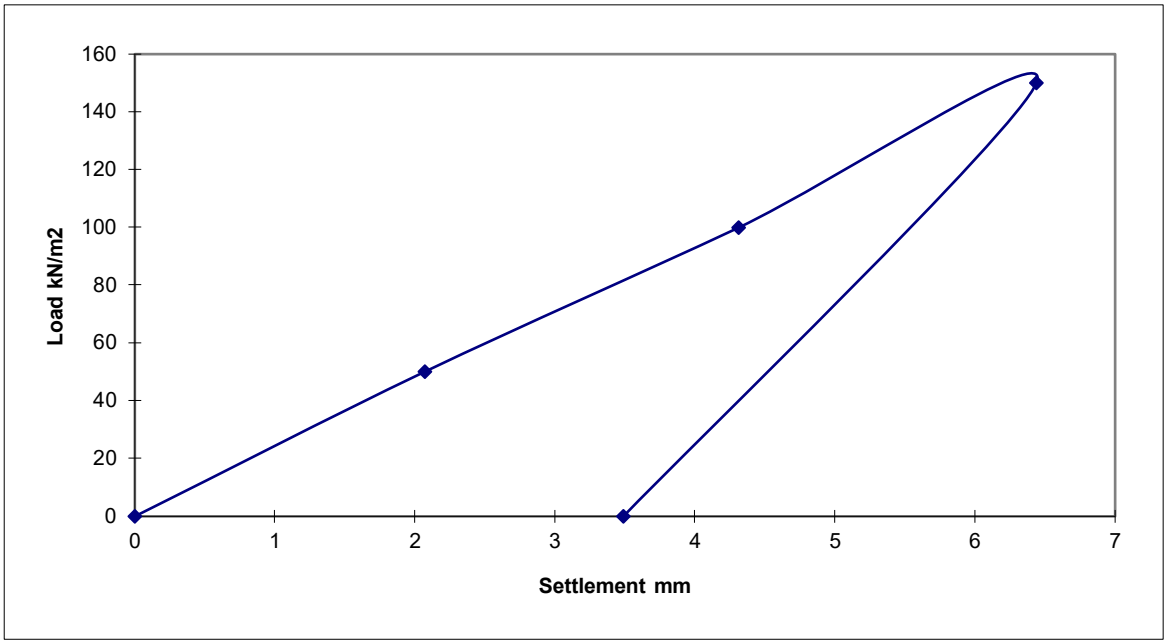
Contract:	Date:
Virginia Park Caerphilly	31.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P45	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.07	50	6
4.31	100	14
6.44	150	26
3.49	0	31



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park Caerphilly	Date: 31.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 31.08.22

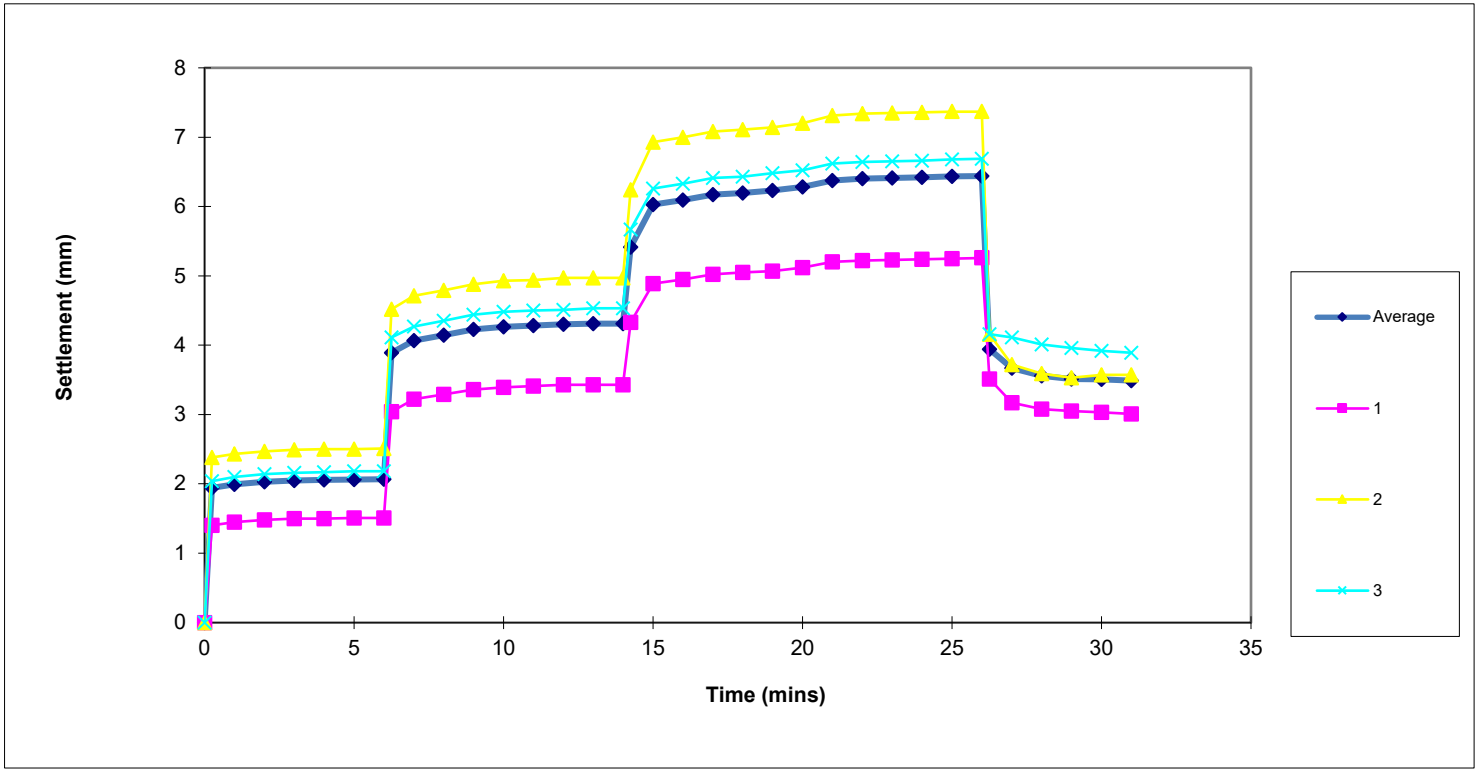
Test Reference: P45 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.40	2.38	2.04	1.94
	1	1.45	2.43	2.10	1.99
	2	1.48	2.47	2.14	2.03
	3	1.50	2.49	2.16	2.05
	4	1.50	2.50	2.17	2.06
	5	1.51	2.50	2.18	2.06
	6	1.51	2.51	2.18	2.07
100kN/m^2 Load	6.25	3.04	4.52	4.11	3.89
	7	3.22	4.71	4.27	4.07
	8	3.29	4.79	4.35	4.14
	9	3.36	4.88	4.44	4.23
	10	3.39	4.93	4.48	4.27
	11	3.41	4.94	4.50	4.28
	12	3.43	4.97	4.51	4.30
	13	3.43	4.97	4.53	4.31
	14	3.43	4.97	4.53	4.31
150kN/m^2 Load	14.25	4.33	6.24	5.67	5.41
	15	4.89	6.93	6.26	6.03
	16	4.95	7.00	6.33	6.09
	17	5.02	7.08	6.41	6.17
	18	5.05	7.11	6.43	6.20
	19	5.07	7.14	6.48	6.23
	20	5.12	7.20	6.52	6.28
	21	5.20	7.31	6.62	6.38
	22	5.22	7.34	6.64	6.40
	23	5.23	7.35	6.65	6.41
	24	5.24	7.36	6.66	6.42
	25	5.25	7.37	6.68	6.43
	26	5.26	7.37	6.69	6.44
0kN/m^2 Unload	26.25	3.51	4.16	4.16	3.94
	27	3.17	3.72	4.11	3.67
	28	3.08	3.59	4.01	3.56
	29	3.05	3.53	3.96	3.51
	30	3.03	3.57	3.92	3.51
	31	3.01	3.57	3.89	3.49

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P45



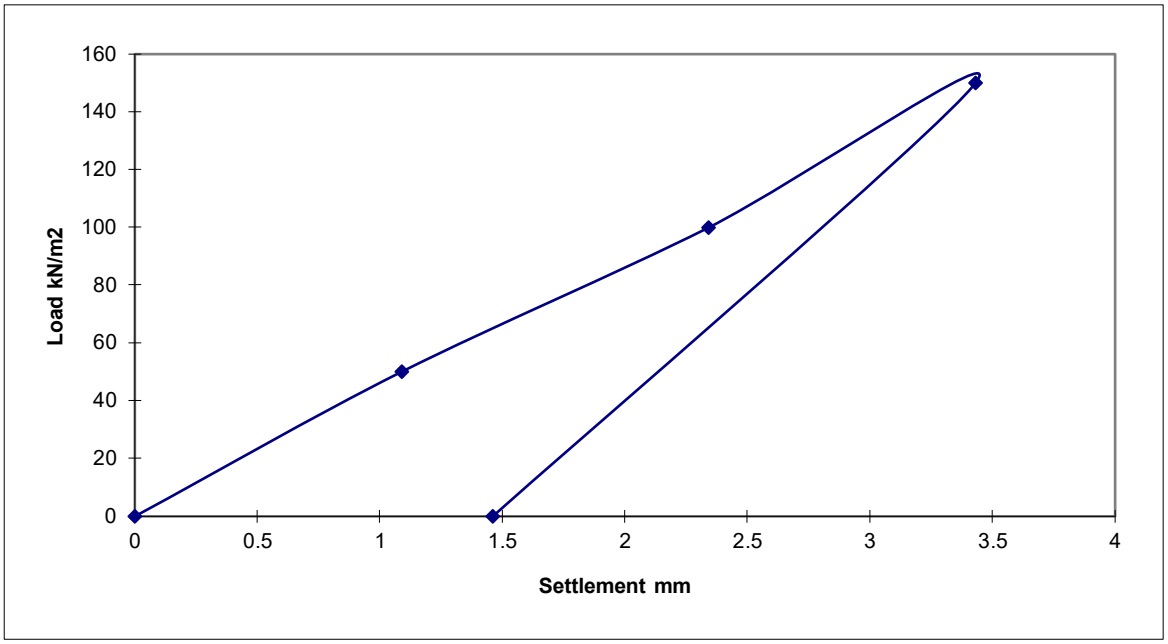
Contract:	Date:
Virginia Park Caerphilly	31.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P46	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.09	50	6
2.34	100	14
3.43	150	26
1.46	0	31



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park Caerphilly	Date: 31.08.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 31.08.22

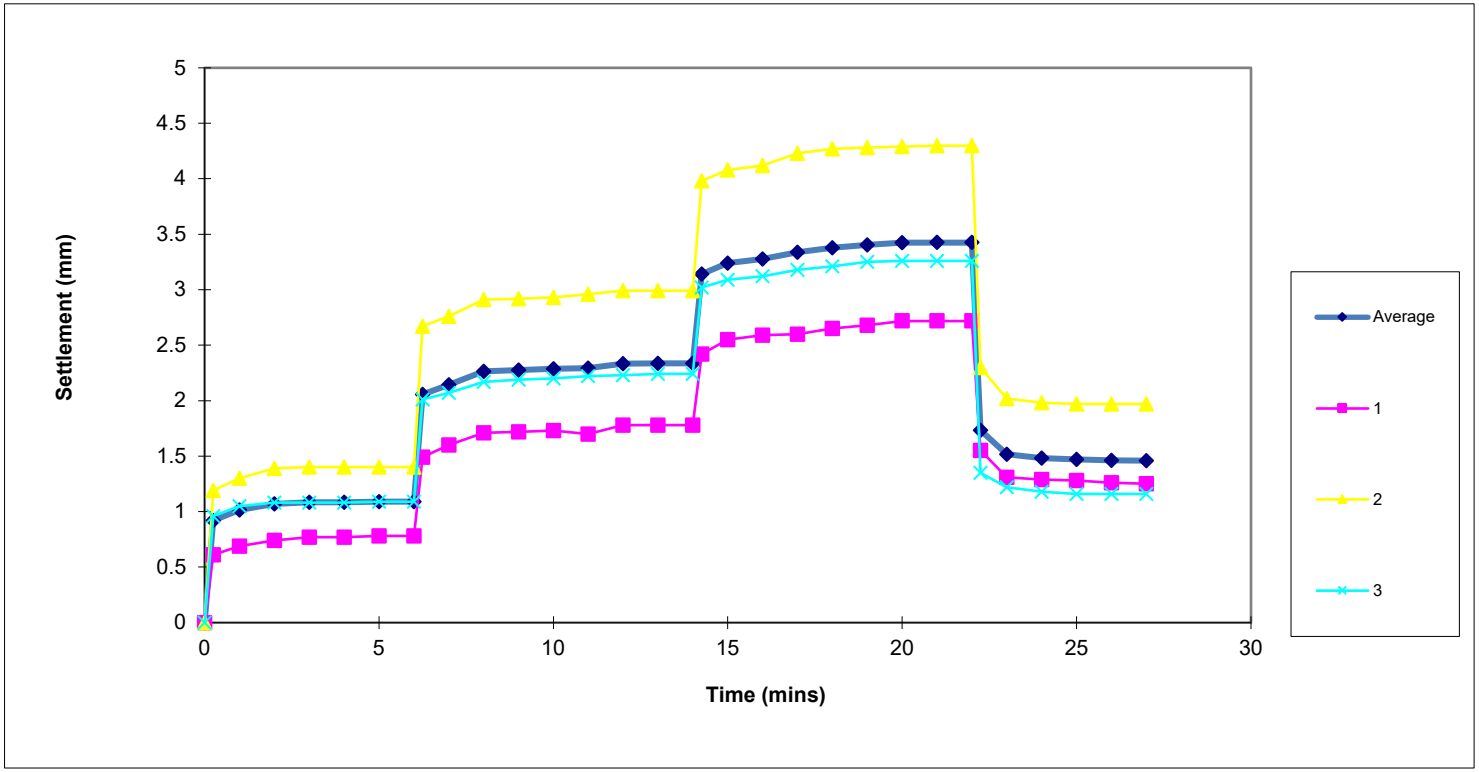
Test Reference: P46 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	0.61	1.19	0.96	0.92
	1	0.69	1.30	1.05	1.01
	2	0.74	1.39	1.08	1.07
	3	0.77	1.40	1.08	1.08
	4	0.77	1.40	1.08	1.08
	5	0.78	1.40	1.09	1.09
	6	0.78	1.40	1.09	1.09
100kN/m^2 Load	6.25	1.49	2.67	2.01	2.06
	7	1.60	2.76	2.07	2.14
	8	1.71	2.91	2.17	2.26
	9	1.72	2.92	2.19	2.28
	10	1.73	2.93	2.20	2.29
	11	1.70	2.96	2.22	2.29
	12	1.78	2.99	2.23	2.33
	13	1.78	2.99	2.24	2.34
	14	1.78	2.99	2.24	2.34
150kN/m^2 Load	14.25	2.42	3.98	3.02	3.14
	15	2.55	4.08	3.09	3.24
	16	2.59	4.12	3.12	3.28
	17	2.60	4.23	3.18	3.34
	18	2.65	4.27	3.21	3.38
	19	2.68	4.28	3.25	3.40
	20	2.72	4.29	3.26	3.42
	21	2.72	4.30	3.26	3.43
	22	2.72	4.30	3.26	3.43
0kN/m^2 Unload	22.25	1.55	2.30	1.35	1.73
	23	1.31	2.02	1.22	1.52
	24	1.29	1.98	1.18	1.48
	25	1.28	1.97	1.16	1.47
	26	1.26	1.97	1.16	1.46
	27	1.25	1.97	1.16	1.46

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P46



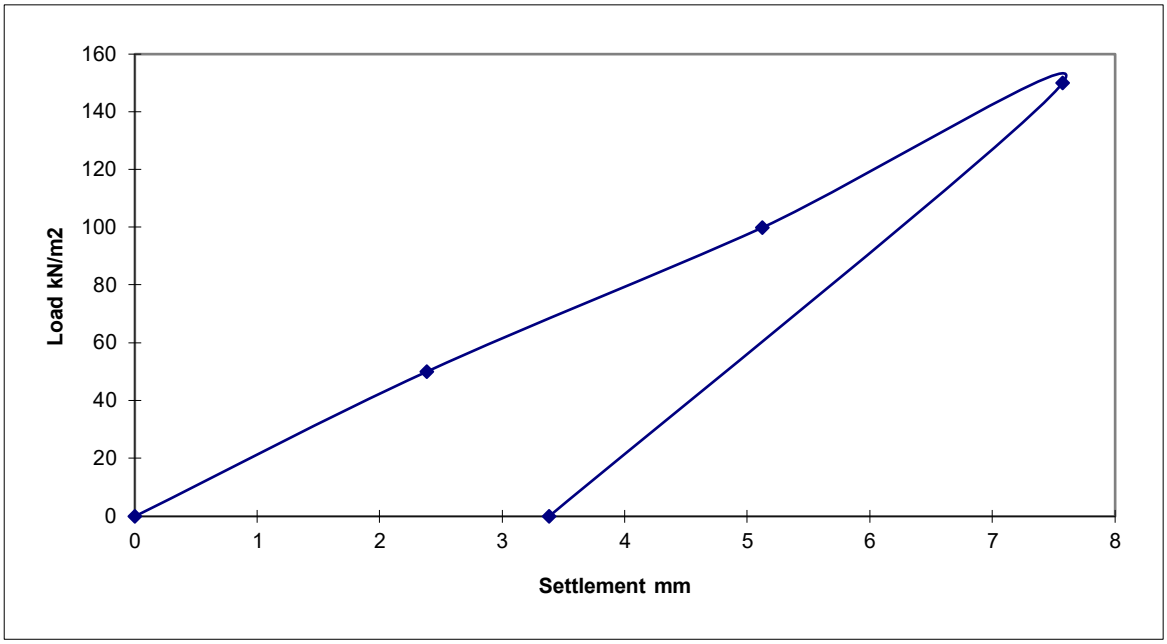
Contract:	Date:
Virginia Park Caerphilly	31.08.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P47	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.38	50	6
5.12	100	14
7.57	150	26
3.38	0	31



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park Caerphilly	Date: 01.09.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 01.09.22

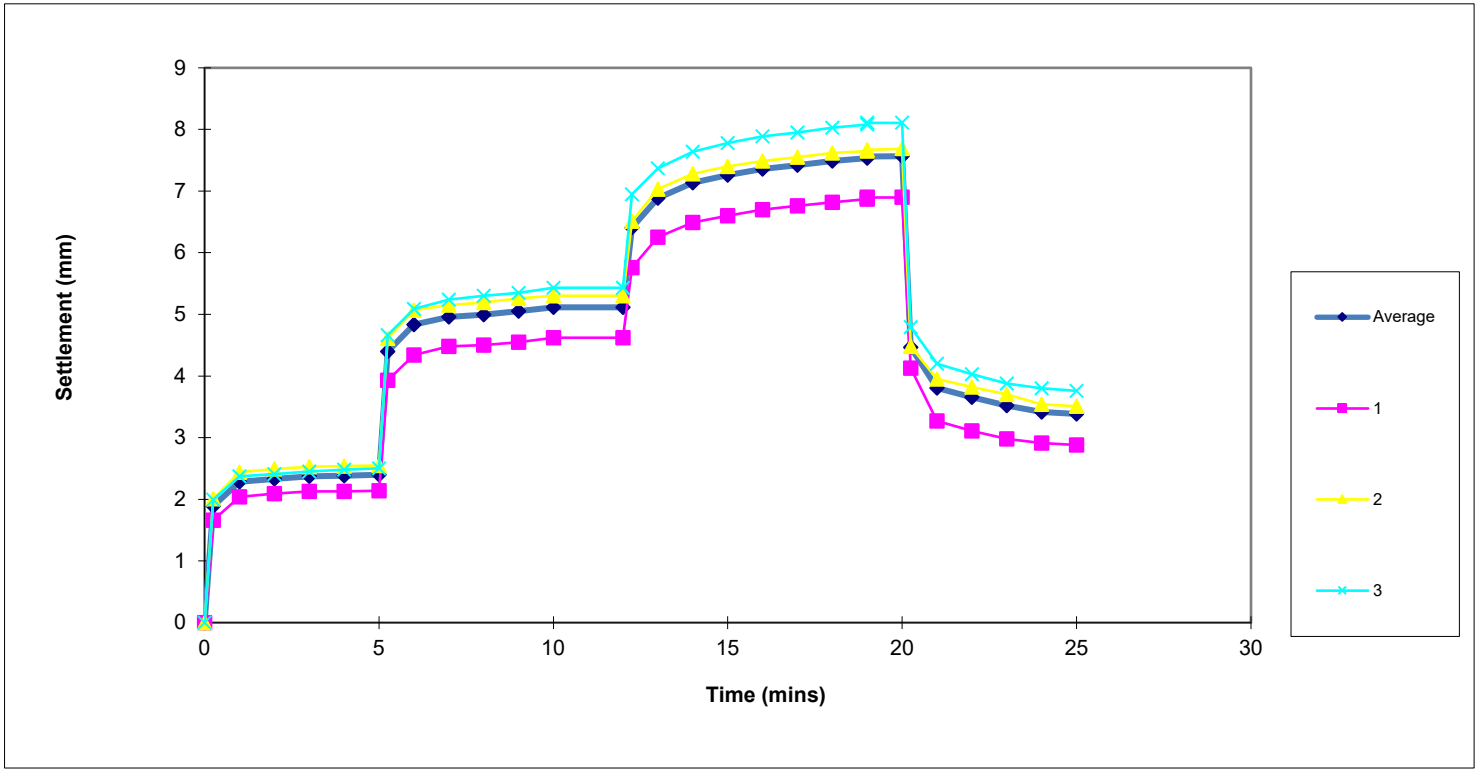
Test Reference: P47 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.66	2.01	1.99	1.89
	1	2.04	2.44	2.37	2.28
	2	2.09	2.49	2.41	2.33
	3	2.13	2.53	2.45	2.37
	4	2.13	2.54	2.48	2.38
	5	2.14	2.55	2.50	2.40
100kN/m^2 Load	5.25	3.93	4.61	4.66	4.40
	6	4.34	5.07	5.09	4.83
	7	4.48	5.15	5.24	4.96
	8	4.50	5.19	5.30	5.00
	9	4.55	5.26	5.35	5.05
	10	4.62	5.30	5.43	5.12
	12	4.62	5.30	5.43	5.12
150kN/m^2 Load	12.25	5.76	6.51	6.95	6.41
	13	6.25	7.03	7.37	6.88
	14	6.49	7.28	7.64	7.14
	15	6.60	7.40	7.78	7.26
	16	6.70	7.49	7.89	7.36
	17	6.76	7.55	7.95	7.42
	18	6.82	7.62	8.03	7.49
	19	6.87	7.65	8.08	7.53
	19	6.90	7.67	8.11	7.56
	20	6.90	7.69	8.11	7.57
0kN/m^2 Unload	20.25	4.13	4.48	4.79	4.47
	21	3.27	3.95	4.20	3.81
	22	3.11	3.82	4.03	3.65
	23	2.98	3.70	3.88	3.52
	24	2.91	3.54	3.80	3.42
	25	2.88	3.51	3.76	3.38

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P47



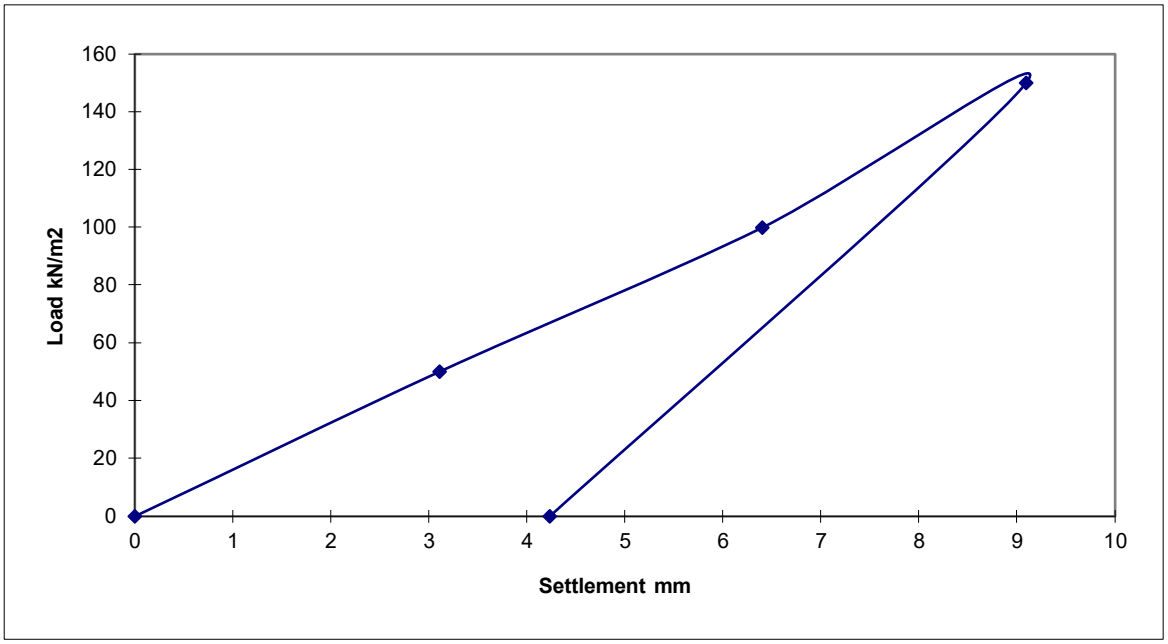
Contract:	Date:
Virginia Park Caerphilly	01.09.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P48	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Brown sandy gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.11	50	6
6.40	100	14
9.09	150	26
4.23	0	31



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using UKAS calibrated electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park Caerphilly	Date: 01.09.22 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 01.09.22

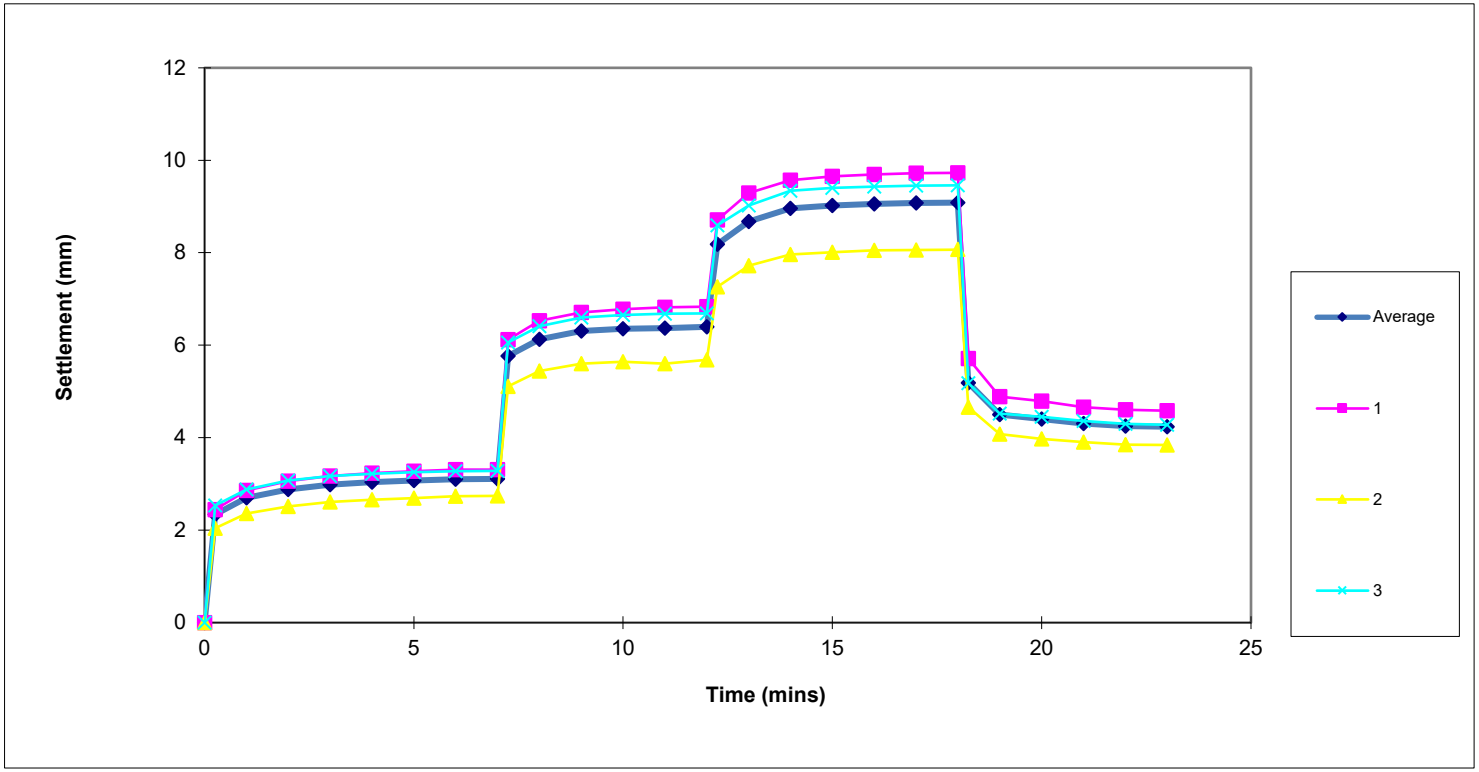
Test Reference: P48 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.44	2.04	2.53	2.34
	1	2.86	2.36	2.88	2.70
	2	3.06	2.51	3.07	2.88
	3	3.17	2.61	3.17	2.98
	4	3.23	2.66	3.22	3.04
	5	3.27	2.69	3.25	3.07
	6	3.31	2.73	3.27	3.10
	7	3.31	2.74	3.28	3.11
100kN/m^2 Load	7.25	6.12	5.11	6.06	5.76
	8	6.53	5.44	6.41	6.13
	9	6.71	5.60	6.60	6.30
	10	6.78	5.64	6.65	6.36
	11	6.82	5.60	6.68	6.37
	12	6.83	5.68	6.69	6.40
150kN/m^2 Load	12.25	8.71	7.26	8.59	8.19
	13	9.29	7.72	9.02	8.68
	14	9.57	7.96	9.34	8.96
	15	9.65	8.01	9.40	9.02
	16	9.69	8.05	9.43	9.06
	17	9.72	8.06	9.45	9.08
	18	9.73	8.07	9.46	9.09
0kN/m^2 Unload	18.25	5.71	4.66	5.18	5.18
	19	4.89	4.08	4.52	4.50
	20	4.79	3.97	4.45	4.40
	21	4.66	3.90	4.36	4.31
	22	4.60	3.85	4.30	4.25
	23	4.58	3.84	4.28	4.23

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P48



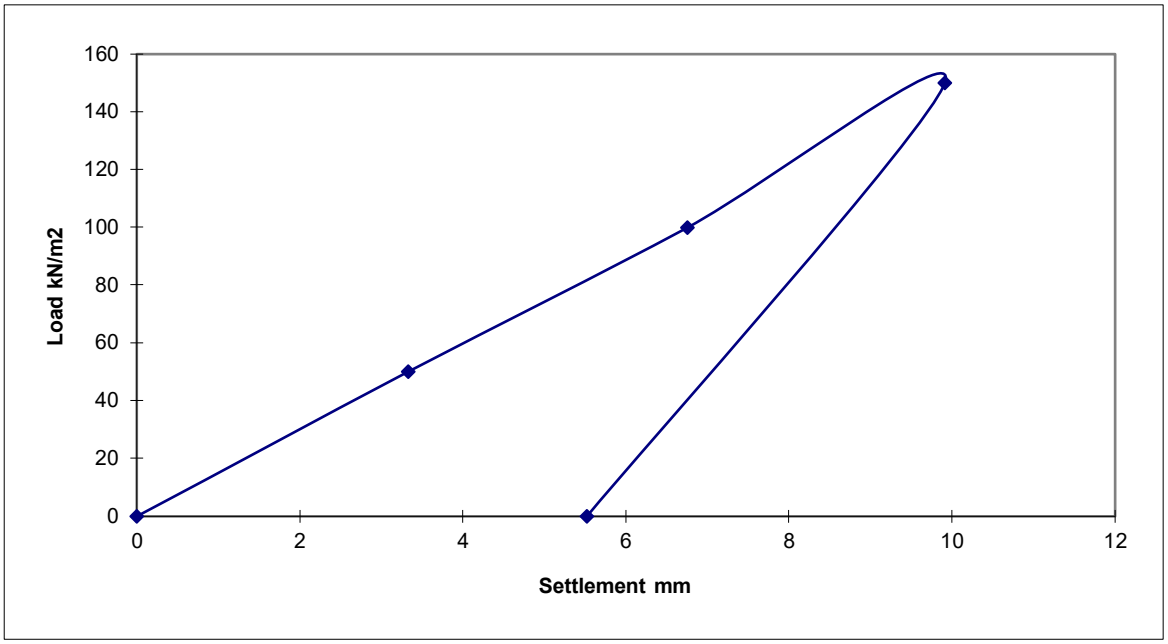
Contract:	Date:
Virginia Park Caerphilly	01.09.22

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P55	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
3.33	50	10
6.75	100	20
9.91	150	30
5.52	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 25.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 25.05.23

Test Reference: P55

Test Depth: Surface

Plate Diameter: 600mm

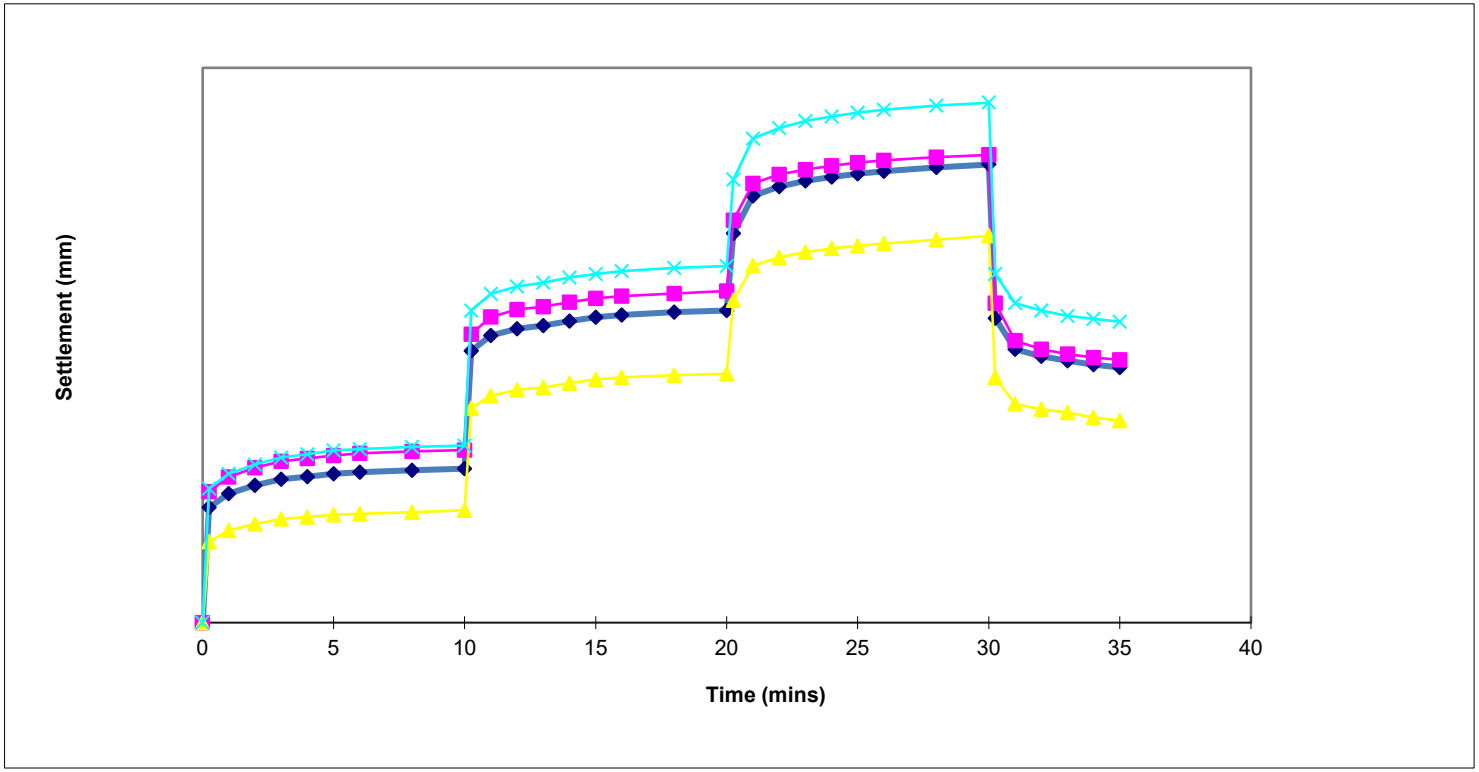
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.83	1.75	2.90	2.49
	1	3.15	1.99	3.22	2.79
	2	3.35	2.13	3.42	2.97
	3	3.49	2.24	3.57	3.10
	4	3.55	2.28	3.64	3.16
	5	3.61	2.33	3.72	3.22
	6	3.66	2.35	3.75	3.25
	8	3.70	2.39	3.80	3.30
	10	3.73	2.43	3.83	3.33
100kN/m^2 Load	10.25	6.24	4.64	6.75	5.88
	11	6.61	4.91	7.11	6.21
	12	6.77	5.03	7.27	6.36
	13	6.83	5.09	7.35	6.42
	14	6.93	5.18	7.46	6.52
	15	7.01	5.26	7.54	6.60
	16	7.06	5.30	7.60	6.65
	18	7.12	5.35	7.67	6.71
	20	7.17	5.38	7.71	6.75
150kN/m^2 Load	20.25	8.70	6.97	9.58	8.42
	21	9.50	7.72	10.47	9.23
	22	9.69	7.90	10.70	9.43
	23	9.80	8.01	10.85	9.55
	24	9.88	8.09	10.95	9.64
	25	9.95	8.15	11.03	9.71
	26	10.00	8.20	11.09	9.76
	28	10.07	8.28	11.18	9.84
	30	10.12	8.37	11.25	9.91
0kN/m^2 Unload	30.25	6.91	5.30	7.54	6.58
	31	6.10	4.73	6.91	5.91
	32	5.91	4.62	6.75	5.76
	33	5.81	4.54	6.63	5.66
	34	5.73	4.44	6.57	5.58
	35	5.68	4.37	6.51	5.52

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P55



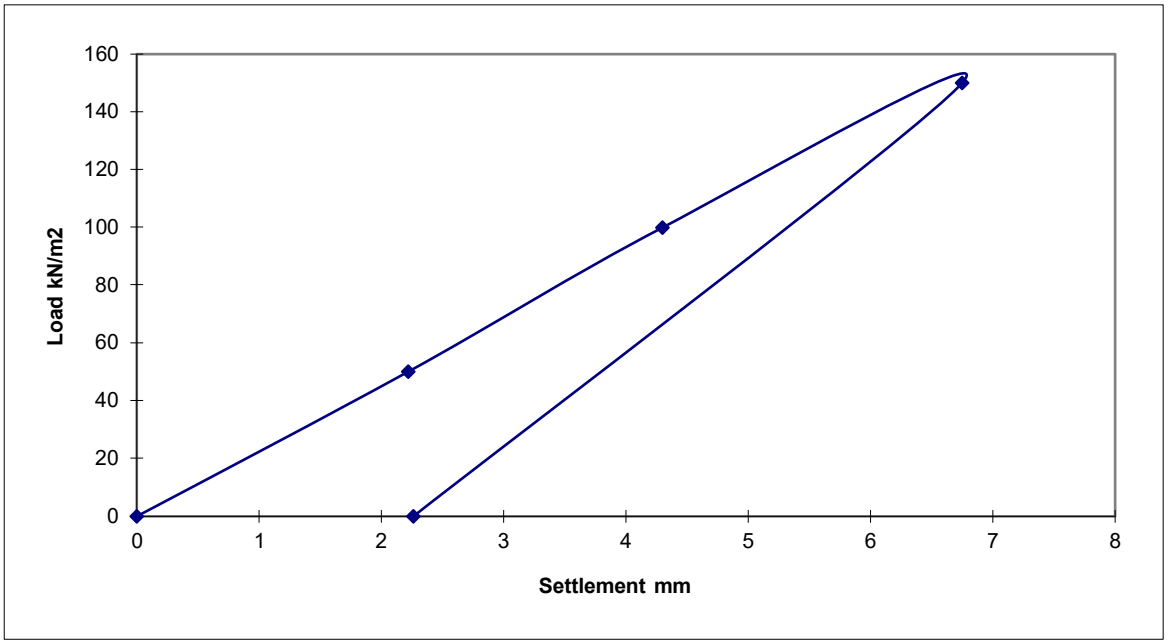
Contract:	Date:
Virginia Park, Caerphilly	25.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P57	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.22	50	5
4.30	100	10
6.75	150	15
2.26	0	20



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 25.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park, Caerphilly

Date: 25.05.23

Test Reference: P57

Test Depth: Surface

Plate Diameter: 600mm

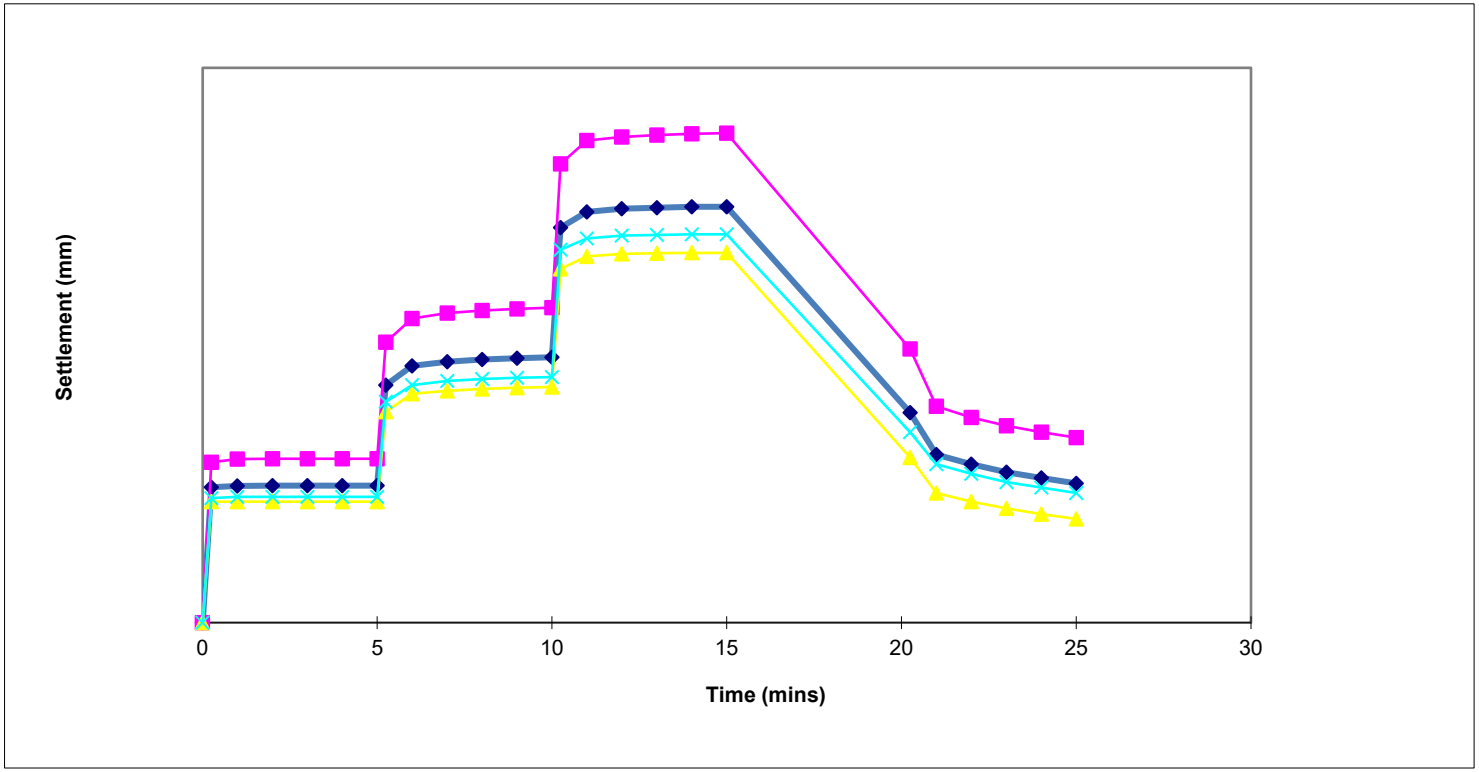
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.60	1.96	2.02	2.19
	1	2.65	1.96	2.04	2.22
	2	2.66	1.96	2.04	2.22
	3	2.66	1.96	2.04	2.22
	4	2.66	1.96	2.04	2.22
	5	2.66	1.96	2.04	2.22
100kN/m^2 Load	5.25	4.55	3.42	3.58	3.85
	6	4.93	3.71	3.85	4.16
	7	5.02	3.76	3.92	4.23
	8	5.06	3.79	3.95	4.27
	9	5.09	3.81	3.97	4.29
	10	5.11	3.82	3.98	4.30
150kN/m^2 Load	10.25	7.44	5.74	6.05	6.41
	11	7.82	5.94	6.23	6.66
	12	7.88	5.98	6.28	6.71
	13	7.91	5.99	6.29	6.73
	14	7.93	6.00	6.30	6.74
	15	7.94	6.00	6.30	6.75
0kN/m^2 Unload	20.25	4.44	2.68	3.09	3.40
	21	3.51	2.10	2.57	2.73
	22	3.33	1.96	2.41	2.57
	23	3.19	1.85	2.28	2.44
	24	3.09	1.76	2.19	2.35
	25	3.00	1.68	2.10	2.26

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P57



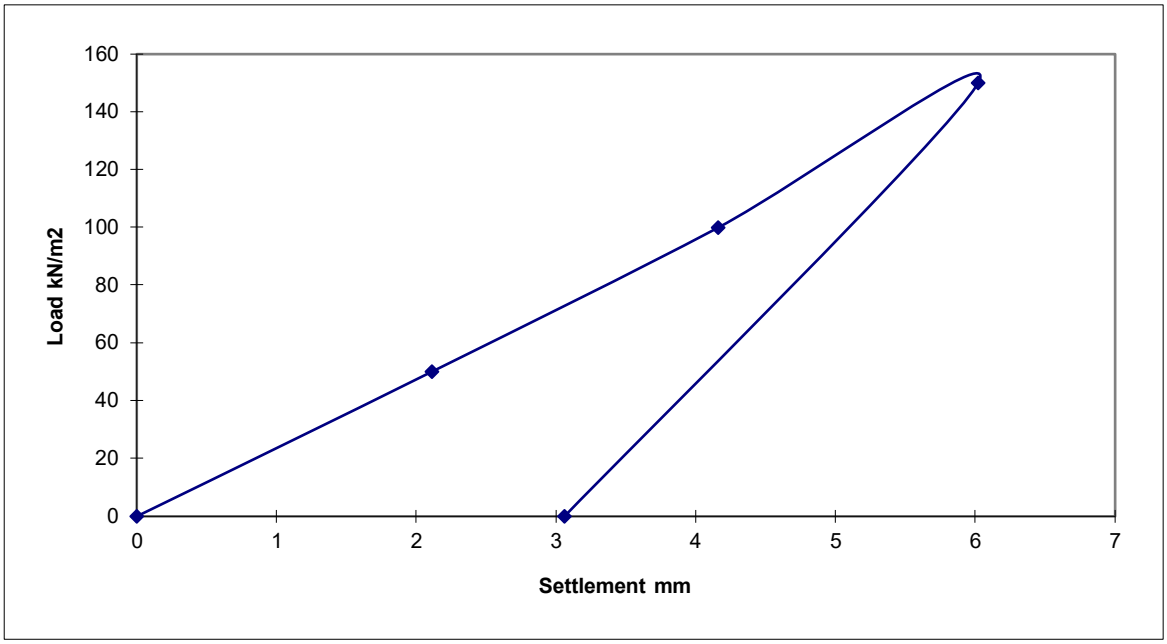
Contract:	Date:
Virginia Park, Caerphilly	25.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P60	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.11	50	5
4.16	100	11
6.02	150	17
3.06	0	22



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 25.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly

Date: 25.05.23

Test Reference: P60

Test Depth: Surface

Plate Diameter: 600mm

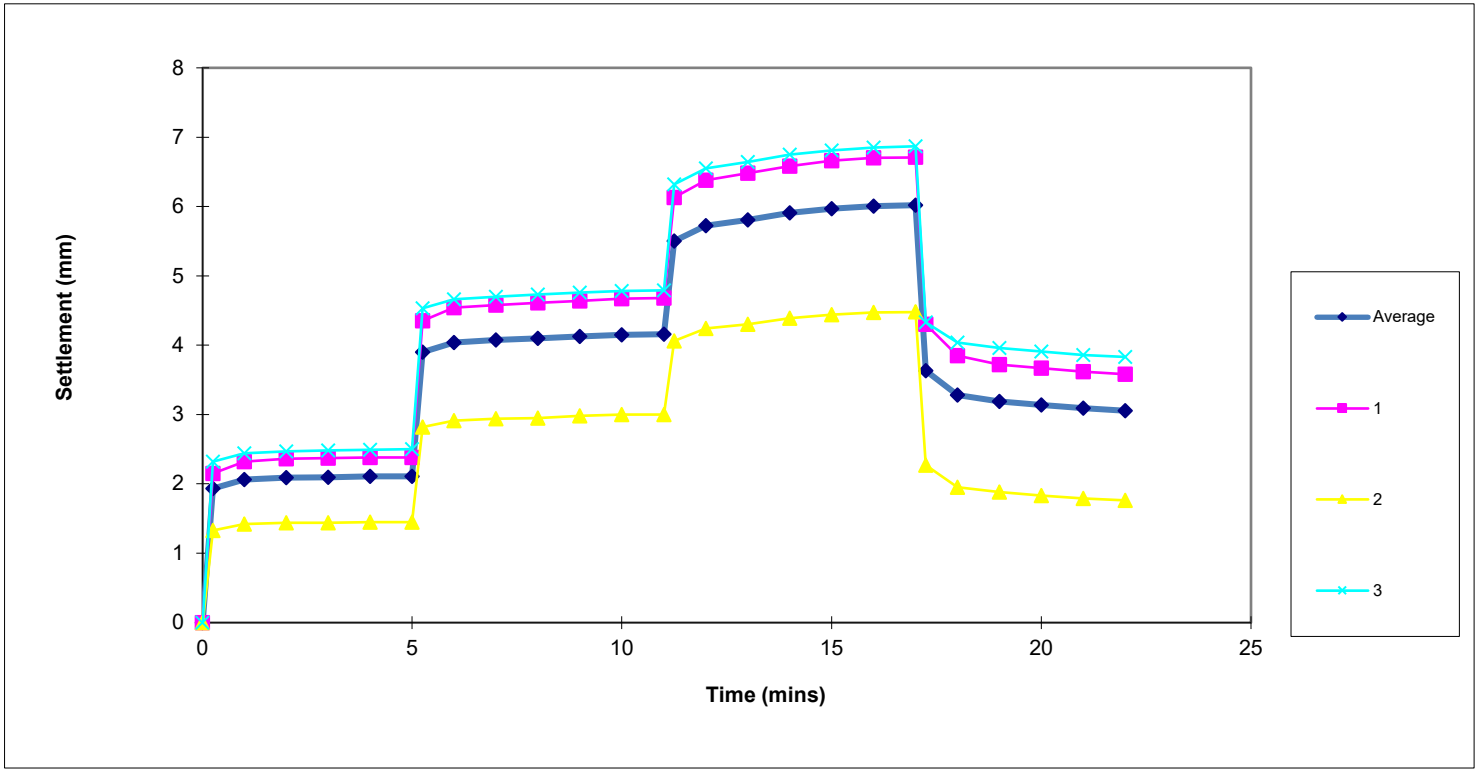
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.15	1.33	2.32	1.93
	1	2.32	1.42	2.44	2.06
	2	2.36	1.44	2.47	2.09
	3	2.37	1.44	2.48	2.10
	4	2.38	1.45	2.49	2.11
	5	2.38	1.45	2.50	2.11
100kN/m^2 Load	5.25	4.35	2.82	4.53	3.90
	6	4.54	2.91	4.66	4.04
	7	4.58	2.94	4.70	4.07
	8	4.61	2.95	4.73	4.10
	9	4.64	2.98	4.76	4.13
	10	4.67	3.00	4.78	4.15
	11	4.68	3.00	4.79	4.16
150kN/m^2 Load	11.25	6.13	4.06	6.32	5.50
	12	6.38	4.24	6.55	5.72
	13	6.48	4.30	6.64	5.81
	14	6.58	4.39	6.75	5.91
	15	6.66	4.44	6.81	5.97
	16	6.70	4.47	6.85	6.01
	17	6.71	4.48	6.87	6.02
0kN/m^2 Unload	17.25	4.30	2.27	4.33	3.63
	18	3.85	1.95	4.04	3.28
	19	3.72	1.88	3.96	3.19
	20	3.67	1.83	3.91	3.14
	21	3.62	1.79	3.86	3.09
	22	3.58	1.76	3.83	3.06

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P60



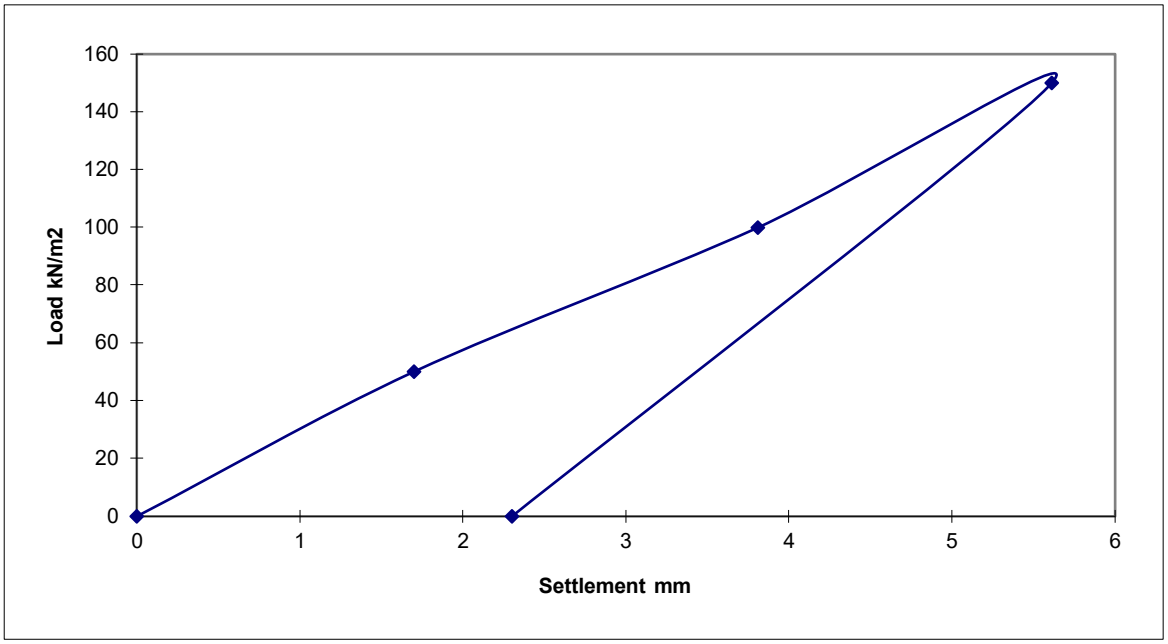
Contract:	Date:
Virginia Park Caerphilly	25.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P61	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.70	50	5
3.81	100	10
5.61	150	15
2.30	0	20



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 25.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly

Date: 25.05.23

Test Reference: P61

Test Depth: Surface

Plate Diameter: 600mm

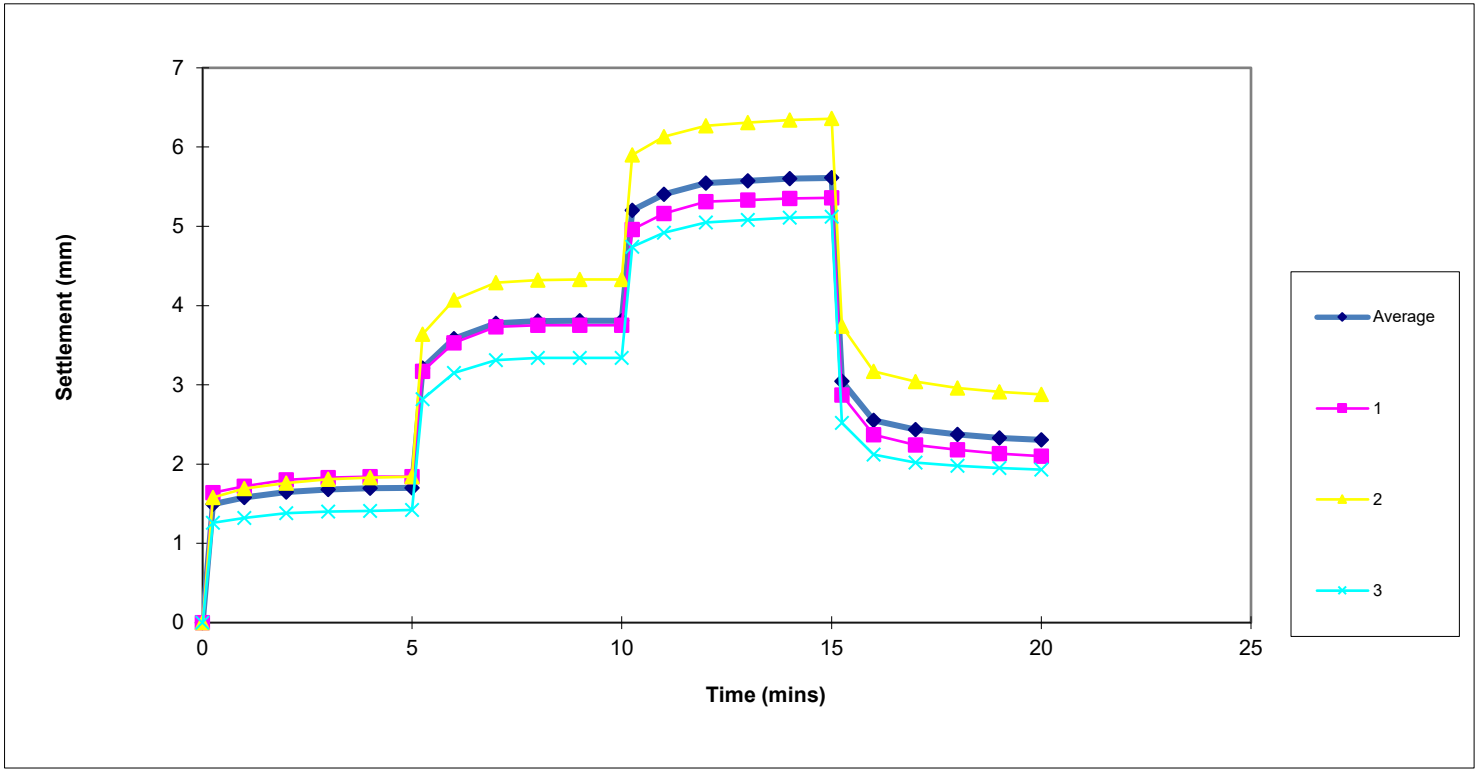
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.64	1.58	1.26	1.49
	1	1.72	1.69	1.32	1.58
	2	1.80	1.76	1.38	1.65
	3	1.83	1.81	1.40	1.68
	4	1.84	1.83	1.41	1.69
	5	1.84	1.84	1.42	1.70
100kN/m^2 Load	5.25	3.17	3.64	2.82	3.21
	6	3.53	4.07	3.15	3.58
	7	3.73	4.29	3.31	3.78
	8	3.75	4.32	3.34	3.80
	9	3.75	4.33	3.34	3.81
	10	3.75	4.33	3.34	3.81
150kN/m^2 Load	10.25	4.96	5.90	4.74	5.20
	11	5.16	6.13	4.92	5.40
	12	5.31	6.27	5.05	5.54
	13	5.33	6.31	5.08	5.57
	14	5.35	6.34	5.11	5.60
	15	5.36	6.36	5.12	5.61
0kN/m^2 Unload	15.25	2.87	3.74	2.52	3.04
	16	2.37	3.17	2.12	2.55
	17	2.24	3.04	2.02	2.43
	18	2.18	2.96	1.98	2.37
	19	2.13	2.91	1.95	2.33
	20	2.10	2.88	1.93	2.30

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P61



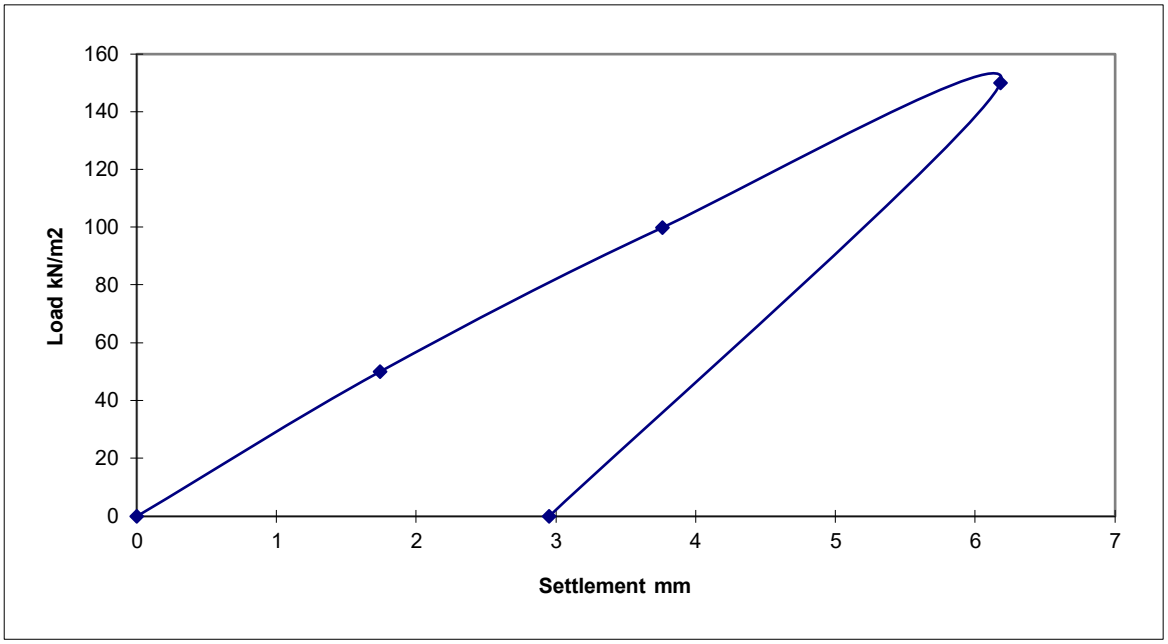
Contract:	Date:
Virginia Park Caerphilly	25.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P62	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.74	50	5
3.76	100	14
6.18	150	22
2.95	0	27



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 25.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 25.05.23

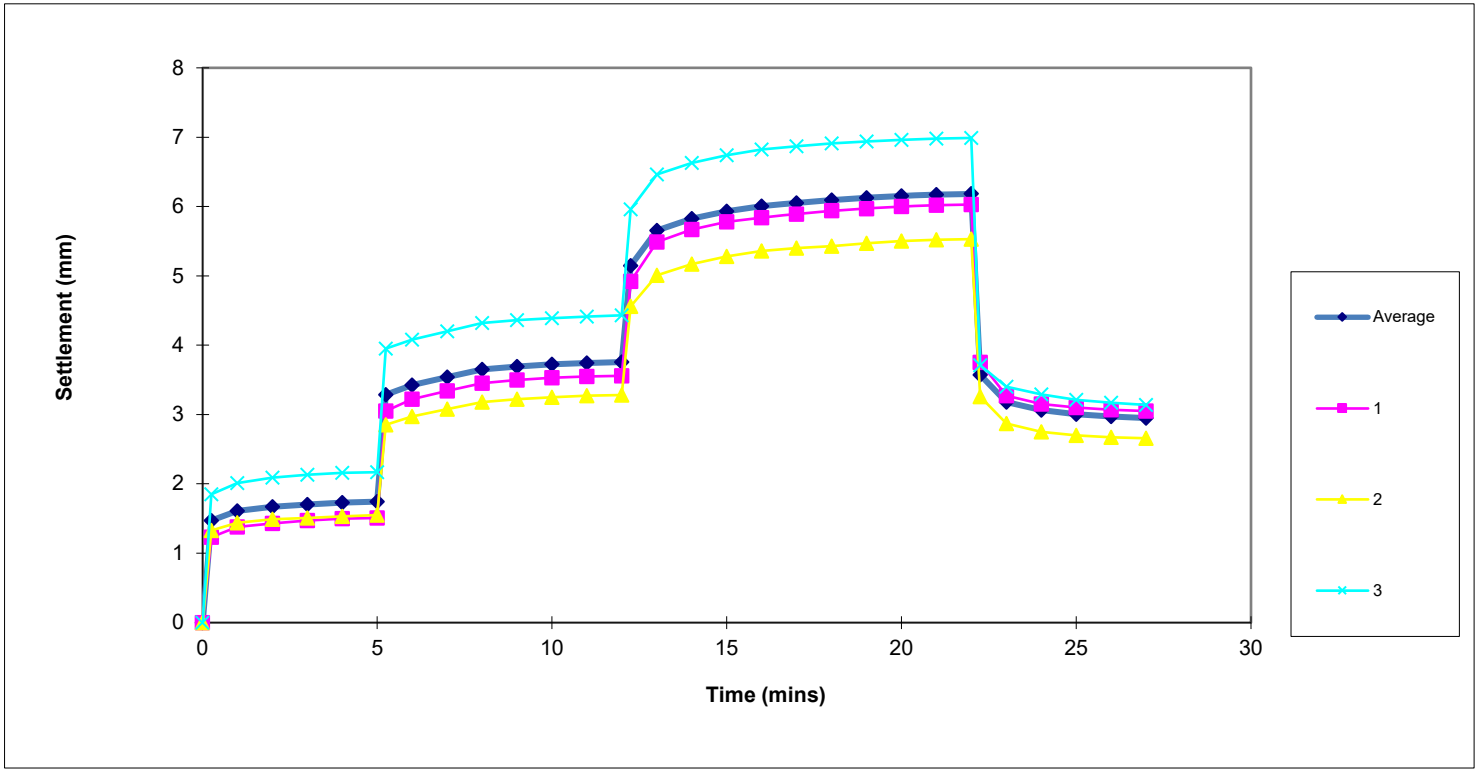
Test Reference: P62 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.23	1.33	1.85	1.47
	1	1.38	1.44	2.01	1.61
	2	1.43	1.49	2.09	1.67
	3	1.47	1.51	2.13	1.70
	4	1.50	1.53	2.16	1.73
	5	1.51	1.55	2.17	1.74
100kN/m^2 Load	5.25	3.05	2.85	3.95	3.28
	6	3.22	2.97	4.08	3.42
	7	3.34	3.08	4.20	3.54
	8	3.45	3.18	4.32	3.65
	9	3.50	3.22	4.36	3.69
	10	3.53	3.25	4.39	3.72
	11	3.55	3.27	4.41	3.74
	12	3.56	3.28	4.43	3.76
150kN/m^2 Load	12.25	4.92	4.56	5.96	5.15
	13	5.49	5.01	6.46	5.65
	14	5.67	5.17	6.63	5.82
	15	5.78	5.28	6.74	5.93
	16	5.84	5.36	6.82	6.01
	17	5.89	5.40	6.87	6.05
	18	5.94	5.43	6.91	6.09
	19	5.97	5.47	6.94	6.13
	20	6.00	5.50	6.96	6.15
	21	6.02	5.52	6.98	6.17
	22	6.03	5.53	6.99	6.18
0kN/m^2 Unload	22.25	3.75	3.26	3.71	3.57
	23	3.27	2.87	3.40	3.18
	24	3.15	2.75	3.29	3.06
	25	3.10	2.70	3.21	3.00
	26	3.07	2.67	3.17	2.97
	27	3.05	2.66	3.14	2.95

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P62



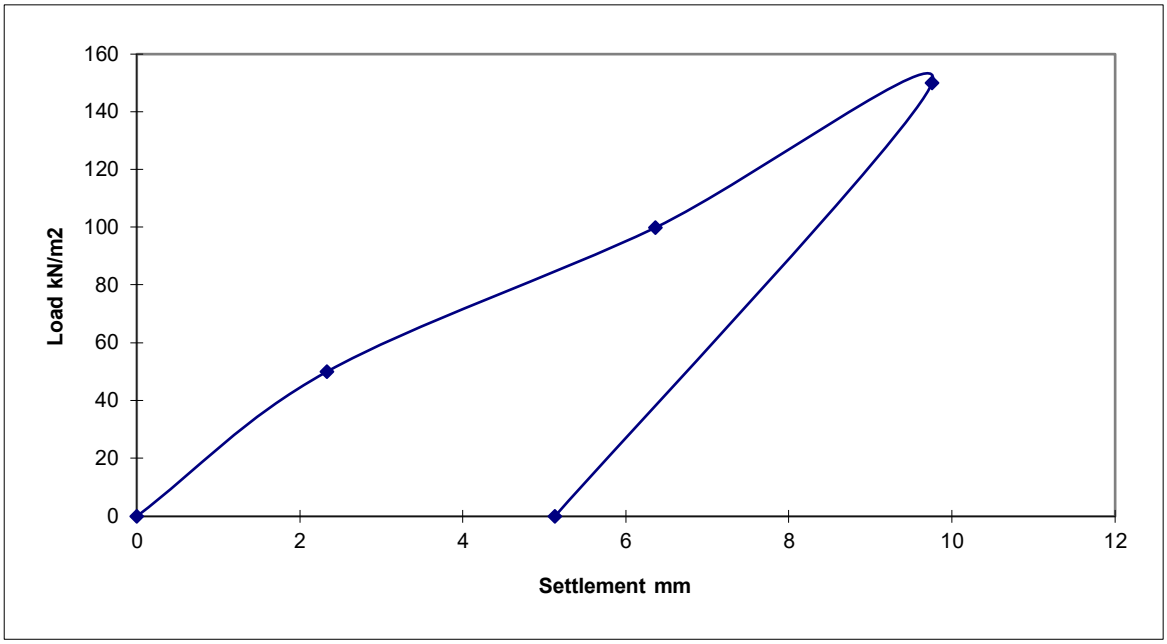
Contract:	Date:
Virginia Park Caerphilly	25.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P63	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.33	50	5
6.36	100	16
9.75	150	30
5.13	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 26.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 26.05.23

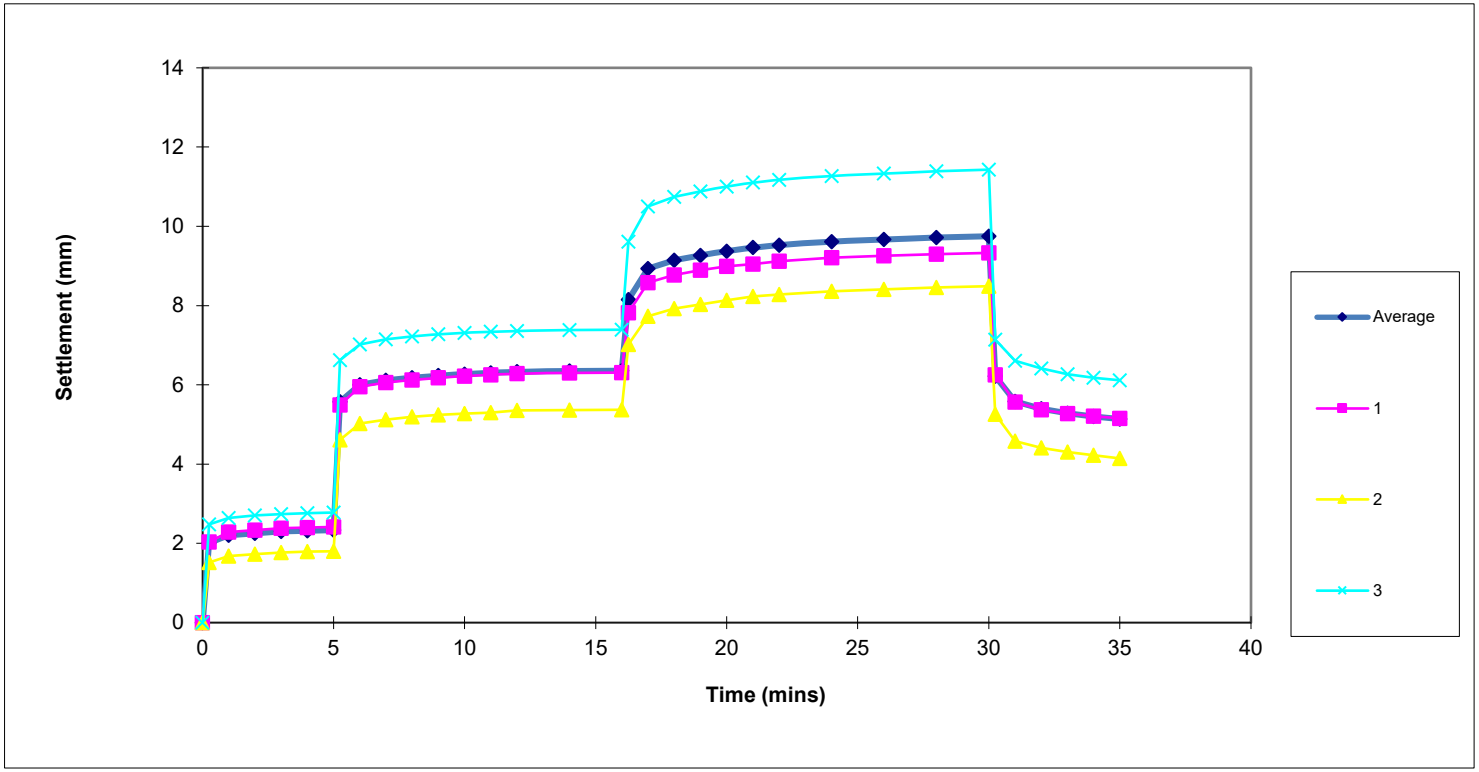
Test Reference: P63 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.03	1.52	2.48	2.01
	1	2.28	1.68	2.64	2.20
	2	2.33	1.73	2.70	2.25
	3	2.38	1.77	2.74	2.30
	4	2.40	1.79	2.76	2.32
	5	2.41	1.80	2.78	2.33
100kN/m^2 Load	5.25	5.49	4.61	6.62	5.57
	6	5.95	5.02	7.02	6.00
	7	6.06	5.12	7.15	6.11
	8	6.12	5.19	7.22	6.18
	9	6.18	5.24	7.28	6.23
	10	6.22	5.27	7.31	6.27
	11	6.25	5.30	7.34	6.30
	12	6.28	5.35	7.36	6.33
	14	6.30	5.36	7.38	6.35
	16	6.31	5.37	7.39	6.36
150kN/m^2 Load	16.25	7.82	7.02	9.61	8.15
	17	8.58	7.73	10.50	8.94
	18	8.77	7.92	10.74	9.14
	19	8.89	8.03	10.88	9.27
	20	8.99	8.13	11.00	9.37
	21	9.05	8.23	11.11	9.46
	22	9.12	8.28	11.17	9.52
	24	9.21	8.36	11.27	9.61
	26	9.26	8.41	11.33	9.67
	28	9.30	8.46	11.39	9.72
	30	9.33	8.49	11.43	9.75
0kN/m^2 Unload	30.25	6.25	5.26	7.14	6.22
	31	5.56	4.58	6.61	5.58
	32	5.37	4.41	6.41	5.40
	33	5.27	4.30	6.27	5.28
	34	5.21	4.22	6.18	5.20
	35	5.15	4.14	6.11	5.13

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P63



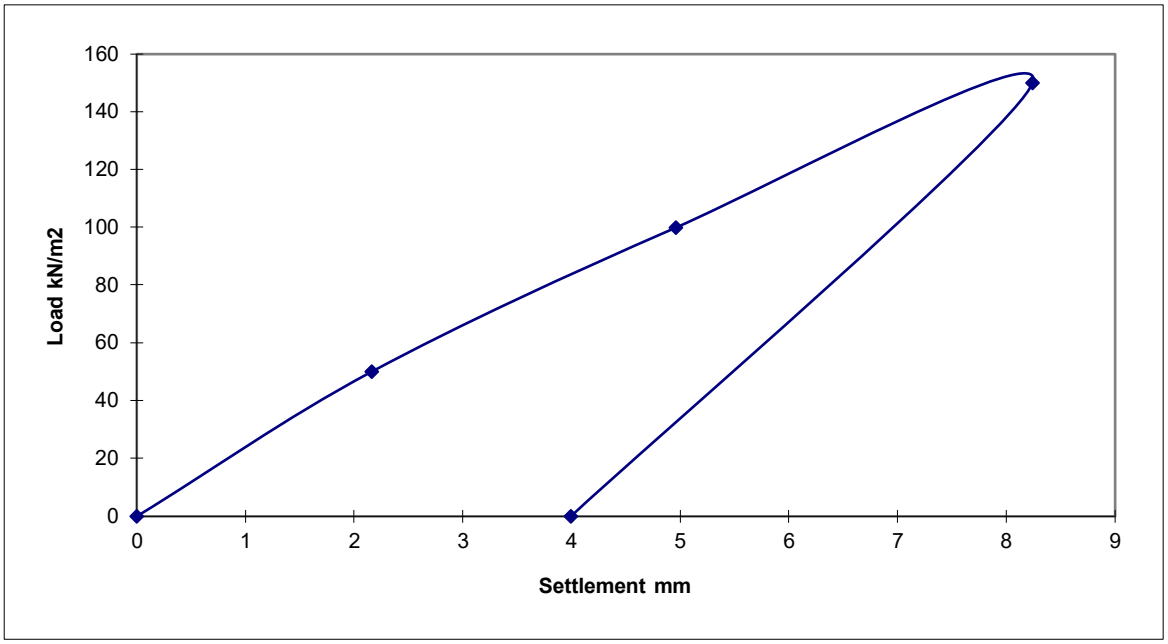
Contract:	Date:
Virginia Park Caerphilly	26.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P64	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.16	50	5
4.96	100	11
8.24	150	24
3.99	0	29



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 26.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 26.05.23

Test Reference: P64 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

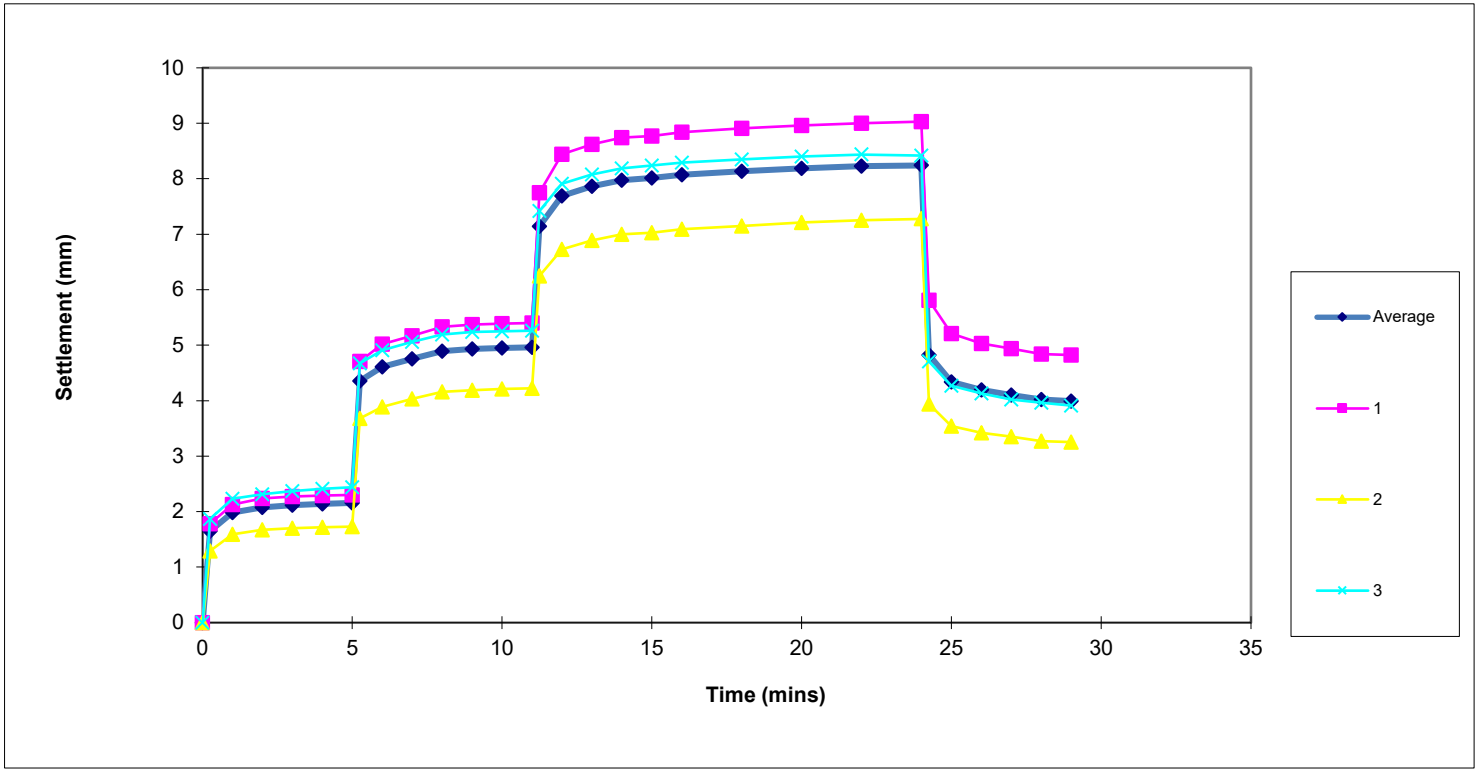
		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.78	1.29	1.87	1.65
	1	2.13	1.59	2.23	1.98
	2	2.24	1.67	2.31	2.07
	3	2.27	1.70	2.37	2.11
	4	2.29	1.72	2.41	2.14
	5	2.30	1.73	2.44	2.16
100kN/m^2 Load	5.25	4.71	3.68	4.67	4.35
	6	5.02	3.89	4.91	4.61
	7	5.17	4.03	5.06	4.75
	8	5.33	4.16	5.19	4.89
	9	5.37	4.19	5.24	4.93
	10	5.39	4.21	5.25	4.95
	11	5.40	4.22	5.26	4.96
150kN/m^2 Load	11.25	7.75	6.25	7.42	7.14
	12	8.44	6.73	7.91	7.69
	13	8.62	6.89	8.08	7.86
	14	8.74	7.00	8.19	7.98
	15	8.77	7.03	8.24	8.01
	16	8.84	7.09	8.29	8.07
	18	8.91	7.15	8.35	8.14
	20	8.96	7.21	8.40	8.19
	22	9.00	7.25	8.44	8.23
	24	9.03	7.28	8.42	8.24
0kN/m^2 Unload	24.25	5.81	3.94	4.71	4.82
	25	5.21	3.54	4.27	4.34
	26	5.03	3.42	4.13	4.19
	27	4.94	3.35	4.02	4.10
	28	4.84	3.27	3.96	4.02
	29	4.82	3.25	3.91	3.99

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot

Test Reference: P64



Contract:

Virginia Park Caerphilly

Date:

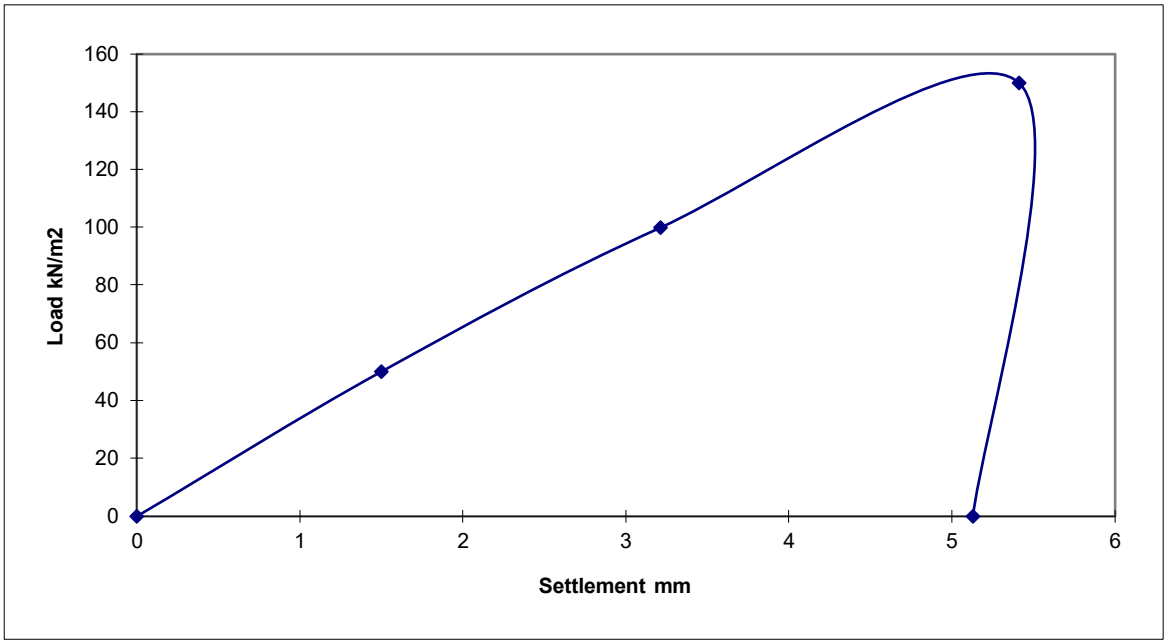
26.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P66	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
1.50	50	5
3.21	100	10
5.41	150	22
5.13	0	27



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 26.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly

Date: 26.05.23

Test Reference: P66

Test Depth: Surface

Plate Diameter: 600mm

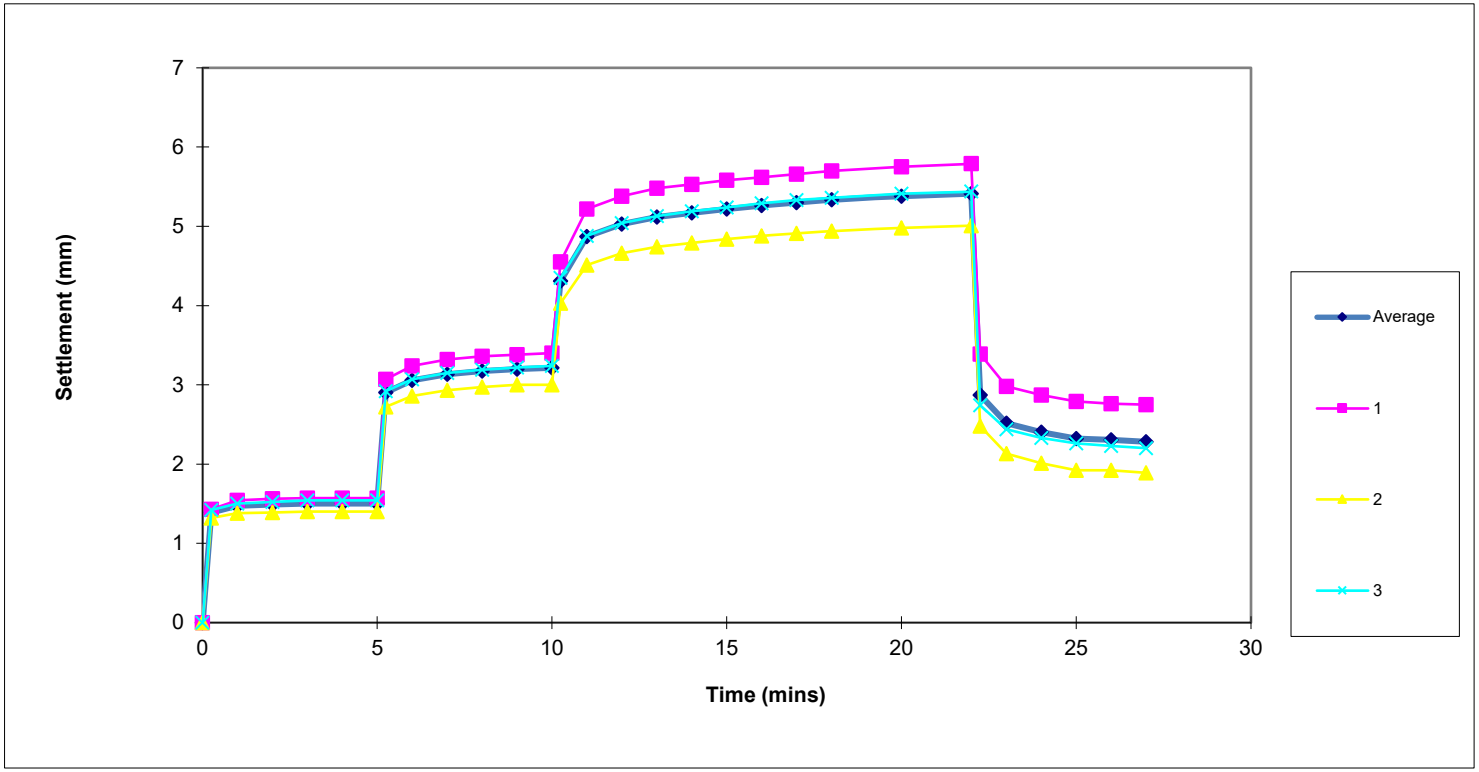
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.43	1.32	1.42	1.39
	1	1.54	1.38	1.50	1.47
	2	1.56	1.39	1.52	1.49
	3	1.57	1.40	1.54	1.50
	4	1.57	1.40	1.54	1.50
	5	1.57	1.40	1.54	1.50
100kN/m^2 Load	5.25	3.07	2.72	2.92	2.90
	6	3.24	2.86	3.07	3.06
	7	3.32	2.93	3.15	3.13
	8	3.36	2.97	3.19	3.17
	9	3.38	3.00	3.22	3.20
	10	3.40	3.00	3.24	3.21
150kN/m^2 Load	10.25	4.55	4.03	4.35	4.31
	11	5.22	4.51	4.88	4.87
	12	5.38	4.66	5.04	5.03
	13	5.48	4.74	5.13	5.12
	14	5.53	4.79	5.19	5.17
	15	5.58	4.84	5.24	5.22
	16	5.62	4.88	5.29	5.26
	17	5.66	4.91	5.33	5.30
	18	5.70	4.94	5.36	5.33
	20	5.75	4.98	5.41	5.38
	22	5.79	5.01	5.44	5.41
0kN/m^2 Unload	22.25	3.39	2.48	2.74	2.87
	23	2.98	2.13	2.44	2.52
	24	2.87	2.01	2.33	2.40
	25	2.79	1.92	2.26	2.32
	26	2.76	1.92	2.23	2.30
	27	2.75	1.89	2.20	2.28

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P66



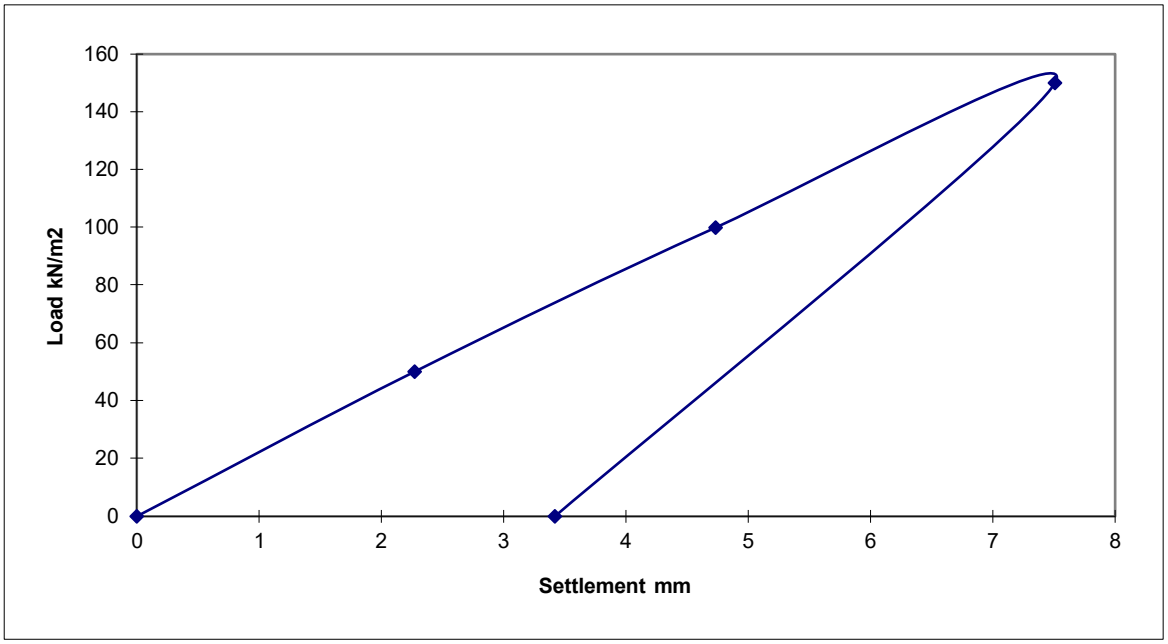
Contract:	Date:
Virginia Park Caerphilly	26.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P68	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.27	50	5
4.73	100	10
7.51	150	24
3.42	0	29



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 26.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly

Date: 26.05.23

Test Reference: P68

Test Depth: Surface

Plate Diameter: 600mm

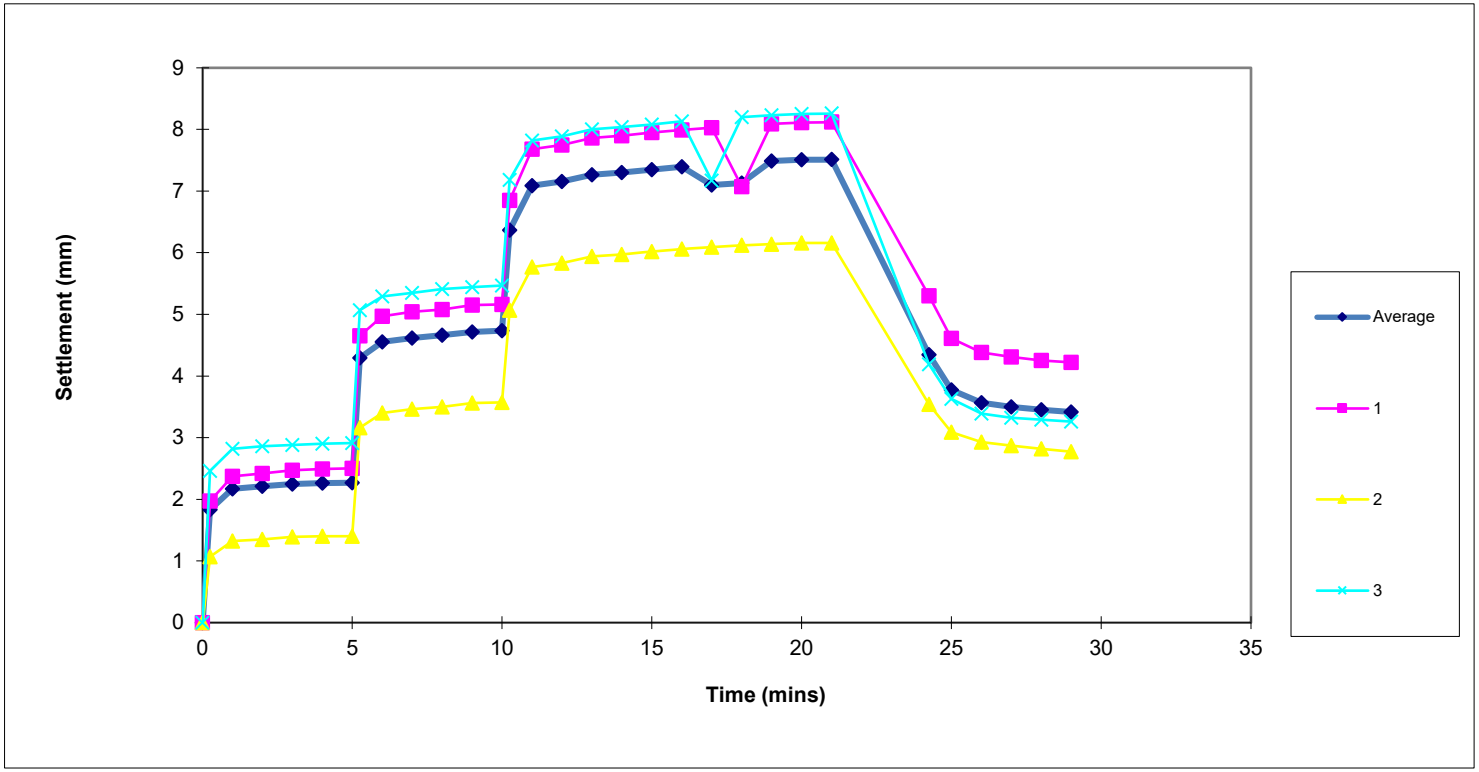
Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	1.97	1.07	2.46	1.83
	1	2.37	1.32	2.82	2.17
	2	2.42	1.35	2.86	2.21
	3	2.47	1.39	2.88	2.25
	4	2.49	1.40	2.90	2.26
	5	2.50	1.40	2.91	2.27
100kN/m^2 Load	5.25	4.65	3.16	5.07	4.29
	6	4.97	3.40	5.29	4.55
	7	5.04	3.46	5.35	4.62
	8	5.08	3.50	5.41	4.66
	9	5.15	3.56	5.44	4.72
	10	5.16	3.57	5.47	4.73
150kN/m^2 Load	10.25	6.85	5.07	7.18	6.37
	11	7.68	5.77	7.82	7.09
	12	7.75	5.83	7.89	7.16
	13	7.86	5.94	8.00	7.27
	14	7.90	5.97	8.04	7.30
	15	7.95	6.02	8.08	7.35
	16	7.99	6.06	8.13	7.39
	17	8.03	6.09	7.17	7.10
	18	7.07	6.12	8.20	7.13
	19	8.09	6.14	8.23	7.49
	20	8.11	6.16	8.25	7.51
	21	8.12	6.16	8.26	7.51
0kN/m^2 Unload	24.25	5.30	3.54	4.19	4.34
	25	4.61	3.09	3.63	3.78
	26	4.38	2.93	3.39	3.57
	27	4.31	2.87	3.32	3.50
	28	4.25	2.82	3.29	3.45
	29	4.22	2.77	3.26	3.42

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P68



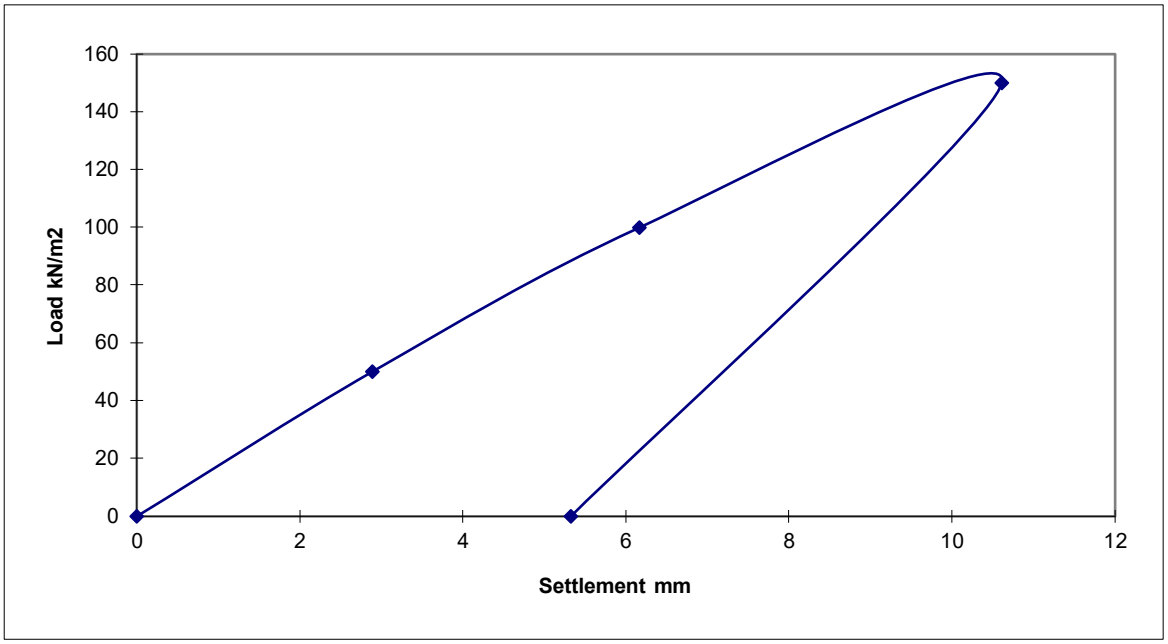
Contract:	Date:
Virginia Park Caerphilly	26.05.23

SOUTH WALES GROUND TESTING

PLATE LOAD TEST SUMMARY

Test Reference: P71	Test Depth: GL	Plate Diameter: 600mm	Soil Description: Grey brown gravelly clay

Average Plate Settlement (mm)	Load (kN/m^2)	Time (mins)
0	0	0
2.89	50	6
6.16	100	13
10.61	150	30
5.32	0	35



Notes:

1: Circular steel plate bedded on uniform coarse sand.
2: Tracked excavator used as counter weight.
3: Load applied to plate via hydraulic jack and loading columns.
4: Load increments applied until plate settlement less than 0.02mm per min.
5: Plate settlement measured by three travel guages fixed to datum beams.
6: Load measured using electric load cell.

SOUTH WALES GROUND TESTING

Approved by: D. McArthur

David McArthur BSc, MSc, ARSM

REMARKS: Test carried out in accordance with BS1377.1990, Part 9.

CONTRACT: Virginia Park, Caerphilly	Date: 26.05.23 Sheet 1 of 1

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Data

Contract: Virginia Park Caerphilly | Date: 26.05.23

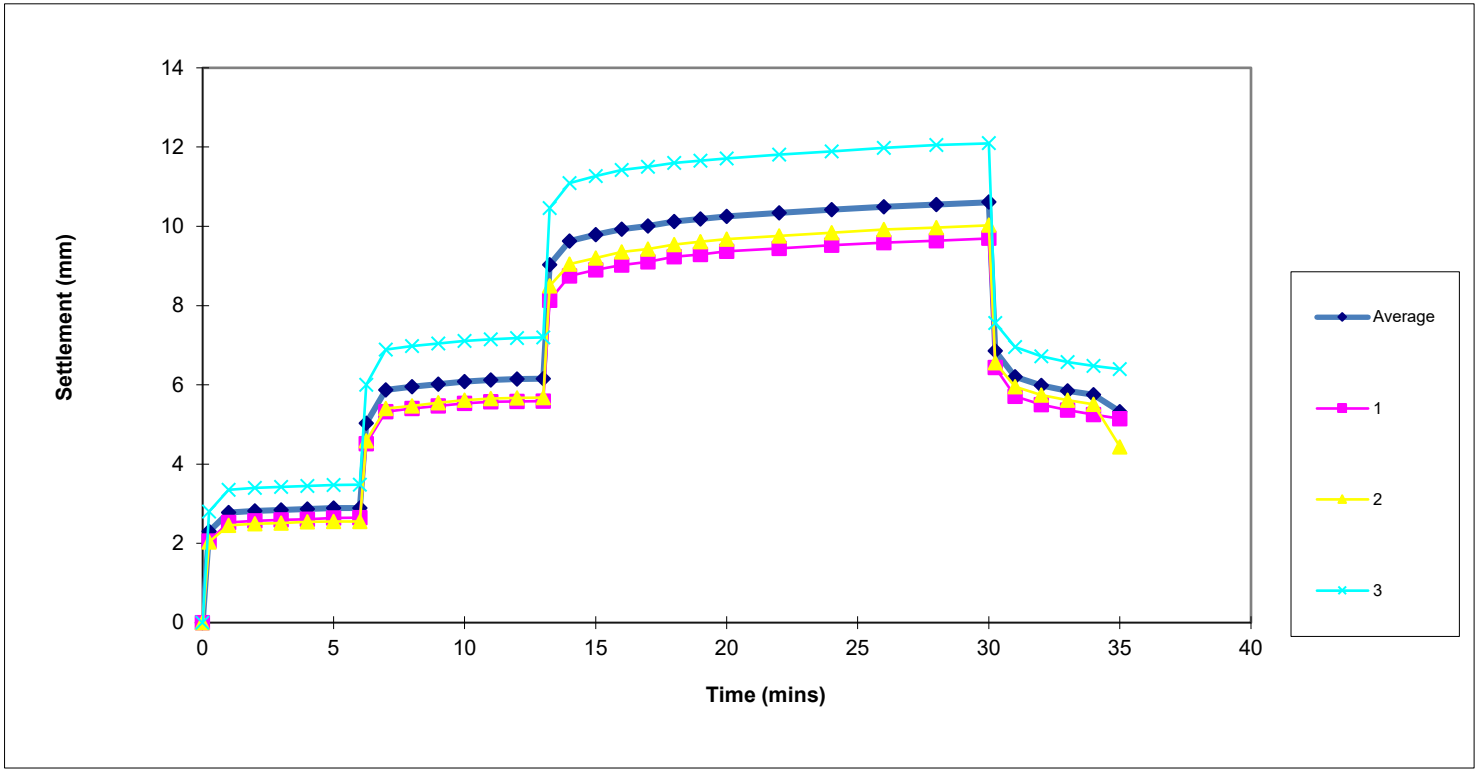
Test Reference: P71 | Test Depth: Surface | Plate Diameter: 600mm | Seating Load: 7.5kN/m^2

		Travel Gauges set on plate			
	Time (mins)	Gauge 1	Gauge 2	Gauge 3	Average Plate Settlement mm
50kN/m^2 Load	0	0	0	0	0
	0.25	2.06	2.03	2.80	2.30
	1	2.53	2.45	3.35	2.78
	2	2.57	2.49	3.40	2.82
	3	2.59	2.51	3.42	2.84
	4	2.61	2.54	3.45	2.87
	5	2.64	2.55	3.47	2.89
	6	2.65	2.55	3.48	2.89
100kN/m^2 Load	6.25	4.51	4.59	6.00	5.03
	7	5.32	5.40	6.89	5.87
	8	5.40	5.47	6.98	5.95
	9	5.47	5.55	7.04	6.02
	10	5.53	5.61	7.11	6.08
	11	5.57	5.65	7.15	6.12
	12	5.58	5.67	7.18	6.14
	13	5.59	5.68	7.20	6.16
150kN/m^2 Load	13.25	8.13	8.50	10.46	9.03
	14	8.75	9.05	11.09	9.63
	15	8.90	9.20	11.27	9.79
	16	9.02	9.35	11.42	9.93
	17	9.10	9.43	11.50	10.01
	18	9.23	9.54	11.60	10.12
	19	9.29	9.61	11.66	10.19
	20	9.37	9.68	11.71	10.25
	22	9.44	9.76	11.81	10.34
	24	9.52	9.84	11.89	10.42
	26	9.59	9.92	11.98	10.50
	28	9.64	9.97	12.05	10.55
	30	9.70	10.03	12.10	10.61
0kN/m^2 Unload	30.25	6.44	6.56	7.56	6.85
	31	5.71	5.95	6.95	6.20
	32	5.50	5.74	6.72	5.99
	33	5.36	5.61	6.57	5.85
	34	5.25	5.51	6.48	5.75
	35	5.14	4.43	6.40	5.32

SOUTH WALES GROUND TESTING

SOUTH WALES GROUND TESTING

Plate Load Test Settlement v Time Plot	Test Reference: P71



Contract:	Date:
Virginia Park Caerphilly	26.05.23

APPENDIX D

IN SITU TESTING: CONTINUOUS CPT RESULTS

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 26.04.23

Hole Ref	CPT 216					**Hole Ref**	CPT 215					**Hole Ref**	CPT 214					**Hole Ref**	CPT 213				
Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N
0.00-0.30	3	2	2	2	9	0.00-0.30	1	5	3	3	12	0.00-0.30	1	2	1	3	7	0.00-0.30	1	3	3	12	19
0.30-0.60	4	4	3	4	15	0.30-0.60	2	3	10	6	21	0.30-0.60	4	9	6	4	23	0.30-0.60	14	4	2	3	23
0.60-0.90	3	3	3	5	14	0.60-0.90	5	3	3	4	15	0.60-0.90	8	9	5	3	25	0.60-0.90	5	6	4	3	18
0.90-1.20	4	3	2	3	12	0.90-1.20	5	4	4	3	16	0.90-1.20	4	4	2	2	12	0.90-1.20	3	3	4	5	15
1.20-1.50	2	2	3	2	9	1.20-1.50	4	5	4	4	17	1.20-1.50	2	2	2	4	10	1.20-1.50	4	4	6	4	18
1.50-1.80	4	6	4	2	16	1.50-1.80	4	3	3	2	12	1.50-1.80	6	3	3	4	16	1.50-1.80	4	4	3	4	15
1.80-2.10	4	3	2	2	11	1.80-1.96	3	3	3	2	11	1.80-2.10	3	5	4	4	16	1.80-2.10	3	3	3	2	11
2.10-2.40	2	2	1	1	6	2.10-2.40	2	2	2	2	8	2.10-2.40	4	3	3	3	13	2.10-2.40	3	3	3	3	12
2.40-2.70	1	1	1	1	4	2.40-2.70	3	3	2	3	11	2.40-2.70	4	3	3	3	13	2.40-2.70	2	2	3	3	10
2.70-3.00	1	1	2	1	5	2.70-3.00	3	3	2	2	10	2.70-3.00	2	2	3	3	10	2.70-3.00	3	2	3	2	10
3.00-3.30	3	5	4	5	17	3.00-3.30	3	3	4	5	15	3.00-3.30	3	8	8	9	28	3.00-3.30	2	3	4	5	14
3.30-3.60	6	5	5	6	22	3.30-3.60	5	4	5	8	22	3.30-3.46	10	31	9		50/160	3.30-3.60	5	5	8	14	28
3.60-3.90	6	7	9	7	29	3.60-3.90	12	8	8	9	37				10			3.60-3.76	13	15	22		50/160
3.90-4.20	7	8	6	5	26	3.90-4.15	10	13	18	9	50/245										10		
4.20-4.50	5	4	5	5	19					20													
4.50-4.80	6	5	6	9	26																		
4.80-5.10	8	8	7	8	31																		

Hole Ref						**Hole Ref**						**Hole Ref**						**Hole Ref**					
Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N
0.00-0.30						0.00-0.30						0.00-0.30						0.00-0.30					
0.30-0.60						0.30-0.60						0.30-0.60						0.30-0.60					
0.60-0.90						0.60-0.90						0.60-0.90						0.60-0.90					
0.90-1.20						0.90-1.20						0.90-1.20						0.90-1.20					
1.20-1.50						1.20-1.50						1.20-1.50						1.20-1.50					
1.50-1.80						1.50-1.80						1.50-1.80						1.50-1.80					
1.80-2.10						1.80-2.10						1.80-2.10						1.80-2.10					
2.10-2.40						2.10-2.40						2.10-2.40						2.10-2.40					
2.40-2.70						2.40-2.70						2.40-2.70						2.40-2.70					
2.70-3.00						2.70-3.00						2.70-3.00						2.70-3.00					
3.00-3.30						3.00-3.30						3.00-3.30						3.00-3.30					
3.30-3.60						3.30-3.60						3.30-3.60						3.30-3.60					
3.60-3.90						3.60-3.90						3.60-3.90						3.60-3.90					
3.90-4.20						3.90-4.20						3.90-4.20						3.90-4.20					
4.20-4.50						4.20-4.50						4.20-4.50						4.20-4.50					
4.50-4.80						4.50-4.80						4.50-4.80						4.50-4.80					
4.80-5.10						4.80-5.10						4.80-5.10						4.80-5.10					

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 26.04.23

Hole Ref	CPT 224				
Depth	Blows per 75mm				SPT N
0.00-0.30	3	3	6	4	16
0.30-0.60	3	3	4	4	14
0.60-0.90	3	2	2	2	9
0.90-1.20	2	3	3	5	13
1.20-1.50	5	3	5	4	17
1.50-1.80	4	6	6	6	22
1.80-2.10	4	4	6	5	19
2.10-2.40	6	5	6	5	22
2.40-2.70	5	6	5	5	21
2.70-3.00	7	4	4	4	19
3.00-3.30	4	5	6	4	19
3.30-3.60	3	2	2	2	9
3.60-3.90	3	2	2	2	9
3.90-4.20	2	3	4	4	13
4.20-4.50	6	10	10	11	37
4.50-4.69	15	18	17		50/190
			40		

Hole Ref	CPT223				
Depth	Blows per 75mm				SPT N
0.00-0.30	3	2	3	3	11
0.30-0.60	2	2	2	3	9
0.60-0.90	3	4	3	2	12
0.90-1.20	3	5	4	3	15
1.20-1.50	4	3	3	3	13
1.50-1.80	3	3	2	3	11
1.80-1.96	2	3	2	3	10
2.10-2.40	3	4	3	4	14
2.40-2.70	4	4	5	9	22
2.70-2.98	7	11	15	17	50/275
				50	

Hole Ref	CPT 222				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	2	2	3	8
0.30-0.60	3	2	3	5	13
0.60-0.90	5	5	5	5	20
0.90-1.20	3	3	3	4	13
1.20-1.50	4	4	4	3	15
1.50-1.80	4	3	4	2	13
1.80-2.10	4	3	4	3	14
2.10-2.40	9	15	7	2	39
2.40-2.70	8	7	6	5	26
2.70-3.00	5	5	5	4	19
3.00-3.30	3	3	3	3	12
3.30-3.60	2	3	4	4	13
3.60-3.90	5	4	4	5	18
3.90-4.20	5	8	10	9	32
4.20-4.50	9	10	12	14	45

Hole Ref	CPT 221				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	2	2	8
0.30-0.60	2	3	4	5	14
0.60-0.90	4	4	4	4	16
0.90-1.20	3	4	3	4	14
1.20-1.50	5	3	4	4	16
1.50-1.80	4	5	3	3	15
1.80-2.10	4	3	4	4	15
2.10-2.40	10	8	4	3	25
2.40-2.70	4	4	5	7	20
2.70-3.00	4	5	4	4	17
3.00-3.30	4	3	2	3	12
3.30-3.60	3	3	4	3	13
3.60-3.90	5	6	6	7	24
3.90-4.20	8	8	8	7	31
4.20-4.47	7	8	16	19	50/265
				40	

Hole Ref	CPT220				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	1	1	6
0.30-0.60	2	2	4	3	11
0.60-0.90	4	3	3	3	13
0.90-1.20	4	3	3	3	13
1.20-1.50	2	3	4	4	13
1.50-1.80	2	3	3	3	11
1.80-2.10	3	4	2	2	11
2.10-2.40	3	5	3	0	11
2.40-2.70	1	2	1	2	6
2.70-3.00	7	9	5	4	25
3.00-3.30	3	3	4	4	14
3.30-3.60	4	3	5	8	18
3.60-3.90	8	6	5	7	26
3.90-4.20	8	8	8	11	35
4.20-4.45	12	14	15	9	50/245
				20	

Hole Ref	CPT219				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	2	3	3	9
0.30-0.60	2	2	1	2	7
0.60-0.90	2	3	2	3	10
0.90-1.20	4	4	3	3	14
1.20-1.50	5	2	2	2	9
1.50-1.80	2	1	2	2	7
1.80-2.10	3	3	3	3	12
2.10-2.40	3	3	3	4	13
2.40-2.70	4	6	5	10	25
2.70-3.00	10	5	4	4	23
3.00-3.30	4	3	3	4	14
3.30-3.60	5	4	4	4	17
3.60-3.90	4	5	4	4	17
3.90-4.20	6	5	4	3	18
4.20-4.50	4	7	10	10	31
4.50-4.76	12	14	14	10	50/255
				30	

Hole Ref	CPT218				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	4	3	2	8
0.30-0.60	3	3	3	2	11
0.60-0.90	3	2	3	2	10
0.90-1.20	1	1	2	2	6
1.20-1.50	2	2	2	1	7
1.50-1.80	2	2	3	3	10
1.80-2.10	2	2	4	3	11
2.10-2.40	3	3	2	2	10
2.40-2.70	3	2	3	2	10
2.70-3.00	2	3	2	2	9
3.00-3.30	2	1	2	2	7
3.30-3.60	3	5	5	9	22
3.60-3.90	4	8	9	11	35
3.90-4.14	12	14	17	7	50/235
				10	

Hole Ref	CPT217				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	1	4	2	8
0.30-0.60	2	3	3	2	10
0.60-0.90	3	4	4	3	14
0.90-1.20	3	3	3	2	11
1.20-1.50	2	3	2	3	10
1.50-1.80	2	2	2	1	7
1.80-2.10	9	5	5	3	22
2.10-2.40	3	3	2	3	11
2.40-2.70	3	2	3	2	10
2.70-3.00	2	2	3	2	9
3.00-3.30	2	2	2	3	9
3.30-3.60	4	6	8	8	26
3.60-3.90	7	10	9	8	34
3.90-4.20	7	8	6	6	27
4.20-4.50	6	5	8	6	25
4.50-4.80	6	5	6	6	23
4.80-5.10	5	6	7	8	26

SOUTH WALES GROUND TESTING - Continouous CPT | **P1** | **CONTRACT:** Victoria Park, Caerphilly | **Date: 09.05.22**

Hole Ref	CPT 1					**Hole Ref**	CPT6				
Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N
0.00-0.30	3	4	4	3	14	0.00-0.30	1	1	1	2	5
0.30-0.60	3	3	4	5	15	0.30-0.60	2	4	5	7	18
0.60-0.90	5	3	4	2	14	0.60-0.90	7	7	4	4	22
0.90-1.20	2	3	3	2	10	0.90-1.20	3	2	2	1	8
1.20-1.50	2	2	3	3	10	1.20-1.50	1	2	2	4	9
1.50-1.80	3	2	2	1	8	1.50-1.80	7	8	2	2	19
1.80-2.10	2	3	5	3	13	1.80-2.10	2	2	3	2	9
2.10-2.40	2	2	1	2	7	2.10-2.40	2	3	2	2	9
2.40-2.70	2	2	2	2	8	2.40-2.70	2	1	2	1	6
2.70-3.00	2	3	4	3	12	2.70-3.00	2	2	1	1	6
3.00-3.30	4	4	8	4	20	3.00-3.30	1	1	8	12	22
3.30-3.60	3	3	3	2	11	3.30-3.48	13	15	22		50/180
3.60-3.84	4	10	21	15	50/235				30		
				10							

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 18.08.22

Hole Ref	CPT 29				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	5	5	14
0.30-0.60	3	4	3	2	12
0.60-0.90	3	3	3	4	13
0.90-1.20	3	3	5	4	15
1.20-1.50	5	5	7	7	24
1.50-1.80	5	6	4	5	20
1.80-2.10	4	3	2	2	11
2.10-2.40	2	1	1	3	7
2.40-2.70	2	1	1	2	6
2.70-3.00	1	1	2	2	6
3.00-3.30	1	2	1	5	9
3.30-3.60	1	4	2	2	9
3.60-3.90	1	2	2	3	8
3.90-4.20	2	2	2	2	8
4.20-4.50	2	2	2	2	8
4.50-4.80	3	4	8	8	23
4.80-5.10	8	9	10	12	39

Hole Ref	CPT 30				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	3	5	2	11
0.30-0.60	2	3	2	3	10
0.60-0.90	3	3	3	4	13
0.90-1.20	5	6	8	6	25
1.20-1.50	6	5	7	5	23
1.50-1.80	3	3	3	3	12
1.80-2.10	3	2	2	4	11
2.10-2.40	3	3	2	2	10
2.40-2.70	2	2	2	2	8
2.70-3.00	2	2	2	3	9
3.00-3.30	2	3	3	3	11
3.30-3.60	3	14	19	8	45
3.60-3.90	6	4	3	4	17
3.90-4.20	3	4	10	14	31
4.20-4.50	16	18	16		50/200
			50mm		

Hole Ref	CPT 31				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	3	2	9
0.30-0.60	2	2	2	1	7
0.60-0.90	2	2	2	2	8
0.90-1.20	2	3	3	2	10
1.20-1.50	2	2	3	3	10
1.50-1.80	4	4	3	4	15
1.80-2.10	3	3	2	2	10
2.10-2.40	1	2	18	8	29
2.40-2.70	3	2	2	3	10
2.70-3.00	4	4	4	2	14
3.00-3.30	3	3	3	3	12
3.30-3.60	4	3	3	3	13
3.60-3.90	3	2	3	2	10
3.90-4.20	4	8	6	6	24
4.20-4.50	7	8	19	12	36
4.50-4.80	15	16	19		50/210
			20mm		

Hole Ref	CPT 28				
Depth	Blows per 75mm				SPT N
0.00-0.30	3	4	4	4	15
0.30-0.60	4	3	3	4	14
0.60-0.90	3	2	3	3	11
0.90-1.20	6	3	4	4	17
1.20-1.50	8	6	5	4	23
1.50-1.80	4	4	2	2	12
1.80-2.10	2	2	2	2	8
2.10-2.40	2	2	1	2	7
2.40-2.70	2	2	1	2	7
2.70-3.00	2	2	2	1	7
3.00-3.30	2	2	1	3	8
3.30-3.60	2	2	2	2	8
3.60-3.90	1	5	2	3	11
3.90-4.20	2	2	2	2	8
4.20-4.50	3	2	2	3	10
4.50-4.80	3	2	3	3	11
4.80-5.10	4	6	5	5	20

Hole Ref	CPT 27				
Depth	Blows per 75mm				SPT N
0.00-0.30	3	5	4	4	16
0.30-0.60	5	5	4	4	18
0.60-0.90	4	2	3	3	12
0.90-1.20	4	3	2	3	12
1.20-1.50	3	3	4	5	15
1.50-1.80	4	3	2	2	11
1.80-2.10	1	2	2	1	6
2.10-2.40	1	1	2	1	5
2.40-2.70	2	2	1	1	6
2.70-3.00	2	2	1	1	6
3.00-3.30	4	3	2	4	13
3.30-3.60	3	3	3	2	11
3.60-3.90	2	2	2	2	8
3.90-4.20	2	2	2	2	8
4.20-4.50	3	3	2	2	10
4.50-4.80	2	2	2	3	9
4.80-5.10	3	4	4	5	16

Hole Ref	CPT 26				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	1	2	2	6
0.30-0.60	2	2	1	2	7
0.60-0.90	1	1	2	2	6
0.90-1.20	2	1	1	1	5
1.20-1.50	1	2	2	4	9
1.50-1.80	2	3	2	4	11
1.80-2.10	2	3	2	2	9
2.10-2.40	1	1	2	3	7
2.40-2.70	3	3	3	3	12
2.70-3.00	3	2	2	4	11
3.00-3.30	2	3	2	2	9
3.30-3.60	3	3	3	3	12
3.60-3.90	3	3	3	3	12
3.90-4.20	2	2	3	6	13
4.20-4.50	12	12	13	13	50/285
				60mm	

Hole Ref	CPT12				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	1	2	1	6
0.30-0.60	2	4	5	2	13
0.60-0.90	2	2	2	3	9
0.90-1.20	3	3	4	4	14
1.20-1.50	3	4	5	4	16
1.50-1.80	4	4	3	4	15
1.80-2.10	2	3	4	4	13
2.10-2.40	1	2	2	2	7
2.40-2.70	1	2	1	1	5
2.70-3.00	1	2	1	2	6
3.00-3.30	2	1	2	1	6
3.30-3.60	2	1	3	2	8
3.60-3.90	3	3	2	2	10
3.90-4.20	4	5	6	5	20
4.20-4.50	4	5	6	5	20
4.50-4.80	5	5	5	6	21

Hole Ref	CPT13				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	2	2	1	6
0.30-0.60	1	1	3	2	7
0.60-0.90	2	2	2	2	8
0.90-1.20	2	3	4	2	11
1.20-1.50	3	3	4	3	13
1.50-1.80	2	2	2	2	8
1.80-2.10	4	6	4	4	18
2.10-2.40	4	3	4	3	14
2.40-2.70	2	2	3	2	9
2.70-3.00	2	2	2	2	8
3.00-3.30	2	2	2	2	8
3.30-3.60	2	2	2	3	9
3.60-3.90	3	3	3	3	12
3.90-4.20	3	4	3	3	13
4.20-4.50	2	3	6	6	17
4.50-4.80	5	5	6	10	26

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 05.08.22

Hole Ref	CPT14				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	1	1	2	5
0.30-0.60	2	1	2	2	7
0.60-0.90	2	1	1	2	6
0.90-1.20	3	2	3	2	10
1.20-1.50	3	3	3	2	11
1.50-1.80	2	3	4	4	13
1.80-2.10	4	2	3	3	12
2.10-2.40	3	4	3	3	13
2.40-2.70	4	3	3	3	13
2.70-3.00	2	2	2	2	8
3.00-3.30	2	2	2	1	7
3.30-3.60	2	1	2	3	8
3.60-3.90	2	3	3	3	11
3.90-4.20	4	7	4	8	23
4.20-4.50	8	9	9	11	37

Hole Ref	CP15				
Depth	Blows per 75mm				SPT N
0.00-0.30	3	3	2	2	10
0.30-0.60	2	1	2	1	6
0.60-0.90	3	3	2	2	10
0.90-1.20	2	2	3	2	9
1.20-1.50	2	2	2	2	8
1.50-1.80	2	2	2	1	7
1.80-2.10	2	2	2	1	7
2.10-2.40	1	2	2	1	6
2.40-2.70	2	2	2	2	8
2.70-3.00	3	3	12	10	28
3.00-3.30	6	5	4	4	19
3.30-3.60	3	3	3	3	12
3.60-3.90	3	2	5	4	14
3.90-4.20	3	4	5	6	18
4.20-4.50	9	11	13	13	46

Hole Ref	CPT16				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	1	1	1	4
0.30-0.60	3	4	3	3	13
0.60-0.90	2	2	2	1	7
0.90-1.20	1	1	2	2	6
1.20-1.50	2	2	2	2	8
1.50-1.80	3	3	1	2	9
1.80-2.10	2	1	2	2	7
2.10-2.40	4	3	3	3	13
2.40-2.70	2	3	2	5	12
2.70-3.00	5	4	8	7	24
3.00-3.30	5	4	3	2	14
3.30-3.60	6	7	6	7	26
3.60-3.90	7	7	7	6	27
3.90-4.20	8	9	11	10	38

Hole Ref	CPT17				
Depth	Blows per 75mm				SPT N
0.00-0.30	0	0	0	0	0
0.30-0.60	1	2	2	1	6
0.60-0.90	2	1	1	1	5
0.90-1.20	0	1	2	3	6
1.20-1.50	2	2	3	2	9
1.50-1.80	3	4	3	4	14
1.80-2.10	3	4	4	3	14
2.10-2.40	3	3	4	4	14
2.40-2.70	4	3	4	5	16
2.70-3.00	3	5	5	4	17
3.00-3.30	6	5	5	4	20
3.30-3.60	4	4	4	3	15
3.60-3.90	4	3	2	3	12
3.90-4.20	5	4	6	7	22
4.20-4.50	15	16	19		50
			40mm		

Hole Ref	CPT18				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	1	0	1	3
0.30-0.60	2	2	2	1	7
0.60-0.90	1	1	2	3	7
0.90-1.20	2	3	2	3	10
1.20-1.50	2	3	2	3	10
1.50-1.80	4	4	4	6	18
1.80-2.10	6	5	5	5	21
2.10-2.40	4	3	4	2	13
2.40-2.70	2	2	3	2	9
2.70-3.00	3	3	3	3	12
3.00-3.30	2	3	3	2	10
3.30-3.60	3	2	4	3	12
3.60-3.90	3	3	4	3	13
3.90-4.20	4	9	10	11	34

Hole Ref	CPT23				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	0	1	2	4
0.30-0.60	4	4	4	4	16
0.60-0.90	3	3	3	2	11
0.90-1.20	1	1	2	2	6
1.20-1.50	2	2	2	2	8
1.50-1.80	3	2	2	2	9
1.80-2.10	2	2	2	2	8
2.10-2.40	2	2	2	2	8
2.40-2.70	3	4	6	5	18
2.70-3.00	4	3	3	2	12
3.00-3.30	2	3	2	2	9
3.30-3.60	3	4	7	10	24
3.60-3.90	10	11	11	12	44

Hole Ref	CPT20				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	1	1	1	4
0.30-0.60	3	3	4	3	13
0.60-0.90	2	3	2	1	8
0.90-1.20	2	2	3	2	9
1.20-1.50	2	2	2	3	9
1.50-1.80	2	2	3	3	10
1.80-2.10	3	3	3	2	11
2.10-2.40	2	1	1	2	6
2.40-2.70	2	2	2	1	7
2.70-3.00	2	2	2	2	8
3.00-3.30	2	1	3	2	8
3.30-3.60	3	2	1	2	8
3.60-3.90	2	2	2	2	8
3.90-4.20	8	9	12	16	45

Hole Ref	CP19				
Depth	Blows per 75mm				SPT N
0.00-0.30	1	1	2	1	5
0.30-0.60	2	2	1	2	7
0.60-0.90	2	2	1	1	6
0.90-1.20	1	3	3	3	10
1.20-1.50	4	3	3	4	14
1.50-1.80	4	3	4	4	15
1.80-2.10	3	3	3	3	12
2.10-2.40	2	2	1	2	7
2.40-2.70	2	2	2	3	9
2.70-3.00	3	2	3	2	10
3.00-3.30	2	3	3	4	12
3.30-3.60	4	3	4	5	16
3.60-3.90	5	4	4	4	17
3.90-4.20	6	10	11	10	37

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 19.08.22

Hole Ref	CPT33				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	2	2	8
0.30-0.60	2	2	3	2	9
0.60-0.90	2	2	2	2	8
0.90-1.20	2	3	2	3	10
1.20-1.50	3	3	3	3	12
1.50-1.80	3	3	2	2	10
1.80-2.10	3	2	3	2	10
2.10-2.40	3	2	3	2	10
2.40-2.70	2	1	2	2	7
2.70-3.00	2	3	2	2	9
3.00-3.30	3	3	3	3	12
3.30-3.60	3	3	4	5	15
3.60-3.90	5	7	9	11	32
3.90-4.20	16	19	15		50/200
		50mm			

Hole Ref	CP34				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	2	2	8
0.30-0.60	3	2	2	4	11
0.60-0.90	3	2	2	2	9
0.90-1.20	2	3	2	3	10
1.20-1.50	3	3	3	2	11
1.50-1.80	3	2	2	3	10
1.80-2.10	3	2	2	1	8
2.10-2.40	1	1	2	1	5
2.40-2.70	2	1	1	1	5
2.70-3.00	2	1	2	3	8
3.00-3.30	2	3	2	2	9
3.30-3.60	3	3	3	2	11
3.60-3.90	2	2	9	14	27
3.90-4.20	17	19	14		50/190
			40mm		

Hole Ref	CPT35				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	3	2	2	9
0.30-0.60	3	2	2	4	11
0.60-0.90	3	2	3	2	10
0.90-1.20	3	3	3	3	12
1.20-1.50	3	4	3	2	12
1.50-1.80	3	3	3	10	19
1.80-2.10	9	6	3	3	21
2.10-2.40	3	3	3	3	12
2.40-2.70	3	3	2	2	10
2.70-3.00	2	3	2	3	10
3.00-3.30	2	3	3	3	11
3.30-3.60	2	3	2	3	10
3.60-3.90	5	5	4	3	17
3.90-4.20	7	7	7	11	32
4.20-4.50	8	8	6	10	32
4.50-4.80	14	17	19		50/200
4.80-5.10			50mm		

Hole Ref	CPT36				
Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	2	2	8
0.30-0.60	2	2	2	2	8
0.60-0.90	2	2	2	3	9
0.90-1.20	4	4	3	2	13
1.20-1.50	2	3	4	4	13
1.50-1.80	3	3	3	2	11
1.80-2.10	2	1	2	2	7
2.10-2.40	1	1	2	3	7
2.40-2.70	2	2	2	2	8
2.70-3.00	2	2	2	2	8
3.00-3.30	2	2	4	3	11
3.30-3.60	2	2	4	3	11
3.60-3.90	3	5	4	5	17
3.90-4.20	6	10	10	12	38
4.20-4.50	12	13	14	11	50/285
			60mm		

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 05.08.22

Hole Ref CPT21

Depth	Blows per 75mm				SPT N
0.00-0.30	1	0	1	0	2
0.30-0.60	2	1	2	2	7
0.60-0.90	2	3	2	3	10
0.90-1.20	3	2	2	3	10
1.20-1.50	2	2	3	2	9
1.50-1.80	3	2	2	3	10
1.80-2.10	2	3	2	2	9
2.10-2.40	3	4	4	3	14
2.40-2.70	2	2	2	1	7
2.70-3.00	2	7	7	6	22
3.00-3.30	4	2	1	2	9
3.30-3.60	3	2	2	2	9
3.60-3.90	3	4	5	6	18
3.90-4.20	10	10	8	10	38

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date: 24.06.22**

Hole Ref	CPT 101				
Depth	Blows per 75mm				SPT N
0.00-0.30	4	4	5	3	16
0.30-0.60	4	4	3	2	13
0.60-0.90	2	3	3	3	11
0.90-1.13	14	10	20		50/225
			75		

Hole Ref	CPT 102				
Depth	Blows per 75mm				SPT N
0.00-0.30	5	4	7	4	20
0.30-0.60	4	4	5	3	16
0.60-0.90	3	3	4	3	13
0.90-1.20	6	4	4	5	19
1.20-1.50	17	4	5	6	32
1.50-1.80	3	4	3	10	20
1.80-2.10	6	7	4	3	20
2.10-2.40	2	2	2	3	9
2.40-2.70	5	3	4	5	17
2.70-3.00	5	4	6	4	19

Hole Ref	CPT 111				
Depth	Blows per 75mm				SPT N
0.00-0.30	4	3	3	2	12
0.30-0.60	2	3	3	2	10
0.60-0.90	2	1	2	2	7
0.90-1.20	1	2	2	1	6
1.20-1.50	3	2	3	2	10
1.50-1.80	2	2	1	1	6
1.80-2.10	1	0	2	1	4
2.10-2.40	2	2	3	2	9
2.40-2.70	3	3	2	3	11
2.70-3.00	2	1	3	4	10

Hole Ref	CPT 113				
Depth	Blows per 75mm				SPT N
0.00-0.30	4	3	2	2	11
0.30-0.60	3	3	2	2	10
0.60-0.90	1	0	1	3	5
0.90-1.20	4	2	2	1	9
1.20-1.50	2	1	2	2	7
1.50-1.80	1	2	3	3	9
1.80-2.10	4	3	3	4	14
2.10-2.40	3	3	4	3	13
2.40-2.70	4	4	5	4	17
2.70-3.00	2	3	2	4	11

Hole Ref	CPT 114				
Depth	Blows per 75mm				SPT N
0.00-0.30	7	4	5	6	22
0.30-0.60	5	4	4	4	17
0.60-0.90	3	3	4	2	12
0.90-1.20	2	1	1	1	5
1.20-1.50	1	1	2	1	5
1.50-1.80	3	3	3	3	12
1.80-2.10	4	3	2	2	11
2.10-2.40	3	3	3	5	14
2.40-2.70	4	4	5	4	17
2.70-3.00	4	2	3	2	11

Hole Ref	CPT 115				
Depth	Blows per 75mm				SPT N
0.00-0.30	7	5	4	5	21
0.30-0.60	4	5	3	3	15
0.60-0.90	3	3	2	2	10
0.90-1.20	2	2	3	3	10
1.20-1.50	4	4	5	5	18
1.50-1.80	4	3	3	3	13
1.80-2.10	2	2	3	2	9
2.10-2.40	3	3	3	15	24
2.40-2.70	10	5	6	5	26
2.70-3.00	5	5	6	12	28

Hole Ref	CPT 116				
Depth	Blows per 75mm				SPT N
0.00-0.30	7	4	3	3	17
0.30-0.60	5	4	3	4	16
0.60-0.90	3	4	3	2	12
0.90-1.20	2	3	3	3	11
1.20-1.50	4	5	5	4	18
1.50-1.80	3	3	3	3	12
1.80-2.10	3	3	3	3	12
2.10-2.40	4	4	3	3	14
2.40-2.70	5	6	6	4	21
2.70-3.00	4	4	5	4	17

Hole Ref	CPT 117				
Depth	Blows per 75mm				SPT N
0.00-0.30	4	3	3	4	14
0.30-0.60	3	4	4	3	14
0.60-0.90	2	2	2	2	8
0.90-1.20	3	4	2	2	11
1.20-1.50	2	3	3	4	12
1.50-1.80	4	4	2	2	12
1.80-2.10	4	2	3	4	13
2.10-2.40	4	4	4	4	16
2.40-2.70	4	3	4	5	16
2.70-3.00	3	4	5	4	16

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date: 24.06.22**

Hole Ref	CPT 118					**Hole Ref**	CPT 119					**Hole Ref**	CPT 120					**Hole Ref**	CPT 109				
Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N
0.00-0.30	5	4	4	3	16	0.00-0.30	7	5	4	5	21	0.00-0.30	6	4	5	4	19	0.00-0.30	3	2	2	2	9
0.30-0.60	4	4	3	4	15	0.30-0.60	4	4	4	5	17	0.30-0.60	4	4	4	4	16	0.30-0.60	2	3	4	3	12
0.60-0.90	6	4	3	4	17	0.60-0.90	3	4	4	3	14	0.60-0.90	4	3	5	3	15	0.60-0.90	2	2	1	1	6
0.90-1.20	3	2	2	1	8	0.90-1.20	3	4	2	3	12	0.90-1.20	3	4	3	3	13	0.90-1.20	1	1	1	2	5
1.20-1.50	0	2	2	3	7	1.20-1.50	2	1	1	1	5	1.20-1.50	3	2	2	2	9	1.20-1.50	2	2	2	1	7
1.50-1.80	4	6	5	4	19	1.50-1.80	2	1	1	2	6	1.50-1.80	2	2	3	3	10	1.50-1.80	4	3	3	2	12
1.80-2.10	3	3	6	3	15	1.80-2.10	4	3	4	6	17	1.80-2.10	4	4	6	3	17	1.80-2.10	2	2	5	4	13
2.10-2.40	5	6	3	4	18	2.10-2.40	10	4	4	5	23	2.10-2.40	4	3	5	4	16	2.10-2.40	6	3	4	3	16
2.40-2.70	4	4	3	3	14	2.40-2.70	4	4	5	4	17	2.40-2.70	4	4	3	4	15	2.40-2.70	2	2	1	3	8
2.70-3.00	3	3	3	4	13	2.70-3.00	6	5	3	4	18	2.70-3.00	3	4	3	3	13	2.70-3.00	2	4	3	4	13

Hole Ref	CPT 122					**Hole Ref**	CPT 124				
Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N
0.00-0.30	3	3	2	3	11	0.00-0.30	5	2	3	3	13
0.30-0.60	2	2	1	2	7	0.30-0.60	2	2	3	3	10
0.60-0.90	3	2	3	1	9	0.60-0.90	3	3	4	2	12
0.90-1.20	2	2	2	2	8	0.90-1.20	1	2	1	1	5
1.20-1.50	1	4	3	2	10	1.20-1.50	2	1	1	1	5
1.50-1.80	2	1	1	1	5	1.50-1.80	2	3	2	2	9
1.80-2.10	1	2	1	2	6	1.80-2.10	1	2	1	1	5
2.10-2.40	2	3	4	3	12	2.10-2.40	1	2	1	2	6
2.40-2.70	4	3	2	2	11	2.40-2.70	3	2	2	5	12
2.70-3.00	4	4	3	4	15	2.70-3.00	4	4	4	6	18

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 22.05.23

Hole Ref CPT 301

Depth	Blows per 75mm				SPT N
0.00-0.30	2	3	4	2	11
0.30-0.60	3	2	3	3	11
0.60-0.90	3	2	3	2	10
0.90-1.20	2	3	2	3	10
1.20-1.50	3	4	4	2	13
1.50-1.80	3	4	4	7	18
1.80-2.10	10	5	3	3	21
2.10-2.40	2	3	2	2	9
2.40-2.70	2	2	1	2	7
2.70-3.00	3	2	3	3	11
3.00-3.30	3	3	3	4	13
3.30-3.60	3	4	3	2	12
3.60-3.90	2	2	3	7	14
3.90-4.20	8	10	12	12	42
4.20-4.37	14	21	15		50/170
			20		

Hole Ref CPT 302

Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	3	2	9
0.30-0.60	3	2	3	4	12
0.60-0.90	3	3	3	3	12
0.90-1.20	3	3	3	2	11
1.20-1.50	2	1	1	2	6
1.50-1.80	2	2	1	1	6
1.80-1.96	2	2	2	2	8
2.10-2.40	2	4	2	1	9
2.40-2.70	3	11	12	9	35
2.70-3.00	5	3	3	2	12
3.00-3.30	2	1	1	1	5
3.30-3.60	1	2	4	5	12
3.60-3.90	6	5	4	4	19
3.90-4.20	2	3	5	6	16
4.20-4.50	7	8	10	11	36
4.50-4.67	14	17	19		50/170
			20		

Hole Ref CPT 303

Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	4	5	13
0.30-0.60	4	5	6	6	21
0.60-0.90	6	7	8	7	28
0.90-1.20	11	8	6	4	29
1.20-1.50	3	3	4	12	22
1.50-1.80	17	19	8	4	48
1.80-2.10	3	4	4	4	15
2.10-2.40	4	4	3	3	14
2.40-2.70	3	3	3	3	12
2.70-3.00	3	4	5	5	17
3.00-3.30	4	6	5	7	22
3.30-3.60	4	5	4	5	18
3.60-3.90	3	2	2	2	9
3.90-4.20	5	6	9	9	29
4.20-4.44	11	14	19	6	50/235
				10	

Hole Ref CPT 304

Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	4	4	12
0.30-0.60	4	6	4	7	21
0.60-0.90	5	6	5	5	21
0.90-1.20	4	3	3	2	12
1.20-1.50	2	1	1	1	6
1.50-1.80	1	1	2	2	6
1.80-2.10	2	2	2	2	8
2.10-2.40	2	1	2	2	7
2.40-2.70	2	1	1	1	5
2.70-3.00	1	1	2	1	6
3.00-3.30	2	2	2	2	8
3.30-3.60	2	3	3	4	12
3.60-3.90	3	3	3	4	13
3.90-4.20	6	8	7	6	27
4.20-4.50	7	6	9	10	32
4.50-4.80	10	10	9	10	39
4.80-5.04	12	12	16	10	50/235
				20	

Hole Ref CPT 305

Depth	Blows per 75mm				SPT N
0.00-0.30	3	3	3	3	12
0.30-0.60	2	4	3	3	12
0.60-0.90	2	2	2	2	8
0.90-1.20	2	4	4	4	14
1.20-1.50	3	3	3	2	11
1.50-1.80	2	2	2	2	8
1.80-2.10	3	4	3	3	13
2.10-2.40	4	3	4	3	14
2.40-2.70	4	4	2	2	12
2.70-3.00	2	3	2	3	10
3.00-3.30	3	4	3	3	13
3.30-3.60	7	4	3	2	16
3.60-3.90	3	3	3	2	11
3.90-4.20	2	2	1	1	6
4.20-4.50	1	1	2	2	6
4.50-4.80	1	2	2	1	6
4.80-5.10	1	2	7	19	29
5.10-5.20	22	28			50/95

Hole Ref CPT 306

Depth	Blows per 75mm				SPT N
0.00-0.30	2	4	4	4	14
0.30-0.60	3	3	4	4	14
0.60-0.90	4	3	3	4	14
0.90-1.20	3	3	4	5	15
1.20-1.50	4	4	4	4	16
1.50-1.80	5	4	4	4	17
1.80-2.10	3	3	4	3	13
2.10-2.40	3	3	3	3	12
2.40-2.70	3	4	4	3	14
2.70-3.00	4	5	4	4	17
3.00-3.30	3	3	3	3	12
3.30-3.60	4	4	4	4	16
3.60-3.90	4	5	4	4	17
3.90-4.20	3	3	3	3	12
4.20-4.50	5	2	2	4	13
4.50-4.80	4	9	11	14	38
4.80-5.10	13	13	11	12	49

Hole Ref CPT 307

Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	3	3	10
0.30-0.60	3	4	6	6	19
0.60-0.90	4	2	3	2	11
0.90-1.20	2	3	3	4	12
1.20-1.50	4	3	3	3	13
1.50-1.80	4	5	4	3	16
1.80-2.10	2	4	3	3	12
2.10-2.40	3	4	6	6	19
2.40-2.70	4	3	3	2	12
2.70-3.00	3	3	3	3	12
3.00-3.30	3	3	3	3	12
3.30-3.60	3	3	3	3	12
3.60-3.90	4	5	3	2	14
3.90-4.20	3	3	2	2	10
4.20-4.50	5	1	1	2	9
4.50-4.80	2	3	4	4	13
4.80-5.10	6	6	10	11	33

Hole Ref CPT 308

Depth	Blows per 75mm				SPT N
0.00-0.30	2	2	3	3	10
0.30-0.60	4	5	5	4	18
0.60-0.90	4	4	4	4	16
0.90-1.20	4	3	2	2	11
1.20-1.50	2	2	4	2	10
1.50-1.80	2	3	3	3	11
1.80-2.10	2	1	2	2	7
2.10-2.40	2	2	1	1	6
2.40-2.70	1	1	1	2	6
2.70-3.00	2	1	2	3	8
3.00-3.30	1	2	2	2	7
3.30-3.60	2	2	1	1	6
3.60-3.90	3	4	4	4	15
3.90-4.20	6	6	6	7	25
4.20-4.50	7	4	3	3	17
4.50-4.80	3	3	3	3	12
4.80-5.10	4	7	8	8	27

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 22.05.23

Hole Ref	CPT 309					**Hole Ref**	CPT 310					**Hole Ref**	CPT 311					**Hole Ref**	CPT 312				
Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N
0.00-0.30	2	3	3	3	11	0.00-0.30	2	3	2	2	9	0.00-0.30	3	3	3	3	12	0.00-0.30	2	3	2	2	9
0.30-0.60	4	8	9	5	26	0.30-0.60	2	7	8	7	24	0.30-0.60	3	4	7	6	20	0.30-0.60	2	5	9	8	21
0.60-0.90	4	4	4	6	18	0.60-0.90	6	9	8	6	29	0.60-0.90	5	5	4	4	18	0.60-0.90	7	9	9	6	31
0.90-1.20	4	3	1	2	10	0.90-1.20	6	6	6	6	24	0.90-1.20	3	4	4	2	13	0.90-1.20	6	5	5	6	22
1.20-1.50	2	2	3	3	10	1.20-1.50	5	5	3	3	16	1.20-1.50	3	3	4	4	14	1.20-1.50	7	6	7	7	27
1.50-1.80	2	2	2	2	8	1.50-1.80	3	3	5	3	14	1.50-1.80	5	4	6	4	19	1.50-1.80	7	6	5	5	23
1.80-2.10	2	1	2	2	7	1.80-1.96	2	7	5	3	17	1.80-2.10	3	3	2	3	11	1.80-2.10	4	4	4	4	16
2.10-2.40	2	2	2	1	7	2.10-2.40	3	3	3	3	12	2.10-2.40	3	2	1	2	8	2.10-2.40	3	2	2	2	9
2.40-2.70	2	1	1	2	6	2.40-2.70	2	1	2	2	7	2.40-2.70	2	1	2	2	7	2.40-2.70	3	3	2	2	10
2.70-3.00	3	2	1	1	7	2.70-3.00	2	3	2	2	10	2.70-3.00	2	2	3	2	9	2.70-3.00	2	2	2	3	9
3.00-3.30	1	2	1	2	6	3.00-3.30	3	2	3	3	11	3.00-3.30	3	3	3	3	12	3.00-3.30	2	3	2	3	10
3.30-3.60	2	2	1	2	7	3.30-3.60	2	2	2	2	8	3.30-3.60	1	2	1	2	6	3.30-3.60	3	3	2	2	10
3.60-3.90	3	4	2	3	12	3.60-3.90	2	3	2	2	9	3.60-3.90	1	1	2	2	6	3.60-3.90	2	2	2	2	8
3.90-4.20	8	8	3	3	22	3.90-4.20	3	3	3	3	12	3.90-4.20	2	2	1	2	7	3.90-4.20	6	4	2	2	14
4.20-4.50	4	2	2	2	10	4.20-4.50	2	3	5	6	16	4.20-4.50	2	3	2	2	9	4.20-4.50	3	8	4	3	18
4.50-4.80	2	2	2	2	8	4.50-4.80	7	7	8	7	29	4.50-4.80	2	3	4	7	16	4.50-4.80	7	9	11	14	41
4.80-5.10	2	3	1	7	13	4.80-5.10	7	8	10	11	36	4.80-5.10	7	3	3	6	19	4.80-4.97	17	22	11		50/170
																					20		

Hole Ref	CPT 313					**Hole Ref**	CPT 314					**Hole Ref**	CPT 315					**Hole Ref**	CPT 316				
Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N	Depth	Blows per 75mm				SPT N
0.00-0.30	2	3	2	2	9	0.00-0.30	2	4	4	13	23	0.00-0.30	2	3	4	4	13	0.00-0.30	4	4	3	2	13
0.30-0.60	3	3	4	7	17	0.30-0.60	8	3	4	3	18	0.30-0.60	4	4	4	4	16	0.30-0.60	1	3	1	1	6
0.60-0.90	8	8	9	12	37	0.60-0.90	3	4	4	4	15	0.60-0.90	3	3	3	4	13	0.60-0.90	5	6	9	9	29
0.90-1.20	11	12	8	7	38	0.90-1.20	4	2	2	2	10	0.90-1.20	3	4	5	5	18	0.90-1.20	5	4	5	4	18
1.20-1.50	6	6	6	7	25	1.20-1.50	2	3	3	3	11	1.20-1.50	4	5	5	4	18	1.20-1.50	6	5	5	5	21
1.50-1.80	7	13	12	6	38	1.50-1.80	2	3	4	3	12	1.50-1.80	6	4	4	4	18	1.50-1.80	6	5	5	5	21
1.80-2.10	5	4	5	4	18	1.80-2.10	3	4	4	4	15	1.80-2.10	4	4	4	4	16	1.80-2.10	4	4	4	4	16
2.10-2.40	4	4	3	3	14	2.10-2.40	4	5	5	5	19	2.10-2.40	4	4	2	2	12	2.10-2.40	3	4	3	4	14
2.40-2.70	2	3	3	3	11	2.40-2.70	2	2	2	2	8	2.40-2.70	2	2	1	1	6	2.40-2.70	8	6	4	3	21
2.70-3.00	4	3	3	3	13	2.70-3.00	2	3	3	3	11	2.70-3.00	1	2	3	3	9	2.70-3.00	2	2	1	1	6
3.00-3.30	3	3	4	6	16	3.00-3.30	1	2	2	2	7	3.00-3.30	3	4	4	3	14	3.00-3.30	2	2	2	1	7
3.30-3.60	5	5	4	6	20	3.30-3.60	2	2	2	2	8	3.30-3.60	2	2	2	1	7	3.30-3.60	1	2	2	2	7
3.60-3.90	4	4	4	4	16	3.60-3.90	3	3	3	3	12	3.60-3.90	2	1	1	2	6	3.60-3.90	1	2	2	2	7
3.90-4.20	4	5	4	3	16	3.90-4.20	14	11	10	10	45	3.90-4.20	2	2	2	2	8	3.90-4.20	2	2	3	4	11
4.20-4.50	4	4	3	3	14	4.20-4.37	12	18	20		50/170	4.20-4.50	4	2	2	2	10	4.20-4.50	4	3	3	2	12
4.50-4.80	3	3	4	5	15				20			4.50-4.80	2	2	4	4	12	4.50-4.80	3	3	5	4	15
4.80-4.98	11	14	25		50/180							4.80-5.10	5	5	4	4	18	4.80-5.10	5	6	6	6	23
			30																				

SOUTH WALES GROUND TESTING - Continuous CPT

CONTRACT: Virginia Park **Date:** 22.05.23

Hole Ref CPT 317

Depth	Blows per 75mm				SPT N
0.00-0.30	4	3	3	2	12
0.30-0.60	3	3	4	6	16
0.60-0.90	6	6	6	6	24
0.90-1.20	8	7	8	7	30
1.20-1.50	6	6	5	6	23
1.50-1.80	9	10	10	12	41
1.80-2.10	9	5	5	5	24
2.10-2.40	4	4	4	3	15
2.40-2.70	3	3	3	3	12
2.70-3.00	3	4	3	4	14
3.00-3.30	3	4	4	4	15
3.30-3.60	5	4	4	4	17
3.60-3.90	4	4	4	5	17
3.90-4.20	5	5	6	5	21
4.20-4.45	9	11	17	13	50/245
				20	

Hole Ref CPT 318

Depth	Blows per 75mm				SPT N
0.00-0.30	3	6	5	4	18
0.30-0.60	3	3	5	3	14
0.60-0.90	3	3	11	7	24
0.90-1.20	4	3	3	4	14
1.20-1.50	2	2	2	4	10
1.50-1.80	2	2	3	3	10
1.80-1.96	2	3	3	2	10
2.10-2.40	4	5	5	3	17
2.40-2.70	4	4	4	5	17
2.70-3.00	3	2	2	1	8
3.00-3.30	1	2	2	2	7
3.30-3.60	2	2	2	2	8
3.60-3.90	2	2	3	3	10
3.90-4.20	3	2	3	4	12
4.20-4.50	3	2	6	7	18
4.50-4.80	12	8	7	7	34
4.80-5.10	5	6	7	7	25

Hole Ref

Depth	Blows per 75mm				SPT N
0.00-0.30					
0.30-0.60					
0.60-0.90					
0.90-1.20					
1.20-1.50					
1.50-1.80					
1.80-2.10					
2.10-2.40					
2.40-2.70					
2.70-3.00					
3.00-3.30					
3.30-3.60					
3.60-3.90					
3.90-4.20					
4.20-4.50					
4.50-4.80					
4.80-5.10					

Hole Ref

Depth	Blows per 75mm				SPT N
0.00-0.30					
0.30-0.60					
0.60-0.90					
0.90-1.20					
1.20-1.50					
1.50-1.80					
1.80-2.10					
2.10-2.40					
2.40-2.70					
2.70-3.00					
3.00-3.30					
3.30-3.60					
3.60-3.90					
3.90-4.20					
4.20-4.50					
4.50-4.80					
4.80-5.10					

Hole Ref

Depth	Blows per 75mm				SPT N
0.00-0.30					
0.30-0.60					
0.60-0.90					
0.90-1.20					
1.20-1.50					
1.50-1.80					
1.80-2.10					
2.10-2.40					
2.40-2.70					
2.70-3.00					
3.00-3.30					
3.30-3.60					
3.60-3.90					
3.90-4.20					
4.20-4.50					
4.50-4.80					
4.80-5.10					

Hole Ref

Depth	Blows per 75mm				SPT N
0.00-0.30					
0.30-0.60					
0.60-0.90					
0.90-1.20					
1.20-1.50					
1.50-1.80					
1.80-2.10					
2.10-2.40					
2.40-2.70					
2.70-3.00					
3.00-3.30					
3.30-3.60					
3.60-3.90					
3.90-4.20					
4.20-4.50					
4.50-4.80					
4.80-5.10					

Hole Ref

Depth	Blows per 75mm				SPT N
0.00-0.30					
0.30-0.60					
0.60-0.90					
0.90-1.20					
1.20-1.50					
1.50-1.80					
1.80-2.10					
2.10-2.40					
2.40-2.70					
2.70-3.00					
3.00-3.30					
3.30-3.60					
3.60-3.90					
3.90-4.20					
4.20-4.50					
4.50-4.80					
4.80-5.10					

Hole Ref

Depth	Blows per 75mm				SPT N
0.00-0.30					
0.30-0.60					
0.60-0.90					
0.90-1.20					
1.20-1.50					
1.50-1.80					
1.80-2.10					
2.10-2.40					
2.40-2.70					
2.70-3.00					
3.00-3.30					
3.30-3.60					
3.60-3.90					
3.90-4.20					
4.20-4.50					
4.50-4.80					
4.80-5.10					

APPENDIX E

LABORATORY CHEMICAL TEST RESULTS – COMPLIANCE TESTING

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Analytical Report Number : 21-11703

Replaces Analytical Report Number: 21-11703, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	23/09/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	23/09/2021
Your order number:	12476 RB	**Analysis completed by:**	14/10/2021
Report Issue Number:	2	**Report issued on:**	14/10/2021
Samples Analysed:	7 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-11703
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2020454	2020455	2020456	2020457	2020458
Sample Reference				ES79	ES80	ES81	ES82	ES83
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				21/09/2021	21/09/2021	21/09/2021	21/09/2021	21/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	18	19	15	18
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	Amosite
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	7.8	7.6	7.5	7.5
Total Cyanide	mg/kg	1	MCERTS	3.5	2.7	3.7	3.8	3.6
Total Sulphate as SO4	mg/kg	50	MCERTS	1100	1500	2300	2200	2200
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.36	0.59	0.76	0.86	0.85
Sulphide	mg/kg	1	MCERTS	54	82	69	85	67
Total Sulphur	mg/kg	50	MCERTS	940	1400	1800	1500	1800
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.0	3.5	3.9	3.8	4.5
Loss on Ignition @ 450oC	%	0.2	MCERTS	6.2	8.8	8.7	9.2	10.9
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	1.4	4.1	2.7	2.0	3.7
Acenaphthylene	mg/kg	0.05	MCERTS	0.50	0.81	0.83	0.75	0.98
Acenaphthene	mg/kg	0.05	MCERTS	1.3	1.9	1.5	1.2	2.0
Fluorene	mg/kg	0.05	MCERTS	1.2	2.6	2.0	1.7	2.7
Phenanthrene	mg/kg	0.05	MCERTS	5.3	9.4	8.6	7.1	11
Anthracene	mg/kg	0.05	MCERTS	1.7	3.7	4.0	3.2	3.8
Fluoranthene	mg/kg	0.05	MCERTS	5.4	7.5	9.4	7.3	11
Pyrene	mg/kg	0.05	MCERTS	3.6	5.1	6.0	5.1	7.0
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.3	6.3	7.7	6.5	9.5
Chrysene	mg/kg	0.05	MCERTS	2.9	4.7	6.9	4.3	6.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	4.6	6.0	4.0	6.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.6	2.5	2.6	3.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	3.0	4.2	3.0	4.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.4	1.9	2.7	2.0	2.8
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.52	0.89	1.0	0.81	1.2
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.4	2.1	2.7	2.1	3.0
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	31.0	60.1	68.6	53.5	79.2

Analytical Report Number: 21-11703
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2020454	2020455	2020456	2020457	2020458
Sample Reference				ES79	ES80	ES81	ES82	ES83
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				21/09/2021	21/09/2021	21/09/2021	21/09/2021	21/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	16	16	15	16
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.77	1.1	1.2	1.1	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	0.8	1.0	0.3	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	1.3	1.4	1.3	1.6
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	31	36	30	35
Copper (aqua regia extractable)	mg/kg	1	MCERTS	43	74	83	78	92
Lead (aqua regia extractable)	mg/kg	1	MCERTS	64	110	120	120	130
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29	40	45	40	45
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	21	27	31	28	29
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	200	290	330	300	390
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	4.1	6.0	4.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	24	21	18	14	12
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	67	130	100	82	89
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	91	150	120	96	100
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	30	60	62	52	52
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	95	150	130	98	100
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	130	210	190	150	150
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	3.6	4.6	2.6	< 1.0	2.3
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	11	11	9.8	8.4	9.9
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	25	30	32	25	32
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	65	100	100	82	100
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	22	32	37	28	33
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	36	49	60	44	53
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	110	150	150	120	150
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	140	200	210	160	200
TPH Total C5 - C44	mg/kg	10	NONE	270	410	400	310	350

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-11703
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2020459	2020460
Sample Reference				ES84	ES85
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				21/09/2021	21/09/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	21	20
Total mass of sample received	kg	0.001	NONE	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.1	7.7
Total Cyanide	mg/kg	1	MCERTS	3.9	2.9
Total Sulphate as SO4	mg/kg	50	MCERTS	3300	2500
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.3	0.81
Sulphide	mg/kg	1	MCERTS	50	130
Total Sulphur	mg/kg	50	MCERTS	1800	2400
Total Organic Carbon (TOC)	%	0.1	MCERTS	4.5	4.8
Loss on Ignition @ 450oC	%	0.2	MCERTS	9.4	10.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	2.6	1.7
Acenaphthylene	mg/kg	0.05	MCERTS	0.79	0.50
Acenaphthene	mg/kg	0.05	MCERTS	1.4	0.91
Fluorene	mg/kg	0.05	MCERTS	1.7	1.2
Phenanthrene	mg/kg	0.05	MCERTS	7.1	4.3
Anthracene	mg/kg	0.05	MCERTS	2.8	1.6
Fluoranthene	mg/kg	0.05	MCERTS	8.0	4.5
Pyrene	mg/kg	0.05	MCERTS	5.3	3.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	7.0	4.1
Chrysene	mg/kg	0.05	MCERTS	5.5	3.2
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	5.0	2.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	2.7	1.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.6	2.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.3	1.4
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.92	0.55
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.3	1.6

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	58.8	35.5

Analytical Report Number: 21-11703
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2020459	2020460
Sample Reference				ES84	ES85
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				21/09/2021	21/09/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	15
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.93	1.0
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.2	1.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	69	73
Lead (aqua regia extractable)	mg/kg	1	MCERTS	90	96
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	34	36
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	25	26
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	270	390
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	3.4
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	14	21
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	99	120
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	110	140
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	63	65
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	110	140
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	180	210
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.2	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	8.5	10
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	29	25
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	120	94
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	45	35
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	73	58
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	160	130
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	230	190
TPH Total C5 - C44	mg/kg	10	NONE	410	400

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-11703
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
2020455	ES80	0.10	143	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
2020458	ES83	0.10	119	Loose Fibres	**Amosite**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-11703
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2020454	ES79	None Supplied	0.1	Brown clay and loam with gravel.
2020455	ES80	None Supplied	0.1	Brown loam and clay with gravel.
2020456	ES81	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2020457	ES82	None Supplied	0.1	Brown loam and clay with gravel.
2020458	ES83	None Supplied	0.1	Brown loam and clay with gravel.
2020459	ES84	None Supplied	0.1	Brown loam and clay with gravel.
2020460	ES85	None Supplied	0.1	Brown loam and clay with gravel.

Analytical Report Number : 21-11703
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-11703
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-17997

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	22/10/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	22/10/2021
Your order number:	12476 RB	**Analysis completed by:**	01/11/2021
Report Issue Number:	1	**Report issued on:**	01/11/2021
Samples Analysed:	5 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-17997
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2056364	2056365	2056366	2056367	2056368
Sample Reference				ES86	ES87	ES88	ES89	ES90
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	18	14	16	16
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.0	8.1	8.1	7.7	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	380	440	250	850	530
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.034	0.045	0.033	0.16	0.088
Sulphide	mg/kg	1	MCERTS	1.4	< 1.0	1.1	4.2	< 1.0
Total Sulphur	mg/kg	50	MCERTS	250	260	180	500	340
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.1	1.3	1.0	1.4	1.1
Loss on Ignition @ 450oC	%	0.2	MCERTS	3.2	3.3	2.9	5.5	3.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.28	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.41	< 0.05	0.39	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.65	< 0.05	0.44	0.41
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.51	< 0.05	0.39	0.33
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.28	< 0.05	0.36	0.33
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.25	< 0.05	0.34	0.27
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.37	0.29
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.23	0.18
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.33	0.26
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	2.10	< 0.80	3.13	2.07

Analytical Report Number: 21-17997
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2056364	2056365	2056366	2056367	2056368
Sample Reference				ES86	ES87	ES88	ES89	ES90
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				19/10/2021	19/10/2021	19/10/2021	19/10/2021	19/10/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	12	11	14	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.74	0.83	0.94	0.89	0.81
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	< 0.2	0.2	0.8	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	0.8	0.5	1.1	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	21	22	24	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	17	14	19	14
Lead (aqua regia extractable)	mg/kg	1	MCERTS	37	49	33	53	41
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	26	28	25	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	24	27	27	29	27
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	170	130	210	160
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-17997
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2056364	ES86	None Supplied	None Supplied	Brown clay and sand.
2056365	ES87	None Supplied	None Supplied	Brown clay and sand with vegetation.
2056366	ES88	None Supplied	None Supplied	Brown clay and sand with vegetation.
2056367	ES89	None Supplied	None Supplied	Brown clay and sand with gravel.
2056368	ES90	None Supplied	None Supplied	Brown clay and sand with vegetation.

Analytical Report Number : 21-17997
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-17997
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-21136

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	08/11/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	08/11/2021
Your order number:	12476 RB	**Analysis completed by:**	16/11/2021
Report Issue Number:	1	**Report issued on:**	16/11/2021
Samples Analysed:	8 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-21136
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2073355	2073356	2073357	2073358	2073359
Sample Reference				ES91	ES92	ES93	ES94	ES95
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				03/11/2021	03/11/2021	03/11/2021	03/11/2021	03/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	17	19	21	20
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.4	9.7	7.1	8.1	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	910	880	690	640	600
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.083	0.16	0.098	0.059	0.028
Sulphide	mg/kg	1	MCERTS	14	50	20	26	27
Total Sulphur	mg/kg	50	MCERTS	440	450	560	570	490
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.3	1.1	1.3	1.5	1.6
Loss on Ignition @ 450oC	%	0.2	MCERTS	4.1	3.9	3.8	4.5	4.8
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80

Analytical Report Number: 21-21136
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2073355	2073356	2073357	2073358	2073359
Sample Reference				ES91	ES92	ES93	ES94	ES95
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				03/11/2021	03/11/2021	03/11/2021	03/11/2021	03/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	12	13	14	14
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.76	0.79	0.89	0.85	0.82
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	1.0	0.4	0.3	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.0	0.5	2.0	2.6	2.7
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	21	25	23	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	16	17	18	15	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	31	17	56	67	75
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	18	22	20	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	25	25	27	26	24
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	170	53	380	450	460
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-21136
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2073360	2073361	2073362
Sample Reference				ES96	ES97	ES98
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				03/11/2021	03/11/2021	03/11/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	19	9.4
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
General Inorganics						
pH - Automated	pH Units	N/A	MCERTS	8.2	8.2	8.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	630	690	660
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.025	0.12	0.093
Sulphide	mg/kg	1	MCERTS	22	13	28
Total Sulphur	mg/kg	50	MCERTS	480	460	550
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.6	1.2	1.5
Loss on Ignition @ 450oC	%	0.2	MCERTS	4.4	4.6	4.1
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80

Analytical Report Number: 21-21136
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				2073360	2073361	2073362
Sample Reference				ES96	ES97	ES98
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				03/11/2021	03/11/2021	03/11/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	20	16
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.76	0.79	0.90
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.9	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.9	2.6	2.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	21	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	14	14	50
Lead (aqua regia extractable)	mg/kg	1	MCERTS	69	100	76
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	19	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	22	21	27
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	450	580	530
Petroleum Hydrocarbons						
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-21136
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2073355	ES91	None Supplied	None Supplied	Brown loam and clay.
2073356	ES92	None Supplied	None Supplied	Brown loam and clay with gravel.
2073357	ES93	None Supplied	None Supplied	Brown loam and clay with vegetation.
2073358	ES94	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
2073359	ES95	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
2073360	ES96	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
2073361	ES97	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
2073362	ES98	None Supplied	None Supplied	Brown loam and clay with vegetation.

Analytical Report Number : 21-21136
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-21136
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-66424

Replaces Analytical Report Number: 21-66424, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	06/04/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	06/04/2021
Your order number:	12476 RB	**Analysis completed by:**	21/04/2021
Report Issue Number:	2	**Report issued on:**	21/04/2021
Samples Analysed:	10 soil samples		

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Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-66424
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1824445	1824446	1824447	1824448	1824449
Sample Reference				ES1	ES2	ES3	ES4	ES5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				31/03/2021	31/03/2021	31/03/2021	31/03/2021	31/03/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	14	18	34	24
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	< 0.001	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.8	7.7	7.1	7.3	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	470	310	400	720	520
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.11	0.078	0.051	0.021	0.011
Sulphide	mg/kg	1	MCERTS	3.2	15	3.4	< 1.0	1.3
Total Sulphur	mg/kg	50	MCERTS	370	340	330	570	400
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.1	2.0	2.9	3.7	2.2
Loss on Ignition @ 450oC	%	0.2	MCERTS	7.5	5.2	8.3	10.5	7.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.30	< 0.05	< 0.05	< 0.05	0.30
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.90	< 0.05	0.54	< 0.05	0.65
Pyrene	mg/kg	0.05	MCERTS	0.46	< 0.05	0.28	< 0.05	0.53
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.5	< 0.05	1.2	< 0.05	0.48
Chrysene	mg/kg	0.05	MCERTS	0.79	< 0.05	0.62	< 0.05	0.50
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.9	< 0.05	0.83	< 0.05	0.74
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.27	< 0.05	0.36	< 0.05	0.18
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	< 0.05	1.0	< 0.05	0.45
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.62	< 0.05	0.54	< 0.05	0.29
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.68	< 0.05	0.54	< 0.05	0.29
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	8.50	< 0.80	5.96	< 0.80	4.41

Analytical Report Number: 21-66424
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1824445	1824446	1824447	1824448	1824449
Sample Reference				ES1	ES2	ES3	ES4	ES5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				31/03/2021	31/03/2021	31/03/2021	31/03/2021	31/03/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	9.1	11	11	11
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.71	0.49	0.68	0.64	0.63
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.6	0.4	0.7	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	0.8	0.7	1.1	0.6
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15	17	17	16	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	44	81	48	26	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	71	45	53	48	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	19	24	18	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	21	24	20	19	20
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	140	110	290	100	98

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-66424
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1824450	1824451	1824452	1824453	1824454
Sample Reference				ES6	ES7	ES8	ES9	ES10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				31/03/2021	31/03/2021	31/03/2021	31/03/2021	31/03/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	27	21	22	24	19
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.2	7.4	7.4	7.3	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	690	2700	940	1900	1400
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.053	1.1	0.20	0.64	0.48
Sulphide	mg/kg	1	MCERTS	2.7	240	25	120	130
Total Sulphur	mg/kg	50	MCERTS	430	3500	850	2100	1700
Total Organic Carbon (TOC)	%	0.1	MCERTS	5.0	3.0	2.6	3.8	2.1
Loss on Ignition @ 450oC	%	0.2	MCERTS	11.7	10.5	8.8	10.4	8.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.57	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.24	0.34	0.28	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	2.5	0.40	1.0	1.5
Fluorene	mg/kg	0.05	MCERTS	< 0.05	2.9	0.80	0.89	1.1
Phenanthrene	mg/kg	0.05	MCERTS	0.79	7.6	4.8	5.3	1.8
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.87	1.7	1.7	0.23
Fluoranthene	mg/kg	0.05	MCERTS	1.9	20	7.4	9.6	4.1
Pyrene	mg/kg	0.05	MCERTS	1.3	11	5.7	8.1	2.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.9	13	3.7	4.4	3.8
Chrysene	mg/kg	0.05	MCERTS	2.2	7.3	3.0	4.9	1.9
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.9	18	3.8	5.5	4.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.49	2.8	1.9	3.1	0.63
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.1	5.9	3.1	4.8	1.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.9	9.2	1.6	2.4	2.0
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.56	2.0	0.58	0.84	0.53
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.0	9.4	1.9	2.7	2.2
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	19.9	114	40.4	55.6	29.2

Analytical Report Number: 21-66424
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1824450	1824451	1824452	1824453	1824454
Sample Reference				ES6	ES7	ES8	ES9	ES10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				31/03/2021	31/03/2021	31/03/2021	31/03/2021	31/03/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	24	11	17	14
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.69	1.6	0.80	1.2	1.2
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	1.9	0.3	0.8	1.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.0	3.0	0.7	1.3	2.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	50	23	42	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	48	270	48	110	94
Lead (aqua regia extractable)	mg/kg	1	MCERTS	59	220	59	92	120
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.9	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	110	30	110	33
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	21	32	23	30	29
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	520	140	240	310

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-66424
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1824448	ES4	0.10	104	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1824451	ES7	0.10	127	Hard/Cement Type Material	**Chrysotile**	< 0.001	**< 0.001**
1824454	ES10	0.10	117	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-66424
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1824445	ES1	None Supplied	0.1	Brown loam and clay with gravel.
1824446	ES2	None Supplied	0.1	Brown loam and clay with gravel.
1824447	ES3	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1824448	ES4	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1824449	ES5	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1824450	ES6	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1824451	ES7	None Supplied	0.1	Brown loam and clay with gravel.
1824452	ES8	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1824453	ES9	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1824454	ES10	None Supplied	0.1	Brown loam and clay with gravel.

Analytical Report Number : 21-66424
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

Analytical Report Number : 21-66424
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-67630

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	12/04/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	12/04/2021
Your order number:	12476 RB	**Analysis completed by:**	20/04/2021
Report Issue Number:	1	**Report issued on:**	20/04/2021
Samples Analysed:	4 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-67630
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1831460	1831461	1831462	1831463
Sample Reference				ES11	ES12	ES13	ES14
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10
Date Sampled				08/04/2021	08/04/2021	08/04/2021	08/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	49	43	66	65
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.7	5.8	U/S*	U/S*
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1100	410	620	640
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.29	0.081	0.061	0.026
Sulphide	mg/kg	1	MCERTS	41	8.0	11	2.0
Total Sulphur	mg/kg	50	MCERTS	1700	990	2300	2000
Total Organic Carbon (TOC)	%	0.1	MCERTS	8.4	6.6	7.1	7.7
Loss on Ignition @ 450oC	%	0.2	MCERTS	28.4	16.1	90.4	96.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	2.0	< 1.0	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	2.4	1.8	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.31	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.29	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	1.0	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.3	0.65	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	1.8	0.49	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.7	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.7	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.9	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.64	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	0.95	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	16.4	3.90	< 0.80	< 0.80

Analytical Report Number: 21-67630
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1831460	1831461	1831462	1831463
Sample Reference				ES11	ES12	ES13	ES14
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10
Date Sampled				08/04/2021	08/04/2021	08/04/2021	08/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	6.7	3.8	1.6
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.86	0.52	0.14	0.10
Boron (water soluble)	mg/kg	0.2	MCERTS	2.0	1.3	7.1	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	8.9	< 0.2	0.5	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	4.1
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	11	3.9	5.0
Copper (aqua regia extractable)	mg/kg	1	MCERTS	57	25	7.9	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	29	18	6.3
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.5	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	14	6.8	7.2
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	18	11	3.3	2.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	290	61	94	19

U/S = Unsuitable Sample I/S = Insufficient Sample
*U/S - Unsuitable for analysis, samples absorbed all water used for extraction.

Analytical Report Number : 21-67630
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1831460	ES11	None Supplied	0.1	Grey loam and clay with gravel and vegetation.
1831461	ES12	None Supplied	0.1	Brown loam and clay with gravel.
1831462	ES13	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1831463	ES14	None Supplied	0.1	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-67630
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

Analytical Report Number : 21-67630
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-69872

Replaces Analytical Report Number: 21-69872, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Cearphilly	**Samples received on:**	21/04/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	21/04/2021
Your order number:	12476-RB	**Analysis completed by:**	06/05/2021
Report Issue Number:	2	**Report issued on:**	07/05/2021
Samples Analysed:	7 soil samples		

Signed:

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-69872
Project / Site name: Virginia Park Cearphilly
Your Order No: 12476-RB

Lab Sample Number				1843593	1843594	1843595	1843596	1843597
Sample Reference				ES15	ES16	ES17	ES18	ES19
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.20	0.10	0.20	0.10
Date Sampled				19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	22	20	18	7.3
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	Chrysotile	Chrysotile	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Detected	Detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	0.057	< 0.001	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	0.057	< 0.001	< 0.001	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.4	7.5	7.5	7.6	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	530	3100	760	840	200
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.17	0.42	0.21	0.23	0.021
Sulphide	mg/kg	1	MCERTS	30	160	55	49	< 1.0
Total Sulphur	mg/kg	50	MCERTS	680	2100	930	920	84
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.5	3.1	2.4	2.2	0.4
Loss on Ignition @ 450oC	%	0.2	MCERTS	7.4	9.8	6.7	6.0	1.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.40	5.0	3.7	0.43	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.28	1.7	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.27	1.2	3.0	0.57	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.32	1.4	4.4	0.65	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.3	5.1	16	2.4	0.40
Anthracene	mg/kg	0.05	MCERTS	0.37	1.3	4.0	0.59	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.4	6.7	15	3.7	0.46
Pyrene	mg/kg	0.05	MCERTS	1.9	4.9	10	2.8	0.33
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.8	3.6	6.5	2.0	0.28
Chrysene	mg/kg	0.05	MCERTS	1.4	3.5	6.3	1.7	0.24
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.2	3.6	6.7	2.6	0.27
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	1.8	2.2	0.77	0.10
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.8	2.6	4.7	1.7	0.18
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.95	1.6	2.3	0.89	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.41	0.66	0.79	0.39	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	1.7	2.7	1.0	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	17.8	45.0	90.1	22.1	2.26

Analytical Report Number: 21-69872
Project / Site name: Virginia Park Cearphilly
Your Order No: 12476-RB

Lab Sample Number				1843593	1843594	1843595	1843596	1843597
Sample Reference				ES15	ES16	ES17	ES18	ES19
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.20	0.10	0.20	0.10
Date Sampled				19/04/2021	19/04/2021	19/04/2021	19/04/2021	19/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	19	16	13	7.6
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.70	1.4	0.78	0.76	0.72
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	1.1	1.2	0.8	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	1.7	0.9	1.3	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26	44	23	25	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	37	110	37	45	10
Lead (aqua regia extractable)	mg/kg	1	MCERTS	64	110	300	62	12
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30	97	31	37	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	22	35	26	24	15
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	270	180	160	60
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	2.5	1.4	< 1.0	1.4
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	4.7	6.7	5.6	< 2.0	3.2
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	12	20	8.9	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	37	82	34	23	16
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	48	100	43	23	16
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	19	27	13	9.2	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	54	110	50	27	26
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	73	140	63	37	26
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	0.31	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	0.36	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	0.42	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.0	< 1.0	3.3	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	7.4	4.0	8.2	4.5	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	12	24	45	13	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	21	55	32	22	10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	44	83	89	40	11
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	44	83	89	40	11
TPH Total C5 - C44	mg/kg	10	NONE	120	220	150	76	37

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-69872
Project / Site name: Virginia Park Cearphilly
Your Order No: 12476-RB

Lab Sample Number				1843598	1843599
Sample Reference				ES20	ES21
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				19/04/2021	19/04/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	5.3	7.5
Total mass of sample received	kg	0.001	NONE	0.50	0.50

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.4	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	140	110
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.015	0.019
Sulphide	mg/kg	1	MCERTS	26	< 1.0
Total Sulphur	mg/kg	50	MCERTS	180	120
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.2	0.2
Loss on Ignition @ 450oC	%	0.2	MCERTS	1.3	1.4

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80

Analytical Report Number: 21-69872
Project / Site name: Virginia Park Cearphilly
Your Order No: 12476-RB

Lab Sample Number				1843598	1843599
Sample Reference				ES20	ES21
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				19/04/2021	19/04/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.1	8.4
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.67	0.60
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	14	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	10	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29	28
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	16	14
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	63	60
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-69872
Project / Site name: Virginia Park Cearphilly
Your Order No: 12476-RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1843593	ES15	0.10	101	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1843594	ES16	0.20	103	Loose Fibrous Debris	**Chrysotile**	0.057	**0.057**
1843595	ES17	0.10	126	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1843596	ES18	0.20	101	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-69872
Project / Site name: Virginia Park Cearphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1843593	ES15	None Supplied	0.1	Grey clay and sand with gravel and vegetation.
1843594	ES16	None Supplied	0.2	Grey clay and sand with gravel and vegetation.
1843595	ES17	None Supplied	0.1	Brown clay and sand with glass and gravel
1843596	ES18	None Supplied	0.2	Brown clay and sand with gravel and vegetation.
1843597	ES19	None Supplied	0.1	Brown clay and sand with gravel.
1843598	ES20	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
1843599	ES21	None Supplied	0.1	Brown clay and sand with gravel.

Analytical Report Number : 21-69872
Project / Site name: Virginia Park Cearphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-69872
Project / Site name: Virginia Park Cearphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-71440-2

Replaces Analytical Report Number: 21-71440-2, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	28/04/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	28/04/2021
Your order number:	12476-RB	**Analysis completed by:**	14/05/2021
Report Issue Number:	2	**Report issued on:**	14/05/2021
Samples Analysed:	7 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-71440-2
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1852298	1852299	1852300	1852301	1852302
Sample Reference				ES22	ES23	ES24	ES25	ES26
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.20
Date Sampled				26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	9.5	7.1	9.3	19	20
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.40	0.40
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Chrysotile	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	< 0.001	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	< 0.001	< 0.001
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.0	6.9	8.0	6.9	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1400	680	1200	730	660
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.15	0.061	0.12	0.10	0.051
Sulphide	mg/kg	1	MCERTS	24	1.4	16	39	20
Total Sulphur	mg/kg	50	MCERTS	490	330	430	1000	580
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8	0.6	0.8	3.8	4.4
Loss on Ignition @ 450oC	%	0.2	MCERTS	2.5	2.4	2.6	9.5	8.6
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.15
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.36
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.35
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.5
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.48
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.40	< 0.05	2.6
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.30	< 0.05	1.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.4
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.9
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.5
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.90
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.33
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.92
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	16.8

Analytical Report Number: 21-71440-2
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1852298	1852299	1852300	1852301	1852302
Sample Reference				ES22	ES23	ES24	ES25	ES26
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.20
Date Sampled				26/04/2021	26/04/2021	26/04/2021	26/04/2021	26/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.6	8.7	9.0	19	14
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.43	0.48	0.50	0.85	0.64
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	< 0.2	0.3	1.2	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	0.5	0.9	3.3	1.5
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15	19	20	26	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	10	13	35	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	52	23	52	80	72
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	24	21	28	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	19	20	22	26	22
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	81	110	210	120
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	2.9	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	9.6	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	10	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	51	< 8.0	< 8.0	16
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	61	< 10	< 10	16
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	23	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	73	< 10	< 10	18
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	96	< 10	< 10	18
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	2.8	2.8	3.7
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	19	26
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	11	< 8.4	18	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	13	27	38
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	11	13	45	38
TPH Total C5 - C44	mg/kg	10	NONE	< 10	110	13	45	56

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-71440-2
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1852303	1852304
Sample Reference				ES27	ES28
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.20
Date Sampled				26/04/2021	26/04/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	19
Total mass of sample received	kg	0.001	NONE	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	Chrysotile & Amosite
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.003	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	0.003	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.4	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	260	390
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.15	0.12
Sulphide	mg/kg	1	MCERTS	19	49
Total Sulphur	mg/kg	50	MCERTS	720	650
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.5	3.4
Loss on Ignition @ 450oC	%	0.2	MCERTS	5.7	6.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.2	2.3
Pyrene	mg/kg	0.05	MCERTS	1.1	2.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.61	0.83
Chrysene	mg/kg	0.05	MCERTS	0.77	1.3
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.72	1.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.47	0.85
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.66	0.95
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.37	0.57
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.22
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.34	0.76

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	6.20	11.0

Analytical Report Number: 21-71440-2
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1852303	1852304
Sample Reference				ES27	ES28
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.20
Date Sampled				26/04/2021	26/04/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	11
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.66	0.58
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	0.7
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	32	39
Lead (aqua regia extractable)	mg/kg	1	MCERTS	65	56
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	19	19
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	170	160
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	52	47
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	52	47
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	12
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	55	51
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	55	63
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	7.4	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	18	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	63	32
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	15	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	15	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	88	39
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	100	39
TPH Total C5 - C44	mg/kg	10	NONE	160	100

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-71440
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1852301	ES25	0.10	126	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1852302	ES26	0.20	120	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1852303	ES27	0.10	122	Loose Fibrous Debris	**Chrysotile**	0.003	**0.003**
1852304	ES28	0.20	131	Loose Fibres	**Chrysotile & Amosite**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-71440-2
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1852298	ES22	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1852299	ES23	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1852300	ES24	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1852301	ES25	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1852302	ES26	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
1852303	ES27	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1852304	ES28	None Supplied	0.2	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-71440-2
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-71440-2
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-73655

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	10/05/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	10/05/2021
Your order number:	12476-RB	**Analysis completed by:**	18/05/2021
Report Issue Number:	1	**Report issued on:**	18/05/2021
Samples Analysed:	4 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-73655
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1863779	1863780	1863781	1863782
Sample Reference				ES29	ES30	ES31	ES32
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.20	0.10	0.20
Date Sampled				06/05/2021	06/05/2021	06/05/2021	06/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	15	25	21
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	7.9	7.6	7.6	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1300	610	610	920
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.14	0.080	0.064	0.16
Sulphide	mg/kg	1	MCERTS	16	16	15	41
Total Sulphur	mg/kg	50	MCERTS	780	530	630	830
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.3	2.7	3.3	3.6
Loss on Ignition @ 450oC	%	0.2	MCERTS	6.6	7.3	6.6	7.3
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.30
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.29
Phenanthrene	mg/kg	0.05	MCERTS	0.76	0.64	0.61	1.4
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.22	0.38
Fluoranthene	mg/kg	0.05	MCERTS	1.5	1.5	1.3	3.4
Pyrene	mg/kg	0.05	MCERTS	1.2	1.1	1.0	2.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.2	1.0	1.1	2.7
Chrysene	mg/kg	0.05	MCERTS	0.91	1.1	1.1	2.1
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.4	1.5	1.7	2.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.61	0.59	0.42	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	1.1	1.2	2.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.64	0.59	0.80	1.4
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.53
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.70	0.69	0.77	1.4
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	10.0	9.74	10.2	23.1

Analytical Report Number: 21-73655
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1863779	1863780	1863781	1863782
Sample Reference				ES29	ES30	ES31	ES32
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.20	0.10	0.20
Date Sampled				06/05/2021	06/05/2021	06/05/2021	06/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	12	8.2	10
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.65	0.62	0.68	0.74
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	1.0	0.7	0.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.7	1.1	0.6	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	20	26	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	40	45	21	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	47	45	45	53
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	23	18	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	23	24	31	21
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	120	90	170
Petroleum Hydrocarbons							
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	9.5	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	39	28	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	49	28	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	19	14	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	49	35	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	68	50	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	13	12	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	22	26	22	24
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	35	38	30	33
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	35	38	30	33
TPH Total C5 - C44	mg/kg	10	NONE	100	88	30	33

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-73655
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1863779	ES29	None Supplied	0.1	Grey loam and clay with gravel and vegetation.
1863780	ES30	None Supplied	0.2	Grey loam and clay with gravel.
1863781	ES31	None Supplied	0.1	Grey clay and loam.
1863782	ES32	None Supplied	0.2	Brown clay and loam with gravel and vegetation.

Analytical Report Number : 21-73655
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-73655
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-75560

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	19/05/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	19/05/2021
Your order number:	12476 RB	**Analysis completed by:**	27/05/2021
Report Issue Number:	1	**Report issued on:**	27/05/2021
Samples Analysed:	3 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-75560
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1874143	1874144	1874145
Sample Reference				ES33	ES34	ES35
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10
Date Sampled				17/05/2021	17/05/2021	17/05/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	9.9	9.1	9.7
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.3	9.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	2200	970	3000
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.55	0.22	0.71
Sulphide	mg/kg	1	MCERTS	18	23	76
Total Sulphur	mg/kg	50	MCERTS	1000	920	1600
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.4	1.1	1.7
Loss on Ignition @ 450oC	%	0.2	MCERTS	3.9	3.4	4.1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.39	0.28	0.95
Fluorene	mg/kg	0.05	MCERTS	0.42	0.30	0.81
Phenanthrene	mg/kg	0.05	MCERTS	2.2	1.9	4.1
Anthracene	mg/kg	0.05	MCERTS	0.63	0.53	1.2
Fluoranthene	mg/kg	0.05	MCERTS	3.9	3.2	6.7
Pyrene	mg/kg	0.05	MCERTS	3.1	2.4	5.0
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.6	1.8	4.0
Chrysene	mg/kg	0.05	MCERTS	2.1	1.7	3.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.7	2.2	4.6
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.5	0.87	2.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.2	1.6	3.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.2	0.92	2.0
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.48	0.32	0.68
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.2	0.89	2.0

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	24.5	19.0	41.4

Analytical Report Number: 21-75560
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1874143	1874144	1874145
Sample Reference				ES33	ES34	ES35
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10
Date Sampled				17/05/2021	17/05/2021	17/05/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	10	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.78	0.81	1.0
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	0.5	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	0.5	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	21	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	30	27	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	48	53	91
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	20	19
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	25	26	26
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	120	140
Petroleum Hydrocarbons						
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	5.6	< 2.0	6.1
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	11	8.1	13
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	54	39	59
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	65	47	72
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	81	62	90
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	70	47	78
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	150	110	170
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.5	5.6	11
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	17	15	20
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	80	58	79
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	40	15	38
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	86	15	91
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	110	79	110
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	190	94	200
TPH Total C5 - C44	mg/kg	10	NONE	340	200	370

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-75560
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1874143	ES33	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1874144	ES34	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1874145	ES35	None Supplied	0.1	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-75560
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-75560
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-80192

Replaces Analytical Report Number: 21-80192, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	10/06/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	10/06/2021
Your order number:	12476-RB	**Analysis completed by:**	25/06/2021
Report Issue Number:	2	**Report issued on:**	25/06/2021
Samples Analysed:	17 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898319	1898320	1898321	1898322	1898323
Sample Reference				ES36	ES37	ES38	ES39	ES40
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				08/06/2021	08/06/2021	08/06/2021	08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	35	26	50	57	60
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	5.8	7.0	6.7	6.2	5.8
Total Cyanide	mg/kg	1	MCERTS	1.2	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	820	1000	1300	560	840
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.28	0.22	0.40	0.076	0.20
Sulphide	mg/kg	1	MCERTS	1.5	12	13	1.1	1.9
Total Sulphur	mg/kg	50	MCERTS	1200	960	1700	930	1300
Total Organic Carbon (TOC)	%	0.1	MCERTS	7.7	6.1	7.5	12	8.2
Loss on Ignition @ 450oC	%	0.2	MCERTS	30.0	16.4	29.7	27.6	35.0
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	1.7	1.3	< 1.0	1.5	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.7
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.27
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26	< 0.05	2.2
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28	< 0.05	2.5
Phenanthrene	mg/kg	0.05	MCERTS	0.70	0.48	1.1	< 0.05	8.2
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.23	< 0.05	3.0
Fluoranthene	mg/kg	0.05	MCERTS	1.1	0.95	1.5	< 0.05	5.8
Pyrene	mg/kg	0.05	MCERTS	0.77	0.70	1.1	< 0.05	3.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.69	0.70	0.95	< 0.05	2.5
Chrysene	mg/kg	0.05	MCERTS	0.47	0.45	0.90	< 0.05	2.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.76	0.78	0.99	< 0.05	2.2
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.24	0.27	0.51	< 0.05	1.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.50	0.48	0.90	< 0.05	1.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.23	0.23	0.51	< 0.05	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.23	0.26	0.56	< 0.05	0.98
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	5.66	5.30	9.82	< 0.80	39.6

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898319	1898320	1898321	1898322	1898323
Sample Reference				ES36	ES37	ES38	ES39	ES40
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				08/06/2021	08/06/2021	08/06/2021	08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.8	7.5	8.8	4.1	7.6
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.39	0.59	0.65	0.38	0.53
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	0.8	1.6	0.7	1.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.4	0.7	< 0.2	0.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	22	17	10	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	32	30	8.7	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	30	47	13	30
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	21	21	11	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	9.4	16	18	8.6	13
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	70	83	110	33	78
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	10	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	130	42	60
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	140	42	60
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	94	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	140	42	66
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	240	42	66
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	7.5
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	13
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	26	< 10	24
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	55	35	100	68	150
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	46	30	86	140	150
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	46	65	180	480	380
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	63	43	130	74	200
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	110	110	310	560	580
TPH Total C5 - C44	mg/kg	10	NONE	110	110	540	600	640

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898324	1898325	1898326	1898327	1898328
Sample Reference				ES41	ES42	ES43	ES44	ES45
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				08/06/2021	08/06/2021	08/06/2021	08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	67	4.3	5.7	7.0	8.9
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	I/S	9.1	8.8	7.9	7.6
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	750	2600	2400	710	350
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.056	0.74	0.63	0.13	0.038
Sulphide	mg/kg	1	MCERTS	I/S	130	98	3.4	1.3
Total Sulphur	mg/kg	50	MCERTS	1400	1300	1300	310	150
Total Organic Carbon (TOC)	%	0.1	MCERTS	8.9	2.4	1.6	1.0	0.6
Loss on Ignition @ 450oC	%	0.2	MCERTS	60.1	4.9	4.2	3.1	2.6
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.50	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.50	0.29	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.20	0.76	0.86	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.37	0.79	0.83	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.92	5.4	5.0	0.32	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.23	1.8	1.4	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.3	14	11	1.1	< 0.05
Pyrene	mg/kg	0.05	MCERTS	1.2	13	9.4	1.1	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.97	12	8.4	0.88	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.91	10	7.4	0.65	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.1	12	8.9	1.0	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.73	9.8	5.7	0.39	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	13	8.3	0.79	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.71	6.9	4.8	0.30	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	2.6	2.0	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.76	8.2	5.3	0.36	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	10.9	110	79.9	6.97	< 0.80

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898324	1898325	1898326	1898327	1898328
Sample Reference				ES41	ES42	ES43	ES44	ES45
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				08/06/2021	08/06/2021	08/06/2021	08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.9	13	15	9.0	9.4
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.37	0.82	0.70	0.66	0.75
Boron (water soluble)	mg/kg	0.2	MCERTS	4.0	1.8	1.8	0.2	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	3.6	2.9	0.4	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	19	18	21	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	25	21	12	9.8
Lead (aqua regia extractable)	mg/kg	1	MCERTS	31	89	68	28	29
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	17	17	22	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.9	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	7.6	25	23	21	24
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	80	240	380	100	68
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	3.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	12	10	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	67	100	73	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	67	120	84	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	360	270	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	70	120	84	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	70	480	350	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	7.8	8.7	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	13	53	40	11	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	110	270	190	46	30
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	140	300	180	64	27
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	320	530	440	120	67
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	130	330	240	56	36
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	440	860	680	170	100
TPH Total C5 - C44	mg/kg	10	NONE	510	1300	1000	170	100

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898329	1898330	1898331	1898332	1898333
Sample Reference				ES46	ES47	ES48	ES16N	ES16S
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	1.50	1.50
Date Sampled				08/06/2021	08/06/2021	08/06/2021	08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	-	-
Moisture Content	%	0.01	NONE	8.0	15	13	-	-
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	-	-
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	0.006	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	0.006	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	7.4	7.4	-	-
Total Cyanide	mg/kg	1	MCERTS	< 1.0	1.6	2.0	-	-
Total Sulphate as SO4	mg/kg	50	MCERTS	490	2200	3400	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.082	0.76	1.2	-	-
Sulphide	mg/kg	1	MCERTS	1.4	110	170	-	-
Total Sulphur	mg/kg	50	MCERTS	210	1900	2700	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8	3.6	3.8	-	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	2.5	9.9	11.7	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	3.6	12	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	1.7	4.6	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.79	1.4	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	2.8	6.8	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	9.7	22	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	2.2	5.9	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	8.7	18	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	5.9	13	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	4.3	8.9	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	3.4	7.6	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	4.6	9.2	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.9	3.6	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	3.2	6.6	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.4	2.8	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.58	1.0	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	1.5	2.8	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	56.1	126	-	-

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898329	1898330	1898331	1898332	1898333
Sample Reference				ES46	ES47	ES48	ES16N	ES16S
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	1.50	1.50
Date Sampled				08/06/2021	08/06/2021	08/06/2021	08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.2	16	17	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.62	1.2	0.99	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	1.6	1.7	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.9	1.1	-	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	35	29	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	64	85	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	22	240	150	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	5.5	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	41	34	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	19	29	26	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	64	240	300	-	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.0	< 1.0	2.6	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	8.6	12	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	30	45	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	150	230	-	-
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	180	280	-	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	110	120	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	190	290	-	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	290	410	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	6.6	12	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	20	29	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	51	110	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	160	220	-	-
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	72	70	-	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	130	130	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	240	380	-	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	370	510	-	-
TPH Total C5 - C44	mg/kg	10	NONE	< 10	660	910	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898334	1898335
Sample Reference				ES16E	ES16W
Sample Number				None Supplied	None Supplied
Depth (m)				1.50	1.50
Date Sampled				08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	-	-
Moisture Content	%	0.01	NONE	-	-
Total mass of sample received	kg	0.001	NONE	-	-

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile & Crocidolite	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-
Total Cyanide	mg/kg	1	MCERTS	-	-
Total Sulphate as SO4	mg/kg	50	MCERTS	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-
Sulphide	mg/kg	1	MCERTS	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1898334	1898335
Sample Reference				ES16E	ES16W
Sample Number				None Supplied	None Supplied
Depth (m)				1.50	1.50
Date Sampled				08/06/2021	08/06/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	-	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	-	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	-	-
TPH Total C5 - C44	mg/kg	10	NONE	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-80192
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1898332	ES16N	1.50	137	Loose Fibres & Loose Fibrous Debris	**Chrysotile**	0.006	**0.006**
1898334	ES16E	1.50	146	Loose Fibres	**Chrysotile & Crocidolite**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-80192
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1898319	ES36	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1898320	ES37	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1898321	ES38	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1898322	ES39	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1898323	ES40	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
1898324	ES41	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
1898325	ES42	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
1898326	ES43	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
1898327	ES44	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
1898328	ES45	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
1898329	ES46	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
1898330	ES47	None Supplied	0.1	Brown clay and sand with gravel and vegetation.
1898331	ES48	None Supplied	0.1	Brown clay and sand with gravel and vegetation.

Analytical Report Number : 21-80192
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-80192
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-81876

Project / Site name:	Virginia Park Caerphiily	**Samples received on:**	18/06/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	18/06/2021
Your order number:	12476 RB	**Analysis completed by:**	24/06/2021
Report Issue Number:	1	**Report issued on:**	24/06/2021
Samples Analysed:	2 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-81876
Project / Site name: Virginia Park Caerphiily
Your Order No: 12476 RB

Lab Sample Number				1907615	1907616
Sample Reference				ES50	ES51
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				16/06/2021	16/06/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	17
Total mass of sample received	kg	0.001	NONE	0.40	0.40
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	8.1	7.6
Total Cyanide	mg/kg	1	MCERTS	5.4	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	3400	390
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.9	0.098
Sulphide	mg/kg	1	MCERTS	110	16
Total Sulphur	mg/kg	50	MCERTS	2500	460
Total Organic Carbon (TOC)	%	0.1	MCERTS	4.2	3.2
Loss on Ignition @ 450oC	%	0.2	MCERTS	14.6	6.4
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.46	0.40
Fluorene	mg/kg	0.05	MCERTS	0.53	0.64
Phenanthrene	mg/kg	0.05	MCERTS	2.7	2.2
Anthracene	mg/kg	0.05	MCERTS	0.77	0.89
Fluoranthene	mg/kg	0.05	MCERTS	4.5	1.9
Pyrene	mg/kg	0.05	MCERTS	3.4	1.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.6	1.0
Chrysene	mg/kg	0.05	MCERTS	2.7	1.2
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.1	0.90
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	2.3	0.49
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.9	0.76
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.5	0.36
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.54	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.5	0.41
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	30.4	12.3

Analytical Report Number: 21-81876
Project / Site name: Virginia Park Caerphiily
Your Order No: 12476 RB

Lab Sample Number				1907615	1907616
Sample Reference				ES50	ES51
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				16/06/2021	16/06/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	5.2
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3	0.49
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.6	0.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	44	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	120	14
Lead (aqua regia extractable)	mg/kg	1	MCERTS	240	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	51	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	33	17
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	640	66
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	10	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	19	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	55	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	270	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	320	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	130	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	350	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	480	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	47	17
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	190	34
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	26	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	26	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	240	51
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	260	51
TPH Total C5 - C44	mg/kg	10	NONE	740	51

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-81876
Project / Site name: Virginia Park Caerphiily

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1907615	ES50	None Supplied	0.1	Brown loam and clay with vegetation.
1907616	ES51	None Supplied	0.1	Brown clay and sand with gravel.

Analytical Report Number : 21-81876
Project / Site name: Virginia Park Caerphiily

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-81876
Project / Site name: Virginia Park Caerphiily

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-83306

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	25/06/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	25/06/2021
Your order number:	12476 RB	**Analysis completed by:**	05/07/2021
Report Issue Number:	1	**Report issued on:**	05/07/2021
Samples Analysed:	4 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-83306
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1916663	1916664	1916665	1916666
Sample Reference				ES52	ES53	ES54	ES55
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.10	0.20	0.10
Date Sampled				23/06/2021	23/06/2021	23/06/2021	23/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	11	12	12
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	8.0	8.8	7.8	8.0
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	400	1500	550	490
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.047	0.28	0.068	0.056
Sulphide	mg/kg	1	MCERTS	8.5	49	13	4.6
Total Sulphur	mg/kg	50	MCERTS	280	980	420	360
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.9	1.5	1.8	1.3
Loss on Ignition @ 450oC	%	0.2	MCERTS	3.2	4.5	4.9	3.4
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.94	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.76	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	4.0	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	5.7	0.44	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	4.1	0.32	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	3.5	0.37	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	2.9	0.24	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.1	0.34	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.9	0.17	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	2.5	0.24	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.6	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.60	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	1.8	< 0.05	< 0.05
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	34.3	2.12	< 0.80

Analytical Report Number: 21-83306
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1916663	1916664	1916665	1916666
Sample Reference				ES52	ES53	ES54	ES55
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.10	0.20	0.10
Date Sampled				23/06/2021	23/06/2021	23/06/2021	23/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	14	11	9.6
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.70	0.70	0.67	0.70
Boron (water soluble)	mg/kg	0.2	MCERTS	1.4	1.1	1.2	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.6	< 0.2	0.5
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	20	22	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	23	18	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	40	44	23	27
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	19	21	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	27	25	24	22
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	96	94	88	84
Petroleum Hydrocarbons							
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	8.1	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	31	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	49	29	< 10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	17	21	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	17	43	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	88	34	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	100	77	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	100	77	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-83306
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1916663	ES52	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
1916664	ES53	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
1916665	ES54	None Supplied	0.2	Brown clay and loam with gravel and vegetation.
1916666	ES55	None Supplied	0.1	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-83306
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

Analytical Report Number : 21-83306
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-87242

Replaces Analytical Report Number: 21-87242, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	16/07/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	16/07/2021
Your order number:	12476 RB	**Analysis completed by:**	02/08/2021
Report Issue Number:	2	**Report issued on:**	02/08/2021
Samples Analysed:	14 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-87242
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1939850	1939851	1939852	1939853	1939854
Sample Reference				ES48N	ES48S	ES48E	ES48W	ES49
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				14/07/2021	14/07/2021	14/07/2021	14/07/2021	14/07/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	15	11	16	29
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	7.9
Total Cyanide	mg/kg	1	MCERTS	-	-	-	-	2.9
Total Sulphate as SO4	mg/kg	50	MCERTS	-	-	-	-	9400
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	2.0
Sulphide	mg/kg	1	MCERTS	-	-	-	-	93
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	4600
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	5.0
Loss on Ignition @ 450oC	%	0.2	MCERTS	-	-	-	-	18.3
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.79	< 0.05	13	4.1
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.2	0.56
Acenaphthene	mg/kg	0.05	MCERTS	0.87	1.0	< 0.05	6.6	2.2
Fluorene	mg/kg	0.05	MCERTS	1.1	1.2	< 0.05	7.6	2.3
Phenanthrene	mg/kg	0.05	MCERTS	5.4	6.1	0.96	22	7.8
Anthracene	mg/kg	0.05	MCERTS	1.5	1.6	0.26	7.2	2.9
Fluoranthene	mg/kg	0.05	MCERTS	7.2	7.7	2.1	22	13
Pyrene	mg/kg	0.05	MCERTS	5.3	5.9	1.8	16	9.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.5	5.3	1.7	15	9.7
Chrysene	mg/kg	0.05	MCERTS	3.8	4.1	1.7	14	10
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	4.9	4.5	2.0	14	11
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.8	3.6	1.2	6.9	5.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.0	4.8	1.8	12	8.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.4	1.8	0.56	4.1	3.4
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.49	0.75	< 0.05	2.1	1.4
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.6	2.1	0.72	4.5	4.4
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	43.8	51.2	14.8	169	95.8

Analytical Report Number: 21-87242
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1939850	1939851	1939852	1939853	1939854
Sample Reference				ES48N	ES48S	ES48E	ES48W	ES49
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				14/07/2021	14/07/2021	14/07/2021	14/07/2021	14/07/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	28
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	2.4
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	3.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	2.0
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	-	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	47
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	190
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	230
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	54
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	43
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	510
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	16
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	20
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	37
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	190
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	-	-	-	-	220
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	-	-	-	-	87
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	260
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	-	-	-	-	350
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	39
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	170
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	-	-	-	-	28
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	-	-	-	-	45
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	210
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	-	-	-	-	250
TPH Total C5 - C44	mg/kg	10	NONE	-	-	-	-	600

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-87242
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1939855	1939856	1939857	1939858	1939859
Sample Reference				ES56	ES57	ES58	ES59	ES60
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.10	0.20	0.10	0.20
Date Sampled				14/07/2021	14/07/2021	14/07/2021	14/07/2021	14/07/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	21	11	9.1	11
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.40	0.50	0.50
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile & Amosite	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.007	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.007	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.4	8.2	7.8	7.9	7.8
Total Cyanide	mg/kg	1	MCERTS	2.0	1.0	< 1.0	< 1.0	2.6
Total Sulphate as SO4	mg/kg	50	MCERTS	3200	2500	490	410	510
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.3	0.90	0.077	0.094	0.10
Sulphide	mg/kg	1	MCERTS	28	32	13	1.7	7.4
Total Sulphur	mg/kg	50	MCERTS	2200	1600	500	300	380
Total Organic Carbon (TOC)	%	0.1	MCERTS	4.2	4.1	1.5	1.3	1.9
Loss on Ignition @ 450oC	%	0.2	MCERTS	10.1	10.4	3.5	3.1	4.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.94	1.3	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.28	0.30	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.57	0.86	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.97	1.0	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	4.4	4.2	0.35	0.77	0.46
Anthracene	mg/kg	0.05	MCERTS	1.3	1.8	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	6.9	8.1	0.74	1.1	1.0
Pyrene	mg/kg	0.05	MCERTS	5.3	6.4	0.67	0.96	0.85
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.6	7.0	0.62	0.56	0.69
Chrysene	mg/kg	0.05	MCERTS	4.0	5.4	0.42	0.68	0.54
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	5.3	6.3	0.75	0.75	0.83
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.6	4.9	0.29	0.32	0.33
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.0	5.9	0.59	0.55	0.61
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.6	2.4	0.26	0.27	0.30
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.59	1.0	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.8	2.8	0.30	0.33	0.38
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	44.1	59.9	4.99	6.25	6.03

Analytical Report Number: 21-87242
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1939855	1939856	1939857	1939858	1939859
Sample Reference				ES56	ES57	ES58	ES59	ES60
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.10	0.20	0.10	0.20
Date Sampled				14/07/2021	14/07/2021	14/07/2021	14/07/2021	14/07/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	17	11	9.7	9.8
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.96	1.1	0.69	0.65	0.73
Boron (water soluble)	mg/kg	0.2	MCERTS	1.8	1.2	0.7	0.5	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.0	1.1	0.7	0.7	0.9
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	82	21	20	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	82	86	21	43	30
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	140	39	33	46
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	33	24	28	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	25	31	22	20	19
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	280	320	95	100	110
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.8
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	13	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	9.6	20	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	36	85	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	46	110	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	21	57	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	46	120	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	66	170	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	6.2	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	7.2	8.7	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	20	20	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	50	78	< 10	< 10	19
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	13	21	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	22	37	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	77	110	< 10	16	26
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	99	150	< 10	16	26
TPH Total C5 - C44	mg/kg	10	NONE	170	320	< 10	16	26

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-87242
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1939860	1939861	1939862	1939863
Sample Reference				ES61	ES62	ES63	ES64
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.20	0.10	0.20
Date Sampled				14/07/2021	14/07/2021	14/07/2021	14/07/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	8.4	9.5	14
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	7.8	7.8	7.8	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	1.8	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	580	390	1100	800
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.16	0.032	0.20	0.17
Sulphide	mg/kg	1	MCERTS	8.4	23	14	12
Total Sulphur	mg/kg	50	MCERTS	410	220	800	660
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.9	1.3	2.8	2.9
Loss on Ignition @ 450oC	%	0.2	MCERTS	3.6	3.1	7.2	6.2
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.54	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.32	0.25
Phenanthrene	mg/kg	0.05	MCERTS	0.82	0.22	1.6	1.3
Anthracene	mg/kg	0.05	MCERTS	0.23	< 0.05	0.46	0.44
Fluoranthene	mg/kg	0.05	MCERTS	1.4	0.52	3.0	2.1
Pyrene	mg/kg	0.05	MCERTS	1.1	0.48	2.4	1.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.84	0.35	2.2	1.5
Chrysene	mg/kg	0.05	MCERTS	0.95	0.37	2.2	1.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.91	0.33	2.5	1.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.62	0.27	1.3	1.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.88	0.34	2.1	1.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.36	< 0.05	0.87	0.61
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.34	0.22
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.45	< 0.05	1.1	0.71
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	8.52	2.88	21.4	14.8

Analytical Report Number: 21-87242
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Lab Sample Number				1939860	1939861	1939862	1939863
Sample Reference				ES61	ES62	ES63	ES64
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.20	0.10	0.20
Date Sampled				14/07/2021	14/07/2021	14/07/2021	14/07/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.0	11	14	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.49	0.57	0.91	0.76
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.3	0.6	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.0	< 0.2	1.1	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	21	24	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	19	15	64	46
Lead (aqua regia extractable)	mg/kg	1	MCERTS	37	36	110	85
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	19	34	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	25	28	23	21
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	92	79	220	150
Petroleum Hydrocarbons							
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	22	14
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	22	14
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	12	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	28	14
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	40	14
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	14	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	20	< 10	34	29
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	15
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	26	< 10	48	36
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	26	< 10	48	51
TPH Total C5 - C44	mg/kg	10	NONE	26	< 10	88	65

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-87242
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476 RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1939855	ES56	0.20	134	Loose Fibrous Debris	**Chrysotile & Amosite**	0.007	**0.007**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-87242
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1939850	ES48N	None Supplied	0.1	Grey clay and gravel with vegetation.
1939851	ES48S	None Supplied	0.1	Grey loam with gravel.
1939852	ES48E	None Supplied	0.1	Grey loam with gravel.
1939853	ES48W	None Supplied	0.1	Grey loam with gravel.
1939854	ES49	None Supplied	0.1	Grey clay with gravel.
1939855	ES56	None Supplied	0.2	Grey loam with gravel and vegetation.
1939856	ES57	None Supplied	0.1	Grey loam with gravel and vegetation.
1939857	ES58	None Supplied	0.2	Brown loam with gravel and vegetation.
1939858	ES59	None Supplied	0.1	Brown loam with gravel and vegetation.
1939859	ES60	None Supplied	0.2	Brown loam with gravel and vegetation.
1939860	ES61	None Supplied	0.1	Brown loam with gravel and vegetation.
1939861	ES62	None Supplied	0.2	Brown sandy loam with gravel and vegetation.
1939862	ES63	None Supplied	0.1	Brown loam with gravel and vegetation.
1939863	ES64	None Supplied	0.2	Brown loam with gravel and vegetation.

Analytical Report Number : 21-87242
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-87242
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-97225

Replaces Analytical Report Number: 21-97225, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	06/09/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	06/09/2021
Your order number:	12476-RB	**Analysis completed by:**	23/09/2021
Report Issue Number:	2	**Report issued on:**	23/09/2021
Samples Analysed:	11 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-97225
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1998262	1998263	1998264	1998265	1998266
Sample Reference				ES65	ES66	ES67	ES68	ES69
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				02/09/2021	02/09/2021	02/09/2021	02/09/2021	02/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	16	19	14	23
Total mass of sample received	kg	0.001	NONE	0.30	0.30	0.30	0.40	0.30
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	Amosite	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	< 0.001	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	< 0.001	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.3	7.5	7.5	7.5	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	3.0	4.0	2.4
Total Sulphate as SO4	mg/kg	50	MCERTS	1100	2500	2200	3100	2500
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.20	0.91	0.76	1.2	0.90
Sulphide	mg/kg	1	MCERTS	22	46	61	120	170
Total Sulphur	mg/kg	50	MCERTS	730	1500	1700	2400	3400
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.5	1.9	4.1	4.1	4.4
Loss on Ignition @ 450oC	%	0.2	MCERTS	7.3	6.3	9.9	9.4	11.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	2.9
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.54	3.8
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.85	1.5	6.0
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.76	2.0	10
Phenanthrene	mg/kg	0.05	MCERTS	1.1	< 0.05	3.4	8.8	40
Anthracene	mg/kg	0.05	MCERTS	1.1	< 0.05	1.4	3.9	9.8
Fluoranthene	mg/kg	0.05	MCERTS	2.9	< 0.05	5.5	13	40
Pyrene	mg/kg	0.05	MCERTS	2.2	< 0.05	4.2	8.9	25
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.3	< 0.05	4.9	9.0	17
Chrysene	mg/kg	0.05	MCERTS	1.5	< 0.05	2.9	4.5	9.1
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.4	< 0.05	5.3	7.3	12
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	< 0.05	1.3	2.6	5.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.6	< 0.05	2.4	3.9	9.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.99	< 0.05	1.5	2.2	4.9
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.33	< 0.05	0.55	0.84	1.9
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	< 0.05	1.6	2.6	4.8
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	18.8	< 0.80	36.5	72.0	203

Analytical Report Number: 21-97225
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1998262	1998263	1998264	1998265	1998266
Sample Reference				ES65	ES66	ES67	ES68	ES69
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				02/09/2021	02/09/2021	02/09/2021	02/09/2021	02/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	42	67	12	14	17
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.7	0.69	1.1	1.3
Boron (water soluble)	mg/kg	0.2	MCERTS	1.0	0.7	1.3	1.8	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	1.7	0.6	1.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	39	29	23	25	55
Copper (aqua regia extractable)	mg/kg	1	MCERTS	45	59	35	51	82
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	36	70	59	150
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	44	46	21	84	62
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	47	39	22	24	33
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	200	140	160	140	310
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	6.6	7.7	12	8.6
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	20	37	55	31
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	65	69	150	270	120
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	65	89	190	330	150
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	40	18	59	120	42
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	74	96	190	340	160
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	110	110	250	450	200
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	5.0	8.7
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	4.2	< 2.0	3.1	15	56
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	17	15	26	80	230
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	110	44	83	190	280
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	57	14	26	57	34
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	85	30	42	88	54
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	130	60	110	290	570
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	210	91	150	380	630
TPH Total C5 - C44	mg/kg	10	NONE	330	200	410	830	830

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-97225
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1998267	1998268	1998269	1998270	1998271
Sample Reference				ES72	ES73	ES75	ES76	ES77
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				02/09/2021	02/09/2021	02/09/2021	02/09/2021	02/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	9.3	6.5	8.7	9.6
Total mass of sample received	kg	0.001	NONE	0.30	0.30	0.30	0.30	0.30
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Amosite	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.6	7.5	7.6	8.0
Total Cyanide	mg/kg	1	MCERTS	4.3	3.7	7.1	4.3	3.3
Total Sulphate as SO4	mg/kg	50	MCERTS	2600	2800	3200	1600	1800
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.97	1.0	1.0	0.58	0.53
Sulphide	mg/kg	1	MCERTS	28	150	56	37	27
Total Sulphur	mg/kg	50	MCERTS	1500	2000	1700	1000	1200
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.5	3.6	3.0	2.7	3.3
Loss on Ignition @ 450oC	%	0.2	MCERTS	7.3	8.3	8.1	6.1	8.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.51	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	2.2	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	2.7	< 0.05	< 0.05	0.54
Phenanthrene	mg/kg	0.05	MCERTS	2.3	13	0.90	1.6	3.0
Anthracene	mg/kg	0.05	MCERTS	0.55	3.5	0.28	0.61	1.1
Fluoranthene	mg/kg	0.05	MCERTS	2.8	15	1.6	2.9	6.5
Pyrene	mg/kg	0.05	MCERTS	2.0	10	1.3	2.1	4.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.9	9.1	1.3	2.0	4.5
Chrysene	mg/kg	0.05	MCERTS	1.2	6.1	0.92	1.3	3.4
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.9	7.9	1.6	2.2	4.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.60	3.8	0.51	0.61	1.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.95	5.5	0.90	1.2	2.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.55	2.6	0.50	0.64	1.6
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.97	< 0.05	0.28	0.64
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.55	2.9	0.50	0.71	1.7
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	15.3	86.0	10.3	16.0	37.0

Analytical Report Number: 21-97225
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1998267	1998268	1998269	1998270	1998271
Sample Reference				ES72	ES73	ES75	ES76	ES77
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				02/09/2021	02/09/2021	02/09/2021	02/09/2021	02/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	17	13	16	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.6	0.98	0.96	0.80
Boron (water soluble)	mg/kg	0.2	MCERTS	1.0	1.2	1.2	0.9	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.8	1.0	0.9	1.3	0.9
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	31	53	28	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	91	75	55	69	130
Lead (aqua regia extractable)	mg/kg	1	MCERTS	100	93	100	110	70
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	47	36	35	35	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29	30	24	24	22
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	340	230	190	290	190
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.2
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	6.0	5.6	6.7	< 2.0	12
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	29	36	31	26	39
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	96	140	140	86	100
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	120	180	170	110	140
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	44	55	67	33	44
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	130	180	180	110	150
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	170	240	250	150	200
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.9	< 1.0	< 1.0	1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	6.2	11	< 2.0	3.8	4.3
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	31	49	25	25	22
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	71	120	85	64	58
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	15	34	26	19	16
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	15	53	50	33	25
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	110	180	110	93	85
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	120	240	160	130	110
TPH Total C5 - C44	mg/kg	10	NONE	300	480	410	270	310

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-97225
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1998272
Sample Reference				ES78
Sample Number				None Supplied
Depth (m)				0.10
Date Sampled				02/09/2021
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	6.4
Total mass of sample received	kg	0.001	NONE	0.30

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-
Asbestos Quantification Total	%	0.001	ISO 17025	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1
Total Cyanide	mg/kg	1	MCERTS	2.4
Total Sulphate as SO4	mg/kg	50	MCERTS	1200
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.40
Sulphide	mg/kg	1	MCERTS	28
Total Sulphur	mg/kg	50	MCERTS	950
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.4
Loss on Ignition @ 450oC	%	0.2	MCERTS	5.8

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.57
Phenanthrene	mg/kg	0.05	MCERTS	2.9
Anthracene	mg/kg	0.05	MCERTS	1.3
Fluoranthene	mg/kg	0.05	MCERTS	3.9
Pyrene	mg/kg	0.05	MCERTS	2.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.6
Chrysene	mg/kg	0.05	MCERTS	1.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.6
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.80
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.78
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.34
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.87

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	22.7

Analytical Report Number: 21-97225
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				1998272
Sample Reference				ES78
Sample Number				None Supplied
Depth (m)				0.10
Date Sampled				02/09/2021
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Heavy Metals / Metalloids				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.81
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.0
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	47
Lead (aqua regia extractable)	mg/kg	1	MCERTS	63
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	21
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	210
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	3.3
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	10
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	39
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	49
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	22
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	53
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	74
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	12
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	32
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	45
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	45
TPH Total C5 - C44	mg/kg	10	NONE	120

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-97225
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1998264	ES67	0.10	79	Sheeting/Board Debris	**Amosite**	< 0.001	**< 0.001**
1998267	ES72	0.10	74	Loose Fibres	**Amosite**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-97225
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1998262	ES65	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998263	ES66	None Supplied	0.1	Grey clay and sand with gravel.
1998264	ES67	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998265	ES68	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998266	ES69	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998267	ES72	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998268	ES73	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998269	ES75	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998270	ES76	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998271	ES77	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
1998272	ES78	None Supplied	0.1	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-97225
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-97225
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-98137

Replaces Analytical Report Number: 21-98137, issue no. 1
Additional analysis undertaken.

Project / Site name:	Virginia Park Caerphilly	**Samples received on:**	09/09/2021
Your job number:	12476	**Samples instructed on/ Analysis started on:**	09/09/2021
Your order number:	12476-RB	**Analysis completed by:**	01/10/2021
Report Issue Number:	2	**Report issued on:**	01/10/2021
Samples Analysed:	7 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-98137
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				2003814	2003815	2003816	2003817	2003818
Sample Reference				ES70	ES71	ES74	ES48WN	ES48WS
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	20	7.6	18	18
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.20	0.20
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Amosite	-	Amosite	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Detected	-	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	< 0.001	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	< 0.001	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.7	8.0	-	-
Total Cyanide	mg/kg	1	MCERTS	2.6	2.0	< 1.0	-	-
Total Sulphate as SO4	mg/kg	50	MCERTS	2000	2100	1100	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.62	0.67	0.31	-	-
Sulphide	mg/kg	1	MCERTS	25	100	12	-	-
Total Sulphur	mg/kg	50	MCERTS	1700	2000	670	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.9	3.6	1.5	-	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	8.1	9.0	3.4	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	2.3	2.9	< 0.05	2.2	1.7
Acenaphthylene	mg/kg	0.05	MCERTS	0.41	0.38	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	1.8	1.3	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	2.3	1.6	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	9.6	6.0	1.8	-	-
Anthracene	mg/kg	0.05	MCERTS	2.9	1.9	0.51	-	-
Fluoranthene	mg/kg	0.05	MCERTS	11	8.1	3.0	-	-
Pyrene	mg/kg	0.05	MCERTS	7.2	5.6	2.3	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.9	5.0	1.9	-	-
Chrysene	mg/kg	0.05	MCERTS	7.0	4.9	1.7	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	8.6	6.1	2.1	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	2.0	2.2	0.82	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	5.3	4.3	1.5	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.0	2.4	0.86	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.2	0.86	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.1	2.6	0.93	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	74.5	56.0	17.4	-	-

Analytical Report Number: 21-98137
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				2003814	2003815	2003816	2003817	2003818
Sample Reference				ES70	ES71	ES74	ES48WN	ES48WS
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	16	8.2	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.99	1.1	0.69	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9	1.3	0.3	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.2	1.5	0.5	-	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	31	33	18	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	77	93	23	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	140	31	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	36	40	25	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	27	30	19	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	260	330	100	-	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.9	< 1.0	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	9.9	< 2.0	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	31	< 8.0	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	27	150	< 8.0	-	-
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	27	180	< 10	-	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	11	72	< 8.4	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	29	190	< 10	-	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	40	260	< 10	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.4	2.0	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	8.0	11	6.3	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	28	51	11	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	41	130	32	-	-
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	25	11	-	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	39	18	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	77	200	51	-	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	77	240	69	-	-
TPH Total C5 - C44	mg/kg	10	NONE	120	500	69	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-98137
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				2003819	2003820
Sample Reference				ES48WE	ES48WW
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				07/09/2021	07/09/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	18
Total mass of sample received	kg	0.001	NONE	0.20	0.20
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	-	-
Total Cyanide	mg/kg	1	MCERTS	-	-
Total Sulphate as SO4	mg/kg	50	MCERTS	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-
Sulphide	mg/kg	1	MCERTS	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	-	-
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	4.6	1.3
Acenaphthylene	mg/kg	0.05	MCERTS	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-

Analytical Report Number: 21-98137
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Lab Sample Number				2003819	2003820
Sample Reference				ES48WE	ES48WW
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.10
Date Sampled				07/09/2021	07/09/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	-	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	-	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	-	-
TPH Total C5 - C44	mg/kg	10	NONE	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-98137
Project / Site name: Virginia Park Caerphilly
Your Order No: 12476-RB

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
2003814	ES70	0.10	100	Loose Fibres	**Amosite**	< 0.001	**< 0.001**
2003816	ES74	0.10	106	Loose Fibres	**Amosite**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-98137
Project / Site name: Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2003814	ES70	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2003815	ES71	None Supplied	0.1	Brown clay and loam with gravel.
2003816	ES74	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2003817	ES48WN	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2003818	ES48WS	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2003819	ES48WE	None Supplied	0.1	Brown clay and loam with gravel and vegetation.
2003820	ES48WW	None Supplied	0.1	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-98137
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 21-98137
Project / Site name: Virginia Park Caerphilly

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

APPENDIX F

LABORATORY CHEMICAL TEST RESULTS – VALIDATION SAMPLE TESTING

Gary Shawley
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CF83 2AX

t: 02920807991
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Croxley Green
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Watford,
Herts,
WD18 8YS

t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 22-65361

Project / Site name:	Phase 1 Virginia Park Caerphilly	**Samples received on:**	17/06/2022
Your job number:	12476	**Samples instructed on/ Analysis started on:**	17/06/2022
Your order number:	12476 GNS	**Analysis completed by:**	28/06/2022
Report Issue Number:	1	**Report issued on:**	28/06/2022
Samples Analysed:	8 soil samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-65361
Project / Site name: Phase 1 Virginia Park Caerphilly
Your Order No: 12476 GNS

Lab Sample Number				2316312	2316313	2316314	2316315	2316316
Sample Reference				P1	P2	P3	P4	P5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.70	0.20	0.30	0.30
Date Sampled				16/06/2022	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Time Taken				0915	1015	1115	1215	1315
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	5.7	9.6	6.4	5.9
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.2	0.3
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MLO	MLO	MLO	SCA	MLO
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.3	8.1	7.8	7.5
Total Cyanide	mg/kg	1	MCERTS	2.8	1.5	1.3	2.5	2.2
Total Sulphate as SO4	mg/kg	50	MCERTS	1800	2400	1400	1300	2500
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.67	0.91	0.56	0.44	1.2
Sulphide	mg/kg	1	MCERTS	79	53	51	150	110
Total Sulphur	mg/kg	50	MCERTS	1500	1600	1400	1300	1600
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	3.4	2.8	2.6	2.8	3
Loss on Ignition @ 450oC	%	0.2	MCERTS	8.3	6.9	6	6.8	7.3
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	1	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.64	0.37	< 0.05	0.87
Acenaphthene	mg/kg	0.05	MCERTS	0.43	1	0.48	0.36	1.5
Fluorene	mg/kg	0.05	MCERTS	0.55	1.4	0.68	0.4	1.8
Phenanthrene	mg/kg	0.05	MCERTS	2.2	4.8	2.5	2	9
Anthracene	mg/kg	0.05	MCERTS	0.79	2.2	1.1	0.71	3
Fluoranthene	mg/kg	0.05	MCERTS	3.4	8.9	4.7	3.4	13
Pyrene	mg/kg	0.05	MCERTS	2.5	6.7	3.8	2.6	9.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.2	4.7	2.8	2	6.4
Chrysene	mg/kg	0.05	MCERTS	2.3	4.4	3.2	1.6	6.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.2	4.4	3	1.6	5.3
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.3	1.8	1.1	1.1	3.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.9	3.5	2.3	1.3	4.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.96	1.7	1.2	0.68	2.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.31	< 0.05	< 0.05	0.26	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	2	1.3	0.81	2.4
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	23.1	48	28.4	18.8	69.8

Analytical Report Number: 22-65361
Project / Site name: Phase 1 Virginia Park Caerphilly
Your Order No: 12476 GNS

Lab Sample Number				2316312	2316313	2316314	2316315	2316316
Sample Reference				P1	P2	P3	P4	P5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.70	0.20	0.30	0.30
Date Sampled				16/06/2022	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Time Taken				0915	1015	1115	1215	1315
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	11	12	14	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.97	0.98	0.83	0.98	0.88
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.5	1	0.8	1.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.8	1.1	1	1.2	1.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	27	23	35	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	77	58	69	97	78
Lead (aqua regia extractable)	mg/kg	1	MCERTS	94	66	77	82	69
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	0.5	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	38	37	31	39	37
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	25	23	23	29	24
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	340	230	260	250	270
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	12	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	45	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	< 10	< 10	< 10	57	< 10
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	19	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	MCERTS	< 10	< 10	< 10	57	< 10
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	< 10	76	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	12	4.7	3.2	4
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	26	10	14	30
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	28	51	36	31	36
TPH-CWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	16	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	32	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	MCERTS	38	88	51	48	70
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	70	88	51	48	70
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	70	88	51	120	70

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-65361
Project / Site name: Phase 1 Virginia Park Caerphilly
Your Order No: 12476 GNS

Lab Sample Number				2316317	2316318	2316319
Sample Reference				P6	P7	P8
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.50	0.30
Date Sampled				16/06/2022	16/06/2022	16/06/2022
Time Taken				1415	1515	1615
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	10	5.2	16
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MLO	MLO	MLO
General Inorganics						
pH - Automated	pH Units	N/A	MCERTS	7.7	7.6	7.6
Total Cyanide	mg/kg	1	MCERTS	1.9	1.2	2.3
Total Sulphate as SO4	mg/kg	50	MCERTS	1300	1500	1900
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.46	0.37	0.7
Sulphide	mg/kg	1	MCERTS	24	57	70
Total Sulphur	mg/kg	50	MCERTS	1300	920	1500
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.6	2.4	3.3
Loss on Ignition @ 450oC	%	0.2	MCERTS	6.1	5.6	7.2
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.37	0.38	0.78
Acenaphthene	mg/kg	0.05	MCERTS	0.41	0.45	1.4
Fluorene	mg/kg	0.05	MCERTS	0.67	0.56	1.9
Phenanthrene	mg/kg	0.05	MCERTS	3	2.7	10
Anthracene	mg/kg	0.05	MCERTS	1.6	1.8	2.6
Fluoranthene	mg/kg	0.05	MCERTS	5.7	5.2	14
Pyrene	mg/kg	0.05	MCERTS	4.1	3.9	9.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.1	3	6.1
Chrysene	mg/kg	0.05	MCERTS	2.9	3.1	6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.6	2.6	5.3
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	1.9	2.8
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.1	2.3	4.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.1	1.2	2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	1.4	2.6
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	30.1	30.5	69.9

Analytical Report Number: 22-65361
Project / Site name: Phase 1 Virginia Park Caerphilly
Your Order No: 12476 GNS

Lab Sample Number				2316317	2316318	2316319
Sample Reference				P6	P7	P8
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.50	0.30
Date Sampled				16/06/2022	16/06/2022	16/06/2022
Time Taken				1415	1515	1615
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	11	13
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	0.82	0.94
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.9	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.5	1.1	1.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	34	25	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	100	44	170
Lead (aqua regia extractable)	mg/kg	1	MCERTS	87	65	85
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	45	31	49
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	30	23	26
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	320	190	310
Petroleum Hydrocarbons						
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	1.1	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	5.6	< 2.0	3.2
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	20	< 10	41
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	46	< 10	50
TPH-CWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	< 10	< 10	13
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	< 8.4	< 8.4	13
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	MCERTS	72	< 10	94
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	72	< 10	110
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	72	< 10	110

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-65361
Project / Site name: Phase 1 Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2316312	P1	None Supplied	0.6	Brown loam and clay with gravel and vegetation.
2316313	P2	None Supplied	0.7	Brown loam and clay with gravel and vegetation.
2316314	P3	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
2316315	P4	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2316316	P5	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2316317	P6	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
2316318	P7	None Supplied	0.5	Brown loam and clay with gravel and glass
2316319	P8	None Supplied	0.3	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 22-65361
Project / Site name: Phase 1 Virginia Park Caerphilly

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

Analytical Report Number : 22-65361
Project / Site name: Phase 1 Virginia Park Caerphilly

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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Analytical Report Number : 23-16317

Replaces Analytical Report Number: 23-16317, issue no. 1
Additional analysis undertaken.
Asbestos Quantification added for possitve samples as per client's request

Project / Site name:	Phase 1A Virginia Park Caerphilly	**Samples received on:**	08/02/2023
Your job number:	12476	**Samples instructed on/ Analysis started on:**	08/02/2023
Your order number:	12476-GNS	**Analysis completed by:**	22/02/2023
Report Issue Number:	2	**Report issued on:**	09/05/2023
Samples Analysed:	10 soil samples		

Signed:

Dominika Warjan
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly
Your Order No: 12476-GNS

Lab Sample Number				2577527	2577528	2577529	2577530	2577531
Sample Reference				VPWS01	VPWS02	VPWS03	VPWS04	VPWS05A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.50	0.50	0.40
Date Sampled				03/02/2023	03/02/2023	03/02/2023	03/02/2023	03/02/2023
Time Taken				0900	0930	1045	1100	1145
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	16	13	14	10
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3	0.3
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	Chrysotile	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	< 0.001	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	< 0.001	-	-
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	KSZ	KSZ	KSZ
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.3	7.6	7.5	7.8
Total Cyanide	mg/kg	1	MCERTS	1.4	< 1.0	2.5	2.7	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	2000	870	1400	1600	630
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.74	0.26	0.47	0.51	0.17
Sulphide	mg/kg	1	MCERTS	39	29	39	10	15
Total Sulphur	mg/kg	50	MCERTS	1400	530	1000	1000	470
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	3	2.9	2.7	2.9	1.6
Loss on Ignition @ 450oC	%	0.2	MCERTS	7.6	6.4	6.7	7.2	4.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.88	0.28	1.2	1.1	0.32
Acenaphthylene	mg/kg	0.05	MCERTS	0.19	< 0.05	0.22	0.26	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.99	0.13	0.77	0.7	0.18
Fluorene	mg/kg	0.05	MCERTS	1.2	0.16	1	1.1	0.26
Phenanthrene	mg/kg	0.05	MCERTS	4.5	0.71	3.9	3.8	1.3
Anthracene	mg/kg	0.05	MCERTS	1.4	0.26	1.2	1.5	0.44
Fluoranthene	mg/kg	0.05	MCERTS	6.5	1.4	5.2	5.2	2.1
Pyrene	mg/kg	0.05	MCERTS	4.7	1	3.6	3.8	1.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.6	1	3.6	2.9	1.3
Chrysene	mg/kg	0.05	MCERTS	3.8	0.89	2.5	3.2	1.4
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	5.4	1.3	3.4	3.4	1.5
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.1	0.35	1.1	1.2	0.69
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.4	0.88	2.3	2.3	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.9	0.52	1.3	1.4	0.65
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.76	0.2	0.52	0.51	0.27
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2	0.56	1.3	1.5	0.66
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	43.4	9.68	33	33.8	13.6

Analytical Report Number: 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly
Your Order No: 12476-GNS

Lab Sample Number				2577527	2577528	2577529	2577530	2577531
Sample Reference				VPWS01	VPWS02	VPWS03	VPWS04	VPWS05A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.50	0.50	0.40
Date Sampled				03/02/2023	03/02/2023	03/02/2023	03/02/2023	03/02/2023
Time Taken				0900	0930	1045	1100	1145
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	8.7	12	13	11
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	0.64	0.88	0.92	0.77
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.7	0.3	0.4	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.7	0.7	1.1	1.9	0.9
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	38	17	28	30	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	90	30	87	97	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120	47	81	88	50
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	43	23	35	35	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	31	19	25	26	21
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	330	120	220	290	200
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	2.7	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	6.4	< 2.0	4.2	4.2	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	16	< 8.0	23	17	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	74	31	89	69	16
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	90	31	110	86	16
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	45	35	60	53	19
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	99	35	120	91	21
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	140	69	180	140	40
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	4.5	7.8	7.7
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	13	< 10	26	20	12
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	48	29	76	44	17
TPH-CWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	14	14	25	15	< 10
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	14	36	55	35	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	61	38	110	72	37
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	75	74	160	110	37
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	220	140	340	250	77

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly
Your Order No: 12476-GNS

Lab Sample Number				2577532	2577533	2577534	2577535	2577536
Sample Reference				VPWS06	VS1	VS2	VS3	VS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.20	0.10	0.30
Date Sampled				03/02/2023	03/02/2023	03/02/2023	03/02/2023	03/02/2023
Time Taken				1200	1215	1300	1330	1400
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	21	12	11	12	14
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3	0.3
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	KSZ	KSZ	KSZ
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.3	7.9	7.4	7.4	7.8
Total Cyanide	mg/kg	1	MCERTS	3.3	< 1.0	< 1.0	2.1	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1500	1000	1600	1800	510
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.47	0.25	0.65	0.65	0.1
Sulphide	mg/kg	1	MCERTS	48	16	33	76	17
Total Sulphur	mg/kg	50	MCERTS	1400	600	940	1200	510
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.3	1.7	2.4	3.1	1.8
Loss on Ignition @ 450oC	%	0.2	MCERTS	11.6	4.5	5.7	7.3	4.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	1.2	0.31	0.8	1.5	0.29
Acenaphthylene	mg/kg	0.05	MCERTS	0.34	< 0.05	0.33	0.71	0.17
Acenaphthene	mg/kg	0.05	MCERTS	0.99	0.6	1.1	2.3	0.29
Fluorene	mg/kg	0.05	MCERTS	1.3	0.75	1.3	3.8	0.44
Phenanthrene	mg/kg	0.05	MCERTS	5.6	4.8	4.6	19	1.9
Anthracene	mg/kg	0.05	MCERTS	1.7	1.2	1.6	7.6	0.62
Fluoranthene	mg/kg	0.05	MCERTS	8.2	7	6.5	23	3
Pyrene	mg/kg	0.05	MCERTS	5.6	4.8	4.7	16	2.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	5.3	3.9	4.2	11	1.9
Chrysene	mg/kg	0.05	MCERTS	4.1	3.2	3.5	8.2	1.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	5.2	3.5	3.9	9.6	1.7
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.6	1.7	1.4	2.7	0.56
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.9	2.5	2.6	6.8	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.3	1.5	1.5	3.4	0.72
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.79	0.51	0.58	1.1	0.25
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.3	1.5	1.5	3.3	0.65
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	51.4	37.7	39.9	120	17.2

Analytical Report Number: 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly
Your Order No: 12476-GNS

Lab Sample Number				2577532	2577533	2577534	2577535	2577536
Sample Reference				VPWS06	VS1	VS2	VS3	VS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.20	0.10	0.30
Date Sampled				03/02/2023	03/02/2023	03/02/2023	03/02/2023	03/02/2023
Time Taken				1200	1215	1300	1330	1400
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	12	10	11	9.7
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	0.79	0.77	0.91	0.72
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	0.3	1	0.5	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.4	1.2	1	1.1	1
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	24	22	24	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110	28	47	55	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120	58	65	97	49
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	43	25	28	32	25
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	31	24	20	22	20
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	380	250	200	220	200
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	3.4	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	17	< 8.0	15	15	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	84	< 8.0	56	69	30
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	100	< 10	71	84	30
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH\_CU\_1D\_AL}$	mg/kg	8.4	NONE	55	< 8.4	34	44	21
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	100	< 10	74	84	36
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	160	< 10	110	130	56
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	3.4	6.4	< 2.0	7.8	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	30	12	< 10	39	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	99	17	24	69	18
TPH-CWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	28	< 10	< 10	17	< 10
TPH-CWG - Aromatic > EC35 - EC44 $_{EH\_CU\_1D\_AR}$	mg/kg	8.4	NONE	50	< 8.4	11	26	12
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	130	35	34	120	25
TPH-CWG - Aromatic (EC5 - EC44) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	180	35	45	140	37
TPH Total C5 - C44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	340	35	150	270	93

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly
Your Order No: 12476-GNS

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
2577529	VPWS03	0.50	150	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2577527	VPWS01	None Supplied	0.4	Brown clay and loam with gravel and vegetation.
2577528	VPWS02	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
2577529	VPWS03	None Supplied	0.5	Brown loam and clay with gravel and vegetation.
2577530	VPWS04	None Supplied	0.5	Brown loam and clay with gravel and vegetation.
2577531	VPWS05A	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
2577532	VPWS06	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2577533	VS1	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2577534	VS2	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
2577535	VS3	None Supplied	0.1	Brown clay and sand with gravel.
2577536	VS4	None Supplied	0.3	Brown clay and sand with gravel.

Analytical Report Number : 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

Analytical Report Number : 23-16317
Project / Site name: Phase 1A Virginia Park Caerphilly

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX G

LABORATORY CHEMICAL TEST RESULTS: SUMMARY TABLES

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park - Plateau Validation Samples
Soil Type: Engineered Soils
Soil Organic Matter: 1%

METALS AND SEMI-METALS

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
1	VPWS01	0.40	17	0.7	1.1	1.7	38	< 1.8	90	120	0.4	43	< 1.0	31	330
2	VPWS02	0.40	8.7	0.7	0.64	0.7	17	< 1.8	30	47	< 0.3	23	< 1.0	19	120
3	VPWS03	0.50	12	0.3	0.88	1.1	28	< 1.8	87	81	< 0.3	35	< 1.0	25	220
4	VPWS04	0.50	13	0.4	0.92	1.9	30	< 1.8	97	88	0.4	35	< 1.0	26	290
5	VPWS05A	0.40	11	0.7	0.77	0.9	20	< 1.8	29	50	< 0.3	27	< 1.0	21	200
6	VPWS06	0.30	16	1.2	1.2	1.4	35	< 1.8	110	120	0.4	43	< 1.0	31	380
7	VS1	0.30	12	0.3	0.79	1.2	24	< 1.8	28	58	< 0.3	25	< 1.0	24	250
8	VS2	0.20	10	1	0.77	1	22	< 1.8	47	65	< 0.3	28	< 1.0	20	200
9	VS3	0.10	11	0.5	0.91	1.1	24	< 1.8	55	97	< 0.3	32	< 1.0	22	220
10	VS4	0.30	9.7	0.3	0.72	1	19	< 1.8	32	49	< 0.3	25	< 1.0	20	200
11	P1	0.60	14	0.4	0.97	1.8	29	1.8	77	94	0.6	38	< 1.0	25	340
12	P2	0.70	11	0.5	0.98	1.1	27	< 1.8	58	66	< 0.3	37	< 1.0	23	230
13	P3	0.20	12	1	0.83	1	23	< 1.8	69	77	0.5	31	< 1.0	23	260
14	P4	0.30	14	0.8	0.98	1.2	35	< 1.8	97	82	< 0.3	39	< 1.0	29	250
15	P5	0.30	12	1.4	0.88	1.2	29	< 1.8	78	69	< 0.3	37	< 1.0	24	270
16	P6	0.40	16	0.6	1.1	1.5	34	< 1.8	100	87	< 0.3	45	< 1.0	30	320
17	P7	0.50	11	0.9	0.82	1.1	25	< 1.8	44	65	0.4	31	< 1.0	23	190
18	P8	0.30	13	0.5	0.94	1.2	32	< 1.8	170	85	< 0.3	49	< 1.0	26	310
	Screening Criteria Value		222.0	1740.0	10.2	66.0	5460.0	36.0	14400.0	1200.0	240.0	1080.0	1500.0	2460.0	22200.0
	Source of Screening Criteria Value		SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park - Plateau Validation Samples
Soil Type: Engineered Soils
Soil Organic Matter: 1%

INORGANIC CHEMICALS & OTHERS

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
1	VPWS01	0.40	1.40	7.60	15.00	< 1.0	7.50	0.740	2000.00	39.00	1400.00	3.00	5.16	Not-detected	-
2	VPWS02	0.40	< 1.0	6.40	16.00	< 1.0	7.30	0.260	870.00	29.00	530.00	2.90	4.99	Not-detected	-
3	VPWS03	0.50	2.50	6.70	13.00	< 1.0	7.60	0.470	1400.00	39.00	1000.00	2.70	4.64	Detected	< 0.001
4	VPWS04	0.50	2.70	7.20	14.00	< 1.0	7.50	0.510	1600.00	10.00	1000.00	2.90	4.99	Not-detected	-
5	VPWS05A	0.40	< 1.0	4.20	10.00	< 1.0	7.80	0.170	630.00	15.00	470.00	1.60	2.75	Not-detected	-
6	VPWS06	0.30	3.30	11.60	21.00	< 1.0	7.30	0.470	1500.00	48.00	1400.00	4.30	7.40	Not-detected	-
7	VS1	0.30	< 1.0	4.50	12.00	< 1.0	7.90	0.250	1000.00	16.00	600.00	1.70	2.92	Not-detected	-
8	VS2	0.20	< 1.0	5.70	11.00	< 1.0	7.40	0.650	1600.00	33.00	940.00	2.40	4.13	Not-detected	-
9	VS3	0.10	2.10	7.30	12.00	< 1.0	7.40	0.650	1800.00	76.00	1200.00	3.10	5.33	Not-detected	-
10	VS4	0.30	< 1.0	4.50	14.00	< 1.0	7.80	0.100	510.00	17.00	510.00	1.80	3.10	Not-detected	-
11	P1	0.60	2.80	8.30	11.00	< 1.0	7.50	0.670	1800.00	79.00	1500.00	3.40	5.85	Not-detected	0.00
12	P2	0.70	1.50	6.90	5.70	< 1.0	7.30	0.910	2400.00	53.00	1600.00	2.80	4.82	Not-detected	0.00
13	P3	0.20	1.30	6.00	9.60	< 1.0	8.10	0.560	1400.00	51.00	1400.00	2.60	4.47	Not-detected	0.00
14	P4	0.30	2.50	6.80	6.40	< 1.0	7.80	0.440	1300.00	150.00	1300.00	2.80	4.82	Not-detected	0.00
15	P5	0.30	2.20	7.30	5.90	< 1.0	7.50	1.200	2500.00	110.00	1600.00	3.00	5.16	Not-detected	0.00
16	P6	0.40	1.90	6.10	10.00	< 1.0	7.70	0.460	1300.00	24.00	1300.00	2.60	4.47	Not-detected	0.00
17	P7	0.50	1.20	5.60	5.20	< 1.0	7.60	0.370	1500.00	57.00	920.00	2.40	4.13	Not-detected	0.00
18	P8	0.30	2.30	7.20	16.00	< 1.0	7.60	0.700	1900.00	70.00	1500.00	3.30	5.68	Not-detected	0.00
	Screening Criteria Value		**34.0**	-	-	**490.0**	-	-	-	-	-	-	-	-	**0.001**
	Source of Screening Criteria Value		SSTL1	-	-	SSTL1	-	-	-	-	-	-	-	-	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park - Plateau Validation Samples
Soil Type: Engineered Soils
Soil Organic Matter: 1%

POLYAROMATIC HYDROCARBONS (PAH)

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
1	VPWS01	0.40	0.99	0.19	1.4	4.6	3.4	5.4	2	1.1	3.8	0.76	6.5	1.2	1.9	0.88	4.5	4.7
2	VPWS02	0.40	0.13	< 0.05	0.26	1	0.88	1.3	0.56	0.35	0.89	0.2	1.4	0.16	0.52	0.28	0.71	1
3	VPWS03	0.50	0.77	0.22	1.2	3.6	2.3	3.4	1.3	1.1	2.5	0.52	5.2	1	1.3	1.2	3.9	3.6
4	VPWS04	0.50	0.7	0.26	1.5	2.9	2.3	3.4	1.5	1.2	3.2	0.51	5.2	1.1	1.4	1.1	3.8	3.8
5	VPWS05A	0.40	0.18	< 0.05	0.44	1.3	1.1	1.5	0.66	0.69	1.4	0.27	2.1	0.26	0.65	0.32	1.3	1.5
6	VPWS06	0.30	0.99	0.34	1.7	5.3	3.9	5.2	2.3	2.6	4.1	0.79	8.2	1.3	2.3	1.2	5.6	5.6
7	VS1	0.30	0.6	< 0.05	1.2	3.9	2.5	3.5	1.5	1.7	3.2	0.51	7	0.75	1.5	0.31	4.8	4.8
8	VS2	0.20	1.1	0.33	1.6	4.2	2.6	3.9	1.5	1.4	3.5	0.58	6.5	1.3	1.5	0.8	4.6	4.7
9	VS3	0.10	2.3	0.71	7.6	11	6.8	9.6	3.3	2.7	8.2	1.1	23	3.8	3.4	1.5	19	16
10	VS4	0.30	0.29	0.17	0.62	1.9	1.1	1.7	0.65	0.56	1.5	0.25	3	0.44	0.72	0.29	1.9	2.2
11	P1	0.60	0.43	< 0.05	0.79	2.2	1.9	2.2	1.1	1.3	2.3	0.31	3.4	0.55	0.96	1	2.2	2.5
12	P2	0.70	1	0.64	2.2	4.7	3.5	4.4	2	1.8	4.4	< 0.05	8.9	1.4	1.7	< 0.05	4.8	6.7
13	P3	0.20	0.48	0.37	1.1	2.8	2.3	3	1.3	1.1	3.2	< 0.05	4.7	0.68	1.2	< 0.05	2.5	3.8
14	P4	0.30	0.36	< 0.05	0.71	2	1.3	1.6	0.81	1.1	1.6	0.26	3.4	0.4	0.68	< 0.05	2	2.6
15	P5	0.30	1.5	0.87	3	6.4	4.7	5.3	2.4	3.2	6.5	< 0.05	13	1.8	2.1	< 0.05	9	9.8
16	P6	0.40	0.41	0.37	1.6	3.1	2.1	2.6	1.3	1.2	2.9	< 0.05	5.7	0.67	1.1	< 0.05	3	4.1
17	P7	0.50	0.45	0.38	1.8	3	2.3	2.6	1.4	1.9	3.1	< 0.05	5.2	0.56	1.2	< 0.05	2.7	3.9
18	P8	0.30	1.4	0.78	2.6	6.1	4.5	5.3	2.6	2.8	6	< 0.05	14	1.9	2	< 0.05	10	9.8
	Screening Criteria Value		1260.0	1020.0	14400.0	34.0	13.0	16.0	1920.0	462.0	90.0	1.44	1080.0	1020.0	162.0	2.3	570.0	3720.0
	Source of Screening Criteria Value		SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park - Plateau Validation Samples
Soil Type: Engineered Soils
Soil Organic Matter: 1%

PETROLEUM HYDROCARBONS

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10-C12 EPH (mg/kg)	Aliphatic C12-C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35-C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10-C12 EPH (mg/kg)	Aromatic C12-C16 EPH (mg/kg)	Aromatic C16-C21 EPH (mg/kg)	Aromatic C21-C35 EPH (mg/kg)	Aromatic C35-C40 EPH (mg/kg)
1	VPWS01	0.40	< 0.001	< 0.001	< 0.001	2.7	6.4	90	45	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	13	48	14
2	VPWS02	0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	31	35	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	29	14
3	VPWS03	0.50	< 0.001	< 0.001	< 0.001	< 1.0	4.2	110	60	< 0.001	< 0.001	< 0.001	< 1.0	4.5	26	76	25
4	VPWS04	0.50	< 0.001	< 0.001	< 0.001	< 1.0	4.2	86	53	< 0.001	< 0.001	< 0.001	< 1.0	7.8	20	44	15
5	VPWS05A	0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	16	19	< 0.001	< 0.001	< 0.001	< 1.0	7.7	12	17	< 10
6	VPWS06	0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	100	55	< 0.001	< 0.001	< 0.001	< 1.0	3.4	30	99	28
7	VS1	0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	6.4	12	17	< 10
8	VS2	0.20	< 0.001	< 0.001	< 0.001	< 1.0	3.4	71	34	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	24	< 10
9	VS3	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	84	44	< 0.001	< 0.001	< 0.001	< 1.0	7.8	39	69	17
10	VS4	0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	30	21	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	18	< 10
11	P1	0.60	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	28	16
12	P2	0.70	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	12	26	51	< 10
13	P3	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	4.7	10	36	< 10
14	P4	0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	57	19	< 0.001	< 0.001	< 0.001	< 1.0	3.2	14	31	< 10
15	P5	0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	4	30	36	< 10
16	P6	0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	1.1	5.6	20	46	< 10
17	P7	0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 10
18	P8	0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	3.2	41	50	13
	Screening Criteria Value		42.0	100.0	27.0	130.0	1100.0	390000.0	390000.0	380.0	780.0	47.0	260.0	840.0	1560.0	6600.0	6600.0
	Source of Screening Criteria Value		SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Soil Type: Placed Soils 0.6m to 1.6m depth
Soil Organic Matter: 1%

METALS AND SEMI-METALS

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
1	ES86	None Supplied	11	0.4	0.74	0.6	18	< 4.0	15	37	< 0.3	23	< 1.0	24	130
2	ES87	None Supplied	12	< 0.2	0.83	0.8	21	< 4.0	17	49	< 0.3	26	< 1.0	27	170
3	ES88	None Supplied	11	0.2	0.94	0.5	22	< 4.0	14	33	< 0.3	28	< 1.0	27	130
4	ES89	None Supplied	14	0.8	0.89	1.1	24	< 4.0	19	53	< 0.3	25	< 1.0	29	210
5	ES90	None Supplied	12	0.6	0.81	0.8	23	< 4.0	14	41	< 0.3	26	< 1.0	27	160
6	ES91	None Supplied	12	0.8	0.76	1.0	21	< 4.0	16	31	< 0.3	18	< 1.0	25	170
7	ES92	None Supplied	12	1.0	0.79	0.5	21	< 4.0	17	17	< 0.3	18	< 1.0	25	53
8	ES93	None Supplied	13	0.4	0.89	2.0	25	< 4.0	18	56	< 0.3	22	< 1.0	27	380
9	ES94	None Supplied	14	0.3	0.85	2.6	23	< 4.0	15	67	< 0.3	20	< 1.0	26	450
10	ES95	None Supplied	14	0.8	0.82	2.7	21	< 4.0	16	75	< 0.3	20	< 1.0	24	460
11	ES96	None Supplied	13	0.8	0.76	2.9	21	< 4.0	14	69	< 0.3	18	< 1.0	22	450
12	ES97	None Supplied	20	0.9	0.79	2.6	21	< 4.0	14	100	< 0.3	19	< 1.0	21	580
13	ES98	None Supplied	16	0.8	0.90	2.4	27	< 4.0	50	76	< 0.3	23	< 1.0	27	530
	Screening Criteria Value		222.0	1740.0	10.2	66.0	5460.0	36.0	14400.0	1200.0	240.0	1080.0	1500.0	2460.0	22200.0
	Source of Screening Criteria Value		SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Soil Type: Placed Soils 0.6m to 1.6m depth
Soil Organic Matter: 1%

INORGANIC CHEMICALS & OTHERS

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
1	ES86	None Supplied	< 1.0	3.2	16	< 1.0	8.0	0.034	380	1.4	250	1.1	1.89	Not-detected	0.00
2	ES87	None Supplied	< 1.0	3.3	18	< 1.0	8.1	0.045	440	< 1.0	260	1.3	2.24	Not-detected	0.00
3	ES88	None Supplied	< 1.0	2.9	14	< 1.0	8.1	0.033	250	1.1	180	1.0	1.72	Not-detected	0.00
4	ES89	None Supplied	< 1.0	5.5	16	< 1.0	7.7	0.16	850	4.2	500	1.4	2.41	Not-detected	0.00
5	ES90	None Supplied	< 1.0	3.2	16	< 1.0	7.9	0.088	530	< 1.0	340	1.1	1.89	Not-detected	0.00
6	ES91	None Supplied	< 1.0	4.1	18	< 1.0	8.4	0.083	910	14	440	1.3	2.24	Not-detected	0.00
7	ES92	None Supplied	< 1.0	3.9	17	< 1.0	9.7	0.16	880	50	450	1.1	1.89	Not-detected	0.00
8	ES93	None Supplied	< 1.0	3.8	19	< 1.0	7.1	0.098	690	20	560	1.3	2.24	Not-detected	0.00
9	ES94	None Supplied	< 1.0	4.5	21	< 1.0	8.1	0.059	640	26	570	1.5	2.58	Not-detected	0.00
10	ES95	None Supplied	< 1.0	4.8	20	< 1.0	8.1	0.028	600	27	490	1.6	2.75	Not-detected	0.00
11	ES96	None Supplied	< 1.0	4.4	20	< 1.0	8.2	0.025	630	22	480	1.6	2.75	Not-detected	0.00
12	ES97	None Supplied	< 1.0	4.6	19	< 1.0	8.2	0.12	690	13	460	1.2	2.06	Not-detected	0.00
13	ES98	None Supplied	< 1.0	4.1	9.4	< 1.0	8.7	0.093	660	28	550	1.5	2.58	Not-detected	0.00
	Screening Criteria Value		**34.0**	-	-	**490.0**	-	-	-	-	-	-	-	-	**0.001**
	Source of Screening Criteria Value		SSTL1	-	-	SSTL1	-	-	-	-	-	-	-	-	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Soil Type: Placed Soils 0.6m to 1.6m depth
Soil Organic Matter: 1%

POLYAROMATIC HYDROCARBONS (PAH)

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
1	ES86	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2	ES87	None Supplied	< 0.05	< 0.05	< 0.05	0.28	< 0.05	< 0.05	< 0.05	< 0.05	0.25	< 0.05	0.65	< 0.05	< 0.05	< 0.05	0.41	0.51
3	ES88	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4	ES89	None Supplied	< 0.05	< 0.05	< 0.05	0.36	0.33	0.37	< 0.05	0.23	0.34	< 0.05	0.44	< 0.05	< 0.05	0.28	0.39	0.39
5	ES90	None Supplied	< 0.05	< 0.05	< 0.05	0.33	0.26	0.29	< 0.05	0.18	0.27	< 0.05	0.41	< 0.05	< 0.05	< 0.05	< 0.05	0.33
6	ES91	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
7	ES92	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
8	ES93	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
9	ES94	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
10	ES95	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
11	ES96	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
12	ES97	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
13	ES98	None Supplied	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	Screening Criteria Value		1260.0	1020.0	14400.0	34.0	13.0	16.0	1920.0	462.0	90.0	1.44	1080.0	1020.0	162.0	2.3	570.0	3720.0
	Source of Screening Criteria Value		SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Soil Type: Placed Soils 0.6m to 1.6m depth
Soil Organic Matter: 1%

PETROLEUM HYDROCARBONS

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10-C12 EPH (mg/kg)	Aliphatic C12-C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35-C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10-C12 EPH (mg/kg)	Aromatic C12-C16 EPH (mg/kg)	Aromatic C16-C21 EPH (mg/kg)	Aromatic C21-C35 EPH (mg/kg)	Aromatic C35-C40 EPH (mg/kg)
1	ES86	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
2	ES87	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
3	ES88	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
4	ES89	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
5	ES90	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
6	ES91	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
7	ES92	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
8	ES93	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
9	ES94	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
10	ES95	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
11	ES96	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
12	ES97	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
13	ES98	None Supplied	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
	Screening Criteria Value		42.0	100.0	27.0	130.0	1100.0	390000.0	390000.0	380.0	780.0	47.0	260.0	840.0	1560.0	6600.0	6600.0
	Source of Screening Criteria Value		SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1	SSTL1

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

METALS AND SEMI-METALS

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
4	ES4	0.10	11	0.7	0.64	1.1	16	< 4.0	26	48	< 0.3	18	< 1.0	19	100
5	ES5	0.10	11	0.4	0.63	0.6	17	< 4.0	26	45	< 0.3	20	< 1.0	20	98
6	ES6	0.10	12	1.1	0.69	1.0	18	< 4.0	48	59	< 0.3	26	< 1.0	21	130
7	ES7	0.10	24	1.9	1.6	3.0	50	< 4.0	270	220	0.9	110	< 1.0	32	520
8	ES8	0.10	11	0.3	0.80	0.7	23	< 4.0	48	59	< 0.3	30	< 1.0	23	140
9	ES9	0.10	17	0.8	1.2	1.3	42	< 4.0	110	92	< 0.3	110	< 1.0	30	240
10	ES10	0.10	14	1.4	1.2	2.4	22	< 4.0	94	120	< 0.3	33	< 1.0	29	310
15	ES15	0.10	12	0.6	0.70	0.9	26	< 4.0	37	64	< 0.3	30	< 1.0	22	130
16	ES16	0.20	19	1.1	1.4	1.7	44	< 4.0	110	110	< 0.3	97	< 1.0	35	270
17	ES16N	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
18	ES16S	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
19	ES16E	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
20	ES16W	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-
21	ES17	0.10	16	1.2	0.78	0.9	23	< 4.0	37	300	< 0.3	31	< 1.0	26	180
22	ES18	0.20	13	0.8	0.76	1.3	25	< 4.0	45	62	< 0.3	37	< 1.0	24	160
23	ES19	0.10	7.6	< 0.2	0.72	< 0.2	15	< 4.0	10	12	< 0.3	27	< 1.0	15	60
24	ES20	0.10	7.1	< 0.2	0.67	< 0.2	16	< 4.0	14	10	< 0.3	29	< 1.0	16	63
25	ES21	0.10	8.4	< 0.2	0.60	< 0.2	16	< 4.0	16	13	< 0.3	28	< 1.0	14	60
26	ES22	0.10	8.6	0.6	0.43	0.9	15	< 4.0	13	52	< 0.3	16	< 1.0	19	100
27	ES23	0.10	8.7	< 0.2	0.48	0.5	19	< 4.0	10	23	< 0.3	24	< 1.0	20	81
28	ES24	0.10	9.0	0.3	0.50	0.9	20	< 4.0	13	52	< 0.3	21	< 1.0	22	110
29	ES25	0.10	19	1.2	0.85	3.3	26	< 4.0	35	80	< 0.3	28	< 1.0	26	210
30	ES26	0.20	14	0.8	0.64	1.5	20	< 4.0	29	72	< 0.3	21	< 1.0	22	120
31	ES27	0.10	11	0.9	0.66	0.9	19	< 4.0	32	65	< 0.3	20	< 1.0	19	170
32	ES28	0.20	11	0.8	0.58	0.7	18	< 4.0	39	56	< 0.3	20	< 1.0	19	160
33	ES29	0.10	11	1.2	0.65	2.7	22	< 4.0	40	47	< 0.3	24	< 1.0	23	130
34	ES30	0.20	12	1.0	0.62	1.1	20	< 4.0	45	45	< 0.3	23	< 1.0	24	120
35	ES31	0.10	8.2	0.7	0.68	0.6	26	< 4.0	21	45	< 0.3	18	< 1.0	31	90
36	ES32	0.20	10	0.9	0.74	0.8	19	< 4.0	29	53	< 0.3	20	< 1.0	21	170
37	ES33	0.10	11	0.5	0.78	0.6	23	< 4.0	30	48	< 0.3	20	< 1.0	25	120
38	ES34	0.10	10	0.5	0.81	0.5	21	< 4.0	27	53	< 0.3	20	< 1.0	26	120
39	ES35	0.10	12	0.4	1.0	0.8	22	< 4.0	29	91	< 0.3	19	< 1.0	26	140
46	ES42	0.10	13	1.8	0.82	3.6	19	< 4.0	25	89	< 0.3	17	< 1.0	25	240
47	ES43	0.10	15	1.8	0.70	2.9	18	< 4.0	21	68	< 0.3	17	1.9	23	380
48	ES44	0.10	9.0	0.2	0.66	0.4	21	< 4.0	12	28	< 0.3	22	< 1.0	21	100
49	ES45	0.10	9.4	0.3	0.75	< 0.2	21	< 4.0	9.8	29	< 0.3	26	< 1.0	24	68
50	ES46	0.10	8.2	0.4	0.62	< 0.2	22	< 4.0	11	22	< 0.3	24	< 1.0	19	64
51	ES47	0.10	16	1.6	1.2	0.9	35	< 4.0	64	240	< 0.3	41	< 1.0	29	240
52	ES48	0.10	17	1.7	0.99	1.1	29	< 4.0	85	150	5.5	34	< 1.0	26	300
53	ES48N	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
54	ES48S	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
55	ES48E	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
56	ES48W	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
57	ES48WN	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
58	ES48WS	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
59	ES48WE	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
60	ES48WW	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
61	ES49	0.10	28	3.4	2.4	2.0	47	< 4.0	190	230	< 0.3	54	< 1.0	43	510
62	ES50	0.10	21	1.3	1.3	1.6	44	< 4.0	120	240	< 0.3	51	< 1.0	33	640
63	ES51	0.10	5.2	0.4	0.49	0.4	26	< 4.0	14	26	< 0.3	22	< 1.0	17	66
64	ES52	0.20	10	1.4	0.70	0.4	29	< 4.0	17	40	< 0.3	23	< 1.0	27	96
65	ES53	0.10	14	1.1	0.70	0.6	20	< 4.0	23	44	< 0.3	19	< 1.0	25	94
66	ES54	0.20	11	1.2	0.67	< 0.2	22	< 4.0	18	23	< 0.3	21	< 1.0	24	88
67	ES55	0.10	9.6	1.2	0.70	0.5	24	< 4.0	19	27	< 0.3	23	< 1.0	22	84
68	ES56	0.20	18	1.8	0.96	1.0	29	< 4.0	82	130	< 0.3	32	< 1.0	25	280
69	ES57	0.10	17	1.2	1.1	1.1	82	< 4.0	86	140	< 0.3	33	< 1.0	31	320

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

METALS AND SEMI-METALS

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
70	ES58	0.20	11	0.7	0.69	0.7	21	< 4.0	21	39	< 0.3	24	< 1.0	22	95
71	ES59	0.10	9.7	0.5	0.65	0.7	20	< 4.0	43	33	< 0.3	28	< 1.0	20	100
72	ES60	0.20	9.8	0.4	0.73	0.9	20	< 4.0	30	46	< 0.3	27	< 1.0	19	110
73	ES61	0.10	9.0	0.7	0.49	1.0	28	< 4.0	19	37	< 0.3	23	< 1.0	25	92
74	ES62	0.20	11	0.3	0.57	< 0.2	21	< 4.0	15	36	< 0.3	19	< 1.0	28	79
75	ES63	0.10	14	0.6	0.91	1.1	24	< 4.0	64	110	< 0.3	34	< 1.0	23	220
76	ES64	0.20	12	0.8	0.76	0.8	21	< 4.0	46	85	< 0.3	27	< 1.0	21	150
77	ES65	0.10	42	1.0	1.2	< 0.2	39	< 4.0	45	130	< 0.3	44	< 1.0	47	200
78	ES66	0.10	67	0.7	1.7	< 0.2	29	< 4.0	59	36	< 0.3	46	< 1.0	39	140
79	ES67	0.10	12	1.3	0.69	1.7	23	< 4.0	35	70	< 0.3	21	< 1.0	22	160
80	ES68	0.10	14	1.8	1.1	0.6	25	< 4.0	51	59	< 0.3	84	< 1.0	24	140
81	ES69	0.10	17	0.7	1.3	1.2	55	< 4.0	82	150	< 0.3	62	< 1.0	33	310
82	ES70	0.10	19	0.9	0.99	1.2	31	< 4.0	77	130	< 0.3	36	< 1.0	27	260
83	ES71	0.10	16	1.3	1.1	1.5	33	< 4.0	93	140	< 0.3	40	< 1.0	30	330
84	ES72	0.10	16	1.0	1.2	1.8	36	< 4.0	91	100	< 0.3	47	< 1.0	29	340
85	ES73	0.10	17	1.2	1.6	1.0	31	< 4.0	75	93	< 0.3	36	< 1.0	30	230
86	ES74	0.10	8.2	0.3	0.69	0.5	18	< 4.0	23	31	< 0.3	25	< 1.0	19	100
87	ES75	0.10	13	1.2	0.98	0.9	53	< 4.0	55	100	< 0.3	35	< 1.0	24	190
88	ES76	0.10	16	0.9	0.96	1.3	28	< 4.0	69	110	< 0.3	35	< 1.0	24	290
89	ES77	0.10	12	0.8	0.80	0.9	23	< 4.0	130	70	< 0.3	32	< 1.0	22	190
90	ES78	0.10	12	0.6	0.81	1.0	23	< 4.0	47	63	< 0.3	30	< 1.0	21	210
91	ES79	0.10	10	< 0.2	0.77	0.9	22	< 4.0	43	64	< 0.3	29	< 1.0	21	200
92	ES80	0.10	16	0.8	1.1	1.3	31	< 4.0	74	110	< 0.3	40	< 1.0	27	290
93	ES81	0.10	16	1.0	1.2	1.4	36	< 4.0	83	120	< 0.3	45	< 1.0	31	330
94	ES82	0.10	15	0.3	1.1	1.3	30	< 4.0	78	120	< 0.3	40	< 1.0	28	300
95	ES83	0.10	16	0.5	1.1	1.6	35	< 4.0	92	130	< 0.3	45	< 1.0	29	390
96	ES84	0.10	15	0.7	0.93	1.2	27	< 4.0	69	90	< 0.3	34	< 1.0	25	270
97	ES85	0.10	15	0.5	1.0	1.2	27	< 4.0	73	96	< 0.3	36	< 1.0	26	390
	Screening Criteria Value		-	-	-	-	-	-	-	-	-	-	-	-	-
	Source of Screening Criteria Value		SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

INORGANIC CHEMICALS & OTHERS

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
4	ES4	0.10	< 1.0	10.5	34	< 1.0	7.3	0.021	720	< 1.0	570	3.7	6.36	Detected	<0.001
5	ES5	0.10	< 1.0	7.4	24	< 1.0	7.4	0.011	520	1.3	400	2.2	3.78	Not-detected	-
6	ES6	0.10	< 1.0	11.7	27	< 1.0	7.2	0.053	690	2.7	430	5.0	8.60	Not-detected	-
7	ES7	0.10	< 1.0	10.5	21	< 1.0	7.4	1.1	2700	240	3500	3.0	5.16	Detected	<0.001
8	ES8	0.10	< 1.0	8.8	22	< 1.0	7.4	0.20	940	25	850	2.6	4.47	Not-detected	-
9	ES9	0.10	< 1.0	10.4	24	< 1.0	7.3	0.64	1900	120	2100	3.8	6.54	Not-detected	-
10	ES10	0.10	1.0	8.5	19	< 1.0	7.7	0.48	1400	130	1700	2.1	3.61	Detected	<0.001
15	ES15	0.10	< 1.0	7.4	20	< 1.0	7.4	0.17	530	30	680	2.5	4.30	Detected	< 0.001
16	ES16	0.20	< 1.0	9.8	22	< 1.0	7.5	0.42	3100	160	2100	3.1	5.33	Detected	0.057
17	ES16N	1.50	-	-	-	-	-	-	-	-	-	-	<0.1	Detected	0.006
18	ES16S	1.50	-	-	-	-	-	-	-	-	-	-	<0.1	Not-detected	-
19	ES16E	1.50	-	-	-	-	-	-	-	-	-	-	<0.1	Detected	< 0.001
20	ES16W	1.50	-	-	-	-	-	-	-	-	-	-	<0.1	Not-detected	-
21	ES17	0.10	< 1.0	6.7	20	< 1.0	7.5	0.21	760	55	930	2.4	4.13	Detected	< 0.001
22	ES18	0.20	< 1.0	6.0	18	< 1.0	7.6	0.23	840	49	920	2.2	3.78	Detected	< 0.001
23	ES19	0.10	< 1.0	1.5	7.3	< 1.0	7.5	0.021	200	< 1.0	84	0.4	0.69	Not-detected	-
24	ES20	0.10	< 1.0	1.3	5.3	< 1.0	7.4	0.015	140	26	180	0.2	0.34	Not-detected	-
25	ES21	0.10	< 1.0	1.4	7.5	< 1.0	8.3	0.019	110	< 1.0	120	0.2	0.34	Not-detected	-
26	ES22	0.10	< 1.0	2.5	9.5	< 1.0	8.0	0.15	1400	24	490	0.8	1.38	Not-detected	-
27	ES23	0.10	< 1.0	2.4	7.1	< 1.0	6.9	0.061	680	1.4	330	0.6	1.03	Not-detected	-
28	ES24	0.10	< 1.0	2.6	9.3	< 1.0	8.0	0.12	1200	16	430	0.8	1.38	Not-detected	-
29	ES25	0.10	< 1.0	9.5	19	< 1.0	6.9	0.10	730	39	1000	3.8	6.54	Detected	< 0.001
30	ES26	0.20	< 1.0	8.6	20	< 1.0	7.9	0.051	660	20	580	4.4	7.57	Detected	< 0.001
31	ES27	0.10	< 1.0	5.7	18	< 1.0	7.4	0.15	260	19	720	2.5	4.30	Detected	0.003
32	ES28	0.20	< 1.0	6.3	19	< 1.0	7.3	0.12	390	49	650	3.4	5.85	Detected	< 0.001
33	ES29	0.10	< 1.0	6.6	16	< 1.0	7.9	0.14	1300	16	780	3.3	5.68	Not-detected	-
34	ES30	0.20	< 1.0	7.3	15	< 1.0	7.6	0.080	610	16	530	2.7	4.64	Not-detected	-
35	ES31	0.10	< 1.0	6.6	25	< 1.0	7.6	0.064	610	15	630	3.3	5.68	Not-detected	-
36	ES32	0.20	< 1.0	7.3	21	< 1.0	7.5	0.16	920	41	830	3.6	6.19	Not-detected	-
37	ES33	0.10	< 1.0	3.9	9.9	< 1.0	8.6	0.55	2200	18	1000	1.4	2.41	Not-detected	-
38	ES34	0.10	< 1.0	3.4	9.1	< 1.0	8.3	0.22	970	23	920	1.1	1.89	Not-detected	-
39	ES35	0.10	< 1.0	4.1	9.7	< 1.0	9.1	0.71	3000	76	1600	1.7	2.92	Not-detected	-
46	ES42	0.10	< 1.0	4.9	4.3	< 1.0	9.1	0.74	2600	130	1300	2.4	4.13	Not-detected	-
47	ES43	0.10	< 1.0	4.2	5.7	< 1.0	8.8	0.63	2400	98	1300	1.6	2.75	Not-detected	-
48	ES44	0.10	< 1.0	3.1	7.0	< 1.0	7.9	0.13	710	3.4	310	1.0	1.72	Not-detected	-
49	ES45	0.10	< 1.0	2.6	8.9	< 1.0	7.6	0.038	350	1.3	150	0.6	1.03	Not-detected	-
50	ES46	0.10	< 1.0	2.5	8.0	< 1.0	7.8	0.082	490	1.4	210	0.8	1.38	Not-detected	-
51	ES47	0.10	1.6	9.9	15	< 1.0	7.4	0.76	2200	110	1900	3.6	6.19	Not-detected	-
52	ES48	0.10	2.0	11.7	13	< 1.0	7.4	1.2	3400	170	2700	3.8	6.54	Not-detected	-
53	ES48N	0.10	-	-	15	-	-	-	-	-	-	-		-	-
54	ES48S	0.10	-	-	15	-	-	-	-	-	-	-		-	-
55	ES48E	0.10	-	-	11	-	-	-	-	-	-	-		-	-
56	ES48W	0.10	-	-	16	-	-	-	-	-	-	-		-	-
57	ES48WN	0.10	-	-	18	-	-	-	-	-	-	-		-	-
58	ES48WS	0.10	-	-	18	-	-	-	-	-	-	-		-	-
59	ES48WE	0.10	-	-	19	-	-	-	-	-	-	-		-	-
60	ES48WW	0.10	-	-	18	-	-	-	-	-	-	-		-	-
61	ES49	0.10	2.9	18.3	29	< 1.0	7.9	2.0	9400	93	4600	5.0	8.60	Not-detected	-
62	ES50	0.10	5.4	14.6	13	< 1.0	8.1	1.9	3400	110	2500	4.2	7.22	Not-detected	-
63	ES51	0.10	< 1.0	6.4	17	< 1.0	7.6	0.098	390	16	460	3.2	5.50	Not-detected	-
64	ES52	0.20	< 1.0	3.2	11	< 1.0	8.0	0.047	400	8.5	280	0.9	1.55	Not-detected	-
65	ES53	0.10	< 1.0	4.5	11	< 1.0	8.8	0.28	1500	49	980	1.5	2.58	Not-detected	-
66	ES54	0.20	< 1.0	4.9	12	< 1.0	7.8	0.068	550	13	420	1.8	3.10	Not-detected	-
67	ES55	0.10	< 1.0	3.4	12	< 1.0	8.0	0.056	490	4.6	360	1.3	2.24	Not-detected	-
68	ES56	0.20	2.0	10.1	20	< 1.0	7.4	1.3	3200	28	2200	4.2	7.22	Detected	0.007
69	ES57	0.10	1.0	10.4	21	< 1.0	8.2	0.90	2500	32	1600	4.1	7.05	Not-detected	-

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

INORGANIC CHEMICALS & OTHERS

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
70	ES58	0.20	< 1.0	3.5	11	< 1.0	7.8	0.077	490	13	500	1.5	2.58	Not-detected	-
71	ES59	0.10	< 1.0	3.1	9.1	< 1.0	7.9	0.094	410	1.7	300	1.3	2.24	Not-detected	-
72	ES60	0.20	2.6	4.4	11	< 1.0	7.8	0.10	510	7.4	380	1.9	3.27	Not-detected	-
73	ES61	0.10	< 1.0	3.6	11	< 1.0	7.8	0.16	580	8.4	410	1.9	3.27	Not-detected	-
74	ES62	0.20	< 1.0	3.1	8.4	< 1.0	7.8	0.032	390	23	220	1.3	2.24	Not-detected	-
75	ES63	0.10	1.8	7.2	9.5	< 1.0	7.8	0.20	1100	14	800	2.8	4.82	Not-detected	-
76	ES64	0.20	< 1.0	6.2	14	< 1.0	7.7	0.17	800	12	660	2.9	4.99	Not-detected	-
77	ES65	0.10	< 1.0	7.3	13	< 1.0	7.3	0.20	1100	22	730	3.5	6.02	Not-detected	-
78	ES66	0.10	< 1.0	6.3	16	< 1.0	7.5	0.91	2500	46	1500	1.9	3.27	Not-detected	-
79	ES67	0.10	3.0	9.9	19	< 1.0	7.5	0.76	2200	61	1700	4.1	7.05	Detected	< 0.001
80	ES68	0.10	4.0	9.4	14	< 1.0	7.5	1.2	3100	120	2400	4.1	7.05	Not-detected	-
81	ES69	0.10	2.4	11.5	23	< 1.0	7.5	0.90	2500	170	3400	4.4	7.57	Not-detected	-
82	ES70	0.10	2.6	8.1	19	< 1.0	7.5	0.62	2000	25	1700	3.9	6.71	Detected	<0.001
83	ES71	0.10	2.0	9.0	20	< 1.0	7.7	0.67	2100	100	2000	3.6	6.19	Not-detected	-
84	ES72	0.10	4.3	7.3	11	< 1.0	7.5	0.97	2600	28	1500	3.5	6.02	Detected	< 0.001
85	ES73	0.10	3.7	8.3	9.3	< 1.0	7.6	1.0	2800	150	2000	3.6	6.19	Not-detected	-
86	ES74	0.10	< 1.0	3.4	7.6	< 1.0	8.0	0.31	1100	12	670	1.5	2.58	Detected	<0.001
87	ES75	0.10	7.1	8.1	6.5	< 1.0	7.5	1.0	3200	56	1700	3.0	5.16	Not-detected	-
88	ES76	0.10	4.3	6.1	8.7	< 1.0	7.6	0.58	1600	37	1000	2.7	4.64	Not-detected	-
89	ES77	0.10	3.3	8.2	9.6	< 1.0	8.0	0.53	1800	27	1200	3.3	5.68	Not-detected	-
90	ES78	0.10	2.4	5.8	6.4	< 1.0	8.1	0.40	1200	28	950	2.4	4.13	Not-detected	-
91	ES79	0.10	3.5	6.2	15	< 1.0	7.9	0.36	1100	54	940	3.0	5.16	Not-detected	-
92	ES80	0.10	2.7	8.8	18	< 1.0	7.8	0.59	1500	82	1400	3.5	6.02	Detected	< 0.001
93	ES81	0.10	3.7	8.7	19	< 1.0	7.6	0.76	2300	69	1800	3.9	6.71	Not-detected	-
94	ES82	0.10	3.8	9.2	15	< 1.0	7.5	0.86	2200	85	1500	3.8	6.54	Not-detected	-
95	ES83	0.10	3.6	10.9	18	< 1.0	7.5	0.85	2200	67	1800	4.5	7.74	Detected	< 0.001
96	ES84	0.10	3.9	9.4	21	< 1.0	7.1	1.3	3300	50	1800	4.5	7.74	Not-detected	-
97	ES85	0.10	2.9	10.0	20	< 1.0	7.7	0.81	2500	130	2400	4.8	8.26	Not-detected	-
	Screening Criteria Value		34.0	-	-	490.0	-	-	-	-	-	-	-	-	0.010
	Source of Screening Criteria Value		SSTL2	-	-	SSTL2	-	-	-	-	-	-	-	-	SSTL2

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

POLYAROMATIC HYDROCARBONS (PAH)

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
4	ES4	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
5	ES5	0.10	< 0.05	< 0.05	< 0.05	0.48	0.45	0.74	0.29	0.18	0.50	< 0.05	0.65	< 0.05	0.29	< 0.05	0.30	0.53
6	ES6	0.10	< 0.05	< 0.05	< 0.05	2.9	2.1	3.9	2.0	0.49	2.2	0.56	1.9	< 0.05	1.9	< 0.05	0.79	1.3
7	ES7	0.10	2.5	0.24	0.87	13	5.9	18	9.4	2.8	7.3	2.0	20	2.9	9.2	0.57	7.6	11
8	ES8	0.10	0.40	0.34	1.7	3.7	3.1	3.8	1.9	1.9	3.0	0.58	7.4	0.80	1.6	< 0.05	4.8	5.7
9	ES9	0.10	1.0	0.28	1.7	4.4	4.8	5.5	2.7	3.1	4.9	0.84	9.6	0.89	2.4	< 0.05	5.3	8.1
10	ES10	0.10	1.5	< 0.05	0.23	3.8	1.9	4.9	2.2	0.63	1.9	0.53	4.1	1.1	2.0	< 0.05	1.8	2.6
15	ES15	0.10	0.27	< 0.05	0.37	1.8	1.8	2.2	1.1	1.2	1.4	0.41	2.4	0.32	0.95	0.40	1.3	1.9
16	ES16	0.20	1.2	0.28	1.3	3.6	2.6	3.6	1.7	1.8	3.5	0.66	6.7	1.4	1.6	5.0	5.1	4.9
17	ES16N	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	ES16S	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	ES16E	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	ES16W	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	ES17	0.10	3.0	1.7	4.0	6.5	4.7	6.7	2.7	2.2	6.3	0.79	15	4.4	2.3	3.7	16	10
22	ES18	0.20	0.57	< 0.05	0.59	2.0	1.7	2.6	1.0	0.77	1.7	0.39	3.7	0.65	0.89	0.43	2.4	2.8
23	ES19	0.10	< 0.05	< 0.05	< 0.05	0.28	0.18	0.27	< 0.05	0.10	0.24	< 0.05	0.46	< 0.05	< 0.05	< 0.05	0.40	0.33
24	ES20	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
25	ES21	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
26	ES22	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
27	ES23	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
28	ES24	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.40	< 0.05	< 0.05	< 0.05	< 0.05	0.30
29	ES25	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
30	ES26	0.20	0.36	< 0.05	0.48	1.4	1.4	1.5	0.92	1.2	1.9	0.33	2.6	0.35	0.90	0.15	1.5	1.9
31	ES27	0.10	< 0.05	< 0.05	< 0.05	0.61	0.66	0.72	0.34	0.47	0.77	< 0.05	1.2	< 0.05	0.37	< 0.05	< 0.05	1.1
32	ES28	0.20	< 0.05	< 0.05	< 0.05	0.83	0.95	1.1	0.76	0.85	1.3	0.22	2.3	< 0.05	0.57	< 0.05	< 0.05	2.1
33	ES29	0.10	< 0.05	< 0.05	< 0.05	1.2	1.1	1.4	0.70	0.61	0.91	< 0.05	1.5	< 0.05	0.64	< 0.05	0.76	1.2
34	ES30	0.20	< 0.05	< 0.05	< 0.05	1.0	1.1	1.5	0.69	0.59	1.1	< 0.05	1.5	< 0.05	0.59	< 0.05	0.64	1.1
35	ES31	0.10	< 0.05	< 0.05	0.22	1.1	1.2	1.7	0.77	0.42	1.1	< 0.05	1.3	< 0.05	0.80	< 0.05	0.61	1.0
36	ES32	0.20	0.30	< 0.05	0.38	2.7	2.3	2.9	1.4	1.5	2.1	0.53	3.4	0.29	1.4	< 0.05	1.4	2.6
37	ES33	0.10	0.39	< 0.05	0.63	2.6	2.2	2.7	1.2	1.5	2.1	0.48	3.9	0.42	1.2	< 0.05	2.2	3.1
38	ES34	0.10	0.28	< 0.05	0.53	1.8	1.6	2.2	0.89	0.87	1.7	0.32	3.2	0.30	0.92	< 0.05	1.9	2.4
39	ES35	0.10	0.95	< 0.05	1.2	4.0	3.6	4.6	2.0	2.1	3.6	0.68	6.7	0.81	2.0	< 0.05	4.1	5.0
46	ES42	0.10	0.76	0.50	1.8	12	13	12	8.2	9.8	10	2.6	14	0.79	6.9	< 0.05	5.4	13
47	ES43	0.10	0.86	0.29	1.4	8.4	8.3	8.9	5.3	5.7	7.4	2.0	11	0.83	4.8	< 0.05	5.0	9.4
48	ES44	0.10	< 0.05	< 0.05	< 0.05	0.88	0.79	1.0	0.36	0.39	0.65	< 0.05	1.1	< 0.05	0.30	< 0.05	0.32	1.1
49	ES45	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
50	ES46	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
51	ES47	0.10	0.79	1.7	2.2	4.3	3.2	4.6	1.5	1.9	3.4	0.58	8.7	2.8	1.4	3.6	9.7	5.9
52	ES48	0.10	1.4	4.6	5.9	8.9	6.6	9.2	2.8	3.6	7.6	1.0	18	6.8	2.8	12	22	13
53	ES48N	0.10	0.87	< 0.05	1.5	4.5	4.0	4.9	1.6	1.8	3.8	0.49	7.2	1.1	1.4	< 0.05	5.4	5.3
54	ES48S	0.10	1.0	< 0.05	1.6	5.3	4.8	4.5	2.1	3.6	4.1	0.75	7.7	1.2	1.8	0.79	6.1	5.9
55	ES48E	0.10	< 0.05	< 0.05	0.26	1.7	1.8	2.0	0.72	1.2	1.7	< 0.05	2.1	< 0.05	0.56	< 0.05	0.96	1.8
56	ES48W	0.10	6.6	1.2	7.2	15	12	14	4.5	6.9	14	2.1	22	7.6	4.1	13	22	16
57	ES48WN	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-
58	ES48WS	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-
59	ES48WE	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	4.6	-	-
60	ES48WW	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	-	-
61	ES49	0.10	2.2	0.56	2.9	9.7	8.3	11	4.4	5.5	10	1.4	13	2.3	3.4	4.1	7.8	9.2
64	ES52	0.20	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
65	ES53	0.10	0.94	< 0.05	1.2	3.5	2.5	3.1	1.8	1.9	2.9	0.60	5.7	0.76	1.6	< 0.05	4.0	4.1
66	ES54	0.20	< 0.05	< 0.05	< 0.05	0.37	0.24	0.34	< 0.05	0.17	0.24	< 0.05	0.44	< 0.05	< 0.05	< 0.05	< 0.05	0.32
67	ES55	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
68	ES56	0.20	0.57	0.28	1.3	4.6	4.0	5.3	1.8	1.6	4.0	0.59	6.9	0.97	1.6	0.94	4.4	5.3
69	ES57	0.10	0.86	0.30	1.8	7.0	5.9	6.3	2.8	4.9	5.4	1.0	8.1	1.0	2.4	1.3	4.2	6.4
70	ES58	0.20	< 0.05	< 0.05	< 0.05	0.62	0.59	0.75	0.30	0.29	0.42	< 0.05	0.74	< 0.05	0.26	< 0.05	0.35	0.67
71	ES59	0.10	< 0.05	< 0.05	< 0.05	0.56	0.55	0.75	0.33	0.32	0.68	< 0.05	1.1	< 0.05	0.27	< 0.05	0.77	0.96

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

POLYAROMATIC HYDROCARBONS (PAH)

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
72	ES60	0.20	< 0.05	< 0.05	< 0.05	0.69	0.61	0.83	0.38	0.33	0.54	< 0.05	1.0	< 0.05	0.30	< 0.05	0.46	0.85
73	ES61	0.10	< 0.05	< 0.05	0.23	0.84	0.88	0.91	0.45	0.62	0.95	< 0.05	1.4	< 0.05	0.36	< 0.05	0.82	1.1
74	ES62	0.20	< 0.05	< 0.05	< 0.05	0.35	0.34	0.33	< 0.05	0.27	0.37	< 0.05	0.52	< 0.05	< 0.05	< 0.05	0.22	0.48
75	ES63	0.10	0.28	< 0.05	0.46	2.2	2.1	2.5	1.1	1.3	2.2	0.34	3.0	0.32	0.87	0.54	1.6	2.4
76	ES64	0.20	< 0.05	< 0.05	0.44	1.5	1.6	1.7	0.71	1.1	1.6	0.22	2.1	0.25	0.61	< 0.05	1.3	1.8
77	ES65	0.10	< 0.05	< 0.05	1.1	2.3	1.6	2.4	1.1	1.2	1.5	0.33	2.9	< 0.05	0.99	< 0.05	1.1	2.2
78	ES66	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
79	ES67	0.10	0.85	< 0.05	1.4	4.9	2.4	5.3	1.6	1.3	2.9	0.55	5.5	0.76	1.5	< 0.05	3.4	4.2
80	ES68	0.10	1.5	0.54	3.9	9.0	3.9	7.3	2.6	2.6	4.5	0.84	13	2.0	2.2	< 0.05	8.8	8.9
81	ES69	0.10	6.0	3.8	9.8	17	9.5	12	4.8	5.6	9.1	1.9	40	10	4.9	2.9	40	25
82	ES70	0.10	1.8	0.41	2.9	6.9	5.3	8.6	3.1	2.0	7.0	1.2	11	2.3	3.0	2.3	9.6	7.2
83	ES71	0.10	1.3	0.38	1.9	5.0	4.3	6.1	2.6	2.2	4.9	0.86	8.1	1.6	2.4	2.9	6.0	5.6
84	ES72	0.10	< 0.05	< 0.05	0.55	1.9	0.95	1.9	0.55	0.60	1.2	< 0.05	2.8	< 0.05	0.55	< 0.05	2.3	2.0
85	ES73	0.10	2.2	0.51	3.5	9.1	5.5	7.9	2.9	3.8	6.1	0.97	15	2.7	2.6	< 0.05	13	10
86	ES74	0.10	< 0.05	< 0.05	0.51	1.9	1.5	2.1	0.93	0.82	1.7	< 0.05	3.0	< 0.05	0.86	< 0.05	1.8	2.3
87	ES75	0.10	< 0.05	< 0.05	0.28	1.3	0.90	1.6	0.50	0.51	0.92	< 0.05	1.6	< 0.05	0.50	< 0.05	0.90	1.3
88	ES76	0.10	< 0.05	< 0.05	0.61	2.0	1.2	2.2	0.71	0.61	1.3	0.28	2.9	< 0.05	0.64	< 0.05	1.6	2.1
89	ES77	0.10	< 0.05	< 0.05	1.1	4.5	2.9	4.9	1.7	1.6	3.4	0.64	6.5	0.54	1.6	< 0.05	3.0	4.7
90	ES78	0.10	< 0.05	< 0.05	1.3	2.6	1.5	2.6	0.87	0.80	1.8	0.34	3.9	0.57	0.78	< 0.05	2.9	2.7
91	ES79	0.10	1.3	0.50	1.7	4.3	< 0.05	< 0.05	1.4	< 0.05	2.9	0.52	5.4	1.2	1.4	1.4	5.3	3.6
92	ES80	0.10	1.9	0.81	3.7	6.3	3.0	4.6	2.1	1.6	4.7	0.89	7.5	2.6	1.9	4.1	9.4	5.1
93	ES81	0.10	1.5	0.83	4.0	7.7	4.2	6.0	2.7	2.5	6.9	1.0	9.4	2.0	2.7	2.7	8.6	6.0
94	ES82	0.10	1.2	0.75	3.2	6.5	3.0	4.0	2.1	2.6	4.3	0.81	7.3	1.7	2.0	2.0	7.1	5.1
95	ES83	0.10	2.0	0.98	3.8	9.5	4.6	6.7	3.0	3.1	6.8	1.2	11	2.7	2.8	3.7	11	7.0
96	ES84	0.10	1.4	0.79	2.8	7.0	3.6	5.0	2.3	2.7	5.5	0.92	8.0	1.7	2.3	2.6	7.1	5.3
97	ES85	0.10	0.91	0.50	1.6	4.1	2.1	2.9	1.6	1.6	3.2	0.55	4.5	1.2	1.4	1.7	4.3	3.3
	Screening Criteria Value		12000.0	11000.0	330000.0	52.4	160.0	140.0	36000.0	6000.0	390.0	8.50	71000.0	15000.0	1300.0	5.9	15000.0	160000.0
	Source of Screening Criteria Value		SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

PETROLEUM HYDROCARBONS

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10-C12 EPH (mg/kg)	Aliphatic C12-C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35-C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10-C12 EPH (mg/kg)	Aromatic C12-C16 EPH (mg/kg)	Aromatic C16-C21 EPH (mg/kg)	Aromatic C21-C35 EPH (mg/kg)	Aromatic C35-C40 EPH (mg/kg)
4	ES4	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	ES5	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	ES6	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	ES7	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	ES8	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	ES9	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	ES10	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	ES15	0.10	< 0.001	< 0.001	< 0.001	< 1.0	4.7	48	19	0.31	0.36	0.42	2.0	7.4	12	21	< 8.4
16	ES16	0.20	< 0.001	< 0.001	< 0.001	2.5	6.7	100	27	< 0.001	< 0.001	< 0.001	< 1.0	4.0	24	55	< 8.4
17	ES16N	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	ES16S	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	ES16E	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	ES16W	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	ES17	0.10	< 0.001	< 0.001	< 0.001	1.4	5.6	43	13	< 0.001	< 0.001	< 0.001	3.3	8.2	45	32	< 8.4
22	ES18	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	23	9.2	< 0.001	< 0.001	< 0.001	< 1.0	4.5	13	22	< 8.4
23	ES19	0.10	< 0.001	< 0.001	< 0.001	1.4	3.2	16	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	10	< 8.4
24	ES20	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
25	ES21	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
26	ES22	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
27	ES23	0.10	< 0.001	< 0.001	< 0.001	2.9	9.6	61	23	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	11
28	ES24	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	2.8	< 10	< 10	< 8.4
29	ES25	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	2.8	< 10	19	18
30	ES26	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	16	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	3.7	< 10	26	< 8.4
31	ES27	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	52	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	7.4	18	63	15
32	ES28	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	47	12	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	32	< 8.4
33	ES29	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	49	19	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	13	22	< 8.4
34	ES30	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	28	14	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	12	26	< 8.4
35	ES31	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	22	< 8.4
36	ES32	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	24	< 8.4
37	ES33	0.10	< 0.001	< 0.001	< 0.001	< 1.0	5.6	65	81	< 0.001	< 0.001	< 0.001	< 1.0	9.5	17	80	86
38	ES34	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	47	62	< 0.001	< 0.001	< 0.001	< 1.0	5.6	15	58	15
39	ES35	0.10	< 0.001	< 0.001	< 0.001	< 1.0	6.1	72	90	< 0.001	< 0.001	< 0.001	< 1.0	11	20	79	91
46	ES42	0.10	< 0.001	< 0.001	< 0.001	< 1.0	3.0	120	360	< 0.001	< 0.001	< 0.001	< 1.0	7.8	53	270	530
47	ES43	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	84	270	< 0.001	< 0.001	< 0.001	< 1.0	8.7	40	190	440
48	ES44	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	11	46	120
49	ES45	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	30	67
50	ES46	0.10	< 0.001	< 0.001	< 0.001	1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
51	ES47	0.10	< 0.001	< 0.001	< 0.001	< 1.0	8.6	180	110	< 0.001	< 0.001	< 0.001	6.6	20	51	160	130
52	ES48	0.10	< 0.001	< 0.001	< 0.001	2.6	12	280	120	< 0.001	< 0.001	< 0.001	12	29	110	220	130
53	ES48N	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	ES48S	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	ES48E	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	ES48W	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	ES48WN	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58	ES48WS	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	ES48WE	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	ES48WW	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	ES49	0.10	< 0.001	< 0.001	< 0.001	16	20	220	87	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	39	170	45
62	ES50	0.10	< 0.001	< 0.001	< 0.001	10	19	320	130	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	47	190	26
63	ES51	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	17	34	< 8.4
64	ES52	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
65	ES53	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	8.1	31	49	17
66	ES54	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	29	43
67	ES55	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
68	ES56	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	46	21	< 0.001	< 0.001	< 0.001	< 1.0	7.2	20	50	22
69	ES57	0.10	< 0.001	< 0.001	< 0.001	< 1.0	13	110	57	< 0.001	< 0.001	< 0.001	6.2	8.7	20	78	37

Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 12476
Site: Virginia Park Earthworks
Soil Type: Placed soils at >1.6m depth
Soil Organic Matter: 1%

PETROLEUM HYDROCARBONS

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10-C12 EPH (mg/kg)	Aliphatic C12-C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35-C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10-C12 EPH (mg/kg)	Aromatic C12-C16 EPH (mg/kg)	Aromatic C16-C21 EPH (mg/kg)	Aromatic C21-C35 EPH (mg/kg)	Aromatic C35-C40 EPH (mg/kg)
70	ES58	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
71	ES59	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
72	ES60	0.20	< 0.001	< 0.001	< 0.001	1.8	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	19	< 8.4
73	ES61	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	20	< 8.4
74	ES62	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
75	ES63	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	22	12	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	14	34	< 8.4
76	ES64	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	14	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	29	15
77	ES65	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	65	40	< 0.001	< 0.001	< 0.001	< 1.0	4.2	17	110	85
78	ES66	0.10	< 0.001	< 0.001	< 0.001	< 1.0	6.6	89	18	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	15	44	30
79	ES67	0.10	< 0.001	< 0.001	< 0.001	< 1.0	7.7	190	59	< 0.001	< 0.001	< 0.001	< 1.0	3.1	26	83	42
80	ES68	0.10	< 0.001	< 0.001	< 0.001	< 1.0	12	330	120	< 0.001	< 0.001	< 0.001	5.0	15	80	190	88
81	ES69	0.10	< 0.001	< 0.001	< 0.001	< 1.0	8.6	150	42	< 0.001	< 0.001	< 0.001	8.7	56	230	280	54
82	ES70	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	27	11	< 0.001	< 0.001	< 0.001	< 1.0	8.0	28	41	< 8.4
83	ES71	0.10	< 0.001	< 0.001	< 0.001	1.9	9.9	180	72	< 0.001	< 0.001	< 0.001	1.4	11	51	130	39
84	ES72	0.10	< 0.001	< 0.001	< 0.001	< 1.0	6.0	120	44	< 0.001	< 0.001	< 0.001	< 1.0	6.2	31	71	15
85	ES73	0.10	< 0.001	< 0.001	< 0.001	< 1.0	5.6	180	55	< 0.001	< 0.001	< 0.001	1.9	11	49	120	53
86	ES74	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	2.0	6.3	11	32	18
87	ES75	0.10	< 0.001	< 0.001	< 0.001	< 1.0	6.7	170	67	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	25	85	50
88	ES76	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	110	33	< 0.001	< 0.001	< 0.001	< 1.0	3.8	25	64	33
89	ES77	0.10	< 0.001	< 0.001	< 0.001	1.2	12	140	44	< 0.001	< 0.001	< 0.001	1.0	4.3	22	58	25
90	ES78	0.10	< 0.001	< 0.001	< 0.001	< 1.0	3.3	49	22	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	12	32	< 8.4
91	ES79	0.10	< 0.001	< 0.001	< 0.001	< 1.0	4.1	91	30	< 0.001	< 0.001	< 0.001	3.6	11	25	65	36
92	ES80	0.10	< 0.001	< 0.001	< 0.001	< 1.0	6.0	150	60	< 0.001	< 0.001	< 0.001	4.6	11	30	100	49
93	ES81	0.10	< 0.001	< 0.001	< 0.001	< 1.0	4.0	120	62	< 0.001	< 0.001	< 0.001	2.6	9.8	32	100	60
94	ES82	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	96	52	< 0.001	< 0.001	< 0.001	< 1.0	8.4	25	82	44
95	ES83	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	100	52	< 0.001	< 0.001	< 0.001	2.3	9.9	32	100	53
96	ES84	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	110	63	< 0.001	< 0.001	< 0.001	2.2	8.5	29	120	73
97	ES85	0.10	< 0.001	< 0.001	< 0.001	< 1.0	3.4	140	65	< 0.001	< 0.001	< 0.001	< 1.0	10	25	94	58
	Screening Criteria Value		100.0	250.0	64.0	320.0	2700.0	-	-	920.0	2200.0	110.0	620.0	6800.0	-	-	-
	Source of Screening Criteria Value		SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2	SSTL2

Intégral Géotechnique

APPENDIX H

GROUND GAS MONITORING RESULTS

FIELD GAS MONITORING RESULTS

Job No.:	12476
Site:	Virginia Park, Caerphilly
Monitoring Date:	14.03.23
Monitoring Round:	1

Monitoring Conditions			Barometric Pressure (mb)	
Weather:	Sunny		**On Arrival:**	999
Ambient Temp:	10	°C	**During Monitoring:**	999
Instrument:	GA5000		**End of Monitoring:**	999

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
VPWS 01	4.53	2.55	1.80	2.10	36.00	42.00	14.80	15.70	0.80	0.90	<1	<1	<0.3	<0.1
VPWS 02	5.03	2.99	2.90	2.70	58.00	>100	9.20	7.20	1.40	1.50	<1	<1	<0.3	<0.1
VPWS 03	4.11	2.48	3.40	3.40	68.00	>100	12.10	9.30	0.90	1.20	<1	<1	<0.3	<0.1

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Monitoring Date: 27.03.23
Monitoring Round: 2

Monitoring Conditions

Weather:	Sunny	
Ambient Temp:	11	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	1007
During Monitoring:	1007
End of Monitoring:	1007

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
VPWS 01	4.53	2.52	0.80	0.80	16.00	16.00	16.80	16.80	0.70	0.70	<1	<1	<0.3	<0.1
VPWS 02	5.03	2.97	2.20	2.20	44.00	44.00	11.80	11.80	1.10	0.90	<1	<1	<0.3	<0.1
VPWS 03	4.11	2.49	2.30	2.10	46.00	42.00	14.20	14.50	0.70	0.70	<1	<1	<0.3	<0.1

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Monitoring Date: 06.04.23
Monitoring Round: 3

Monitoring Conditions

Weather: Sunny
Ambient Temp: 12 °C
Instrument: GA5000

Barometric Pressure (mb)

On Arrival: 1013
During Monitoring: 1013
End of Monitoring: 1013

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
VPWS 01	4.53	2.54	0.60	0.50	12.00	10.00	16.10	16.30	0.40	0.40	<1	<1	<0.3	<0.1
VPWS 02	5.03	2.95	1.80	1.80	36.00	36.00	10.70	10.90	1.20	1.20	<1	<1	<0.3	<0.1
VPWS 03	4.11	2.41	2.10	2.00	42.00	40.00	15.20	15.20	0.90	0.90	<1	<1	<0.3	<0.1

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Monitoring Date: 04.05.23
Monitoring Round: 4

Monitoring Conditions

Weather:	Cloudy	
Ambient Temp:	13	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	1007
During Monitoring:	1007
End of Monitoring:	1007

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
VPWS 01	4.53	2.56	0.50	0.50	10.00	10.00	15.80	16.10	0.50	0.40	<1	<1	<0.3	<0.1
VPWS 02	5.03	3.02	1.60	1.50	32.00	30.00	10.90	10.90	1.30	1.20	<1	<1	<0.3	<0.1
VPWS 03	4.11	2.46	2.00	1.70	40.00	34.00	15.80	15.80	0.80	0.80	<1	<1	<0.3	<0.1

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Monitoring Date: 11.05.23
Monitoring Round: 5

Monitoring Conditions

Weather:	Raining	
Ambient Temp:	14	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	1008
During Monitoring:	1008
End of Monitoring:	1008

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
VPWS 01	4.53	2.52	0.60	0.50	12.00	10.00	18.10	18.10	0.90	0.80	<1	<1	<0.3	<0.1
VPWS 02	5.03	3.04	2.10	2.10	42.00	42.00	9.80	9.80	1.20	1.20	<1	<1	<0.3	<0.1
VPWS 03	4.11	2.44	4.80	4.80	96.00	96.00	14.10	14.10	1.10	1.00	<1	<1	<0.3	<0.1

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.: 12476
Site: Virginia Park, Caerphilly
Monitoring Date: 26.05.23
Monitoring Round: 6

Monitoring Conditions

Weather: Sunny
Ambient Temp: 22 °C
Instrument: GA5000

Barometric Pressure (mb)

On Arrival: 1018
During Monitoring: 1018
End of Monitoring: 1018

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
VPWS 01	4.53	2.56	0.50	0.50	10.00	10.00	18.00	18.10	1.10	0.90	<1	<1	<0.3	0.10
VPWS 02	5.03	3.01	2.30	2.30	46.00	46.00	8.70	8.70	1.30	1.30	<1	<1	<0.3	<0.1
VPWS 03	4.11	2.48	4.80	4.30	>100	86.00	13.70	13.90	1.00	0.80	<1	<1	<0.3	<0.1

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

APPENDIX I

GROUNDWATER CHEMICAL TEST RESULTS

4041

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Analytical Report Number : 22-84823

Project / Site name:	Virginia Park Golf Course	**Samples received on:**	20/09/2022
Your job number:	12476	**Samples instructed on/ Analysis started on:**	20/09/2022
Your order number:		**Analysis completed by:**	28/09/2022
Report Issue Number:	1	**Report issued on:**	28/09/2022
Samples Analysed:	2 water samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-84823
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2428564	2428565
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				15/09/2022	15/09/2022
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH	pH Units	N/A	ISO 17025	7.1	6.8
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Sulphate as SO4	µg/l	45	ISO 17025	40400	18400
Total Sulphur	µg/l	15	NONE	13000	6100
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	29	19
Ammoniacal Nitrogen as NH4	µg/l	15	ISO 17025	75	1700
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	5.15	4
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	5.95	4.07
Nitrate as N	mg/l	0.01	ISO 17025	0.07	0.51
Nitrate as NO3	mg/l	0.05	ISO 17025	0.3	2.27
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	4000	1200
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	1.9	1.3
Hardness - Total	mgCaCO3/l	1	ISO 17025	465	176
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16

Analytical Report Number: 22-84823
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2428564	2428565
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				15/09/2022	15/09/2022
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	72	32
Calcium (dissolved)	mg/l	0.012	ISO 17025	100	50
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.041	0.019
Magnesium (dissolved)	mg/l	0.005	ISO 17025	51	12
Aluminium (dissolved)	mg/l	0.001	ISO 17025	0.016	0.0023
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.85	0.2
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.06	0.38
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	1.6	1.3
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	870	16000
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.1	14
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.9	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	4	11
Monoaromatics & Oxygenates					
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10

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Project / Site name: Virginia Park Golf Course

Lab Sample Number				2428564	2428565
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				15/09/2022	15/09/2022
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
VOCs					
Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0

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Project / Site name: Virginia Park Golf Course

Lab Sample Number				2428564	2428565
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				15/09/2022	15/09/2022
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0

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Project / Site name: Virginia Park Golf Course

Lab Sample Number				2428564	2428565
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				15/09/2022	15/09/2022
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
SVOCs					
Aniline	µg/l	0.05	NONE	< 0.05	< 0.05
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

Analytical Report Number: 22-84823
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2428564	2428565
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				15/09/2022	15/09/2022
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
3&4-Methylphenol	µg/l	0.1	NONE	< 0.10	< 0.10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-84823
Project / Site name: Virginia Park Golf Course

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Sulphur in water	Determination of total sulphur in water by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	NONE
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

Analytical Report Number : 22-84823
Project / Site name: Virginia Park Golf Course

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammonium as NH4 in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Chloride in water	Determination of Chloride (diissolved) colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Analytical Report Number : 22-84823
Project / Site name: Virginia Park Golf Course

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01 A	None Supplied	W	2428564	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH01 A	None Supplied	W	2428564	c	Ammonium as NH4 in water	L082-PL	c
BH01 A	None Supplied	W	2428564	c	Biological oxygen demand (total) of water	L086-PL	c
BH01 A	None Supplied	W	2428564	c	pH at 20oC in water (automated)	L099-PL	c
BH02 A	None Supplied	W	2428565	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH02 A	None Supplied	W	2428565	c	Ammonium as NH4 in water	L082-PL	c
BH02 A	None Supplied	W	2428565	c	Biological oxygen demand (total) of water	L086-PL	c
BH02 A	None Supplied	W	2428565	c	pH at 20oC in water (automated)	L099-PL	c

4041

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Analytical Report Number : 23-14568

Project / Site name:	Virginia Park Golf Course	**Samples received on:**	30/01/2023
Your job number:	12476 RJH	**Samples instructed on/ Analysis started on:**	30/01/2023
Your order number:		**Analysis completed by:**	07/02/2023
Report Issue Number:	1	**Report issued on:**	07/02/2023
Samples Analysed:	2 water samples		

Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-14568
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2568252	2568253
Sample Reference				BH01A	BH02A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				26/01/2023	26/01/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH (L005B)	pH Units	N/A	ISO 17025	7.3	7.1
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Sulphate as SO4	µg/l	45	ISO 17025	60500	12400
Total Sulphur	µg/l	15	NONE	20000	4100
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	19	21
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	< 15	1200
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	3.9	8.97
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	5.09	12.6
Nitrate as N	mg/l	0.01	ISO 17025	0.05	0.14
Nitrate as NO3	mg/l	0.05	ISO 17025	0.21	0.62
Nitrite as N	µg/l	1	ISO 17025	< 1.0	8.9
Nitrite as NO2	µg/l	5	ISO 17025	< 5.0	29
Chemical Oxygen Demand (Total) (L065B)	mg/l	2	ISO 17025	77	200
BOD (Biochemical Oxygen Demand) (Total) - PL (L086B)	mg/l	1	ISO 17025	4.2	1.4
Hardness - Total	mgCaCO3/l	1	ISO 17025	355	96.8
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	67	61
Calcium (dissolved)	mg/l	0.012	ISO 17025	90	24
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.005	0.051
Magnesium (dissolved)	mg/l	0.005	ISO 17025	32	9.2
Aluminium (dissolved)	mg/l	0.001	ISO 17025	0.0019	0.0016
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.54	0.18
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.04	0.06

Analytical Report Number: 23-14568
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2568252	2568253
Sample Reference				BH01A	BH02A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				26/01/2023	26/01/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	1.2	0.7
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	690	8100
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	3.2	7.3
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	9.4	13
Monoaromatics & Oxygenates					
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
VOCs					
Chloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Chloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Bromomethane	µg/l	3	NONE	< 3.0*	< 3.0*
Vinyl Chloride	µg/l	3	NONE	< 3.0	< 3.0
Trichlorofluoromethane	µg/l	3	NONE	< 3.0	< 3.0
1,1-Dichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	3	NONE	< 3.0*	< 3.0*
Cis-1,2-dichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1-Dichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
2,2-Dichloropropane	µg/l	3	ISO 17025	< 3.0	< 3.0
Trichloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,1-Trichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1-Dichloropropene	µg/l	3	ISO 17025	< 3.0	< 3.0
Trans-1,2-dichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Tetrachloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0

Analytical Report Number: 23-14568
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2568252	2568253
Sample Reference				BH01A	BH02A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				26/01/2023	26/01/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
1,2-Dichloropropane	µg/l	3	ISO 17025	< 3.0	< 3.0
Trichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
Dibromomethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Bromodichloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Cis-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0	< 3.0
Trans-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,2-Trichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,3-Dichloropropane	µg/l	3	ISO 17025	< 3.0	< 3.0
Dibromochloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Tetrachloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dibromoethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Chlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,1,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p & m-Xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
Styrene	µg/l	3	ISO 17025	< 3.0	< 3.0
Tribromomethane	µg/l	3	ISO 17025	< 3.0	< 3.0
o-Xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,2,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Isopropylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Bromobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
n-Propylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
2-Chlorotoluene	µg/l	3	ISO 17025	< 3.0	< 3.0
4-Chlorotoluene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,3,5-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
tert-Butylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2,4-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
sec-Butylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,3-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p-Isopropyltoluene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,4-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Butylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dibromo-3-chloropropane	µg/l	3	NONE	< 3.0*	< 3.0*
1,2,4-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Hexachlorobutadiene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2,3-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05	< 0.05
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05

Analytical Report Number: 23-14568
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2568252	2568253
Sample Reference				BH01A	BH02A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				26/01/2023	26/01/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

Analytical Report Number: 23-14568
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2568252	2568253
Sample Reference				BH01A	BH02A
Sample Number				None Supplied	None Supplied
Depth (m)				>3.00	>3.00
Date Sampled				26/01/2023	26/01/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
3&4-Methylphenol	µg/l	0.1	NONE	< 0.10	< 0.10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and therefore may be unreliable.

Analytical Report Number : 23-14568
Project / Site name: Virginia Park Golf Course

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry).Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Sulphur in water	Determination of total sulphur in water by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	NONE
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025

Analytical Report Number : 23-14568
Project / Site name: Virginia Park Golf Course

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrite as N in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry). Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Chloride in water	Determination of Chloride (diissolved) colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 23-14568
Project / Site name: Virginia Park Golf Course

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 23-14568

Project / Site name: Virginia Park Golf Course

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01A	None Supplied	W	2568252	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH01A	None Supplied	W	2568252	c	Biological oxygen demand (total) of water	L086-PL	c
BH01A	None Supplied	W	2568252	c	pH at 20oC in water (automated)	L099-PL	c
BH02A	None Supplied	W	2568253	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH02A	None Supplied	W	2568253	c	Biological oxygen demand (total) of water	L086-PL	c
BH02A	None Supplied	W	2568253	c	pH at 20oC in water (automated)	L099-PL	c

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Analytical Report Number : 23-32440

Project / Site name:	Virginia Park Golf Course	**Samples received on:**	09/05/2023
Your job number:	12476-RJH	**Samples instructed on/ Analysis started on:**	09/05/2023
Your order number:		**Analysis completed by:**	16/05/2023
Report Issue Number:	1	**Report issued on:**	17/05/2023
Samples Analysed:	2 water samples		

Izabela Wójcik
Signed:

Izabela Wójcik
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-32440
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2671393	2671394
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				3.00	3.00
Date Sampled				04/05/2023	04/05/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH (L005B)	pH Units	N/A	ISO 17025	7	6.6
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Sulphate as SO4	µg/l	45	ISO 17025	16600	13700
Total Sulphur	µg/l	15	NONE	5500	4600
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	17	19
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	53	1200
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	2.46	2.93
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	2.84	3.29
Nitrate as N	mg/l	0.01	ISO 17025	0.07	0.27
Nitrate as NO3	mg/l	0.05	ISO 17025	0.3	1.2
Nitrite as N	µg/l	1	ISO 17025	< 1.0	U/S*
Nitrite as NO2	µg/l	5	ISO 17025	< 5.0	U/S*
Chemical Oxygen Demand (Total) (L065B)	mg/l	2	ISO 17025	8.9	88
BOD (Biochemical Oxygen Demand) (Total) - PL (L086B)	mg/l	1	ISO 17025	2.2	1
Hardness - Total	mgCaCO3/l	1	ISO 17025	330	125
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16

Analytical Report Number: 23-32440
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2671393	2671394
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				3.00	3.00
Date Sampled				04/05/2023	04/05/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	72	37
Calcium (dissolved)	mg/l	0.012	ISO 17025	73	32
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.14	0.22
Magnesium (dissolved)	mg/l	0.005	ISO 17025	36	11
Aluminium (dissolved)	mg/l	0.001	ISO 17025	0.0015	0.0024
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.75	0.45
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	690	9600
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.6	7.6
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	3.7	8.9
Monoaromatics & Oxygenates					
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10
VOCs					
Chloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Chloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Bromomethane	µg/l	3	ISO 17025	< 3.0	< 3.0

Analytical Report Number: 23-32440
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2671393	2671394
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				3.00	3.00
Date Sampled				04/05/2023	04/05/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Vinyl Chloride	µg/l	3	NONE	< 3.0	< 3.0
Trichlorofluoromethane	µg/l	3	NONE	< 3.0	< 3.0
1,1-Dichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,2-Trichloro-1,2,2-trifluoroethane##	µg/l	3	ISO 17025	< 3.0	< 3.0
Cis-1,2-dichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1-Dichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
2,2-Dichloropropane	µg/l	3	ISO 17025	< 3.0	< 3.0
Trichloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,1-Trichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1-Dichloropropene	µg/l	3	ISO 17025	< 3.0	< 3.0
Trans-1,2-dichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Tetrachloromethane##	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dichloropropane	µg/l	3	ISO 17025	< 3.0	< 3.0
Trichloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
Dibromomethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Bromodichloromethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Cis-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0	< 3.0
Trans-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,2-Trichloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,3-Dichloropropane	µg/l	3	ISO 17025	< 3.0	< 3.0
Dibromochloromethane##	µg/l	3	ISO 17025	< 3.0	< 3.0
Tetrachloroethene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dibromoethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Chlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,1,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p & m-Xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
Styrene	µg/l	3	ISO 17025	< 3.0	< 3.0
Tribromomethane	µg/l	3	ISO 17025	< 3.0	< 3.0
o-Xylene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,1,2,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0	< 3.0
Isopropylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Bromobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
n-Propylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
2-Chlorotoluene	µg/l	3	ISO 17025	< 3.0	< 3.0
4-Chlorotoluene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,3,5-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
tert-Butylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2,4-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
sec-Butylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,3-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
p-Isopropyltoluene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,4-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Butylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2-Dibromo-3-chloropropane	µg/l	3	ISO 17025	< 3.0	< 3.0
1,2,4-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
Hexachlorobutadiene##	µg/l	3	ISO 17025	< 3.0	< 3.0

Analytical Report Number: 23-32440
Project / Site name: Virginia Park Golf Course

Lab Sample Number				2671393	2671394
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				3.00	3.00
Date Sampled				04/05/2023	04/05/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
1,2,3-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0	< 3.0
SVOCs					
Aniline	µg/l	0.05	NONE	< 0.05	< 0.05
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

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Lab Sample Number				2671393	2671394
Sample Reference				BH01 A	BH02 A
Sample Number				None Supplied	None Supplied
Depth (m)				3.00	3.00
Date Sampled				04/05/2023	04/05/2023
Time Taken				1000	1100
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
3&4-Methylphenol	µg/l	0.1	NONE	< 0.10	< 0.10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry).Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total Sulphur in water	Determination of total sulphur in water by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	NONE
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025

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Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW, FSE, LL.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrite as N in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry). Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025

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Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride in water	Determination of Chloride (diissolved) colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

*U/S Analysis could not be completed due to sample matrix.
- Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

Sample Deviation Report

Analytical Report Number : 23-32440
Project / Site name: Virginia Park Golf Course

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01 A	None Supplied	W	2671393	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH01 A	None Supplied	W	2671393	c	Biological oxygen demand (total) of water	L086-PL	c
BH01 A	None Supplied	W	2671393	c	pH at 20oC in water (automated)	L099-PL	c
BH02 A	None Supplied	W	2671394	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH02 A	None Supplied	W	2671394	c	Biological oxygen demand (total) of water	L086-PL	c
BH02 A	None Supplied	W	2671394	c	pH at 20oC in water (automated)	L099-PL	c

APPENDIX J

SUMMARY OF GROUNDWATER TEST RESULTS

Sample Reference				BH01 A	BH01A	BH01 A		BH02 A	BH02A	BH02 A	Guideline Value		
Date Sampled				15/09/2022	26/01/2023	04/05/2023		15/09/2022	26/01/2023	04/05/2023	MAC-EQS Inland Surface Water C1	Freshwater EQS >50-100mg/l CaCO3	UK Drinking Water Standards
pH	pH Units	N/A	ISO 17025	7.1	7.3	7		6.8	7.1	6.6	-	-	-
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10		< 10	< 10	< 10	-	-	50
Sulphate as SO4	µg/l	45	ISO 17025	40400	60500	16600		18400	12400	13700	-	400000	250000
Total Sulphur	µg/l	15	NONE	13000	20000	5500		6100	4100	4600			
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0	-	0.25	-
Chloride	mg/l	0.15	ISO 17025	29	19	17		19	21	19	-	250	250
Ammoniacal Nitrogen as NH4	µg/l	15	ISO 17025	**75**	< 15	**53**		**1700**	**1200**	**1200**	-	15	-
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	5.15	3.9	2.46		4	8.97	2.93			
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	5.95	5.09	2.84		4.07	12.6	3.29			
Nitrate as N	mg/l	0.01	ISO 17025	0.07	0.05	0.07		0.51	0.14	0.27	-	-	50
Nitrate as NO3	mg/l	0.05	ISO 17025	0.3	0.21	0.3		2.27	0.62	1.2			
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	4000	77	8.9		1200	200	88	-	-	-
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	1.9	4.2	2.2		1.3	1.4	1	-	-	-
Hardness - Total	mgCaCO3/l	1	ISO 17025	465	355	330		176	96.8	125	-	-	-
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10		< 10	< 10	< 10	-	30	0.5
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	130	10	-
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	0.1	10	-
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	0.12	10	-
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	0.017	10	-
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	0.017	10	-
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	0.27	10	0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	-	10	-
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01	< 0.01	0.0082	10	-
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16		< 0.16	< 0.16	< 0.16			
Boron (dissolved)	µg/l	10	ISO 17025	72	67	72		32	61	37	-	2000	1000
Calcium (dissolved)	mg/l	0.012	ISO 17025	100	90	73		50	24	32	-	-	250
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0			
Iron (dissolved)	mg/l	0.004	ISO 17025	0.041	0.005	0.14		0.019	0.051	0.22	-	1	0.2
Magnesium (dissolved)	mg/l	0.005	ISO 17025	**51**	32	36		12	9.2	11	-	-	50
Aluminium (dissolved)	mg/l	0.001	ISO 17025	0.016	0.0019	0.0015		0.0023	0.0016	0.0024	-	-	0.2
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.85	0.54	0.75		0.2	0.18	0.45	-	50	10
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	-	-	-
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.06	0.04	< 0.02		0.38	0.06	0.02	0.45	5	5
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2	< 0.2	-	10	50
Copper (dissolved)	µg/l	0.5	ISO 17025	1.6	1.2	< 0.5		1.3	0.7	< 0.5	-	6	2000
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2	< 0.2	14	10	10
Manganese (dissolved)	µg/l	0.05	ISO 17025	**870**	**690**	**690**		**16000**	**8100**	**9600**	-	30	50
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	0.07	1	-
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.1	3.2	2.6		14	7.3	7.6	34	100	20
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.9	< 0.6	< 0.6		< 0.6	< 0.6	< 0.6	-	-	10
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2	< 0.2	-	20	-
Zinc (dissolved)	µg/l	0.5	ISO 17025	4	9.4	3.7		11	13	8.9	-	50	5000
Benzene	µg/l	1	ISO 17025	< 1.0	< 3.0	< 3.0		< 1.0	< 3.0	< 3.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 3.0	< 3.0		< 1.0	< 3.0	< 3.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 3.0	< 3.0		< 1.0	< 3.0	< 3.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 3.0	< 3.0		< 1.0	< 3.0	< 3.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 3.0	< 3.0		< 1.0	< 3.0	< 3.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 3.0	< 3.0		< 1.0	< 3.0	< 3.0			
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	50	-	1
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	50	-	1
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	50	-	1
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	50	-	1
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	50	-	1
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0	50	-	1
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10	50	-	1
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10		< 10	< 10	< 10			

APPENDIX K

GROUNDWATER SAMPLE PARAMETERS

Groundwater Quality Monitoring Results

Site: Virginia Park Job No: 12476

Date: 15.09.22 Weather: Sunny

Name of Engineer: RH

Sample No.	Water level (mbgl)	Well Base Level (mbgl)	pH (pH Units)	Temperature (C)	Conductivity (uS/cm)	Total disolved solids (ppm)	Salinity (PSU)	Oxygen Reduction Potential (mV)	Disolved Oxygen (%)	Comments
BH 01 A	3.02	8.52	7.31	11.64	752	376	0.37			Fast Recharge
BH 02 A	3.18	8.74	7.39	11.24	441	281	0.23			Slow Recharge

Notes:

1. Instrument Used: HI Multiparameter
2. Typical Accuracy: Water

Temperature	+/- 0.15 ˚C	DO	+/- 1%	PSU	+/- 2% or '+/- 0.01 PSU
pH	+/- 0.01 pH	Conductivity	+/- 1% or '+/- 1uS/cm	Resistivity	+/- 1% or '+/- 1mg/L
ORP	+/- 1mV				

3. N/R = No Reading Taken

Intégral Géotechnique

Groundwater Quality Monitoring Results

Site: Virginia Park | Job No: 12476

Date: 26.01.23 | Weather: Cloudy

Name of Engineer: RH

Sample No.	Water level (mbgl)	Well Base Level (mbgl)	pH (pH Units)	Temperature (C)	Conductivity (uS/cm)	Total disolved solids (ppm)	Salinity (PSU)	Oxygen Reduction Potential (mV)	Disolved Oxygen (%)	Comments
BH 01 A	2.78	8.52	7.21	11.04	582	329	0.34			Fast Recharge
BH 02 A	2.53	8.74	7.52	10.82	363	248	0.22			Medium Recharge

Notes:

1. Instrument Used: HI Multiparameter
2. Typical Accuracy: Water

Temperature	+/- 0.15 ˚C	DO	+/- 1%	PSU	+/- 2% or '+/- 0.01 PSU
pH	+/- 0.01 pH	Conductivity	+/- 1% or '+/- 1uS/cm	Resistivity	+/- 1% or '+/- 1mg/L
ORP	+/- 1mV				

3. N/R = No Reading Taken

Intégral Géotechnique

Groundwater Quality Monitoring Results

Site: Virginia Park Job No: 12476

Date: 04.05.23 Weather: Cloudy

Name of Engineer: RH

Sample No.	Water level (mbgl)	Well Base Level (mbgl)	pH (pH Units)	Temperature (C)	Conductivity (uS/cm)	Total disolved solids (ppm)	Salinity (PSU)	Oxygen Reduction Potential (mV)	Disolved Oxygen (%)	Comments
BH 01 A	2.86	8.52	7.45	12.01	694	299	0.31			Fast Recharge
BH 02 A	2.56	8.74	7.23	11.87	451	309	0.23			Medium Recharge

Notes:

1. Instrument Used: HI Multiparameter
2. Typical Accuracy: Water

Temperature	+/- 0.15 ˚C	DO	+/- 1%	PSU	+/- 2% or '+/- 0.01 PSU
pH	+/- 0.01 pH	Conductivity	+/- 1% or '+/- 1uS/cm	Resistivity	+/- 1% or '+/- 1mg/L
ORP	+/- 1mV				

3. N/R = No Reading Taken

Intégral Géotechnique

APPENDIX L

AMMONIACAL NITROGEN CALCULATIONS

Ammoniacal Nitrogen Groundwater Risk Assessment

Site: Virginia Park Caerphilly

Job No.: 12476 - BH01a

Since only the unionised component of total ammonia is toxic to aquatic life, it is relevant to compare unionised ammonia in groundwater against EQS values.

Total Ammoniacal Nitrogen can be used to derive Unionised Ammonia using the following equation:

$$\text{Unionised Ammonia} = \frac{\text{Total Ammoniacal Nitrogen}}{1.0+10^{(10.055-(0.0324\times\text{Temperature})-\text{pH})}}$$

Maximum Ammoniacal Nitrogen Concentration	mg/l	0.075
Maximum Temperature	˚C	12.01
Maximum pH	pH Units	7.45
Unionised Ammonia Concentration	**mg/l**	**0.00045**
		OK
EQS Value	mg/l	0.015

Ammoniacal Nitrogen Groundwater Risk Assessment

Site: Virginia Park Caerphilly

Job No.: 12476 - BH02a

Since only the unionised component of total ammonia is toxic to aquatic life, it is relevant to compare unionised ammonia in groundwater against EQS values.

Total Ammoniacal Nitrogen can be used to derive Unionised Ammonia using the following equation:

$$\text{Unionised Ammonia} = \frac{\text{Total Ammoniacal Nitrogen}}{1.0+10^{(10.055-(0.0324\times\text{Temperature})-\text{pH})}}$$

Maximum Ammoniacal Nitrogen Concentration	mg/l	1.7
Maximum Temperature	˚C	11.87
Maximum pH	pH Units	7.52
Unionised Ammonia Concentration	**mg/l**	**0.01194**
		OK
EQS Value	mg/l	0.015

Ammoniacal Nitrogen Groundwater Risk Assessment

Site: Virginia Park Caerphilly

Job No.: 12476 - 'Worst Case'

Since only the unionised component of total ammonia is toxic to aquatic life, it is relevant to compare unionised ammonia in groundwater against EQS values.

Total Ammoniacal Nitrogen can be used to derive Unionised Ammonia using the following equation:

$$\text{Unionised Ammonia} = \frac{\text{Total Ammoniacal Nitrogen}}{1.0+10^{(10.055-(0.0324\times\text{Temperature})-\text{pH})}}$$

Maximum Ammoniacal Nitrogen Concentration	mg/l	1.7
Maximum Temperature	˚C	12.01
Maximum pH	pH Units	7.52
Unionised Ammonia Concentration	**mg/l**	**0.01206**
		OK
EQS Value	mg/l	0.015

APPENDIX M

MANGANESE M-BAT ASSESSMENTS

INPUT DATA											RESULTS (Copper)				RESULTS (Zinc)				RESULTS (Mn)			
ID	Location	Waterbody	Date	Measured Cu Concentration (dissolved) (µg l^{-1})	Measured Zn Concentration (dissolved) (µg l^{-1})	Measured Mn Concentration (dissolved) (µg l^{-1})	Measured Ni Concentration (dissolved) (µg l^{-1})	pH	DOC	Ca	Site-specific PNEC Dissolved Copper (µg l^{-1})	BioF	Bioavailable Copper Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Zinc (µg l^{-1})	BioF	Bioavailable Zinc Concentration (µg l^{-1})	Risk Characterisation Ratio	Site-specific PNEC Dissolved Manganese (µg l^{-1})	BioF	Bioavailable Manganese Concentration (µg l^{-1})	Risk Characterisation Ratio
1	BH01 A - Round 1					870		7.1	5.15	100	22.70	0.04			25.66	0.42			1253.75	0.10	85.35	0.69
2	BH01 A - Round 2					690		7.3	3.9	90	17.21	0.06			23.60	0.46			851.26	0.14	99.70	0.81
3	BH01 A - Round 3					690		7	2.46	73	9.34	0.11			19.75	0.55			1521.55	0.08	55.78	0.45
5	BH02A - Round 1					16000		6.8	4	50	13.60	0.07			21.53	0.51			1351.10	0.09	1456.59	11.84
6	BH02A - Round 2					8100		7.1	8.97	24	37.77	0.03			35.50	0.31			734.42	0.17	1356.93	11.03
7	BH02A - Round 3					9600		6.6	2.93	32	7.50	0.13			18.26	0.60			1522.36	0.08	775.64	6.31

FIGURES

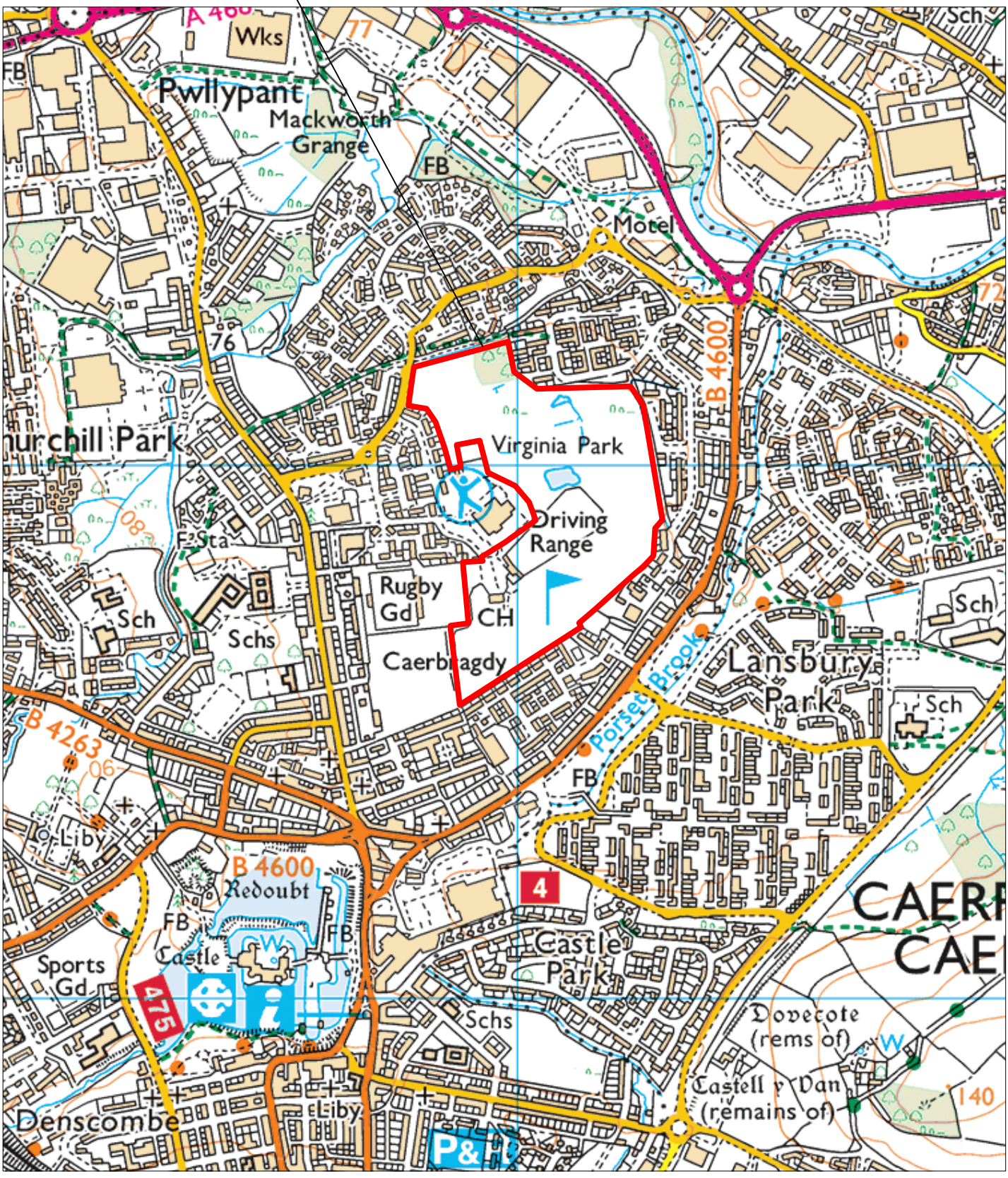

Figure 1: Site Location

Project: Virginia Park Golf Course, Caerphilly	Job no.: 12476	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Virginia Park Golf Club	Scale: 1:10,000 at A4		

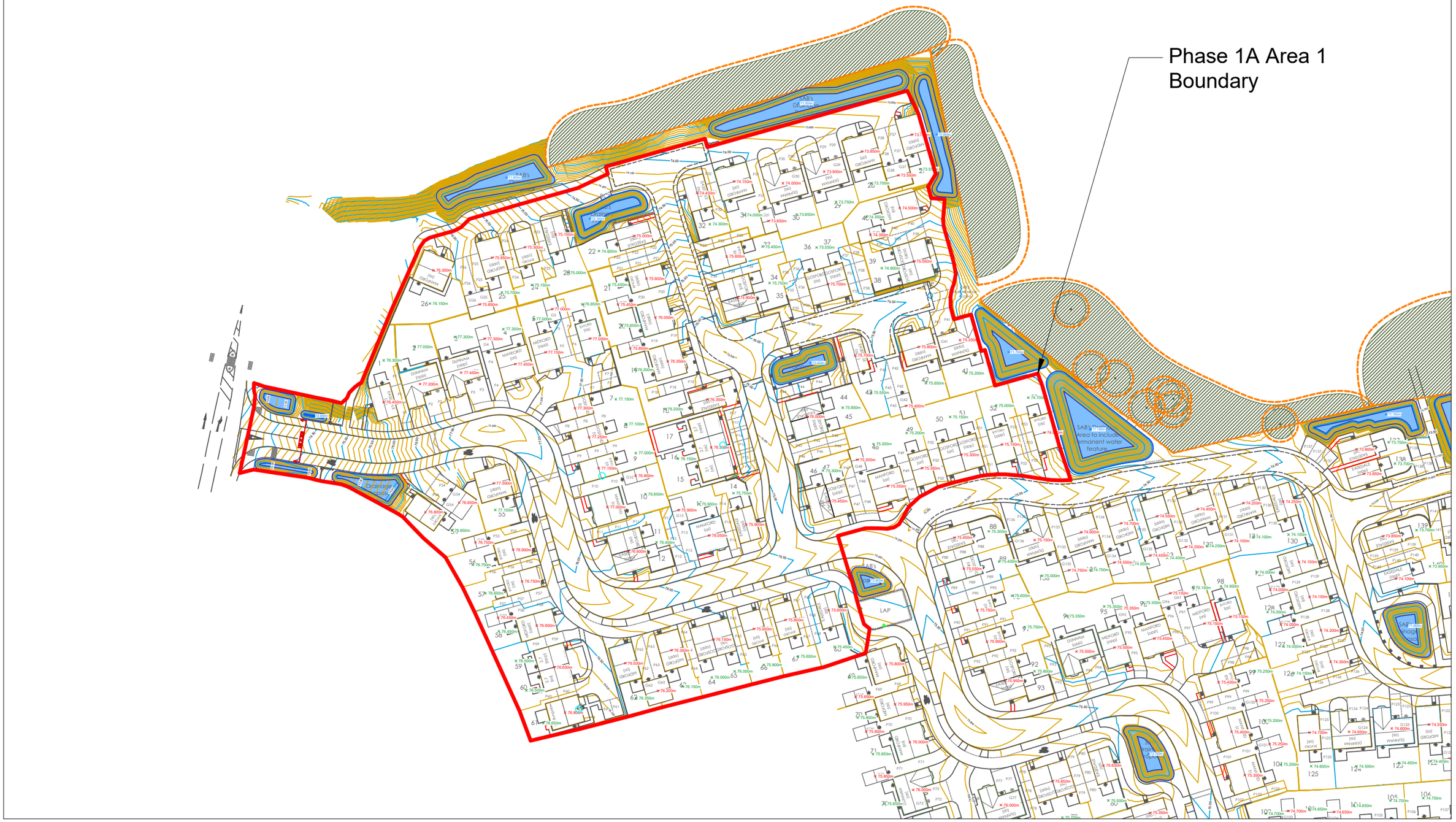

Figure 2: Phase 1A Area 1 Site Plan

Project: Phase 1A Area 1 Virginia Park, Caerphilly	Job No: 12476	Integral Géotechnique
Client: GHR Developments Limited	Scale: 1:1000 at A3	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991

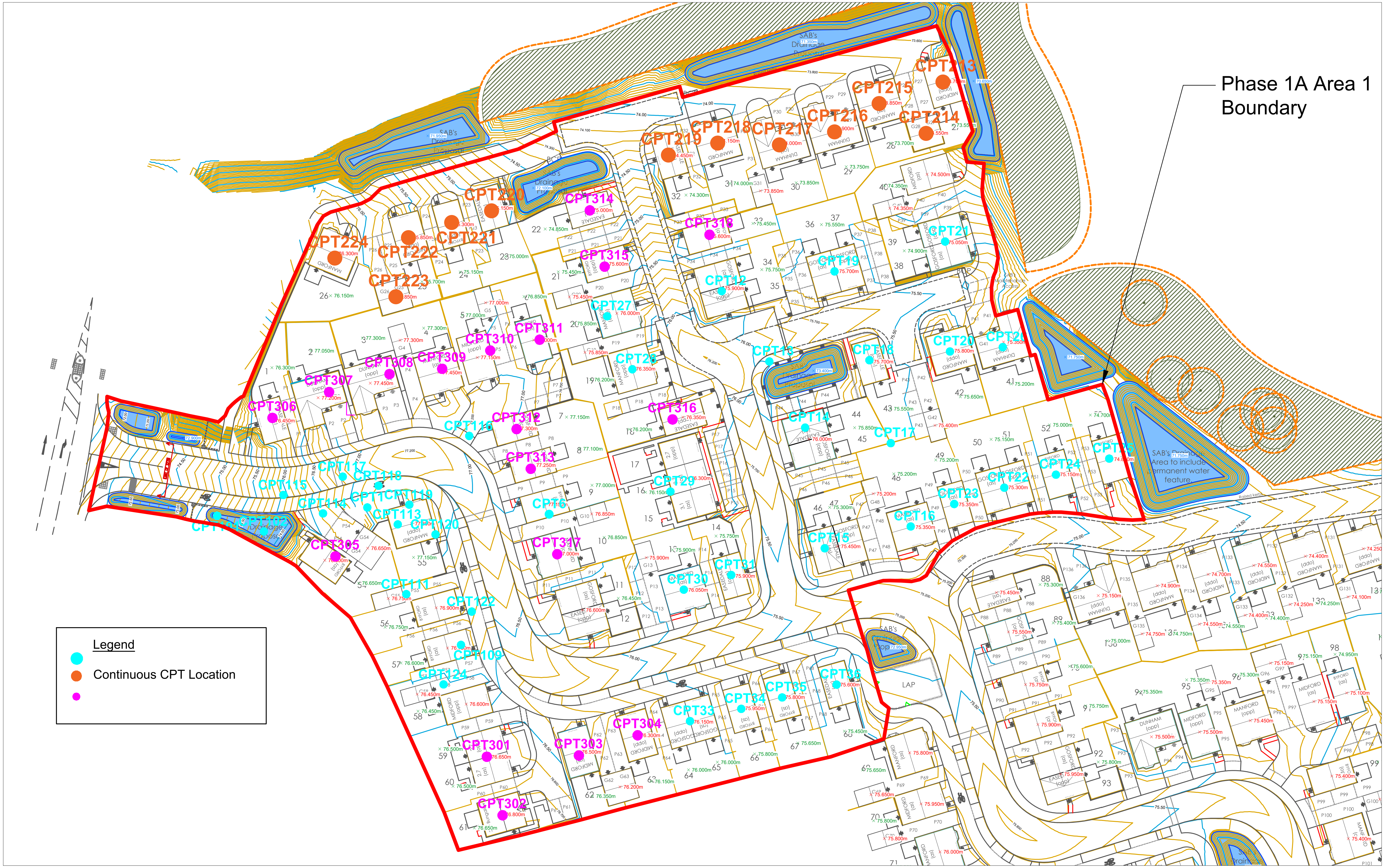

Figure 3A Phase 1A Area 1 - Continuous Cone Penetration Test Locations

Project: Phase 1A Area 1Virginia Park, Caerphilly	Job No.: 12476
Client: GHR Developments Limited	Scale: 1:750 at A3

Intégral Géotechnique
Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7991

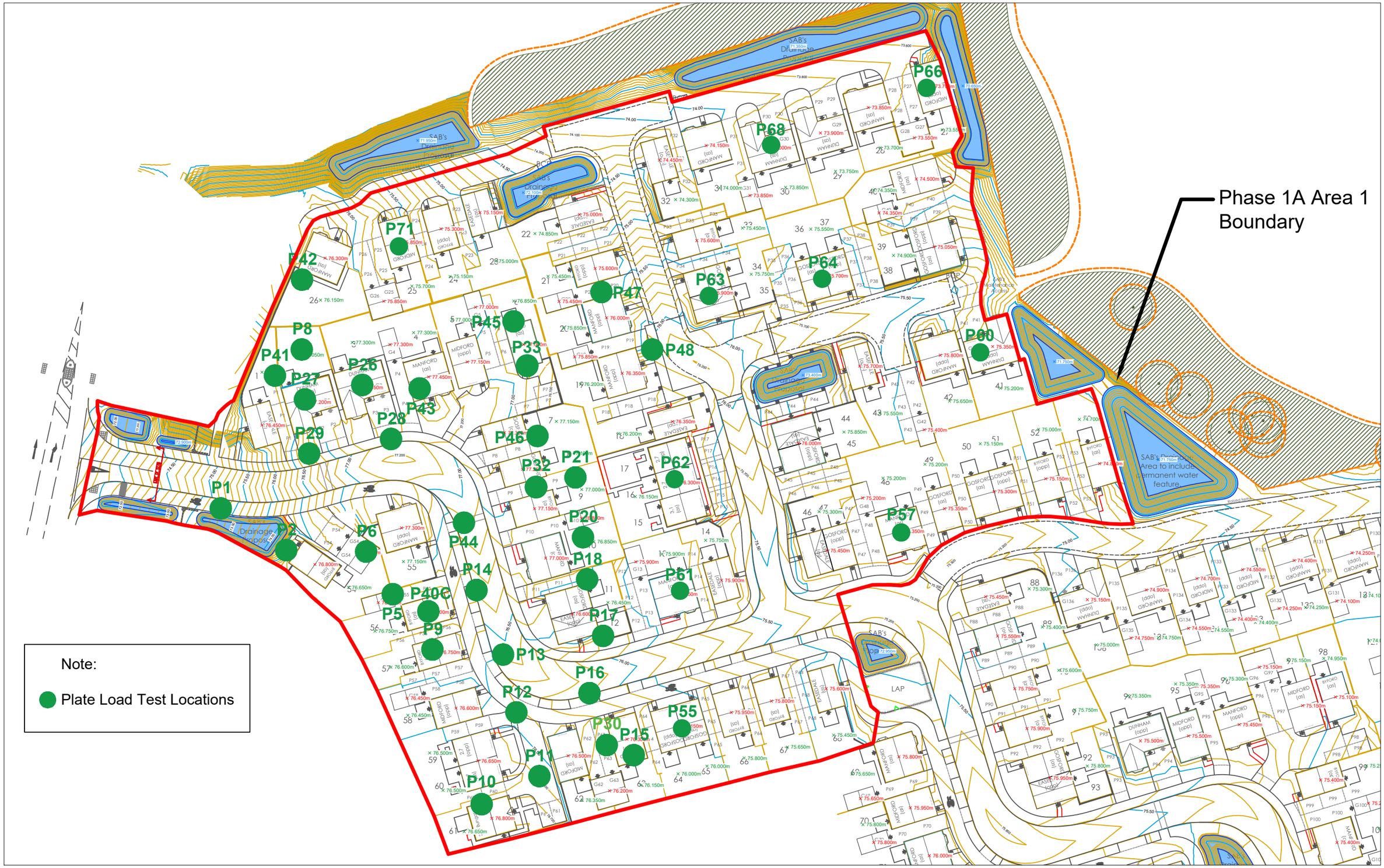

Figure 3B Plate Load Tests Locations

Project: Phase 1A Area 1 Virginia Park, Caerphilly	Job No.: 12476	Intégral Géotechnique
Client: GHR Developments Limited	Scale: 1:750 at A3	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991

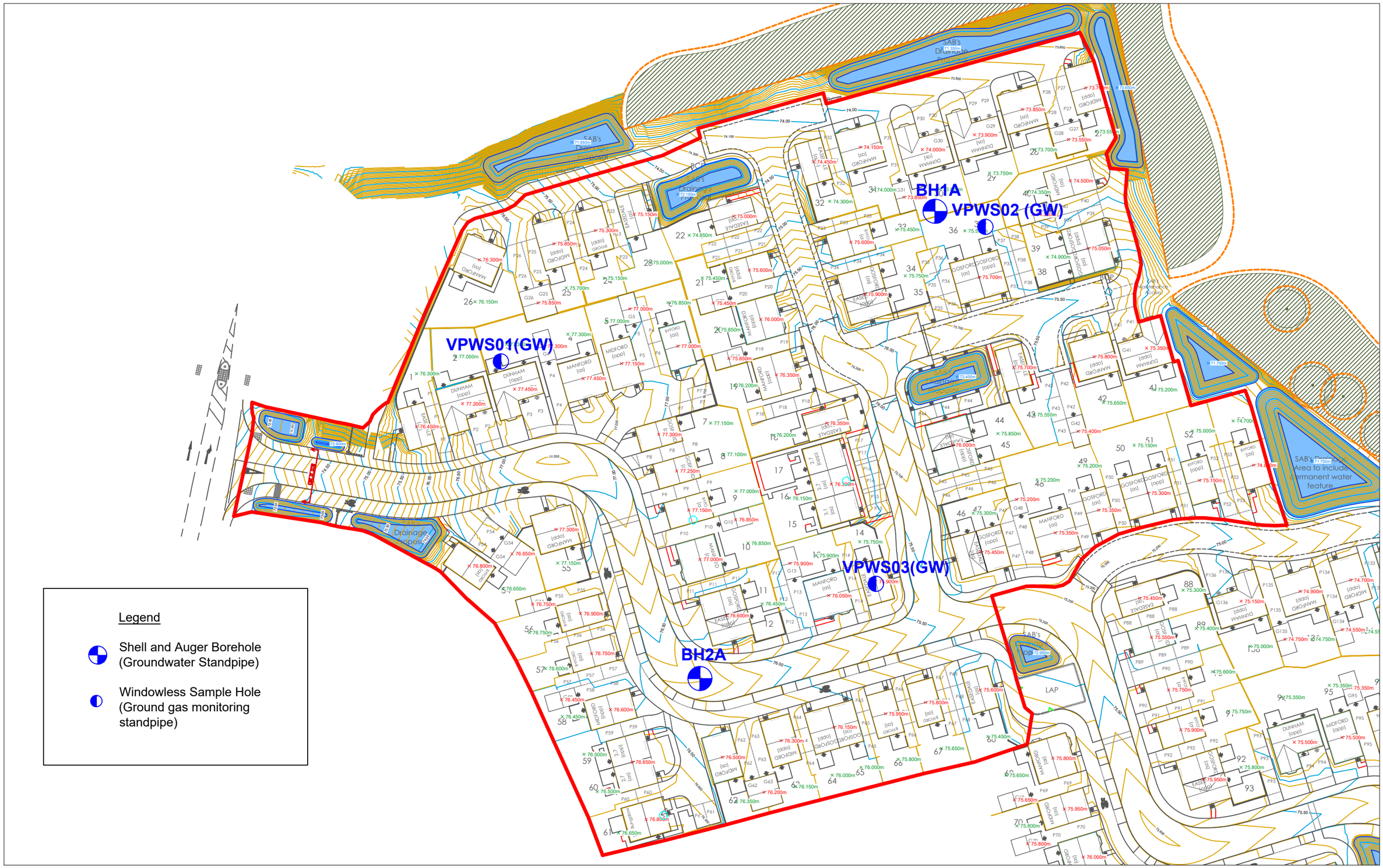

Figure 3C Phase 1A Area 1 - Groundwater and Ground Gas Standpipe Locations

Project: Phase 1A Area 1 Virginia Park, Caerphilly	Job No.: 12476	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: GHR Developments Limited	Scale: 1:750 at A3		

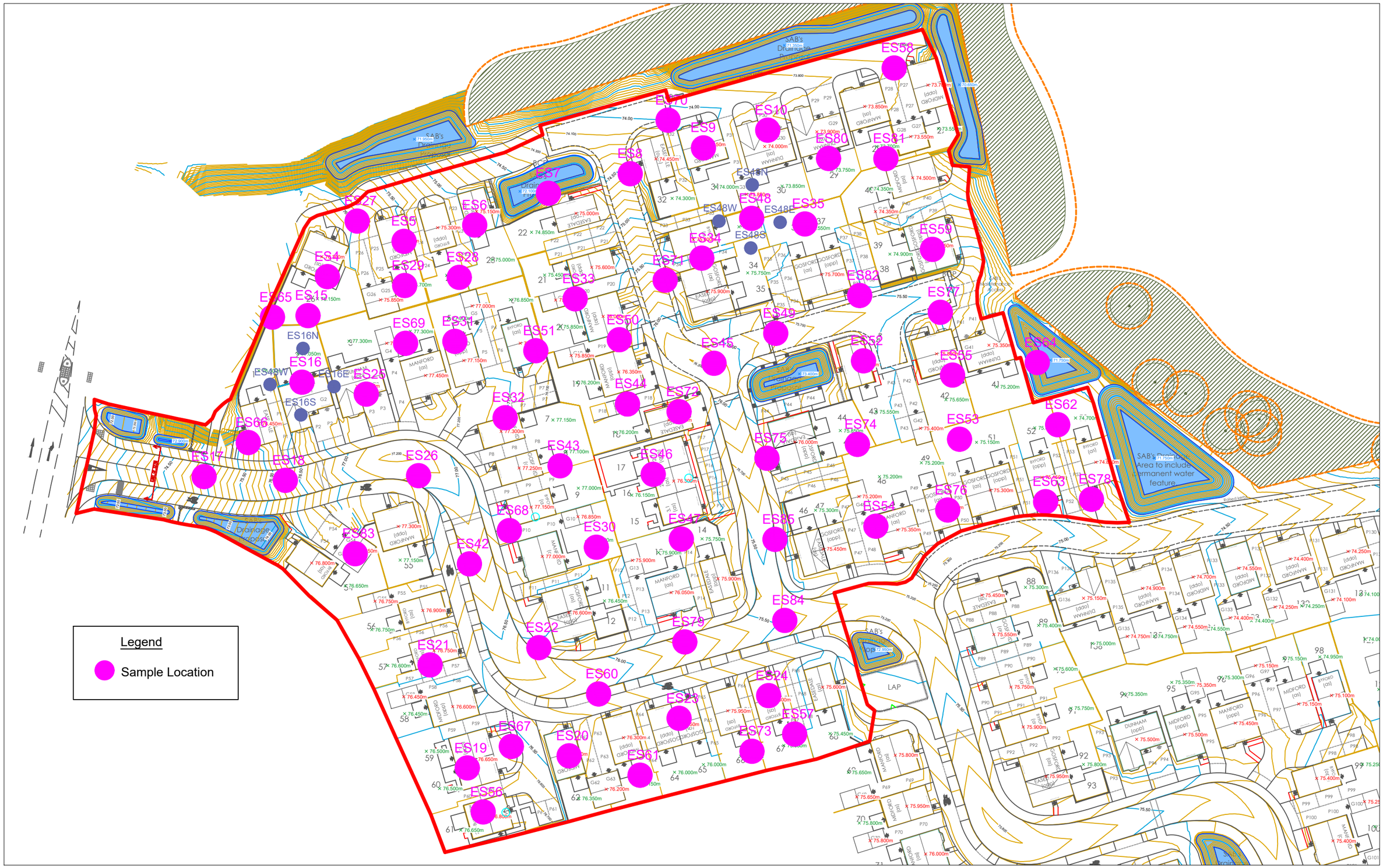

Figure 4A Phase 1A Area 1 - Earthworks Compliance Testing >1.6m depth

Project: Phase 1A Area 1 Virginia Park, Caerphilly	Job No.: 12476	**Intégral Géotechnique**	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: GHR Developments Limited	Scale: 1:750 at A3		

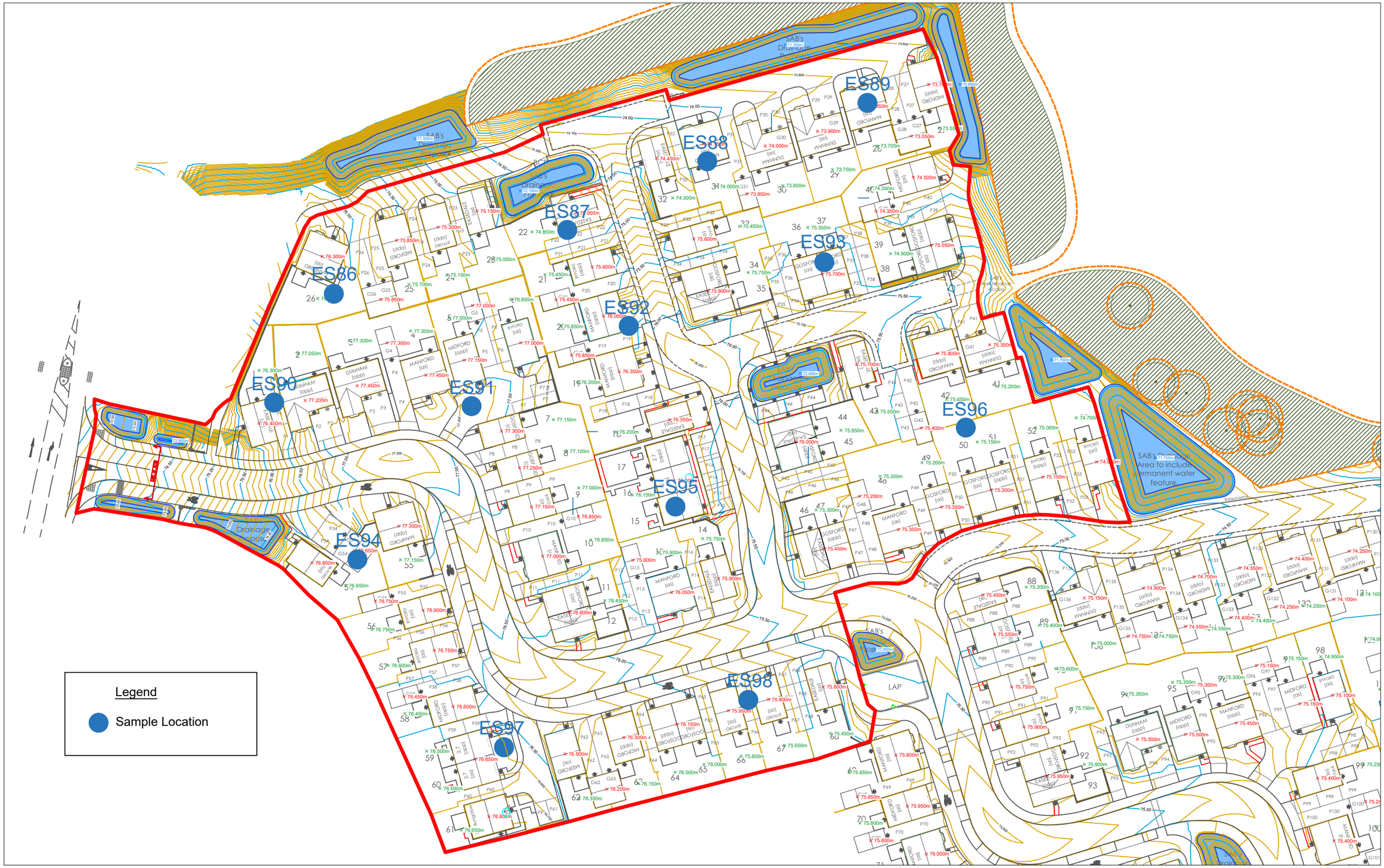

Figure 4B Phase 1A Area 1 - Earthworks Compliance Testing 0.6 to 1.6m depth

Project: Phase 1A Area 1 Virginia Park, Caerphilly	Job No.: 12476	**Intégral** Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: GHR Developments Limited	Scale: 1:750 at A3		

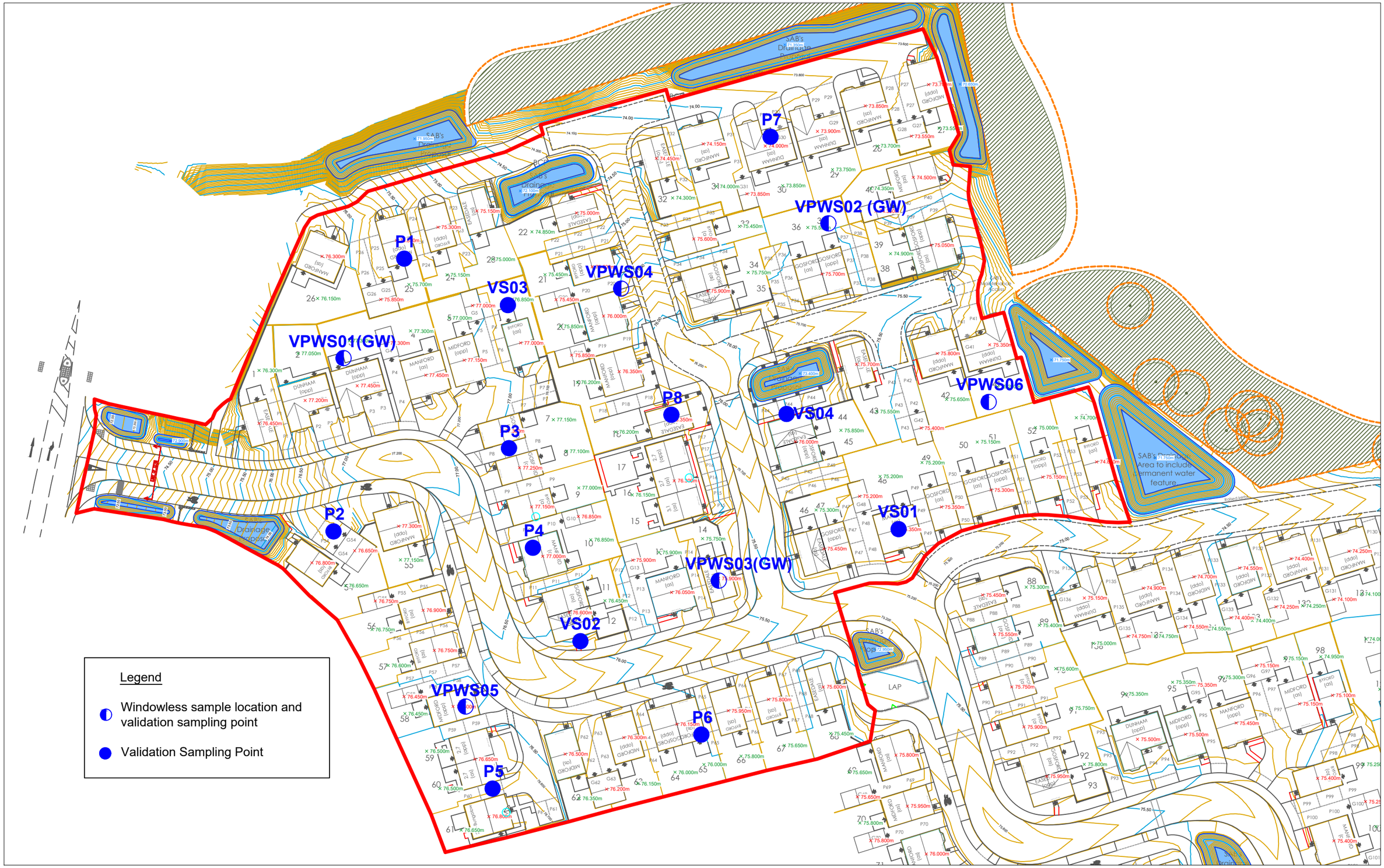

Figure 5 Phase 1A Area 1 - Plateau Validation Sample Locations

Project: Phase 1A Area 1 Virginia Park, Caerphilly	Job No.: 12476	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: GHR Developments Limited	Scale: 1:750 at A3		