North London Waste Authority

Edmonton EcoPark

AMEC Geotechnical Ground Investigation Report

35180rr010i3

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AMEC Environment & Infrastructure UK Ltd.

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nlwa
north london waste authority

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Executive Summary

i.i.i This report has been produced for the purpose of undertaking geotechnical site assessment of the northern area of Edmonton EcoPark, where the construction of an Energy Recovery Facility (ERF) plant is being considered. There have been a series of site investigations undertaken at the site previously; however, more targeted intrusive investigation is required to inform the foundation design of the proposed structures.

i.i.ii The principal objectives of this investigation were to:

- Provide sufficient information to understand the depth profile of the base of the London Clay Formation across the proposed development area. This is in order to ensure sufficient protection of the underlying aquifer from potential contamination;
- Provide geotechnical information to inform the foundation and pile design for the proposed structures; and
- Provide groundwater monitoring installations that can be preserved and used for future groundwater sampling in the River Terrace Gravels and Lambeth Group Aquifers.

i.i.iii The original geo-environmental investigations (undertaken in 2011 and 2012) comprised the drilling and installation of a total of 26 boreholes and 34 window samples (the majority of which were also completed as monitoring locations), with 10 of the boreholes progressed into the Lambeth Group. The latest investigation, conducted in June 2014, comprised of 13 boreholes, which were designed to provide clarification of the geological sequence and geotechnical properties of the geology underlying the site. Groundwater monitoring standpipes were installed at five locations, four within the Lambeth Group and one within the Kempton Park Gravels to supplement the existing groundwater monitoring network.

i.i.iv The additional drilling confirmed that the upper surface of the Lambeth Group is shallowest in the south of the site and deepest in the northeast, with the thickness of the London Clay in the north of the site varying from 10.8 m to 17.9 m. The most likely structural explanation for these findings is the presence of a channel feature on the surface of the Lambeth Group that was subsequently backfilled during deposition of the London Clay.

i.i.v Conclusions regarding geotechnical issues remain as detailed in the initial site investigation report (29541RR009i2) and key geotechnical recommendations are repeated.

1 Introduction

1.1 Terms of Reference and Purpose of this Report

1.1.1 AMEC Environment & Infrastructure Ltd (AMEC) was commissioned by the North London Waste Authority (NLWA) to carry out intrusive geotechnical investigation works at Edmonton EcoPark (the 'site'). The investigation is focused on the northern area of Edmonton EcoPark, where the construction of an Energy Recovery Facility (ERF) is being considered. There have been a series of site investigations undertaken at the site previously; however, more targeted intrusive investigation is required to inform the foundation design of the proposed structures.

1.2 Background

1.2.1 Two site investigations were undertaken at the site by AMEC (formerly Entec) in March 2011 [1] and February 2012 [2], to provide geo-environmental data.

1.2.2 The 2011 investigation comprised drilling and installation of 22 boreholes and 34 window samples (the majority of which were also installed). A total of six of the boreholes were progressed into the Lambeth Group. The depths to this stratum were found to vary between 11.2 m bgl, (0.36 m above ordnance datum (AOD)) in the south of the site, and 24.2 m bgl (-12.45 m AOD), in the north, indicating a marked variation in the thickness of the London Clay. As a result, the extent of underlying aquifer protection provided by the London Clay remained uncertain and further investigation was recommended. The 2012 investigation was designed to provide clarification of the profile of the upper surface of the Lambeth Group by means of a further four boreholes progressed to the Lambeth Group to aid interpretation of the geological structure (i.e. whether faults may be present or if there was a graded profile).

1.2.3 The June 2014 geotechnical investigation, comprised of 13 boreholes, which were designed to provide further clarification of the geological structure and geotechnical properties of the geology underlying the north of the site. Groundwater monitoring standpipes were installed at five locations, four within the Lambeth Group and one within the Kempton Park Gravels to supplement the existing groundwater monitoring network.

2 Site Details

2.1.1 The data provided in the following section is a summary only to provide background information pertinent to this report. Further

[1] Entec (now AMEC), 2011. ISDS Baseline Geo-environmental Site Investigation Report. Reference: 29541rr009i2
[2] AMEC, 2013. ISDS Baseline Geo-environmental Supplementary Site Investigation Report. Reference: 29541rr036i3

details of the site's use are provided in the reports from the earlier phases of investigation[1,2], which should be read in conjunction with this additional site investigation report.

2.1 Site Location and Status

Site Name and Address:	London Waste Ltd (LWL), EcoPark, Advent Way, Edmonton, London N18 3AG		
Grid Reference:	535740, 192370	Site Area:	15.6 ha
Current Site Use:	Waste operations comprising: EfW facility, ash recycling facility, composting plant, waste transfer station and bulky waste facility. There is also a lorry park and open landscaped areas on the site.		
Proposed Site Use:	Planned waste operations comprise: ERF and associated infrastructure		

2.1.1 The site location is shown in Figure 1.

2.2 Site Description

2.2.1 The site is generally flat, lying at approximately 11 m AOD, with engineered raised areas in the northeast. The south of the site, where the main entrance is located, is generally landscaped areas with tarmacked roads and car parks. The main processing areas of the site are in the centre and north with further landscaping in the east. The main processing plant can be divided into four operational areas:

- **Energy from Waste (EfW) Facility** - Located in the centre of the site and comprises a refuse incineration plant with five boilers;
- **Ash Recycling Facility** - Located to the north of the EfW area and comprises sheds and open areas of ash storage;
- **Composting Plant** - Located in the north west of the site. This area comprises several storage and composting sheds;
- **Waste Transfer Station** - This area forms the north eastern corner of the site. Storage areas are present for combustible waste (used to fuel the EfW facility), recyclables and non-recyclables.

2.2.2 The current site layout is shown on Figure 2.

Site History

2.2.3 The site had very limited use prior to its current function, although the northern part of the site was formerly occupied by sludge beds. The surrounding area, particularly to the south and west, has had significant industrial development from at least 1896.

2.3 Geology

2.3.1 A summary of the ground conditions at the site based on data obtained prior to this investigation[1,2] is provided in Table 2.1.

Table 2.1 Geological and Hydrogeology Summary, Based on pre-2014 Data

Strata	Typical Constituents	Approximate Thickness	Aquifer Status
Made Ground	Variable historic demolition rubble, including ash and clinker	0.5-5 m	NA
Alluvium	Silty clay	Absent to <3 m	Secondary Aquifer
Kempton Park Gravels (River Terrace Deposits)	Variably sandy, silty and clayey gravels	<1-5 m	Secondary Aquifer
London Clay	Grey, occasionally sandy or silty clay	3-18 m	Unproductive Strata
Lambeth Group (formerly known as the Woolwich and Reading Beds)	Grey, sandy clay	Unknown	Secondary Aquifer
Thanet Sand	Silty or clayey sand	Unknown	Secondary Aquifer
Upper Chalk	Off-white carbonaceous limestone with flints	>50 m	Principal Aquifer

2.3.2 The site investigation works undertaken in March 2011 confirmed the anticipated geological sequence. A thin layer of Alluvium was identified across much of the site to depths of between 1.90 m and 5.50 m below ground level (10.06 m to 4.70 m AOD), overlying the Kempton Park Gravels (River Terrace Deposits). Although categorised as a secondary aquifer, no water strikes have been encountered in the Alluvium at this site. The base of the Kempton Park Gravels was encountered at between 3.70 m to 8.60 m bgl (7.94 m to 3.62 m AOD) where the top of the London Clay was recorded. The London Clay was characterised by stiff to hard grey/ brown silty sandy CLAY with occasional flint gravel. The interface between the clay and the underlying Lambeth Group deposits was encountered between 10.40 m bgl (0.62 m AOD), in the south of the site (BH124), and 24.20 m bgl (-12.45 m AOD) in the north of the site (BH116). This equates to a depth variation of ~14 m across a horizontal distance of approximately 400 m. This variation suggests a more complex structure than would be anticipated at the interface between these strata. The Lambeth Group comprised very dense clayey sand with shell fragments with sandy silt and clay bands. The base of this stratum was not proven in any of the exploratory holes.

3 Geotechnical Ground Investigation

3.1 Scope of Works

3.1.1 The geotechnical intrusive investigation for the purpose of assessment for the foundation design of the proposed structures comprised the following scope of works:

- Advancement of 13 cable percussive boreholes to the approximate depth of 25 m bgl at locations spread across the proposed building footprint; locations shown in Figure 3;
- Standard Penetration Tests (SPT) at 1.5 m intervals from 4 m below ground level (bgl) to assess the geotechnical properties of the underlying strata for foundation design;
- Installation of one borehole location with screened sections in the Kempton Park Gravels to allow future monitoring of the shallow aquifer at BH302; and
- Installation of four boreholes with screened sections in the Lambeth Group to allow monitoring of the deeper aquifer during piling and foundation works. The Lambeth Group screens were installed in BH301, BH304, BH309 and BH3012, which will supplement the existing BH201 and BH202 in the north of the site.

3.1.2 The boreholes were extended into the Lambeth Group at all borehole locations and geotechnical testing undertaken throughout the profile in order to characterise the underlying geology of the site.

3.1.3 There is data available from previous site investigations regarding the soils conditions. Chemical sampling of the soils was carried out to aid in the characterisation of the Made Ground at the site where gaps in previous data was present. As the soils may need to be excavated for the new ERF construction, the soils have been assessed to determine if they would be classified as hazardous or non-hazardous waste.

3.2 Exploratory Holes

3.2.1 A total of 13 cable percussion boreholes were drilled and installed over a period of 19 days, between 13 May 2014 and 9 June 2014. As the boreholes were expected to encounter several geological horizons before reaching the required depth, the drilling was carried out in such a way as to not introduce a pathway for potentially contaminated soil and groundwater to migrate through the London Clay to the Lambeth Group beneath. Therefore, to provide adequate aquifer protection, all cable percussive boreholes were drilled according to the following methodology:

- All cable percussive boreholes were commenced in a larger diameter (250 mm) drill casing through the Made Ground;
- On reaching natural strata (Alluvium or Kempton Park Gravels), a 2 m bentonite pellet seal was installed, hydrated and left to swell;

- Drilling then recommenced using 200 mm casing, penetrating through the seal and continuing to 1 m into the London Clay. At this point, a second 2 m seal was installed using cement/ bentonite grout mix. This was left for at least 24 hrs before drilling continued; and
- After 24 hrs, drilling recommenced using 150 mm casing and continued through the London Clay into the Lambeth Group. The borehole was completed with the interception of the sandy shelly beds within the Lambeth Group.

3.2.2 The bentonite seals are designed to create an impermeable layer between the two drill strings of the casing, which prevents downward migration of contaminants from the layers above.

3.2.3 On completion of the drilling, the boreholes to be used for future monitoring were installed using 50 mm HDPE standpipe with a 10 mm pea shingle gravel pack. The wells was then backfilled to surface with cement/ bentonite grout or pellets and finished with flush, bolt-down covers rated for Heavy Goods Vehicles (HGV). Where the monitoring well was designed to target the Kempton Park Gravel aquifer, the lower section of the borehole (i.e. in the Lambeth Group and London Clay) was backfilled with bentonite pellets to the desired depth and left to set before completion of the monitoring installation.

3.2.4 Boreholes that were not to be used for monitoring were backfilled with bentonite to the surface on completion of drilling and reinstated to match their location (e.g. concrete, cold-lay tarmac). Installation details are provided in the borehole logs (reviewed by AMEC) included in Appendix A.

3.3 Chemical and Geotechnical Testing

Soil Analysis

3.3.1 A total of eight soil samples were collected and scheduled for the following suite of laboratory tests to inform a waste assessment and supplement the data collected in the original site investigations. The analytical suite for the soil analysis is presented in Table 3.1.

Table 3.1 Soil Analysis

Type	Parameter
Inorganics	Metals (Al, As, Ba, B, Cd, Cr, Cu, Fe, Hg, Pb, Ni, Se, Zn), ammonium, pH, water soluble sulphate, total sulphate, sulphides, asbestos (Made Ground only), total and free cyanide.
Organics	Total petroleum hydrocarbons (TPH – CWG), speciated polycyclic aromatic hydrocarbons (PAH) and phenol.

3.3.2 The results of the waste assessment are provided in Appendix B. Further details on soil analysis and controlled waters risk assessment

have been undertaken in previous reporting for the site and are not repeated within this factual report.

Quality Assurance

3.3.3 During the fieldwork, the following procedures were followed to ensure the accuracy of the sampling and prevent cross contamination:

- Samples were obtained using disposable nitrile gloves (fresh pair per sample) to minimise the potential for cross contamination of samples;
- Samples earmarked for dispatch to the chemical laboratory were placed into laboratory prepared glass jars or plastic tubs, labelled and stored in a chilled cool box. They were then transferred to an on-site refrigerator at the earliest opportunity prior to collection by the laboratory;
- Samples were maintained at a low temperature by AMEC personnel and dispatched to the laboratory in cool boxes with three ice packs each and padding in any remaining space;
- Chain of Custody documentation was completed for each batch of samples; and
- Samples were sent directly to the laboratory using their own vehicles, so that samples were delivered to the laboratory on the same day they were collected from site.

3.3.4 Scheduling documentation on the Chain of Custodies was completed after review of the logs.

3.4 Geotechnical Testing

3.4.1 The following bulk and undisturbed samples were collected during drilling:

- Open tube samples (U100s) were collected in cohesive deposits at 1 m depth intervals in the top 10 m, then at 1.5 m intervals thereafter;
- SPTs were undertaken in more granular soils where the strata was not suitable for collecting U100s;
- Small disturbed samples were collected at each change in soil type and between U100s and SPTs; and
- Bulk disturbed samples were taken of each stratum.

3.4.2 The sample depths and SPT results are shown on the borehole logs in Appendix C.

3.4.3 Selected samples, were scheduled for the following laboratory tests:

- Moisture content and Atterburg limits;
- Building Research Establishment (BRE) SD1 sulphate and pH tests;
- Wet sieve and pipette analyses;
- Unconsolidated, undrained triaxial compression tests; and
- One dimensional consolidation tests.

4 Ground Conditions

4.1.1 A brief summary of the ground conditions encountered during the 2014 investigation is provided below. Further details are provided in the borehole logs contained in Appendix A. A full description of the ground conditions across the site is provided in the original site investigation report.

4.2 Made Ground

4.2.1 Made Ground was encountered in all intrusive locations to depths varying between 6.98 m AOD and 9.55 mAOD (1.90 m to 7.50 m bgl). All of the boreholes were drilled through hardstanding of tarmac or concrete, which was underlain by hardcore and gravel. The Made Ground encountered on the site generally comprised clayey sand or gravelly, sandy clay, with brick and concrete. Tarmac and clinker were encountered in several boreholes and asbestos may be associated with these demolition materials. There was very little visual/ olfactory evidence of contamination in the Made Ground, although hydrocarbon odours were noted in BH301 and BH308.

4.3 Natural Ground

Alluvium

4.3.1 Alluvium was encountered beneath the Made Ground in the majority of locations (the exceptions being BH304 and BH312) and generally consisted of very soft to soft, silty, frequently organic clay, with soft fibrous peat present. The base of the alluvium where present, was encountered between 7.61 m to 8.49 mAOD (3.10 m to 6.7 m bgl).

Kempton Park Gravels

4.3.2 This stratum comprised medium dense silty, gravelly sand and silty sandy gravel. Gravels were predominantly flint. Kempton Park Gravel was encountered in all locations with the exception of BH311; the base was recorded between 4.25 m to 5.86 mAOD (5.10 m to 10.5 m bgl).

London Clay

4.3.3 This stratum comprised firm to stiff clay with local laminations, silty clay and slightly sandy clay. The base was encountered between -6.30 m AOD in BH302 and -12.04 m AOD in BH313 (18.0 m to 26.5 m bgl). Generally the London Clay is thickest in the northeast of the site, varying from 10.8 m at BH301 in the west to 17.9 m at BH313 in the northeast.

Lambeth Group

4.3.4 This stratum comprised very dense clayey sand with shell fragments, with some stiff to very stiff sandy silt bands. As detailed above, the top of the stratum was encountered between -6.30 m AOD in BH302

and -12.04 m AOD at BH313. The base of the stratum was not encountered.

4.3.5 When the data from all three site investigations are considered, they show that the interface between the London Clay and the Lambeth Group is deepest in the north of the site towards the eastern boundary. This potentially indicates the presence of a channel feature through the site, rather than faulting.

4.3.6 Contour mapping using a kriging interpolation method (Golden Software Surfer 8.0) was undertaken for the upper and lower surfaces of the London Clay, as well as the thickness of London Clay, as shown in Figures 4a, b and c. A geological cross section from south-southwest to north-northeast through the site (Section A – A') is provided as Figure 5a. A geological cross section from west to east across the proposed ERF development area in the north of the site (Section B – B') is provided as Figure 5b. The locations of the cross sections are shown in Figure 4a; note that cross-sections A - A' and B - B' incorporate stratigraphical data from all three phases of site investigation. Therefore, the cross-sections presented in this report supersede all previously issued versions.

4.3.7 Cross section A - A' shows that the base of the London Clay is shallowest in the south of the site and deepest in the northeast. Cross section B – B' shows that the thickness of the London Clay is greatest towards the eastern site boundary (BH306).

4.4 Groundwater Observations

4.4.1 Groundwater strikes were observed in each of the 13 boreholes, the majority of which were in either the Kempton Park Gravels or the Lambeth Group. Details of the groundwater strikes are provided in the borehole logs in Appendix A.

4.5 Geotechnical Data

4.5.1 Geotechnical data from this phase of investigation is presented on the borehole logs in Appendix A, geotechnical data in Appendix C. This data should be read in conjunction with the findings of the initial ground investigation report (29541-RR009i2).

5 Soil Analysis & Assessment

5.1 Introduction

5.1.1 The chemical analysis data for soils are compared with the waste classification methodology as detailed in Technical Guidance WM2 *Hazardous waste Interpretation of the definition and classification of hazardous waste* (Environment Agency, 2013), in order to identify if the Made Ground would be categorized as hazardous or non-hazardous. This waste classification has been undertaken for the 2014 samples only.

5.2 Waste Classification of Soils

Soils

5.2.1 Observed soils concentrations were compared with the WM2 waste classification and the comparisons are included in Appendix B and summarised below. A total of eight soils samples were scheduled for the suite of analysis detailed in Table 3.1:

- Boreholes samples BH302 (0.4 – 0.5 m bgl), BH302 (0.8 – 1.0 m bgl) BH301 (0.9 m-1.0 m bgl) and BH303 (2.7 m to 3.0 m bgl) are categorized as hazardous material;
- BH302 (0.4 – 0.5 m bgl) is classified as hazardous as results indicate elevated levels of copper, lead and zinc. The threshold for combined metals concentration to categorize a soil as hazardous is 2,500 mg/kg, the combined metal concentration at BH302 is 9,414mg/kg;
- BH302 (0.8 – 1.0 m bgl) is classified as above the threshold for non-hazardous soils for combined metals;
- BH301 (0.9 m-1.0 m bgl) is classified as hazardous as results indicate elevated levels of TPH;
- BH303 (2.7 m to 3.0 m bgl) is classified as hazardous as results indicate elevated levels of zinc, and asbestos was detected.

6 Soil Permeability

6.1.1 Permeability testing was undertaken on four samples and results are presented in Appendix C. The samples were taken from BH301, BH306, BH307 and BH309, the locations of the samples are presented in the borehole logs in Appendix A. The samples are all London Clay where some sand was identified, between 18 m bgl to 22 m bgl. The vertical permeability of the soils ranged from 3.46×10^{-11} m/sec to 9.39×10^{-11} m/sec. These permeability results for the London Clay are consistent with the permeability results of the previous site investigation.

7 Geotechnical Risks

7.1.1 The section below is an update from the previous site investigation report (AMEC, 2011 29541rr009i2). Geotechnical interpretation is outside the scope of this report.

7.2 Buried Foundations

7.2.1 Due to the history of the site and the presence of existing structures, historic foundations are likely to exist at the site. It is likely that former structures were demolished to ground level only and that foundations and any underground structures such as basements and storage tanks, remain in place.

7.3 Risks Associated with Existing Ground Conditions

7.3.1 The risks associated with existing ground conditions are presented in Table 6.1.

Table 7.1 Risks Associated with Existing Ground Conditions

Material	Geotechnical Risks
Made Ground	Made Ground is present across the site and comprises highly variable material, likely to be classified as non-hazardous or hazardous waste. Asbestos was encountered in one location during the most recent phase of investigation. The Made Ground is not considered a suitable bearing stratum due to the local variation in material characteristics likely to be present.
Alluvium	The Alluvium encountered across the site comprised very soft to soft organic cohesive deposits including peat. The alluvial material is highly compressible and is likely to exhibit very poor load bearing capabilities.
Kempton Park Gravel	This granular stratum is water-bearing and problems may arise during the excavation of this material if a ground and groundwater cut-off is not in place. Specialist dewatering may be required depending on the depth and extent of any excavations.
London Clay	No geotechnical constraints have been identified for this stratum. The properties of London Clay, specifically its very low hydraulic conductivity afford a degree of protection to groundwater in deeper aquifer units, such as the Chalk. Hence piling and construction activities that penetrate the London Clay may require risk assessment and/or inclusion of mitigation measures to ensure that no new pathways for contamination are created.
Lambeth Group (Woolwich and Reading Beds)	The Lambeth Group comprises both granular and cohesive deposits which are likely to act differently under compression which may lead to differential settlement. Irregular, water-bearing sand bodies may also exist within this stratum which may require specialist dewatering.
Thanet Sand Formation	No constraints have been identified for this stratum.
Chalk	Chalk is a pure form of limestone and a carbonate rock which is prone to dissolution. Dissolution can weaken the bedrock and initiate collapse at the surface due to the downward migration of the strata above. Furthermore, due to chalks susceptibility to weathering, irregular rockhead, localised subsidence, caverns and clay filled pipes and fissures may exist at depth. Flint and chert horizons within the Chalk can form an obstruction to piling. Chalk exhibits low load bearing capabilities at shallow depth below the strata boundary.

7.4 Aggressive Ground Conditions

7.4.1 Based on water-soluble sulphate concentrations across the site the design sulphate class and ACEC class recommended is DS-5 m and AC-5 m, respectively. The recommendations of the Building Research Establishment (BRE) Special Digest 1, Concrete in aggressive ground (2005) should be followed for all below ground level concrete.

8 Conclusions and Recommendations

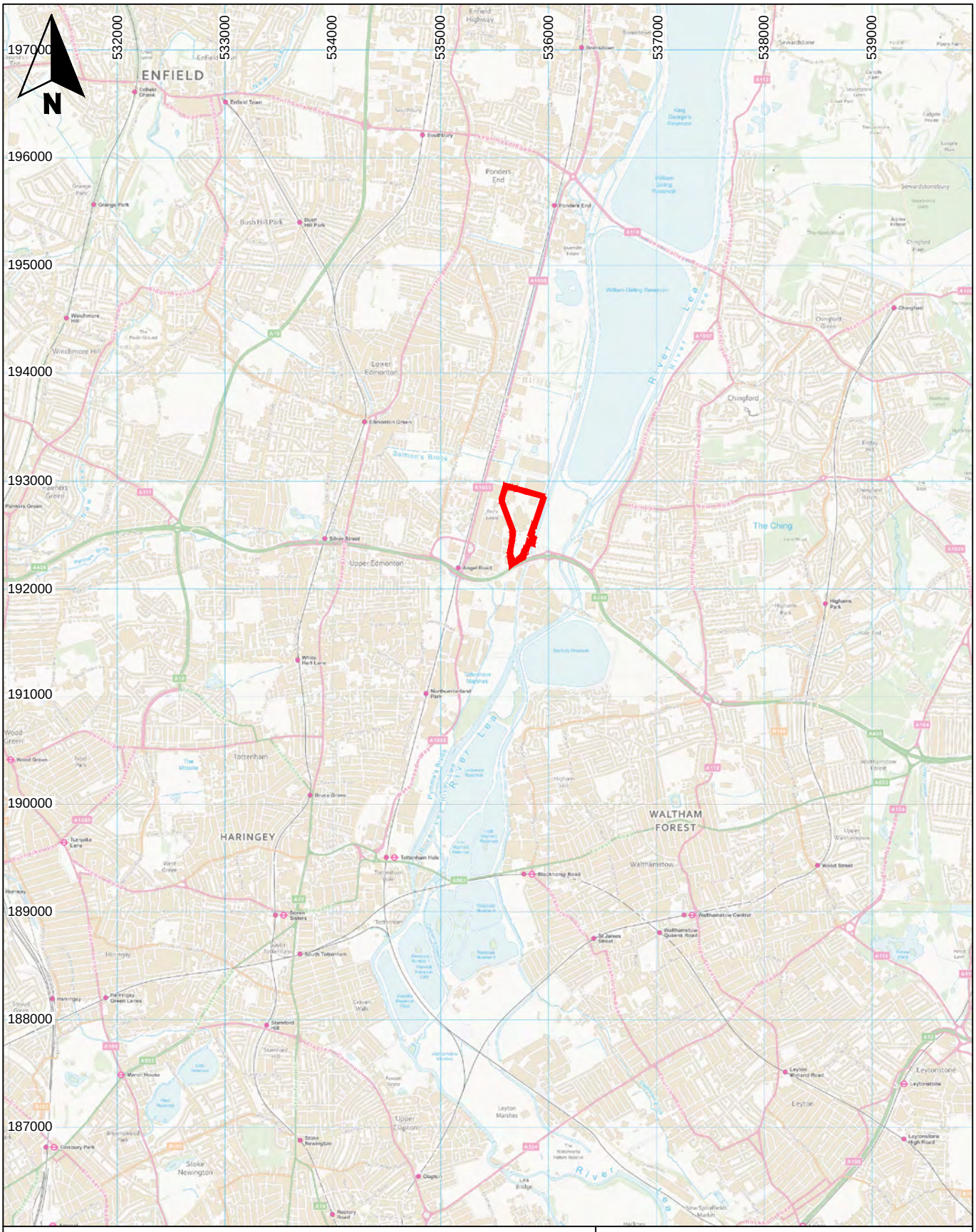
8.1.1 The recent geotechnical ground investigation in 2014 comprised of 13 cable percussion boreholes, which were designed to provide clarification of the geological sequence and geotechnical properties of the geology underlying the site. Groundwater monitoring standpipes were installed at five locations, four within the Lambeth Group and one within the Kempton Park Gravels.

8.1.2 The additional drilling confirmed that the upper surface of the Lambeth Group is shallowest in the south of the site and deepest in the northeast. The most likely structural explanation for these findings is the presence of a channel feature on the surface of the Lambeth Group that was subsequently backfilled during deposition of the London Clay. Contour maps showing the elevation of the top and base of the London Clay and the thickness of the London Clay are provided in Figures 4a, b and c. Updated geological cross-sections for the site, showing the profile of the Lambeth Group surface, are provided in Figure 5a and 5b.

8.1.3 Conclusions regarding geotechnical issues remain as detailed in the initial ground investigation report (29541RR009i2) and key geotechnical recommendations are repeated below:

- It is recommended that any building design and activity location decisions refer to the findings of this ground investigation, and that consideration is given to any potential re-engineering of the site regarding ground conditions and potential foundation design. This includes the groundwater considerations. The variable nature of the ground conditions may have a significant impact on the foundation requirements of buildings and associated construction risks and costs;
- Reference to documents such as *Piling and Preventative Ground Improvement Methods on Land Affected by Contamination: guidance on Pollution Prevention* (National Groundwater and Contaminated Land Centre report NC/99/73), *Piling into contaminated sites* (Environment Agency publication) and Piling in layered ground: risks to groundwater and archaeology (Environment Agency publication) should be made to establish and design appropriate foundation structures.

Figures



Key

Site boundary

0 km 3 km

Scale 1:50,000 @ A4

NLWA Geotechnical Ground Investigation

Figure 1
Site Location Plan

August 2014
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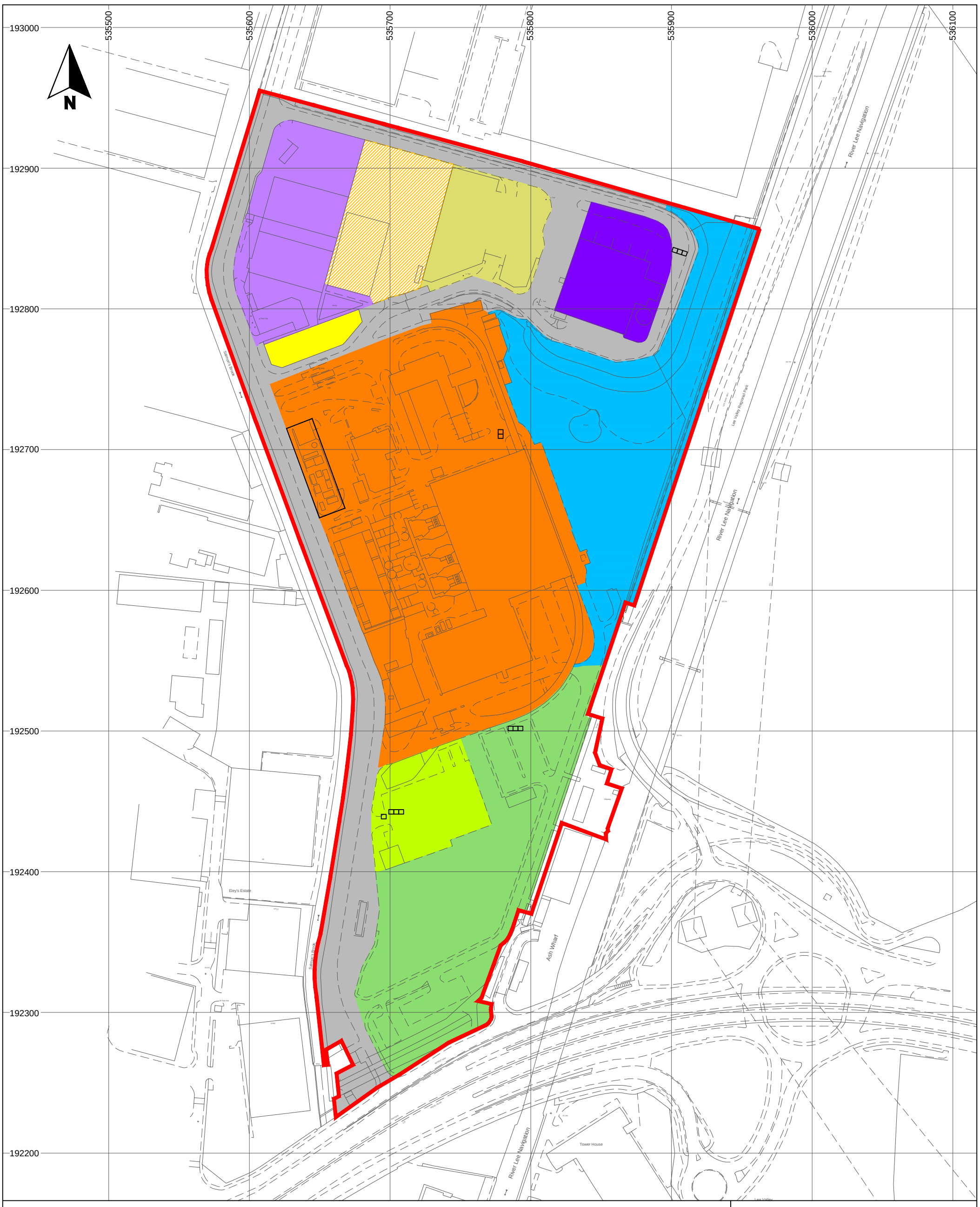

Key

- Site boundary
- Composting plant
- Ash recycling facility
- Disused area
- Materials recycling facility
- Waste transfer station
- Eastern landscaped area
- Incinerator area
- Lorry park
- Southern landscaped area
- Mains access roads* and softstanding/service runs

* There are other on-site roads within the incinerator and southern landscaped area

0 m — 150 m

Scale 1:2500 @ A3

NLWA Geotechnical Ground Investigation

Figure 2
Site Layout

August 2014
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N

535600 535700 535800 535900

192900 192800 192700 192600

COMPOST CENTRE

RECYCLING CENTRE

CLINICAL WASTE

ENERGY CENTRE

COOLING TOWERS

SALMON'S BROOK

RIVER LEE NAVIGATION

SW1

BH101 BH201 BH303 WS101 BH304 WS134 BH105 BH306 BH307 BH107 BH202 BH302 WS102 BH102 BH104 WS104 BH308 BH305 BH301 BH310 BH311 BH106 WS106 BH309 WS105 BH312 WS107 BH313 WS108 BH103 WS103 BH114 WS115 WS109 BH113 WS119 BH117 WS110 BH116 WS112 WS116 WS117 WS113 BH203 WS111 BH115 BH309 WS121

Key

- Site boundary
- 2014 Borehole (backfilled)
- 2014 Borehole (with monitoring standpipe)
- Phase 1 and 2 borehole location
- Pre -2014 window sample
- Pre - 2014 Surface water sampling location
- Surface water sewer
- Foul water sewer
- Water main
- Gas main
- Electrical cable
- CCTV cable
- Telecom
- Duct
- Cable

0 m 75 m

Scale 1:1500 @ A3

NLWA Geotechnical Ground Investigation

Figure 3
Exploratory Hole Locations

August 2014
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N

BH201
BH303
BH304
BH105
BH302
BH102
BH104
BH308
BH306
BH307
BH202
BH305
BH301
BH310
BH106
BH311
BH309
BH312
BH103
BH114
BH313
BH113
BH108
BH116
BH203
BH110
BH118
BH119
BH204
BH120
BH121
BH122
BH124
BH123

A
A'
B
B'

5
4.6
4
5.4

Elevation of Surface of London Clay (m AOD)

5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6

535500
535750
536000
193000
192750
192500
192250

Key:

- Site Boundary
- Site Investigation Borehole (Note: Only boreholes used to generate contours are shown on this figure)
- Top of the London Clay (mAOD)
- Geological Cross Sections

Project Path: R:/Projects/35180 N
LWA SUBFILE/35180 - 03 Edmonton/040 Design/Geotech SI/Surfer figures & data/35180Rea05_Fig4.5a.mxd

0 50 100 Metres
1:2500 @ A3

NLWA Geotechnical Ground Investigation

Figure 4a
Top of the London Clay and Geological Cross Section Locations

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N

BH201
BH303
BH304
BH302
BH308
BH306
BH307
BH202
BH305
BH301
BH311
BH310
BH309
BH312
BH103
BH313
BH116
BH203
BH110
BH118
BH204
BH124
BH123

-7.5
-10
-5
-2.5
0

Elevation of the Base of the London Clay (m AOD)

1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
-4.5
-5
-5.5
-6
-6.5
-7
-7.5
-8
-8.5
-9
-9.5
-10
-10.5
-11
-11.5
-12
-12.5

535500 535750 536000
193000 192750 192500 192250

Key:

Site Boundary

Base of the London Clay (mAOD)

Site Investigation Borehole (Note: Only boreholes used to generate contours are shown in this figure)

NLWA Geotechnical Ground Investigation

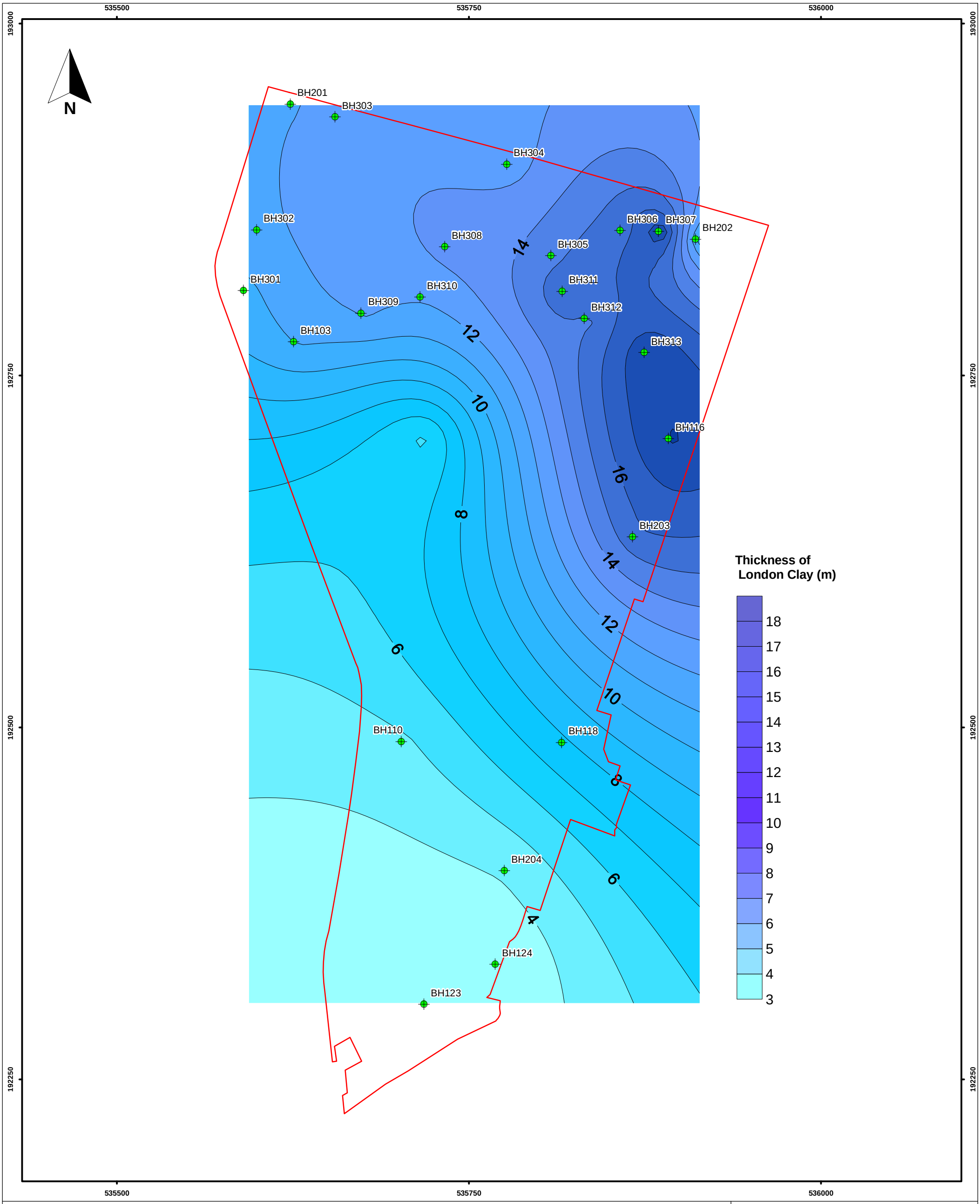
Figure 4b
Base of the London Clay

Project Path: R:/Projects/35180 N
LWA SUBFILE/35180 - 03 Edmonton/040 Design/Geotech SI/Surfer figures & data/35180Rea06_Fig4.5b.mxd

0 50 100 Metres
1:2500 @ A3

July 2014
35180-Rea06.mxd wills

amec



Key:

Site Boundary

Thickness of the London Clay (m)

Site Investigation Borehole (Note: Only boreholes used to generate contours are shown in this figure)

NLWA Geotechnical Ground Investigation

Figure 4c
Thickness of the London Clay

Project Path: R:/Projects/35180 N
LWA SUBFILE/35180 - 03 Edmonton/040 Design/Geotech SI/Surfer figures & data/35180Rea07_Fig4.5c.mxd

0 50 100 Metres
1:2500 @ A3

July 2014
35180-Rea07.mxd gavij

amec

Site Boundary

A

Section A-A'

Site Boundary

A'

BH123 BH124 BH122 BH204 BH121 BH118 BH115 BH203 BH116 BH313 BH202

mAOD

20 18 16 14 12 10 8 6 4 2 0 -2 -4 -6 -8 -10 -12 -14 -16

0 100 200 300 400 500 600

Key

- Made Ground
- Alluvium
- Kempton Park Gravel
- London Clay
- Lambeth Group
- Assumed strata boundary

0 m 150 m

Scale 1:2500 @ A3
10 x vertical exaggeration

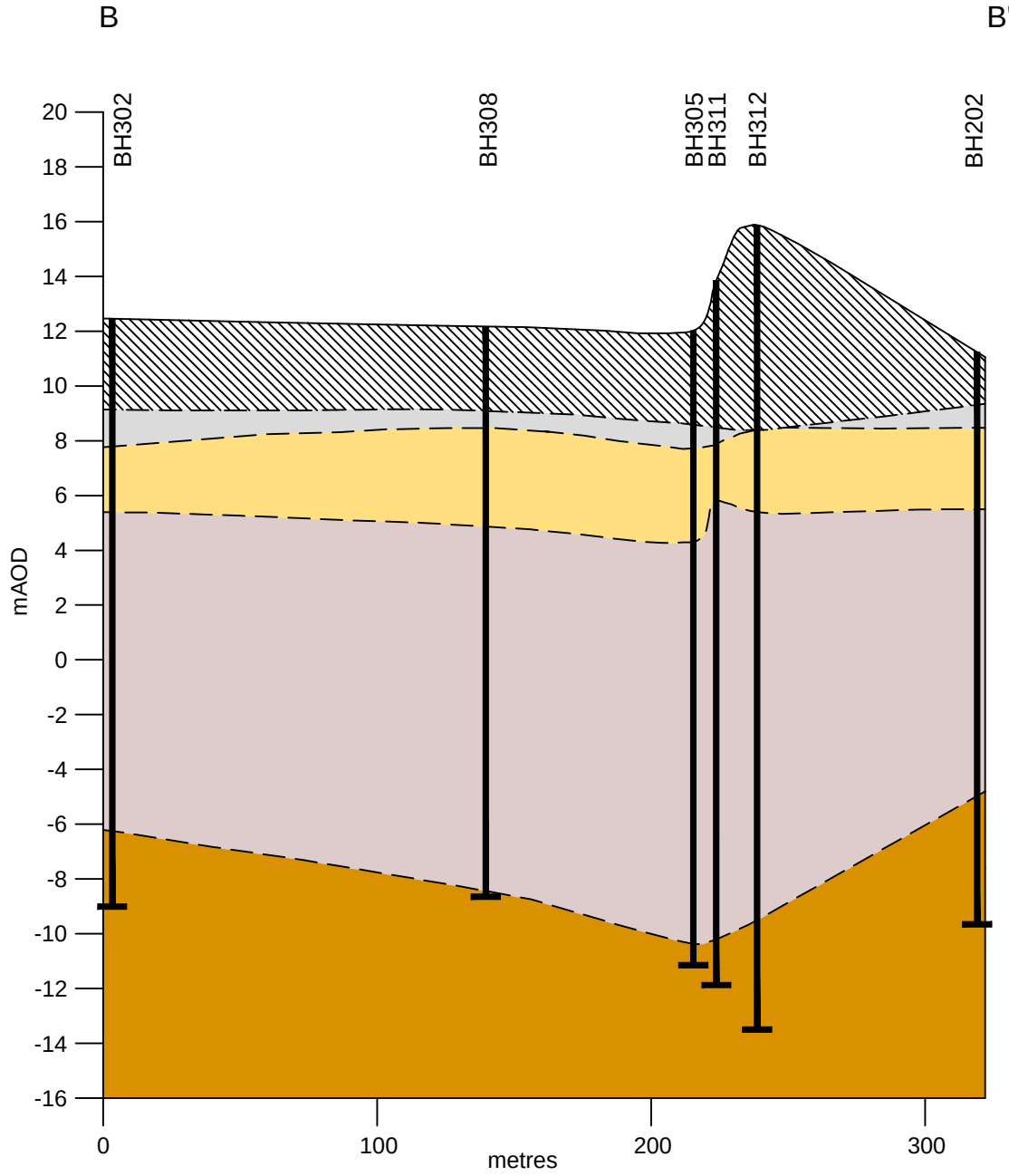
NLWA Geotechnical Ground Investigation

Figure 5a
Cross Section A-A'

August 2014
35180-Rea08.dwg lowec

amec

Section B-B'



Key

- Made Ground
- Alluvium
- Kempton Park Gravel
- London Clay
- Lambeth Group
- Assumed strata boundary

0 m — 150 m

Scale 1:2500 @ A3
10 x vertical exaggeration

NLWA Geotechnical Ground Investigation

Figure 5b
Cross Section B-B'

October 2014
35180-Rea09a.dwg parkj

amec

Appendix A
Borehole Logs

CONFIDENTIAL

GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
www.groundtechnology.co.uk

Borehole Record

BH301

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.747mAOD
Coordinates: 535589.78E
192810.73N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)
MADE GROUND: Tarmac	0.20	11.55	D1	0.30-0.35			
MADE GROUND: Brownish grey sandy GRAVEL. Gravel is subangular to subrounded fine to medium flint and tarmac	0.50	11.25	D2	0.50-0.55			
	0.70	11.05	D3	0.70-0.80			
MADE GROUND: Orangish brown sandy GRAVEL. Gravel is angular to subangular fine to medium flint and tarmac.	0.80	10.95	D4	0.90-1.00			
			D5	1.00-1.20			
			B6	1.00-1.50			
MADE GROUND: Dark brownish black slightly sandy GRAVEL. Gravel is angular to subangular fine to medium red brick, slate, charcoal and concrete with rare angular coarse concrete fragments.			D7	1.50-1.60			
			B8	1.60-2.20			
	2.20	9.55	B10	2.20-2.60			
			D9	2.20-2.25			
MADE GROUND: Firm orangish brown mottled black CLAY, with rare angular fine gravel sized red brick fragments. Between 1.50m and 1.60mbgl becoming black. From 1.60mbgl gravel is fine to medium flint.	3.20	8.55	D11	3.20-3.30			
			B12	3.20-3.60			
Soft brown mottled grey CLAY. (ALLUVIUM)			D13	3.70-3.80			
Very soft dark grey mottled brown CLAY. (ALLUVIUM)	4.00	7.75	S	4.00-4.45	4.00		N=30 (2,6,7,7,8,8)
			D14	4.00-4.45			
Medium dense brownish grey slightly sandy GRAVEL. Gravel is angular to subangular fine to medium, rarely coarse flint. Sand is fine to coarse. (KEMPTON PARK GRAVEL FORMATION)			B15	4.50-5.50			
			S	5.50-5.95	5.50	(3.20)	N=17 (2,4,4,4,4,5)
			D16	5.50-5.95			
	6.00	5.75	B17	6.00-7.00			
Medium dense greyish brown fine to coarse SAND and GRAVEL. Gravel is subangular to subrounded fine to medium flint. (KEMPTON PARK GRAVEL FORMATION)			S	7.00-7.45	7.00	(3.20)	N=13 (2,3,2,3,4,4)
			D18	7.00-7.45			
	7.50	4.25	D19	7.50-7.60			
Firm dark bluish grey slightly silty CLAY. (LONDON CLAY FORMATION)			B20	7.60-8.50			
			S	8.50-8.95	7.70		N=13 (2,2,3,3,3,4)
			D21	8.50-8.95			
			B22	8.50-9.00			
	8.95	2.80					
Very stiff medium to high strength locally thinly laminated brownish grey slightly silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)							
Borehole continued...							

Installations

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
30/05/14	4.20	20	3.10	4.00	7.70
05/06/14	19.30	20	14.00	9.00	-

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	2.60	2.20
200	8.50	7.70
150	20.95	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Dates: 04/06/2014-05/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.20m and 19.30mbgl, rising to 3.10m and 9.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
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Tel: 01553 817657
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Borehole Record

BH301

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.747mAOD
Coordinates: 535589.78E
192810.73N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)
Very stiff medium to high strength locally thinly laminated brownish grey slightly silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)			U23	10.00-10.45			34 blows
			D24	10.45-10.50			PP=200.0kPa
			S	11.50-11.95	9.00		N=23 (3,4,5,5,6,7)
			D25	11.50-11.95			PP=220.0kPa
			B26	11.50-12.00			
			S	13.00-13.45	9.00		N=27 (3,4,6,6,7,8)
			D27	13.00-13.45			
			B28	13.00-13.50			
Very stiff high strength thinly laminated brownish grey CLAY. (LONDON CLAY FORMATION)	14.50	-2.75	S	14.50-14.95	9.00		N=27 (3,4,6,6,7,8)
			D29	14.50-14.95			PP=165.0kPa
			B30	14.50-15.00			
Very stiff high strength brownish grey slightly silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)	15.00	-3.25					
			U31	16.00-16.45			50 blows
			D32	16.45-16.50			
			S	17.50-17.95	9.00		N=29 (3,4,5,6,9,9)
			D33	17.50-17.95			PP=220.0kPa
			B34	17.50-18.00			
Very stiff high strength locally thinly laminated brownish grey with rare greenish grey silty CLAY, with some thin fine sand bands and rare shell fragments. (LAMBETH GROUP UNDIFFERENTIATED)	18.30	-6.55	B35	18.30-18.50			PP=160.0kPa
			B36	18.80-20.00			
			S	19.00-19.43	9.00	(13.00)	50/275mm (6,14,12,14,15,9)
			D37	19.00-19.43			PP=250.0kPa
Dense to very dense brownish grey silty fine to medium SAND, with some sandy clay bands. Borehole continued...	19.30	-7.55	B38	19.30-19.50			

Installations

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
30/05/14	4.20	20	3.10	4.00	7.70
05/06/14	19.30	20	14.00	9.00	-

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	2.60	2.20
200	8.50	7.70
150	20.95	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Dates: 04/06/2014-05/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.20m and 19.30mbgl, rising to 3.10m and 9.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

CONFIDENTIAL

GROUND TECHNOLOGY
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Norfolk, PE34 3AF
Tel: 01553 817657
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Borehole Record

BH301

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.747mAOD
Coordinates: 535589.78E
192810.73N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
(LAMBETH GROUP UNDIFFERENTIATED)				B39	20.00-20.50				
Stiff medium strength light greenish grey with rare yellowish grey CLAY. (LAMBETH GROUP UNDIFFERENTIATED)		20.50	-8.75	S D40	20.50-20.95 20.50-20.95	9.00	(13.20)	N=25 (3,4,4,5,7,9)	
Borehole Complete at 20.95 m		20.95	-9.20						

Water Level Observations

Hole Diameter Detail Diameter (mm)	Depth (m)	Casing Depth (m)	Chiseling Details From (m)	To (m)	Time (hhmm)	Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
250	2.60	2.20				30/05/14	4.20	20	3.10	4.00	7.70
200	8.50	7.70				05/06/14	19.30	20	14.00	9.00	-
150	20.95	9.00									

Dates: 04/06/2014-05/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.20m and 19.30mbgl, rising to 3.10m and 9.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

CONFIDENTIAL

GROUND TECHNOLOGY
Maple Road, Kings Lynn
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Tel: 01553 817657
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Borehole Record

BH302

Project: Edmonton Ecopark

Project ID: GTS-14-403

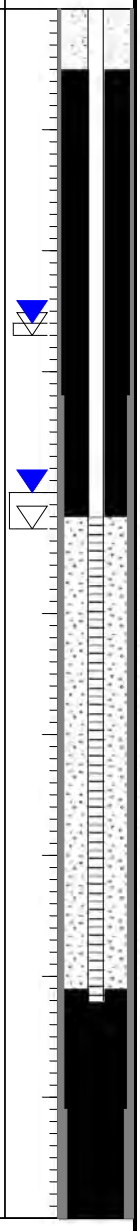
Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 12.397mAOD
Coordinates: 535599.10E
192853.80N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)
MADE GROUND: Tarmacadam	0.20	12.20	D1	0.20-0.25			
MADE GROUND: Black sandy GRAVEL. Gravel is angular to subangular fine to medium flint and tarmac.	0.45	11.95	D2	0.40-0.45			
			D3	0.60-0.65			
			B4	0.60-1.00			
MADE GROUND: Soft slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse flint and brick.			D5	1.20-1.30			
MADE GROUND: Soft dark brownish black mottled black very silty very gravelly CLAY. Gravel is angular to subangular fine to coarse concrete, tile, brick and flint.	1.30	11.10	D6	1.50-1.60			
			B7	1.60-2.10			
			D8	2.10-2.20			
At 2.2mbgl - One cobble sized subangular concrete fragment.			B9	2.20-2.70			
MADE GROUND: Soft to very soft dark brownish grey slightly gravelly CLAY. No gravel description recorded.	2.70	9.70	B10	2.70-3.00			
			D11	3.00-3.10			
Very soft dark bluish grey and brown CLAY. (ALLUVIUM)	3.30	9.10	B12	3.30-4.00			
Soft low strength dark brownish black slightly silty CLAY, with occasional rootlets organic material and rare fine flint and wood. (ALLUVIUM)	4.00	8.40	S	4.00-4.45	3.20		N=6 (1,1,1,1,2,2)
			D13	4.00-4.45			
	4.50	7.90	B14	4.50-5.50			
Loose dark brown sandy GRAVEL. Gravel is subangular to subrounded fine to medium flint. (KEMPTON PARK GRAVEL FORMATION)			S	5.50-5.95	5.50	(4.20)	N=8 (1,2,2,2,2,2)
			D15	5.50-5.95			
Dark yellowish brown slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine flint. (KEMPTON PARK GRAVEL FORMATION)	5.95	6.45	B16	6.00-7.00			
Firm medium strength dark brown slightly gravelly slightly sandy CLAY. Gravel is angular to subangular fine to medium flint. (LONDON CLAY FORMATION)	7.00	5.40	S	7.00-7.45	7.00	(4.80)	N=18 (3,3,4,4,5,5)
			D17	7.00-7.45			
			B18	7.00-8.00			
Firm medium strength brownish grey slightly micaceous CLAY. (LONDON CLAY FORMATION)	8.10	4.30	D19	8.10-8.20			
			S	8.50-8.95	8.50		N=14 (2,2,3,3,4,4)
			D20	8.50-8.95			
Stiff high to very high strength locally closely fissured and or thinly laminated brownish grey slightly silty slightly micaceous CLAY, with rare bioturbation.	8.95	3.45	B21	9.10-9.50			
Borehole continued...							

Installations



Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.20	3.20
200	9.10	9.10
150	21.40	10.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
29/05/14	2.70	20	2.60	2.20	3.00
29/05/14	4.30	20	4.00	4.00	8.50
02/06/14	20.70	20	19.10	10.00	-

Dates: 02/06/2014-03/06/2014
Plant: Dando 2000
Drilled By: T York
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit dug from ground level to 1.20mbgl.
2. Water observed at 2.70m, 4.30m and 20.70mbgl rising to 2.60m, 4.00m and 19.10mbgl after 20 minutes standing.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

CONFIDENTIAL

GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
www.groundtechnology.co.uk

Borehole Record

BH302

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 12.397mAOD
Coordinates: 535599.10E
192853.80N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
(LONDON CLAY FORMATION)				U22	10.00-10.45			21 blows	
				D23	10.45-10.60				
From 11.50mbgl becomes very stiff				S D24 B25	11.50-11.95 11.50-11.95 11.50-12.00	10.00		N=20 (3,4,4,5,5,6) PP=170.0kPa	
				S D26 B27	13.00-13.45 13.00-13.45 13.00-13.50	10.00		N=21 (3,3,4,5,6,6) PP=160.0kPa	
				B28	13.80-14.20			PP=175.0kPa	
				U29	14.50-14.95			22 blows	
				D30	14.95-15.10				
Very stiff medium strength locally thinly laminated brownish grey CLAY, with occasional thin greenish grey bands and rare bioturbation. (LONDON CLAY FORMATION)		16.00	-3.60	S D31 B33	16.00-16.45 16.00-16.45 16.00-16.50	10.00		N=25 (3,4,6,6,6,7) PP=200.0kPa	
				S D32 B34	17.50-17.95 17.50-17.95 17.50-19.00	10.00		N=28 (5,5,5,7,7,9) PP=160.0kPa	
Very stiff medium strength brownish grey slightly silty CLAY, with occasional gravel sized pyritic nodules and rare bioturbation. (LAMBETH GROUP UNDIFFERENTIATED)		18.70	-6.30	S D35 B36	19.00-19.45 19.00-19.45 19.00-19.50	10.00		N=29 (3,5,5,7,7,10) PP=220.0kPa	
Borehole continued...									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.20	3.20
200	9.10	9.10
150	21.40	10.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
29/05/14	2.70	20	2.60	2.20	3.00
29/05/14	4.30	20	4.00	4.00	8.50
02/06/14	20.70	20	19.10	10.00	-

Dates: 02/06/2014-03/06/2014
Plant: Dando 2000
Drilled By: T York
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit dug from ground level to 1.20mbgl.
2. Water observed at 2.70m, 4.30m and 20.70mbgl rising to 2.60m, 4.00m and 19.10mbgl after 20 minutes standing.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

CONFIDENTIAL

GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
www.groundtechnology.co.uk

Borehole Record

BH302

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 12.397mAOD
Coordinates: 535599.10E
192853.80N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)	Installations
Very stiff medium strength brownish grey slightly silty CLAY, with occasional gravel sized pyritic nodules and rare bioturbation. (LAMBETH GROUP UNDIFFERENTIATED)		20.30	-7.90	B38	20.30-20.50					
		20.50	-8.10	S	20.50-20.93	10.00		50/275mm (5,7,9,13,17,11)		
				D37	20.50-20.93					
Very stiff greyish brown slightly sandy CLAY, with some thin brown and greenish grey fine sand bands. (LAMBETH GROUP UNDIFFERENTIATED)				B39	20.50-21.00					
		21.40	-9.00							
Very dense brownish grey silty fine SAND. (LAMBETH GROUP UNDIFFERENTIATED)										
Borehole Complete at 21.40 m										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.20	3.20
200	9.10	9.10
150	21.40	10.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
29/05/14	2.70	20	2.60	2.20	3.00
29/05/14	4.30	20	4.00	4.00	8.50
02/06/14	20.70	20	19.10	10.00	-

Dates: 02/06/2014-03/06/2014
Plant: Dando 2000
Drilled By: T York
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit dug from ground level to 1.20mbgl.
2. Water observed at 2.70m, 4.30m and 20.70mbgl rising to 2.60m, 4.00m and 19.10mbgl after 20 minutes standing.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

CONFIDENTIAL

GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
www.groundtechnology.co.uk

Borehole Record

BH303

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.915mAOD
Coordinates: 535654.88E
192933.92N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
MADE GROUND: Reinforced Concrete.									
MADE GROUND: Hardcore (DRILLERS DESCRIPTION).		0.30	11.62						
MADE GROUND: Yellowish brown slightly silty very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint.		0.50	11.42	B1	0.50-0.60				
				B2	0.90-1.00				
MADE GROUND: Stiff grey CLAY.		1.10	10.82	B3	1.10-1.20				
MADE GROUND: Yellowish grey clayey gravelly fine to medium SAND. Gravel is angular to subrounded fine to coarse flint.		1.40	10.52						
MADE GROUND: Stiff brownish grey CLAY.		1.90	10.02	B4	1.90-2.00				
MADE GROUND: Yellowish brown clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint.		2.10	9.82	B5	2.10-2.20				
MADE GROUND: Firm grey peaty CLAY with some flint, brick, gravel and wood fragments.		2.70	9.22	B6	2.70-3.00				
Soft dark brown very peaty CLAY. (ALLUVIUM)		3.40	8.52	B7	3.40-3.60				
Soft yellowish grey sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium flint. (ALLUVIUM)		3.80	8.12	B8	3.80-3.90				
Loose grey silty very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium flint. (KEMPTON PARK GRAVEL FORMATION)		4.00	7.92	S D10 B9	4.00-4.45 4.00-4.45 4.00-4.50	4.00	(3.80)	N=8 (1,2,2,2,2,2)	
Loose grey fine to coarse SAND and GRAVEL. Gravel is subangular to rounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)		5.50	6.42	S D11 B12	5.50-5.95 5.50-5.95 5.50-6.00	5.50	(3.80)	N=9 (1,2,2,2,2,3)	
Stiff medium to high strength locally thinly laminated brownish grey with rare greenish grey slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)		6.80	5.12	S D13 B14	7.00-7.45 7.00-7.45 7.00-7.50	7.00		N=11 (2,2,2,3,3,3)	
				S D15 B16	8.50-8.95 8.50-8.95 8.50-9.00	8.50		N=17 (2,3,3,4,5,5) PP=110.0kPa	
Borehole continued...									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.50	3.50
200	7.50	7.50
150	21.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
23/06/14	4.00	20	3.80	4.00	7.50
23/06/14	18.00	20	18.00	9.00	-
23/06/14	20.70	20	18.50	9.00	-

Dates: 30/05/2014-23/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.00m, 18.00m and 20.70mbgl, rising to 3.80m, 18.00m and 18.50mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
Maple Road, Kings Lynn
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Borehole Record

BH303

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.915mAOD
Coordinates: 535654.88E
192933.92N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	PID (ppm)
Stiff medium to high strength locally thinly laminated brownish grey with rare greenish grey slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)			U17	10.00-10.45			30 blows	
			D18	10.45-10.50			PP=220.0kPa	
			S	11.50-11.95	9.00		N=21 (3,4,5,5,5,6)	
			D19	11.50-11.95				
			B20	11.50-12.00				
			S	13.00-13.45	9.00		N=22 (2,5,5,5,5,7)	
			D21	13.00-13.45			PP=160.0kPa	
			B22	13.00-13.50				
			S	14.50-14.95	9.00		N=26 (3,5,5,5,8,8)	
			D23	14.50-14.95			PP=200.0kPa	
			B24	14.50-15.00				
			U25	16.00-16.45			PP=220.0kPa	
							31 blows	
	16.45	-4.54	D26	16.45-16.50				
Very stiff high strength thinly laminated brownish grey slightly silty CLAY, with some sandy clay bands. (LONDON CLAY FORMATION)							PP=220.0kPa	
			S	17.50-17.95	9.00		N=26 (3,4,5,6,7,8)	
			D27	17.50-17.95				
			B28	17.50-18.00				
			S	19.00-19.45	9.00	(19.00)	N=40 (3,4,6,9,11,14)	
			D29	19.00-19.45			PP=220.0kPa	
			B30	19.00-19.50				
	19.60	-7.69	B31	19.60-19.80			PP=160.0kPa	
Borehole continued...								

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.50	3.50
200	7.50	7.50
150	21.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
23/06/14	4.00	20	3.80	4.00	7.50
23/06/14	18.00	20	18.00	9.00	-
23/06/14	20.70	20	18.50	9.00	-

Dates: 30/05/2014-23/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.00m, 18.00m and 20.70mbgl, rising to 3.80m, 18.00m and 18.50mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH303

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.915mAOD
Coordinates: 535654.88E
192933.92N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Very stiff very high strength brownish grey silty CLAY, with some greenish grey sandy clay bands. (LAMBETH GROUP UNDIFFERENTIATED)				B32	20.20-20.40				
				S	20.50-20.84	9.00	(18.00)	50/190mm (4,14,15,17,18)	
From 20.70mbgl becomes greenish grey silty fine sand.				D33	20.50-20.84				
		20.84	-8.93						
Borehole Complete at 20.84 m									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.50	3.50
200	7.50	7.50
150	21.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
23/06/14	4.00	20	3.80	4.00	7.50
23/06/14	18.00	20	18.00	9.00	-
23/06/14	20.70	20	18.50	9.00	-

Dates: 30/05/2014-23/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.00m, 18.00m and 20.70mbgl, rising to 3.80m, 18.00m and 18.50mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH304

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ryan Cridlin

Ground Level: 12.679mAOD
Coordinates: 535776.71E
192835.36N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)
MADE GROUND: Tarmacadam.							
MADE GROUND: Reddish brown slightly silty very sandy GRAVEL. Gravel is angular fine to coarse granite.	0.30 0.45	12.38 12.23	B1 B2	0.30-0.45 0.45-1.10			
MADE GROUND: Yellowish brown slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subrounded fine to coarse flint.	1.10	11.58	B3	1.10-1.30			
MADE GROUND: Stiff brownish grey and greyish brown slightly silty CLAY.			B4	2.30-2.50			PP=110.0kPa
MADE GROUND: Greyish brown silty fine to coarse SAND and GRAVEL. Gravel is rounded fine to coarse flint.	2.70	9.98	B5	2.80-3.30			
MADE GROUND: Firm greenish grey with rare yellowish grey and dark grey CLAY.	3.30	9.38	B6	3.30-3.80			PP=50.0kPa
MADE GROUND: Firm low strength dark brown sandy organic SILT, with some silty fine sand bands and occasional brick fragments.	4.20	8.48	S D7 B8	4.50-4.95 4.50-4.95 4.50-5.00	4.00		N=4 (1,0,1,1,1,1) PP=25.0kPa
Medium dense grey slightly silty very sandy GRAVEL. Gravel is angular to rounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)	5.70	6.98	S B10 D9	6.00-6.45 6.00-6.50 6.00-6.45	6.00	(4.00)	N=12 (1,2,2,3,3,4)
From 7.50mbgl becomes SAND and GRAVEL.			S D11 B12	7.50-7.95 7.50-7.95 7.50-8.00	7.50	(4.50)	N=12 (1,2,3,3,3,3)
Stiff medium to high strength locally thinly laminated brownish grey CLAY, with rare bioturbation. (LONDON CLAY FORMATION)	8.40	4.28	B13	8.40-9.00			PP=75.0kPa
			S D14	9.00-9.45 9.00-9.45	9.00	(6.40)	N=17 (2,3,4,5,4,4)
Borehole continued...							

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	4.20	4.20
200	9.00	9.00
150	21.40	10.20

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
14/05/14	4.80	20	4.10	4.50	-
15/05/14	20.80	20	19.30	10.20	-

Dates: 13/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.80m and 20.80mbgl, rising to 4.10m and 19.30mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
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Borehole Record

BH304

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ryan Cridlin

Ground Level: 12.679mAOD
Coordinates: 535776.71E
192835.36N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Stiff medium to high strength locally thinly laminated brownish grey CLAY, with rare bioturbation. (LONDON CLAY FORMATION)	10.20	2.48	B15	10.20-10.50			PP=110.0kPa	
			UT16	10.50-10.95			25 blows	
Stiff brownish grey slightly silty CLAY. (LONDON CLAY FORMATION)	10.95	1.73	D17	10.95-11.10			PP=165.0kPa	
Very stiff locally stiff medium strength locally thinly laminated brownish grey silty CLAY, with rare bioturbation. (LONDON CLAY FORMATION)							PP=160.0kPa	
			S	12.00-12.45	10.20		N=21 (2,4,5,5,5,6)	
			D18	12.00-12.45			PP=165.0kPa	
			B19	12.00-12.50				
			S	13.50-13.95	10.20		N=30 (3,4,7,7,7,9)	
			D20	13.50-13.95			PP=125.0kPa	
			B21	13.50-14.00				
			UT22	15.00-15.45			25 blows	
			D23	15.45-15.60			PP=165.0kPa	
			S	16.50-16.95	10.20		N=26 (3,4,7,6,6,7)	
			D24	16.50-16.95			PP=100.0kPa	
			B25	16.50-17.00				
Very stiff medium strength locally thinly laminated brownish grey slightly silty slightly sandy CLAY, with rare bioturbation. (LONDON CLAY FORMATION)	18.00	-5.32	S	18.00-18.45	10.20		N=29 (3,4,7,7,7,8)	
			D26	18.00-18.45			PP=150.0kPa	
			B27	18.00-18.50				
			S	19.50-19.95	10.20		N=28 (2,3,6,7,7,8)	
			D28	19.50-19.95				
			B29	19.50-20.00				
Borehole continued...								

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	4.20	4.20
200	9.00	9.00
150	21.40	10.20

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
14/05/14	4.80	20	4.10	4.50	-
15/05/14	20.80	20	19.30	10.20	-

Dates: 13/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.80m and 20.80mbgl, rising to 4.10m and 19.30mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
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Borehole Record

BH304

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ryan Cridlin

Ground Level: 12.679mAOD
Coordinates: 535776.71E
192835.36N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)	Installations
Very stiff medium strength locally thinly laminated brownish grey slightly silty slightly sandy CLAY, with rare bioturbation. (LONDON CLAY FORMATION)										
Very dense yellowish grey silty fine SAND. (LAMBETH GROUP UNDIFFERENTIATED)		21.00	-8.32	S D30	21.00-21.39 21.00-21.39	10.20	(19.30)	50/235mm (7,8,12,14,19,5)		
Stiff light greenish grey with rare yellowish grey and reddish brown slightly gravelly CLAY. Gravel is subangular to rounded fine to medium flint. Some black staining on gravel. (LAMBETH GROUP UNDIFFERENTIATED)		21.50	-8.82					PP=140.0kPa		
Borehole Complete at 23.00 m		23.00	-10.32							

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	4.20	4.20
200	9.00	9.00
150	21.40	10.20

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
14/05/14	4.80	20	4.10	4.50	-
15/05/14	20.80	20	19.30	10.20	-

Dates: 13/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.80m and 20.80mbgl, rising to 4.10m and 19.30mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH305

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 12.007mAOD
Coordinates: 535808.17E
192835.36N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
MADE GROUND: Brick paving.		0.10	11.91						
MADE GROUND: Dark yellowish brown fine to coarse SAND.		0.15 0.25	11.86 11.76	B1	0.25-0.80				
MADE GROUND: Tarmacadam.		0.80	11.21	B2	0.80-1.20				
MADE GROUND: Brownish grey and greyish brown slightly clayey very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint and granite.				B3	1.80-2.20				
MADE GROUND: Stiff brownish grey CLAY.		2.30	9.71	B4	2.30-2.80				
MADE GROUND: Yellowish brown slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to rounded fine to coarse flint.		2.90	9.11						
MADE GROUND: Concrete.		3.00	9.01	B5	3.00-3.40			PP=45.0kPa	
MADE GROUND: Firm brownish grey and brown slightly silty slightly gravelly CLAY, with rare wood and shell fragments. Gravel is angular fine to medium brick and flint.		3.40	8.61	B6	3.40-3.60				
Firm low strength brown and grey peaty CLAY. (ALLUVIUM)		4.40	7.61	S D7 B8	4.20-4.65 4.20-4.65 4.20-4.70	4.00		N=9 (1,2,2,2,3,2)	
Loose to medium dense grey silty very sandy GRAVEL. Gravel is angular to rounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)				S B10 D9	5.70-6.15 5.70-6.20 5.70-6.15	5.70	(3.80)	N=29 (3,4,7,7,8,7)	
				S D11 B12	7.20-7.65 7.20-7.65 7.20-7.70	7.20	(4.50)	N=9 (1,2,2,2,2,3)	
Stiff medium to high strength locally closely fissured brownish grey CLAY, with rare bioturbation. (LONDON CLAY FORMATION)		7.70	4.31	B13	7.70-8.20			PP=100.0kPa	
				S D14 B15	8.70-9.15 8.70-9.15 8.70-9.10	8.50	(7.70)	N=15 (1,2,3,4,4,4) PP=110.0kPa	

Borehole continued...

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
15/05/14	4.40	20	4.00	4.00	-
20/05/14	22.40	20	15.00	10.20	-

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.60	3.20
200	8.90	8.90
150	23.07	10.20

Chiseling Details

From (m)	To (m)	Time (hhmm)

Dates: 14/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.40m and 22.40mbgl, rising to 4.00m and 15.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
Maple Road, Kings Lynn
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Borehole Record

BH305

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 12.007mAOD
Coordinates: 535808.17E
192835.36N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Stiff medium to high strength locally closely fissured brownish grey CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				UT16	10.20-10.65			21 blows	
				D17	10.65-10.80			PP=200.0kPa	
				S	11.70-12.15	10.20	(11.60)	N=25 (3,5,6,7,6,6)	
				D18	11.70-12.15				
				B19	11.70-12.20				
				S	13.20-13.65	10.20		N=27 (4,5,6,7,7,7)	
				D20	13.20-13.65			PP=145.0kPa	
				B21	13.20-13.70				
				UT22	14.70-15.15			19 blows	
		15.00	-2.99					PP=200.0kPa	
Very stiff high strength brownish grey slightly silty CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				D23	15.15-15.30				
				S	16.70-17.15	10.20	(16.30)	N=28 (4,5,7,7,7,7)	
				D24	16.70-17.15			PP=150.0kPa	
				B25	16.70-17.20				
		17.60	-5.59						
Stiff high strength brownish grey silty sandy CLAY, with some silty sand bands. (LONDON CLAY FORMATION)				S	18.20-18.65	10.20	(18.00)	N=30 (4,5,8,7,8,7)	
				D26	18.20-18.65			PP=120.0kPa	
				B27	18.20-18.70				
Borehole continued...				S	19.70-20.15	10.20	(19.30)	N=29 (3,5,5,8,8,8)	
				D28	19.70-20.15				
				D29	19.70-20.20				

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.60	3.20
200	8.90	8.90
150	23.07	10.20

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
15/05/14	4.40	20	4.00	4.00	-
20/05/14	22.40	20	15.00	10.20	-

Dates: 14/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.40m and 22.40mbgl, rising to 4.00m and 15.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH305

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 12.007mAOD
Coordinates: 535808.17E
192835.36N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Stiff high strength brownish grey silty sandy CLAY, with some silty sand bands. (LONDON CLAY FORMATION)									
		21.20	-9.19	S D30 B31	21.20-21.65 21.20-21.65 21.20-21.70	10.20	(20.80)	N=46 (5,7,8,12,14,12)	
Very stiff high strength greenish grey and brownish grey slightly silty slightly sandy CLAY, with rare bioturbation. (LONDON CLAY FORMATION)									
		22.40	-10.39						
Greyish brown silty fine SAND. (LAMBETH GROUP UNDIFFERENTIATED)		22.70	-10.69	S D32	22.70-23.07 22.70-23.07	10.20	(15.00)	48/215mm - Abandoned	
Very dense brownish grey silty fine SAND, with some sandy clay bands. (LAMBETH GROUP UNDIFFERENTIATED)		23.07	-11.06						
Borehole Complete at 23.07 m									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.60	3.20
200	8.90	8.90
150	23.07	10.20

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
15/05/14	4.40	20	4.00	4.00	-
20/05/14	22.40	20	15.00	10.20	-

Dates: 14/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 4.40m and 22.40mbgl, rising to 4.00m and 15.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH306

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ryan Cridlin

Ground Level: 11.018mAOD
Coordinates: 535857.33E
192853.39N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)	Installations
MADE GROUND: Brown fine to coarse SAND and GRAVEL (Drillers description).										
		0.80	10.22	B1	0.80-1.10					
MADE GROUND: Yellowish brown slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subangular fine to medium flint and plastic.		1.10	9.92	B2	1.10-1.40					
		1.40	9.62	B3	1.40-1.80					
MADE GROUND: Firm brown slightly gravelly CLAY. Gravel is angular to subangular fine to medium flint.		1.80	9.22	B4	1.80-2.20					
MADE GROUND: Greyish brown silty fine to coarse SAND and GRAVEL. Gravel is subangluar to subrounded fine to coarse flint.		2.20	8.82	B5	2.20-2.60					
MADE GROUND: Yellowish brown silty fine to coarse SAND and GRAVEL. Gravel is rounded fine to coarse flint and brick.		3.20	7.82	B6	3.20-3.60					
Soft grey and yellowish grey silty CLAY, with rare semi decayed plant debris. (ALLUVIUM)										
Medium dense grey slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)				S D7 B8	4.00-4.45 4.00-4.45 4.00-4.50	4.00	(2.50)	N=16 (2,2,4,3,4,5)		
				S	5.50-5.95	5.50	(2.50)	N=14 (1,1,3,3,4,4)		
				B9	6.00-6.50					
		6.50	4.52	B10	6.50-7.00					
Stiff brownish grey CLAY, with rare gravel sized nodules of weak mudstone. (LONDON CLAY FORMATION)		7.00	4.02	S D11 B12	7.00-7.45 7.00-7.45 7.00-7.50	7.00	(6.00)	N=15 (2,3,3,3,4,5)		
Firm medium to high strength brownish grey CLAY. (LONDON CLAY FORMATION)										
				S D13 B14	8.50-8.95 8.50-8.95 8.50-9.00	8.00		N=14 (1,2,3,3,4,4)		

Borehole continued...

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	2.20	2.20
200	7.00	7.00
150	24.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
21/05/14	3.20	20	2.50	3.20	-
28/05/14	23.20	20	11.50	9.00	-

Dates: 21/05/2014-28/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 3.20m and 23.20mbgl, rising to 2.50m and 11.50mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH306

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ryan Cridlin

Ground Level: 11.018mAOD
Coordinates: 535857.33E
192853.39N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Firm medium to high strength brownish grey CLAY. (LONDON CLAY FORMATION)				U15	10.00-10.50			35 blows	
		10.45	0.57	D16	10.45-10.50				
Firm to stiff medium strength dark brown mottled yellowish brown silty CLAY, with rare bioturbation (LONDON CLAY FORMATION)				S D17 B18	12.00-12.45 12.00-12.45 12.00-12.50	9.00		N=23 (2,3,5,5,6,7)	
				S D19 B20	13.50-13.95 13.50-13.95 14.00-15.00	9.00		N=24 (3,4,5,6,6,7)	
		15.00	-3.98	S D21 B22	15.00-15.45 15.00-15.45 15.60-16.60	9.00	(14.90)	N=18 (2,3,4,4,5,5)	
Stiff to very stiff medium strength dark brownish grey silty CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				S D23 B24	16.60-17.05 16.60-17.05 17.00-18.00	9.00	(16.40)	N=19 (2,3,4,4,5,6)	
				S D25 B26	18.00-18.45 18.00-18.45 18.50-19.50	9.00	(17.60)	N=26 (3,4,6,6,6,8)	
		19.50	-8.48	S D27	19.50-19.95 19.50-19.95	9.00	(19.00)	N=33 (4,6,8,8,8,9)	
Stiff high strength dark brownish grey mottled Borehole continued...									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	2.20	2.20
200	7.00	7.00
150	24.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
21/05/14	3.20	20	2.50	3.20	-
28/05/14	23.20	20	11.50	9.00	-

Dates: 21/05/2014-28/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 3.20m and 23.20mbgl, rising to 2.50m and 11.50mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH306

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ryan Cridlin

Ground Level: 11.018mAOD
Coordinates: 535857.33E
192853.39N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	PID (ppm)	Installations
yellowish brown slightly sandy silty CLAY. (LONDON CLAY FORMATION)				B28	20.00-21.00					
				S	21.00-21.45	9.00	(20.10)	N=34 (4,6,8,8,9,9)		
				D29	21.00-21.45					
				U30	21.50-21.95			75 blows		
				D31	21.95-22.10					
Firm to stiff high strength dark brownish grey mottled yellowish brown silty sandy CLAY. (LAMBETH GROUP UNDIFFERENTIATED)		22.10	-11.08							
				S	23.00-23.40	9.00	(20.90)	50/250mm (8,12,12,12,14,12)		
				D32	23.00-23.40					
				B33	23.00-24.00					
Borehole Complete at 24.00 m		24.00	-12.98							

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	2.20	2.20
200	7.00	7.00
150	24.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
21/05/14	3.20	20	2.50	3.20	-
28/05/14	23.20	20	11.50	9.00	-

Dates: 21/05/2014-28/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 3.20m and 23.20mbgl, rising to 2.50m and 11.50mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH307

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 10.887mAOD
Coordinates: 535884.67E
192852.81N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
MADE GROUND: Concrete.									
		0.40	10.49	B1	0.40-0.60				
MADE GROUND: Reddish grey sandy medium GRAVEL. Gravel is angular medium granite.		0.60	10.29	B2	0.60-0.90				
		0.90	9.99	B3	0.90-1.00				
MADE GROUND: Yellowish brown very gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse flint.		1.00	9.89	B4	1.00-1.40				
				B5	1.40-1.90				
MADE GROUND: Soft grey slightly sandy slightly gravelly CLAY. No gravel description recorded.		1.90	8.99	B6	1.90-2.30				
MADE GROUND: Yellowish brown gravelly fine to coarse SAND. Gravel is angular fine to coarse flint. From 1.40mbgl with some brick		2.20	8.69	B7	2.30-2.50				
Soft brownish grey sandy CLAY. (ALLUVIUM)		3.10	7.79	B8	3.20-3.70				
Soft brownish grey sandy SILT. (ALLUVIUM)									
Medium dense grey very sandy GRAVEL. Gravel is angular to subrounded coarse flint. (KEMPTON PARK GRAVEL FORMATION)				S B10	4.00-4.45 4.00-4.50	4.00	(2.30)	N=13 (2,2,3,3,3,4)	
		5.10	5.79	B9	5.10-5.40				
Stiff medium to high strength brownish grey CLAY, with rare fine and medium flint gravel. (LONDON CLAY FORMATION)				S D11 B12	5.50-5.95 5.50-5.95 5.50-6.00	5.40	(4.00)	N=12 (2,2,3,3,3,3) PP=80.0kPa	
				U13	7.00-7.45			16 blows	
				D14	7.45-7.60			PP=175.0kPa	
		8.20	2.69	D15	8.20-8.40				
Grey MUDSTONE. (LONDON CLAY FORMATION)		8.40	2.49	S D16 B17	8.50-8.95 8.50-8.95 8.50-9.00	7.00		N=17 (2,2,3,4,5,5) PP=130.0kPa	
Very stiff medium to high strength closely fissured locally thinly laminated brownish grey CLAY. (LONDON CLAY FORMATION)									
Borehole continued...		9.90	0.99						

Water Level Observations

Hole Diameter Detail			Chiseling Details		
Diameter (mm)	Depth (m)	Casing Depth (m)	From (m)	To (m)	Time (hhmm)
250	2.20	2.20			
200	6.20	6.20			
150	7.00	7.00			

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
05/06/14	23.00	20	12.90	7.00	-

Dates: 03/06/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 23.00m, rising to 12.90m after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
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Borehole Record

BH307

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 10.887mAOD
Coordinates: 535884.67E
192852.81N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Very stiff medium strength brownish grey with rare greenish grey slightly silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				S D18 B19	10.00-10.45 10.00-10.45 10.00-10.50	7.00		N=19 (2,3,4,4,5,6) PP=180.0kPa	
				S D20 B21	11.50-11.95 11.50-11.95 11.50-12.00	7.00		N=20 (2,4,4,4,5,7) PP=180.0kPa	
				S D22 B23	13.00-13.45 13.00-13.45 13.00-13.50	7.00		N=23 (3,4,5,5,6,7) PP=180.0kPa	
From 14.50mbgl with some silty fine sand bands and greenish grey mottling.				S D24 B25	14.50-14.95 14.50-14.95 14.50-15.00	7.00		N=22 (3,4,5,5,6,6) PP=150.0kPa	
				S D26 B27	16.00-16.45 16.00-16.45 16.00-16.50	7.00		N=20 (2,4,4,5,5,6) PP=150.0kPa	
Stiff high strength thinly laminated brownish grey CLAY. (LONDON CLAY FORMATION)		17.50	-6.61	S D28 B29	17.50-17.95 17.50-17.95 17.50-18.00	7.00		N=21 (3,3,4,5,6,6) PP=140.0kPa	
Very stiff medium to high strength brownish grey slightly silty CLAY, with some greenish grey sandy mottling. (LONDON CLAY FORMATION) Borehole continued...		19.00	-8.11	S D30 B31	19.00-19.45 19.00-19.45 19.00-19.50	7.00		N=27 (6,6,7,7,7,6) PP=160.0kPa	

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	2.20	2.20
200	6.20	6.20
150	7.00	7.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
05/06/14	23.00	20	12.90	7.00	-

Dates: 03/06/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 23.00m, rising to 12.90m after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
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Norfolk, PE34 3AF
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Borehole Record

BH307

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 10.887mAOD
Coordinates: 535884.67E
192852.81N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)	Installations
Very stiff medium to high strength brownish grey slightly silty CLAY, with some greenish grey sandy mottling. (LONDON CLAY FORMATION)				U32	20.50-20.95			46 blows		
				D33	20.95-21.10			PP=250.0kPa		
				S	22.00-22.45	7.00		N=38 (6,7,8,10,10,10)		
				D34	22.00-22.45					
				B35	22.30-22.70					
		22.90	-12.01	D36	23.00-23.20					
Brownish grey silty fine SAND. (LAMBETH GROUP UNDIFFERENTIATED)		23.20	-12.31							
Borehole Complete at 23.20 m										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	2.20	2.20
200	6.20	6.20
150	7.00	7.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
05/06/14	23.00	20	12.90	7.00	-

Dates: 03/06/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Groundwater observed at 23.00m, rising to 12.90m after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Tel: 01553 817657
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Borehole Record

BH308

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 12.185mAOD
Coordinates: 535732.67E
192841.85N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)
MADE GROUND: Concrete							
MADE GROUND: Black sandy GRAVEL. Gravel is angular to subangular fine to medium tarmac, granite and red brick.	0.30	11.89	B1	0.30-0.50			
	0.60	11.59	B2	0.60-0.80			
MADE GROUND: Soft very gravelly CLAY, with rare rootlets. Gravel is subangluar to subrounded fine to medium concrete, brick and glass.			B3	1.00-1.20			
	1.40	10.79	B4	1.40-1.60			
MADE GROUND: Firm, locally soft orangish brown and yellowish brown slightly gravelly CLAY. Gravel is subangular fine brick and concrete.			B5	2.20-2.30			
			B6	2.90-3.00			
	3.10	9.09	B7	3.10-3.40			
Firm orangish brown mottled black slightly gravelly CLAY. Gravel is angular to subangular concrete and charcoal. (ALLUVIUM)	3.40	8.79	B8	3.40-3.60			
	3.70	8.49					
Soft, locally firm dark brownish black very organic peaty CLAY, with abundant rootlets and wood fragments. (ALLUVIUM)			S B10 D9	4.00-4.45 4.00-4.50 4.00-4.45	4.00	(3.80)	N=18 (3,4,3,3,6,6)
Medium dense brownish grey sandy GRAVEL. Gravel is subangluar to subrounded fine to medium flint. (KEMPTON PARK GRAVEL FORMATION)			S D11 B12	5.50-5.95 5.50-5.95 5.50-6.00	5.50	(5.00)	N=9 (2,3,2,2,2,3)
			S D13 B14 B15	7.00-7.45 7.00-7.45 7.00-7.30 7.30-7.50	7.00	(4.10)	N=9 (2,2,2,2,2,3)
	7.30	4.89					
Stiff becoming very stiff medium to high strength brownish grey slightly silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)			U16	8.00-8.45			30 blows
			D17	8.45-8.50			

Borehole continued...

Installations

Water Level Observations

Hole Diameter Detail: Diameter (mm)	Depth (m)	Casing Depth (m)	Chiseling Details: From (m)	To (m)	Time (hhmm)
250	3.30	3.30			
200	7.30	7.30			
150	21.00	9.00			

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
30/05/14	3.80	20	3.50	3.80	7.80
03/06/14	16.70	20	16.70	9.00	-
03/06/14	20.60	20	18.00	9.00	-

Dates: 29/05/2014-03/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Groundwater observed at 3.80m, 16.70m and 20.60m, rising to 3.50m, 16.70m and 18.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH308

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 12.185mAOD
Coordinates: 535732.67E
192841.85N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Stiff becoming very stiff medium to high strength brownish grey slightly silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				S D18 B19	10.00-10.45 10.00-10.45 10.00-10.50	9.00		N=18 (3,4,4,4,5,5) PP=110.0kPa	
		11.30	0.89	B20	11.30-11.50			PP=140.0kPa	
Very stiff thickly laminated slightly greenish grey slightly silty CLAY. (LONDON CLAY FORMATION)		11.50	0.69	S D21 B22	11.50-11.95 11.50-11.95 11.50-12.00	9.00		N=21 (3,4,4,5,5,7) PP=160.0kPa	
Very stiff medium strength slightly micaceous thinly laminated brownish grey slightly silty CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				S D23 B24	13.00-13.45 13.00-13.45 13.00-13.50	9.00		N=22 (2,3,4,5,6,7) PP=160.0kPa	
		14.00	-1.82	B25	14.00-14.20			PP=220.0kPa	
Very stiff medium strengththinly laminated brownish grey slightly silty CLAY, with rare bioturbation and rare pyrite nodules. (LONDON CLAY FORMATION)				S D26 B27	14.50-14.95 14.50-14.95 14.50-15.00	9.00		N=19 (2,3,3,4,5,7)	
				U28	16.00-16.45			50 blows	
From 16.45mbgl with some thin silty fine sand bands.				D29	16.45-16.50			PP=220.0kPa	
				S D30 B31	17.50-17.95 17.50-17.95 17.50-18.00	9.00	(17.50)	N=23 (3,3,4,5,6,8) PP=160.0kPa	
		19.10	-6.92	S D32 B33	19.00-19.45 19.00-19.45 19.00-19.50	9.00	(19.00)	N=31 (3,6,6,8,8,9) PP=150.0kPa	
Very stiff medium strength thinly interlaminated brownish grey with rare greenish grey slightly silty slightly micaceous CLAY, with rare Borehole continued...									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.30	3.30
200	7.30	7.30
150	21.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
30/05/14	3.80	20	3.50	3.80	7.80
03/06/14	16.70	20	16.70	9.00	-
03/06/14	20.60	20	18.00	9.00	-

Dates: 29/05/2014-03/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Groundwater observed at 3.80m, 16.70m and 20.60m, rising to 3.50m, 16.70m and 18.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
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Borehole Record

BH308

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 12.185mAOD
Coordinates: 535732.67E
192841.85N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
bioturbation and shell fragments. (LONDON CLAY FORMATION)		20.20	-8.02	B34	20.20-20.40				
Very dense brownish grey silty fine SAND, with some silty clay bands. (LONDON CLAY FORMATION)		20.60	-8.42	S	20.50-20.83	9.00	(15.20)	50/182mm (4,6,12,23,15)	
				D35	20.50-20.83				
Very dense brownish grey mottled greenish grey slightly gravelly silty fine SAND, with rare shell fragments. Gravel is angular to subangular fine to medium flint. (LAMBETH GROUP UNDIFFERENTIATED)		20.83	-8.65						
Borehole Complete at 20.83 m									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.30	3.30
200	7.30	7.30
150	21.00	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
30/05/14	3.80	20	3.50	3.80	7.80
03/06/14	16.70	20	16.70	9.00	-
03/06/14	20.60	20	18.00	9.00	-

Dates: 29/05/2014-03/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Groundwater observed at 3.80m, 16.70m and 20.60m, rising to 3.50m, 16.70m and 18.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH309

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 10.746mAOD
Coordinates: 535673.36E
192794.55N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
MADE GROUND: Sandy GRAVEL. Gravel is angular to subangular fine to coarse brick and concrete.				B1	0.10-0.20				
		0.30	10.45	B2	0.30-1.20				
MADE GROUND: Yellowish brown slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subrounded fine to coarse flint.									
		1.30	9.45	B3	1.30-1.50				
MADE GROUND: Firm to stiff grey and brownish grey slightly sandy slightly gravelly CLAY. Gravel is angular to rounded fine to coarse flint, brick and concrete.		1.70	9.05	B4	1.70-2.20				
MADE GROUND: Firm dark grey grey and brown slightly silty CLAY, with occasional decayed rootlets and slight organic odour.									
		2.80	7.95	B5	2.80-3.10				
Soft light grey and brownish grey sandy slightly gravelly SILT, with some dark brown organic silt pockets and fine decayed roots. Gravel is subrounded fine to medium flint. (ALLUVIUM)		3.10	7.65	B6	3.10-3.50				
Medium dense to loose grey silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)				S D7 B8	4.00-4.45 4.00-4.45 4.00-4.50	4.00	(3.00)	N=10 (1,2,3,3,2,2)	
From 5.50mbgl with some sandy clay bands				S B10 D9 B11	5.50-5.95 5.50-5.90 5.50-5.95 5.90-6.40	5.50	(2.50)	N=9 (2,2,2,2,2,3)	
		5.90	4.85						
Stiff medium strength slightly greenish grey silty slightly micaceous CLAY. (LONDON CLAY FORMATION)								PP=75.0kPa	
				U12	7.50-7.95			20 blows	
				D13	7.95-8.05				
		8.90	1.85						
Very stiff medium strength locally thinly laminated brownish grey silty slightly micaceous CLAY, some sandy clay bands and rare bioturbation. (LONDON CLAY FORMATION)				S D14 B15	9.00-9.45 9.00-9.45 9.00-9.50	7.50		N=18 (1,2,4,5,4,5) PP=175.0kPa	
Borehole continued...									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.00	3.00
200	6.90	6.20
150	19.91	10.70

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
20/05/14	2.80	20	1.90	2.00	-
22/05/14	10.40	20	10.40	7.50	10.70
22/05/14	18.00	20	8.20	10.70	-

Dates: 20/05/2014-23/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 2.80m, 10.40m and 18.00mbgl, rising to 1.90m, 10.40m and 8.20mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH309

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 10.746mAOD
Coordinates: 535673.36E
192794.55N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	PID (ppm)	Installations
Very stiff medium strength locally thinly laminated brownish grey silty slightly micaceous CLAY, some sandy clay bands and rare bioturbation. (LONDON CLAY FORMATION)				S D16 B17	10.50-10.95 10.50-10.95 10.50-11.00	7.50	(10.45)	N=27 (3,4,5,8,7,7) PP=200.0kPa		
Stiff medium strength brownish grey slightly silty slightly sandy CLAY, with rare bioturbation. (LONDON CLAY FORMATION)		11.70	-0.95	B18 S D19 B20	11.70-12.00 12.00-12.45 12.00-12.45 12.00-12.50	10.70		N=24 (3,4,5,6,7,6) PP=180.0kPa		
Medium dense greenish grey clayey fine to medium SAND. (LONDON CLAY FORMATION)		13.50 13.60	-2.75 -2.85	S D21 D22 B23	13.50-13.95 13.50-13.60 13.50-13.95 13.60-14.10	10.50		N=28 (4,5,7,7,7,7) PP=180.0kPa		
Very stiff brownish grey slightly silty slightly sandy CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				U24 D25	15.10-15.55 15.55-15.65			36 blows		
Very stiff high strength greenish grey sandy glauconitic CLAY, with rare bioturbation and fine and medium gravel sized pyrite. (LONDON CLAY FORMATION)		16.50	-5.75	S D26 B27	16.50-16.95 16.50-16.95 16.50-17.00	10.70		N=36 (3,5,8,10,9,9) PP=200.0kPa		
Very stiff thinly laminated greyish brown sandy SILT, with some fine sand bands. (LONDON CLAY FORMATION)		17.40	-6.65	B28	17.40-17.80					
Medium dense grey silty fine SAND, with some glauconitic specks. (LAMBETH GROUP UNDIFFERENTIATED)		18.00	-7.25	S D29 B30	18.00-18.45 18.00-18.45 18.00-18.70	10.70		N=18 (3,3,3,3,3,9)		
Stiff light grey, reddish brown and yellowish grey slightly gravelly CLAY. Gravel is subrounded to rounded fine to coarse flint. Some black staining on gravel. (LAMBETH GROUP UNDIFFERENTIATED)		18.70 19.30	-7.95 -8.55	B31 S D32 B33	18.70-19.30 19.50-19.91 19.50-19.91 19.50-19.80	10.70	(7.50)	PP=120.0kPa 50/260mm (5,10,12,14,15,9)		
Borehole continued...										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.00	3.00
200	6.90	6.20
150	19.91	10.70

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
20/05/14	2.80	20	1.90	2.00	-
22/05/14	10.40	20	10.40	7.50	10.70
22/05/14	18.00	20	8.20	10.70	-

Dates: 20/05/2014-23/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 2.80m, 10.40m and 18.00mbgl, rising to 1.90m, 10.40m and 8.20mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
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Borehole Record

BH309

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 10.746mAOD
Coordinates: 535673.36E
192794.55N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
Stiff very high strength light greenish grey reddish brown and yellowish brown CLAY. (LAMBETH GROUP UNDIFFERENTIATED)		20.00	-9.25						
Borehole Complete at 20.00 m									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.00	3.00
200	6.90	6.20
150	19.91	10.70

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
20/05/14	2.80	20	1.90	2.00	-
22/05/14	10.40	20	10.40	7.50	10.70
22/05/14	18.00	20	8.20	10.70	-

Dates: 20/05/2014-23/05/2014
Plant: Dando 2000
Drilled By: T York
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 2.80m, 10.40m and 18.00mbgl, rising to 1.90m, 10.40m and 8.20mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH310

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.644mAOD
Coordinates: 535715.26E
192805.94N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
MADE GROUND: Tarmacadam.		0.30	11.34						
MADE GROUND: Hardcore (DRILLERS DESCRIPTION).		0.50	11.14	B1	0.50-0.80				
MADE GROUND: Orangish brown slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subrounded fine to coarse flint.		1.00	10.64	B2	1.00-1.50				
MADE GROUND: Stiff brownish grey slightly gravelly CLAY. Gravel is subrounded fine to medium flint.		1.50	10.14	B3	1.50-2.10				
MADE GROUND: Greyish brown silty fine to coarse SAND and GRAVEL. Gravel is angular to rounded fine to coarse flint.		2.10	9.54	B4	2.10-2.60				
MADE GROUND: Yellowish brown slightly silty fine to coarse SAND and GRAVEL, with occasional cobbles. Gravel is angular fine to coarse brick and flint.		2.60	9.04	B5	2.60-3.00				
Firm grey and yellowish grey CLAY. (ALLUVIUM)		3.60	8.04						
Medium dense grey slightly silty very gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)				S D6 B7	4.00-4.45 4.00-4.45 4.00-4.50	4.00	(3.00)	N=17 (2,3,4,4,5,4)	
From 5.50mbgl becomes SAND and GRAVEL.				S B8	5.50-5.95 5.50-6.00	5.50	(3.00)	N=20 (2,3,4,5,5,6)	
Stiff medium strength greyish brown slightly gravelly CLAY. Gravel is angular fine to medium flint. (LONDON CLAY FORMATION)		6.70	4.94	B9 S D10 B11	6.70-7.00 7.00-7.45 7.00-7.45 7.00-7.50	7.00	(5.50)	N=15 (2,3,3,4,4,4)	
				UT12	8.50-8.95			35 blows	
Very stiff medium to high strength locally thinly laminated brownish grey slightly silty CLAY, with some thin brown silt bands and rare bioturbation. (LONDON CLAY FORMATION)		8.90	2.74	D13	8.95-9.00			PP=200.0kPa	
Borehole continued...									

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.00	3.00
200	7.00	7.00
150	19.90	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
04/06/14	3.60	20	3.00	3.60	-
06/06/14	15.00	20	15.00	9.00	-
06/06/14	19.80	20	17.80	9.00	-

Dates: 05/06/2014-06/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Water observed at 3.60m, 15.00m and 19.80mbgl, rising to 3.00m, 15.00m and 17.80mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH310

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Joanne Gavigan

Ground Level: 11.644mAOD
Coordinates: 535715.26E
192805.94N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	PID (ppm)	Installations
Very stiff medium to high strength locally thinly laminated brownish grey slightly silty CLAY, with some thin brown silt bands and rare bioturbation. (LONDON CLAY FORMATION)				S D14 B15	10.00-10.45 10.00-10.45 10.00-10.50	9.00		N=17 (1,3,3,4,4,6) PP=160.0kPa		
Stiff medium strength brownish grey slightly silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)		11.50	0.14	S D16 B17	11.50-11.95 11.50-11.95 11.50-12.00	9.00		N=21 (2,3,4,5,6,6) PP=150.0kPa		
				S D18 B19	13.00-13.45 13.00-13.95 13.00-13.50	9.00		N=22 (3,4,4,5,6,7) PP=160.0kPa		
				S D20 B21	14.50-14.95 14.50-14.95 14.50-15.00	9.00		N=24 (3,4,5,5,7,7) PP=165.0kPa		
				UT22	16.00-16.45			45 blows		
				D23	16.45-16.50					
				S D24 B25 B26	17.50-17.95 17.50-17.95 17.50-17.80 17.80-18.00	9.00	(17.50)	N=33 (3,4,7,7,8,11) PP=165.0kPa		
Very stiff high strength greyish brown CLAY, with some greenish grey sandy clay bands. (LONDON CLAY FORMATION)		17.80	-6.16	B27	18.20-18.40			PP=170.0kPa PP=170.0kPa		
Very dense greyish brown silty fine SAND. (LAMBETH GROUP UNDIFFERENTIATED)		18.80	-7.16	B28	18.80-19.00					
				S D29	19.50-19.85 19.50-19.85	9.00	(18.00)	50/198mm (7,10,13,17,20)		
Borehole Complete at 19.90 m		19.90	-8.26							

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	3.00	3.00
200	7.00	7.00
150	19.90	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
04/06/14	3.60	20	3.00	3.60	-
06/06/14	15.00	20	15.00	9.00	-
06/06/14	19.80	20	17.80	9.00	-

Dates: 05/06/2014-06/06/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Water observed at 3.60m, 15.00m and 19.80mbgl, rising to 3.00m, 15.00m and 17.80mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

CONFIDENTIAL

GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
www.groundtechnology.co.uk

Borehole Record

BH311

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 13.587mAOD
Coordinates: 535816.20E
192810.19N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)	Installations
MADE GROUND: Brick Weave		0.05	13.54						
MADE GROUND: Concrete		0.25	13.34						
		0.35	13.24	B1	0.35-0.50				
MADE GROUND: Yellowish brown slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subrounded fine to coarse flint.				B2	0.90-1.20				
MADE GROUND: Grey slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subangular fine to cobble sized flint, brick and concrete.		1.30	12.29	B3	1.30-1.50				
MADE GROUND: Firm greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular fine to medium flint and brick.									
MADE GROUND: Firm to stiff greyish brown CLAY.		2.50	11.09	B4	2.50-2.70				
				B5	3.50-3.70			PP=75.0kPa	
		3.80	9.79	B6	3.80-4.00				
MADE GROUND: Brownish grey slightly silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint and quartz.		4.00	9.59	S	4.00-4.37	4.00		50/215mm (2,6,12,14,18,6)	
				D7	4.00-4.37				
		4.30	9.29	B8	4.00-4.50				
MADE GROUND: Yellowish brown fine to coarse SAND and GRAVEL. Gravel is angular to subangular fine to coarse flint.		4.50	9.09	B9	4.30-4.50				
				B10	4.50-4.70				
		4.70	8.89	B11	4.70-5.00			PP=50.0kPa	
MADE GROUND: Grey clayey fine to coarse SAND and GRAVEL. Gravel is angular to subangular fine to coarse flint, brick and concrete.		5.10	8.49	B12	5.10-5.30				
		5.30	8.29	B13	5.30-5.50				
				S	5.50-5.95	5.50	(5.30)	N=31 (5,7,8,8,8,7)	
MADE GROUND: Soft greyish brown and brownish grey CLAY, with some black sandy gravelly pockets, slight organic odour.		5.70	7.89	D14	5.50-5.95			PP=10.0kPa	
				B15	5.70-6.00				
Firm grey with rare brown CLAY, with some roots and rootlets. (ALLUVIUM)									
				S	7.00-7.45	7.00	(4.20)	N=22 (1,3,5,5,6,6)	
Soft dark brown amorphous PEAT, locally an organic silt. (ALLUVIUM)				D16	7.00-7.45				
		7.70	5.89	B17	7.70-7.90				
Very soft high strength brownish grey silty CLAY, with some dark brown silty organic pockets. Gravel is angular to subrounded fine to coarse flint. (LONDON CLAY FORMATION)		7.90	5.69						
				UT18	8.50-8.95			25 blows	
Medium dense yellowish grey slightly silty very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. (LONDON CLAY FORMATION)				D19	8.95-9.00				
Firm brownish grey CLAY. (LONDON CLAY FORMATION)									
Borehole continued...									

Water Level Observations

Hole Diameter Detail: Diameter (mm)	Depth (m)	Casing Depth (m)	Chiseling Details: From (m)	To (m)	Time (hhmm)
200	8.00	8.00			
150	25.42	9.00			

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
22/05/14	5.70	20	5.50	5.50	-
28/05/14	19.10	20	19.10	9.00	-
28/05/14	25.00	20	12.00	9.00	-

Dates: 22/05/2014-29/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 5.70m, 19.10m and 25.00m, rising to 5.50m, 19.10m and 12.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
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Borehole Record

BH311

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 13.587mAOD
Coordinates: 535816.20E
192810.19N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)	Installations
Firm to stiff medium to high strength dark bluish grey CLAY. (LONDON CLAY FORMATION) From 10.00mbgl with rare brownish black mottling.				S	10.00-10.45	9.00		N=17 (2,2,2,4,5,6)		
				D20	10.00-10.45					
				B21	10.00-10.50					
		10.60	2.99	B22	10.60-10.80					
Firm to stiff high strength thinly laminated dark brownish grey CLAY with occasional silt. (LONDON CLAY FORMATION)										
From 11.50mbgl with occasional selenite crystals.				S	11.50-11.95	9.00		N=16 (2,3,3,3,4,6)		
				D23	11.50-11.95					
				B24	11.50-12.00					
				S	13.00-13.45	9.00		N=21 (3,3,4,5,5,7)		
				D25	13.00-13.45					
				B26	13.00-13.50					
Firm high strength dark brownish grey mottled brownish grey slightly silty sandy CLAY. (LONDON CLAY FORMATION)		14.00	-0.41	S	14.00-14.45	9.00		N=19 (3,3,4,5,5,5)		
				D27	14.00-14.45					
				B28	14.50-15.00					
				S	16.00-16.45	9.00		N=23 (3,3,5,5,6,7)		
				D29	16.00-16.45					
				B30	16.00-16.50					
				UT31	17.50-17.95			60 blows		
				D32	17.95-18.00					
				S	19.00-19.45	9.00		N=21 (2,5,6,5,5,5)		
				D33	19.00-19.45					
				B34	19.00-19.50					
Borehole continued...										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
200	8.00	8.00
150	25.42	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
22/05/14	5.70	20	5.50	5.50	-
28/05/14	19.10	20	19.10	9.00	-
28/05/14	25.00	20	12.00	9.00	-

Dates: 22/05/2014-29/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 5.70m, 19.10m and 25.00m, rising to 5.50m, 19.10m and 12.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH311

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 13.587mAOD
Coordinates: 535816.20E
192810.19N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	PID (ppm)	Installations
Firm high strength dark brownish grey mottled brownish grey slightly silty sandy CLAY. (LONDON CLAY FORMATION)										
		20.50	-6.91	S D35 B36	20.50-20.95 20.50-20.95 20.50-21.00	9.00	(20.50)	N=23 (2,5,5,5,6,7)		
Stiff medium strength dark brownish grey and yellowish brown slightly silty slightly sandy CLAY, with some black organic specks. (LONDON CLAY FORMATION)										
		22.00	-8.41	S D37 B38	22.00-22.45 22.00-22.45 22.00-22.50	9.00	(22.00)	N=27 (3,5,5,7,7,8)		
Firm to stiff medium strength dark brownish grey mottled black silty sandy CLAY. (LONDON CLAY FORMATION)										
				S D39 B40	23.50-23.95 23.50-23.95 23.50-24.00	9.00	(23.50)	N=42 (4,6,7,9,11,15)		
		23.80	-10.21							
Firm to stiff high strength dark brownish grey and yellowish brown sandy silty CLAY with occasional pockets of dark green organic silt. (LAMBETH GROUP UNDIFFERENTIATED)		24.30	-10.71	B41	24.30-24.60					
Soft yellowish brown and greyish brown very sandy CLAY. (LAMBETH GROUP UNDIFFERENTIATED)		25.00	-11.41	S D42	25.00-25.42 25.00-25.42	9.00	(12.00)	54/265mm (8,14,14,7,12,21)		
Very dense yellowish brown mottled black fine slightly clayey SAND. (LAMBETH GROUP UNDIFFERENTIATED)		25.42	-11.83							
Borehole Complete at 25.42 m										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
200	8.00	8.00
150	25.42	9.00

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
22/05/14	5.70	20	5.50	5.50	-
28/05/14	19.10	20	19.10	9.00	-
28/05/14	25.00	20	12.00	9.00	-

Dates: 22/05/2014-29/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: G Day
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 5.70m, 19.10m and 25.00m, rising to 5.50m, 19.10m and 12.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH312

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 15.866mAOD
Coordinates: 535831.85E
192790.82N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)	Installations
MADE GROUND: Reinforced concrete										
MADE GROUND: Medium dense yellowish brown slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subrounded fine to coarse flint.		0.50	15.37	B1	0.50-1.00					
				S D2	4.00-4.45 4.00-4.45	4.00	(3.70)	N=12 (6,6,4,3,3,2)		
MADE GROUND: Firm low strength brownish grey slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse flint and brick.		4.50	11.37	B3	4.50-5.00					
				S D4	5.50-5.95 5.50-5.95	5.20		N=8 (2,2,2,2,2,2)		
MADE GROUND: Firm medium strength greyish brown slightly gravelly CLAY. Gravel is angular to subangular fine to cobble sized flint and brick.		6.60	9.27	B5	6.70-7.00					
				S D6 W7	7.00-7.45 7.00-7.45 7.20	5.20		N=16 (2,3,5,4,4,3)		
Medium dense grey slightly silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)		7.50	8.37	B9	7.50-8.00					
				S D8	8.50-8.95 8.50-8.95	8.50	(7.70)	N=12 (2,2,3,3,3,3)		
Borehole continued...										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	8.20	8.20
200	11.50	11.50
150	13.50	13.50

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
15/05/14	7.60	20	7.20	7.50	0.00
19/05/14	20.20	20	20.20	13.50	-
20/05/14	28.50	20	16.00	13.50	-

Dates: 19/05/2014-21/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 7.60m, 20.20m and 28.50mbgl, rising to 7.20m, 20.20m and 16.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

CONFIDENTIAL

GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
www.groundtechnology.co.uk

Borehole Record

BH312

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 15.866mAOD
Coordinates: 535831.85E
192790.82N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	PID (ppm)	Installations
Medium dense grey slightly silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)				S D10 B11 B12	10.00-10.45 10.00-10.45 10.00-10.50 10.50-11.00	10.00	(7.50)	N=16 (2,2,4,4,4,4) PP=100.0kPa		
		10.50	5.37							
Stiff medium to high strength locally closely fissured and or thinly laminated brownish grey CLAY. (LONDON CLAY FORMATION)				S D1 B2	12.00-12.45 12.00-12.45 12.00-12.50	12.00	(10.00)	N=10 (1,1,1,2,3,4) PP=90.0kPa		
				UT3	13.50-13.95			50 blows		
		14.00	1.87	D4	13.95-14.00			PP=140.0kPa		
Very stiff medium strength thinly laminated brownish grey slightly silty CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				S D5 B6	15.00-15.45 15.00-15.45 15.00-15.50	13.50		N=24 (2,4,5,6,6,7) PP=150.0kPa		
				D7	16.00-16.10			PP=140.0kPa		
				UT8	16.50-16.95			60 blows		
				D9	16.95-17.00					
				S D10 B11	18.00-18.45 18.00-18.45 18.50-19.00	13.50		N=28 (3,5,6,6,8,8) PP=200.0kPa		
				S D12 B13	19.50-19.95 19.50-19.95 19.50-20.00	13.50		N=21 (3,4,5,5,5,6) PP=160.0kPa		
Borehole continued...										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	8.20	8.20
200	11.50	11.50
150	13.50	13.50

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
15/05/14	7.60	20	7.20	7.50	0.00
19/05/14	20.20	20	20.20	13.50	-
20/05/14	28.50	20	16.00	13.50	-

Dates: 19/05/2014-21/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 7.60m, 20.20m and 28.50mbgl, rising to 7.20m, 20.20m and 16.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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Borehole Record

BH312

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 15.866mAOD
Coordinates: 535831.85E
192790.82N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)
Very stiff medium strength thinly laminated brownish grey slightly silty CLAY, with rare bioturbation. (LONDON CLAY FORMATION) From 20.30mbgl with some greenish grey bands.			B14	20.00-20.30			PP=130.0kPa
Stiff medium strength brownish grey silty CLAY, with some sandy bands and rare selenite crystals. (LONDON CLAY FORMATION)	20.70	-4.83	S D15 B16	21.00-21.45 21.00-21.45 21.00-21.50	13.50	(20.90)	N=26 (3,5,6,6,7,7) PP=130.0kPa
Stiff medium strength brownish grey CLAY. (LONDON CLAY FORMATION)	22.00	-6.13	S D17 B18	22.50-22.95 22.50-22.95 22.50-23.00	13.50	(22.30)	N=24 (3,3,5,5,6,8) PP=100.0kPa
Very stiff medium strength locally thinly laminated brownish grey silty CLAY, with some sandy bands, rare bioturbation and selenite crystals. (LONDON CLAY FORMATION)	24.00	-8.13	S D19 B20	24.00-24.45 24.00-24.45 24.00-24.50	13.50	(23.80)	N=27 (4,5,6,6,7,8)
Very high strength locally thinly laminated brownish grey with rare greenish grey slightly sandy slightly gravelly CLAY, with rare bioturbation. Gravel is angular to subangular fine to medium flint. (LAMBETH GROUP UNDIFFERENTIATED)	25.30	-9.43	B21 S D22 B23 B24	25.30-25.40 25.50-25.95 25.50-25.95 25.50-26.00 26.70-26.80	13.50	(23.80)	PP=200.0kPa N=31 (6,7,7,7,8,9) PP=150.0kPa
Stiff very high strength brownish grey sandy slightly gravelly SILT, with occasional shell fragments. Gravel is angular to subangular fine to medium flint. (LAMBETH GROUP UNDIFFERENTIATED)	27.10	-11.23	S D25 B26	27.00-27.42 27.00-27.42 27.50-28.00	13.50	(25.90)	50/270mm (5,9,11,13,15,11)
Very dense brownish grey silty slightly gravelly fine SAND. Gravel is angular to subangular fine to medium flint. (LAMBETH GROUP UNDIFFERENTIATED)	28.50	-12.63	S D27 B28	28.50-28.87 28.50-28.87 28.50-29.00	13.50	(16.00)	50/220mm (8,16,15,18,17)
Borehole Complete at 29.30 m	29.30	-13.43					

Installations

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	8.20	8.20
200	11.50	11.50
150	13.50	13.50

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
15/05/14	7.60	20	7.20	7.50	0.00
19/05/14	20.20	20	20.20	13.50	-
20/05/14	28.50	20	16.00	13.50	-

Dates: 19/05/2014-21/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl.
2. Water observed at 7.60m, 20.20m and 28.50mbgl, rising to 7.20m, 20.20m and 16.00mbgl after 20 minutes standing time.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
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Borehole Record

BH313

Project: Edmonton Ecopark

Project ID: GTS-14-403

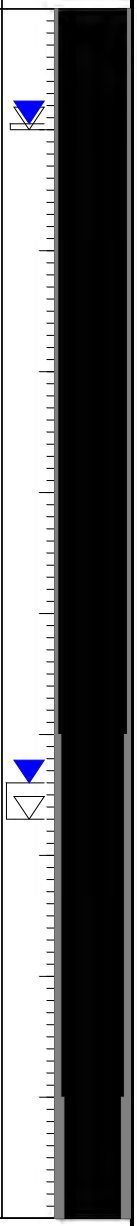
Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 14.459mAOD
Coordinates: 535874.34E
192766.48N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery) PID (ppm)
MADE GROUND: Brick weave	0.05	14.41					
MADE GROUND: Rienforced concrete	0.25	14.21	B1	0.25-0.40			
	0.40	14.06	B2	0.40-0.60			
MADE GROUND: Reddish brown silty fine to coarse SAND and GRAVEL. Gravel is angular fine to coarse granite.	1.00	13.46	B3	1.00-1.20			
MADE GROUND: Orangish brown slightly clayey fine to coarse SAND and GRAVEL. Gravel is angular to subangular fine to coarse flint.	1.20	13.26	B4	1.20-1.50			
MADE GROUND: Yellowish brown slightly silty fine to coarse SAND. Gravel is subangluar to subrounded fine to coarse flint.			B5	2.00-2.50			PP=110.0kPa
MADE GROUND: Firm to stiff brownish grey silty CLAY.			B6	3.50-3.70			PP=140.0kPa
			S	4.00-4.45	3.00		N=11 (1,1,2,2,3,4)
			D7	4.00-4.45			PP=80.0kPa
			B8	4.00-4.50			
MADE GROUND: Yellowish brown slightly silty very sandy GRAVEL. Gravel is angular to rounded fine to coarse flint.	4.50	9.96	B9	4.50-4.80			
	5.10	9.36	B10	5.10-5.50			
MADE GROUND: Loose yellowish grey slightly silty fine to coarse SAND and GRAVEL. Gravel is angular to subangular fine to coarse flint, brick and wood.			S	5.50-5.95	5.50	(5.10)	N=8 (8,8,3,3,1,1)
			D11	5.50-5.95			
	5.70	8.76	B12	5.50-5.70			
Soft low strength dark grey and grey slightly gravelly silty CLAY, with rare semi decayed plant debris. Gravel is angular fine to coarse flint. Organic odour. (ALLUVIUM)			B13	5.70-6.00			
	6.40	8.06	B14	6.40-6.70			
	6.70	7.76	B15	6.70-7.00			
Soft dark greyish brown sandy slightly gravelly SILT, with some roots and rootlets. Gravel is rounded fine to coarse flint and chalk. (ALLUVIUM)	7.00	7.46	S	7.00-7.45	7.00	(6.70)	N=22 (2,3,4,5,6,7)
			D16	7.00-7.45			
			B17	7.00-7.50			
	7.60	6.86	B18	7.60-7.90			
Grey silty gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium flint. (KEMPTON PARK GRAVEL FORMATION)	7.90	6.56	B19	7.90-8.20			
Medium dense grey silty very sandy GRAVEL. Gravel is angular to rounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)			S	8.50-8.95	8.00	(5.80)	N=14 (2,2,2,3,4,5)
	8.60	5.86	D20	8.50-8.95			
			B21	8.70-9.00			PP=75.0kPa
Spongy dark brown slightly sandy slightly gravelly amorphous PEAT. Gravel is angular to subangular fine to medium flint. (ALLUVIUM)							
Borehole continued...							

Installations



Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	6.00	6.00
200	9.00	9.00
150	28.30	10.50

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
21/05/14	1.00	20	0.95	0.00	-
21/05/14	6.70	20	6.40	6.70	-
27/05/14	13.60	20	13.55	10.50	-
27/05/14	27.80	20	16.50	10.50	-

Dates: 21/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Groundwater observed at 1.00m, 6.70m , 13.60m, 27.80m, rising to 0.95m, 6.40m, 13.55m and 16.50mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

GROUND TECHNOLOGY
Maple Road, Kings Lynn
Norfolk, PE34 3AF
Tel: 01553 817657
www.groundtechnology.co.uk

Borehole Record

BH313

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 14.459mAOD
Coordinates: 535874.34E
192766.48N

Description	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)
7.90m - 8.60m : Medium dense grey sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL FORMATION)			J22	10.00-10.45			65 blows	
			D23	10.45-10.50				
8.60m - 16.00m : Stiff medium strength brownish grey CLAY. (LONDON CLAY FORMATION)			S	11.50-11.95	10.50		N=18 (2,2,3,4,5,6)	
			D24	11.50-11.95			PP=110.0kPa	
			B25	11.50-12.00				
			S	13.00-13.45	10.50		N=21 (2,3,4,5,5,7)	
			D26	13.00-13.45			PP=170.0kPa	
			B27	13.00-13.50				
			D28	14.95-15.00				
Very stiff high strength brownish grey locally greenish grey silty slightly micaceous CLAY. (LONDON CLAY FORMATION)	16.00	-1.54	S	16.00-16.45	10.50	(15.95)	N=24 (3,5,6,5,6,7)	
			D29	16.00-16.45				
			B30	16.00-16.50			PP=140.0kPa	
Very stiff high strength brownish grey silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)	17.50	-3.04	S	17.50-17.95	10.50	(17.35)	N=26 (4,6,6,6,6,8)	
			D31	17.50-17.95			PP=140.0kPa	
			B32	17.50-18.00				
			S	19.00-19.45	10.50	(18.80)	N=27 (4,4,6,6,7,8)	
			D33	19.00-19.45			PP=165.0kPa	
			B34	19.00-19.50				
Borehole continued...								

Installations: Groundwater Monitoring Standpipe

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	6.00	6.00
200	9.00	9.00
150	28.30	10.50

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
21/05/14	1.00	20	0.95	0.00	-
21/05/14	6.70	20	6.40	6.70	-
27/05/14	13.60	20	13.55	10.50	-
27/05/14	27.80	20	16.50	10.50	-

Dates: 21/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Groundwater observed at 1.00m, 6.70m , 13.60m, 27.80m, rising to 0.95m, 6.40m, 13.55m and 16.50mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

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GROUND TECHNOLOGY
Maple Road, Kings Lynn
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Tel: 01553 817657
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Borehole Record

BH313

Project: Edmonton Ecopark

Project ID: GTS-14-403

Client : AMEC E & I UK Limited

Engineer : Ben Smith

Ground Level: 14.459mAOD
Coordinates: 535874.34E
192766.48N

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	SPT/CPT Casing Depth (m)	SPT/CPT Water Depth (m)	Remarks and Test Results SPT/HV/PP (Recovery)	Remarks and Test Results PID (ppm)	Installations
Very stiff high strength brownish grey silty slightly micaceous CLAY, with rare bioturbation. (LONDON CLAY FORMATION)				S D35 B36	20.50-20.95 20.50-20.95 20.50-21.00	10.50	(20.30)	N=26 (3,4,5,6,7,8) PP=160.0kPa		
		21.00	-6.54							
Stiff to very stiff high strength dark bluish grey slightly sandy very silty CLAY. (LONDON CLAY FORMATION)				S D37 B38	22.00-22.45 22.00-22.45 22.00-22.50	10.50	(20.80)	N=19 (2,2,3,4,5,7)		
				S D39 B40	23.50-23.95 23.50-23.95 23.50-24.00	10.50	(23.30)	N=28 (3,5,6,7,7,8)		
				B41	24.40-24.60					
				S D42 B43	25.00-25.45 25.00-25.45 25.00-25.50	10.50	(22.60)	N=32 (3,4,6,8,8,10)		
				B44	26.20-26.40					
Firm probably very high strength dark brownish grey mottled yellowish brown silty very sandy CLAY, with occasional black organic specks. (LAMBETH GROUP UNDIFFERENTIATED)		26.50	-12.04	S D45 B46	26.50-26.94 26.50-26.94 26.50-27.00	10.50	(25.00)	50/290mm (6,9,10,11,14,15)		
		27.80	-13.34	B47	27.80-28.30					
Dark brownish grey mottled yellowish brown slightly silty very clayey fine to medium SAND. (LAMBETH GROUP UNDIFFERENTIATED)		28.30	-13.84							
Borehole Complete at 28.30 m										

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)
250	6.00	6.00
200	9.00	9.00
150	28.30	10.50

Chiseling Details

From (m)	To (m)	Time (hhmm)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
21/05/14	1.00	20	0.95	0.00	-
21/05/14	6.70	20	6.40	6.70	-
27/05/14	13.60	20	13.55	10.50	-
27/05/14	27.80	20	16.50	10.50	-

Dates: 21/05/2014
Plant: Dando 2000
Drilled By: A Elsoff
Logged By: J Tomalin
Checked By: P Lewin

Remarks:
1. Inspection pit hand dug from ground level to 1.20mbgl
2. Groundwater observed at 1.00m, 6.70m , 13.60m, 27.80m, rising to 0.95m, 6.40m, 13.55m and 16.50mbgl.
3. Aquifer protection (environmental seals) installed at base of Made Ground / top of Alluvium and at base of the Kempton Park Gravels / top of the London Clay Formation.

Appendix B
Soil Laboratory Analysis Results & Waste Classification

Appendix B Waste Classification of Soils

Exceeding Hazardous Waste Category Limit

Lab Sample Number				Non Hazardous limit	342405	343836	343837	343838	343839	344767	344768	344769
Sample Reference					BH313	BH302-01	BH302-02	BH308	BH301	BH310	BH307-01	BH303-02
Depth (m)					0.25-0.40	0.40-0.50	0.80-1.00	1.40-1.60	0.90-1.00	0.5	None Supplied	None Supplied
Date Sampled					21/05/2014	29/05/2014	29/05/2014	29/05/2014	30/05/2014	04/06/2014	03/06/2014	02/06/2014
Time Taken					1200	1000	1015	1700	800	1315	1605	1605
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	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE		1.7	16	16	18	15	3.4	12	41
Total mass of sample received	kg	0.001	NONE		1.1	1.3	1.3	1.3	1.4	1.8	1.5	1.2
Asbestos in Soil Screen / Identification Name										-	-	Chrysotile - Loose fibres
Asbestos in Soil	Type	N/A	ISO 17025	Detection	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Detected
General Inorganics												
pH	pH Units	N/A	MCERTS	2-11.5	8.50	10.20	9.00	8.5	8.2	8.6	8.2	7.8
Total Organic Carbon (TOC)	%	0.1	MCERTS		< 0.1	1.4	0.60	0.3	0.9	0.2	0.2	6.9
Loss on Ignition @ 450°C	%	0.2	MCERTS		1.00	5.1	6.4	5.2	6.9	1	1.3	19
Speciated PAHs												
Naphthalene	mg/kg	0.05	MCERTS		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1
Acenaphthylene	mg/kg	0.1	MCERTS		< 0.10	< 0.10	< 0.10	< 0.10	0.41	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS		< 0.10	< 0.10	< 0.10	0.74	6.6	< 0.10	< 0.10	0.56
Fluorene	mg/kg	0.1	MCERTS		< 0.10	< 0.10	< 0.10	0.68	4.5	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS		< 0.10	< 0.10	0.96	3.1	12	< 0.10	0.47	4
Anthracene	mg/kg	0.1	MCERTS		< 0.10	< 0.10	0.23	1.9	14	< 0.10	< 0.10	1
Fluoranthene	mg/kg	0.1	MCERTS		< 0.10	0.62	2.1	7.9	51	< 0.10	0.5	5.3
Pyrene	mg/kg	0.1	MCERTS		< 0.10	0.62	1.8	6.2	40	< 0.10	0.37	6.1
Benzo(a)anthracene	mg/kg	0.1	MCERTS	25	< 0.10	0.3	0.95	2.4	18	< 0.10	< 0.10	2
Chrysene	mg/kg	0.05	MCERTS		< 0.05	0.38	0.86	2.7	16	< 0.05	< 0.05	2.4
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS		< 0.10	0.43	0.89	2.1	16	< 0.10	< 0.10	2.6
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS		< 0.10	0.3	0.77	1.5	11	< 0.10	< 0.10	1.3
Benzo(a)pyrene	mg/kg	0.1	MCERTS		< 0.10	0.24	0.97	2.1	17	< 0.10	< 0.10	2.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS		< 0.10	< 0.10	0.37	0.8	8.2	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	25	< 0.10	< 0.10	< 0.10	< 0.10	1.9	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS		< 0.05	< 0.05	0.59	1.1	9.8	< 0.05	< 0.05	< 0.05
Coronene	mg/kg	0.05	NONE		< 0.05	< 0.05	< 0.05	< 0.05	1.1	< 0.05	< 0.05	< 0.05
Total PAH												
Total WAC-17 PAHs	mg/kg	1.6	NONE	1000	< 1.6	3	11	33	230	< 1.6	< 1.6	29
Heavy Metals / Metalloids												
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	1000	2	4.4	7	8.5	11	10	18	18
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1000	< 0.2	6	1.7	< 0.2	0.3	0.4	0.3	45
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	1000	7.1	84	44	33	34	22	33	200
Copper (aqua regia extractable)	mg/kg	1	MCERTS	1000	11	2800	540	36	51	30	26	1000
Lead (aqua regia extractable)	mg/kg	1	MCERTS	1000	5.1	1100	220	130	110	10	21	270
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1000	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	3.9
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	1000	6.6	120	37	28	27	22	27	200
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.6
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	1000	28	5300	780	95	170	56	60	1700.00
Total Metal				1500	59.8	9414.4	1629.7	330.5	403.3	150.4	185.3	3443.5
Petroleum Hydrocarbons												
TPH1 (C10 - C40)	mg/kg	10	MCERTS	1000	< 10	< 10	43	110	2500	< 10	< 10	5000

Appendix C
Geotechnical Analysis Results

Laboratory Report

CONFIDENTIAL

UKAS TESTING 2788

GSTL

GEO Site & Testing Services Ltd

Contract Number: 23719

Client's Reference: **GTS-14-403**

Report Date: **21-07-2014**

Client **Ground Technology Services**
Maple Road
Kings Lynn
Norfolk
PE34 3AF

Contract Title: **Edmonton Ecopark**

For the attention of: **Ben Armstrong**

Date Received: **26-06-2014**

Date Commenced: **26-06-2014**

Date Completed: **21-07-2014**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	13
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	13
One-dimensional Consolidation 75mm or 50mm diameter specimens (5 days) 1377 : 1990 Part 5 : 3 - * UKAS	12
Quick Undrained Triaxial Compression Test - Multi-stage Loading of a single specimen (100mm diameter) 1377 : 1990 Part 7 : 9 - * UKAS	12

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:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Williams (Office Manager) - Paul Evans (Quality/Technical Manager)

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

CONFIDENTIAL

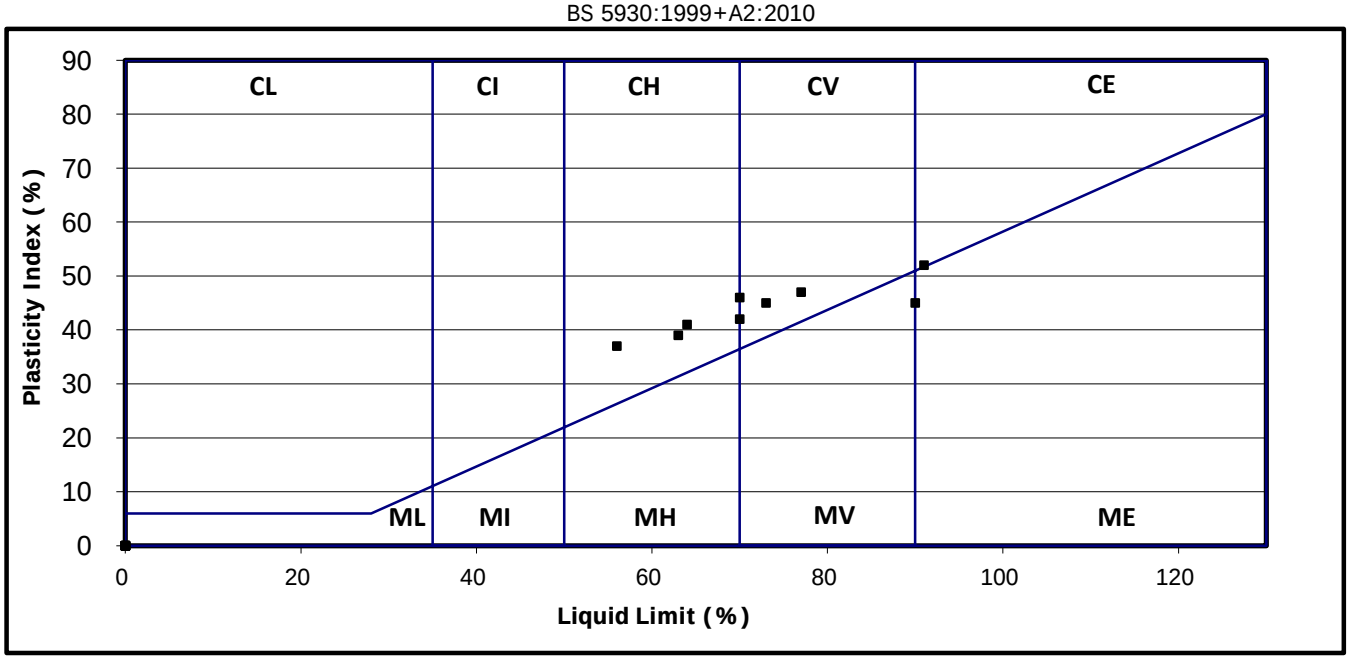
Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref: **35180**
Location: **Edmonton Ecopark**
Contract Number: **23719**

Hole / Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3 / 4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
BH301/11	D	3.20	67	91	39	52	100	CE Extremely High Plasticity
BH302/19	D	8.10	20	63	24	39	93	CH High Plasticity
BH303/13	D	7.00	25	56	19	37	70	CH High Plasticity
BH306/11	D	7.00	34	73	28	45	73	CV Very High Plasticity
BH307/11	D	5.50	36	77	30	47	100	CV Very High Plasticity
BH308/11	D	5.50	2.4		NP		21	
BH309/13	D	7.95	28	64	23	41	100	CH High Plasticity
BH310/10	D	7.00	32	70	24	46	100	CH/V High/High Plasticity
BH311/19	D	8.95	32	70	28	42	100	CH/V High/High Plasticity
BH313/11	D	5.50	58	90	45	45	68	MV/E Very/Extremely High Plasticity

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

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



GSTL
GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

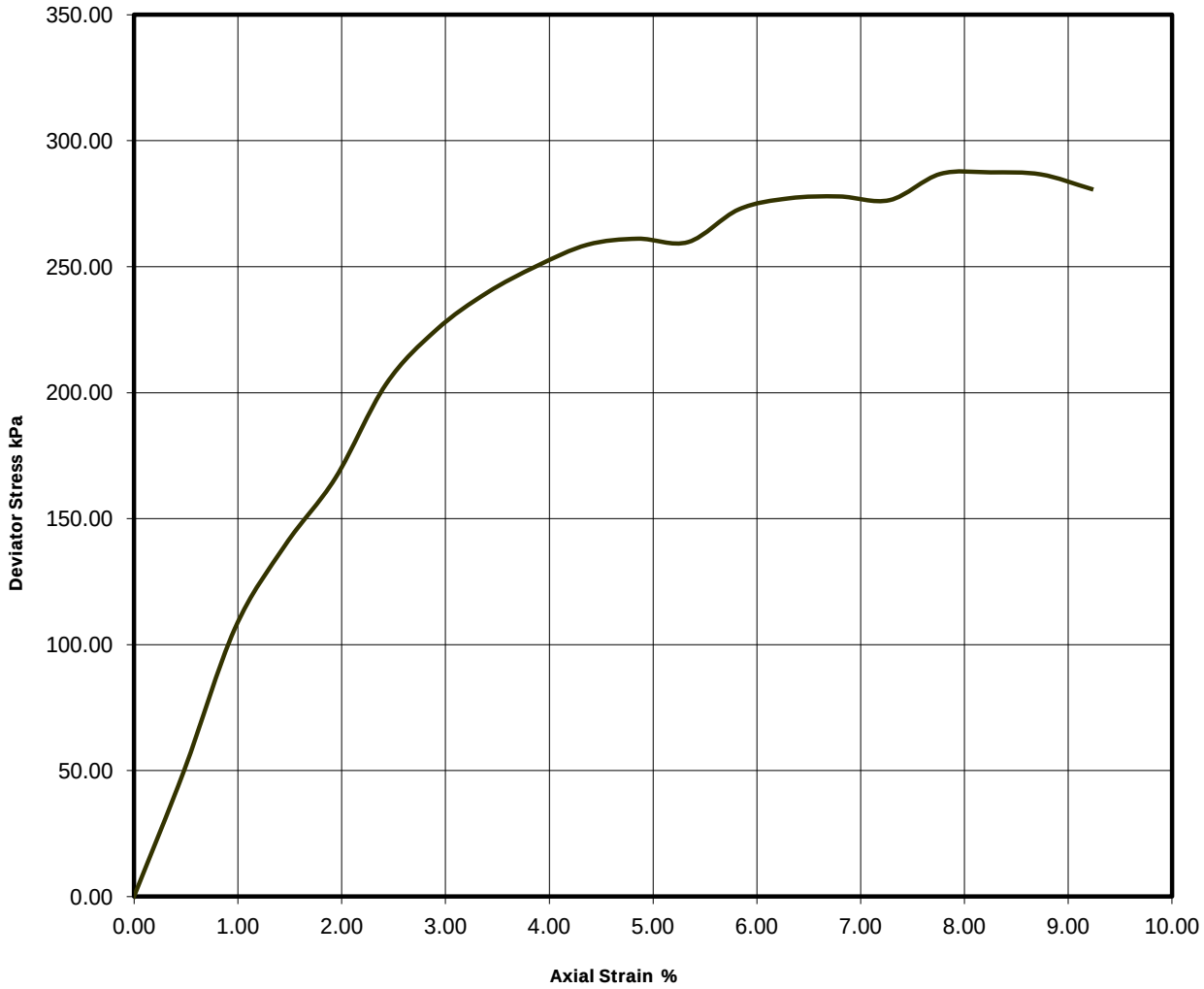
Authorised By:
Ben Sharp (Contracts Manager)
Date: 17.7.14

UKAS TESTING
2788

CONFIDENTIAL

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH301**
Sample Number:	**23**
Depth (m) :	**10.00 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	26.7	2.04	1.61	100	261	131	4.9	Compound	Rate of strain = 2 %/min
				200	278	139	6.8		Latex Membrane used mm thickness
				300	287	144	8.3		

GSTL
GEO Site & Testing Services Limited

Checked By

Approved By:

Date Approved: 17.7.14

UKAS TESTING 2788

CONFIDENTIAL

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH301**
Sample Number:	**23**
Depth (m) :	**10.00**

Post Test Specimen

Specimen Split

Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	26.7	2.04	1.61	100	261	131	4.9	Compound	Rate of strain = 2 %/min
				200	278	139	6.8		Latex Membrane used mm thickness
				300	287	144	8.3		

GSTL
GEO Site & Testing Services Limited

Checked By

Approved By:

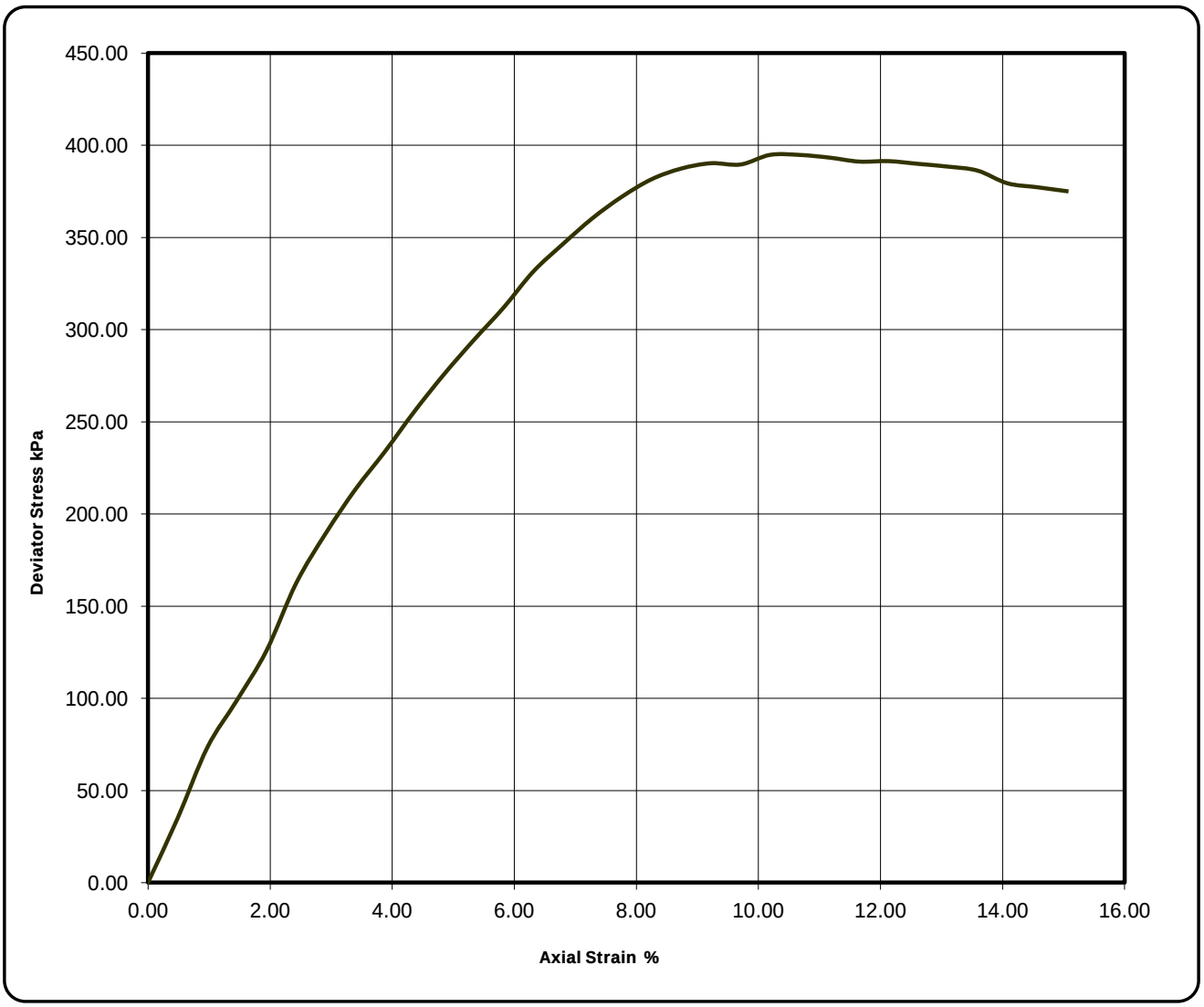
UKAS TESTING 2788

Date Approved: 17.7.14

CONFIDENTIAL

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH302**
Sample Number:	**22**
Depth (m) :	**10.00 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	27.3	2.05	1.61	100	390	195	9.2	Compound	Rate of strain = 2 %/min
				200	395	197	10.2		Latex Membrane used mm thickness
				300	391	196	12.1		

GSTL
GEO Site & Testing Services Limited

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Approved By:

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH302**
Sample Number:	**22**
Depth (m) :	**10.00**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	27.3	2.05	1.61	100	390	195	9.2	Compound	Rate of strain = 2 %/min
				200	395	197	10.2		Latex Membrane used mm thickness
				300	391	196	12.1		

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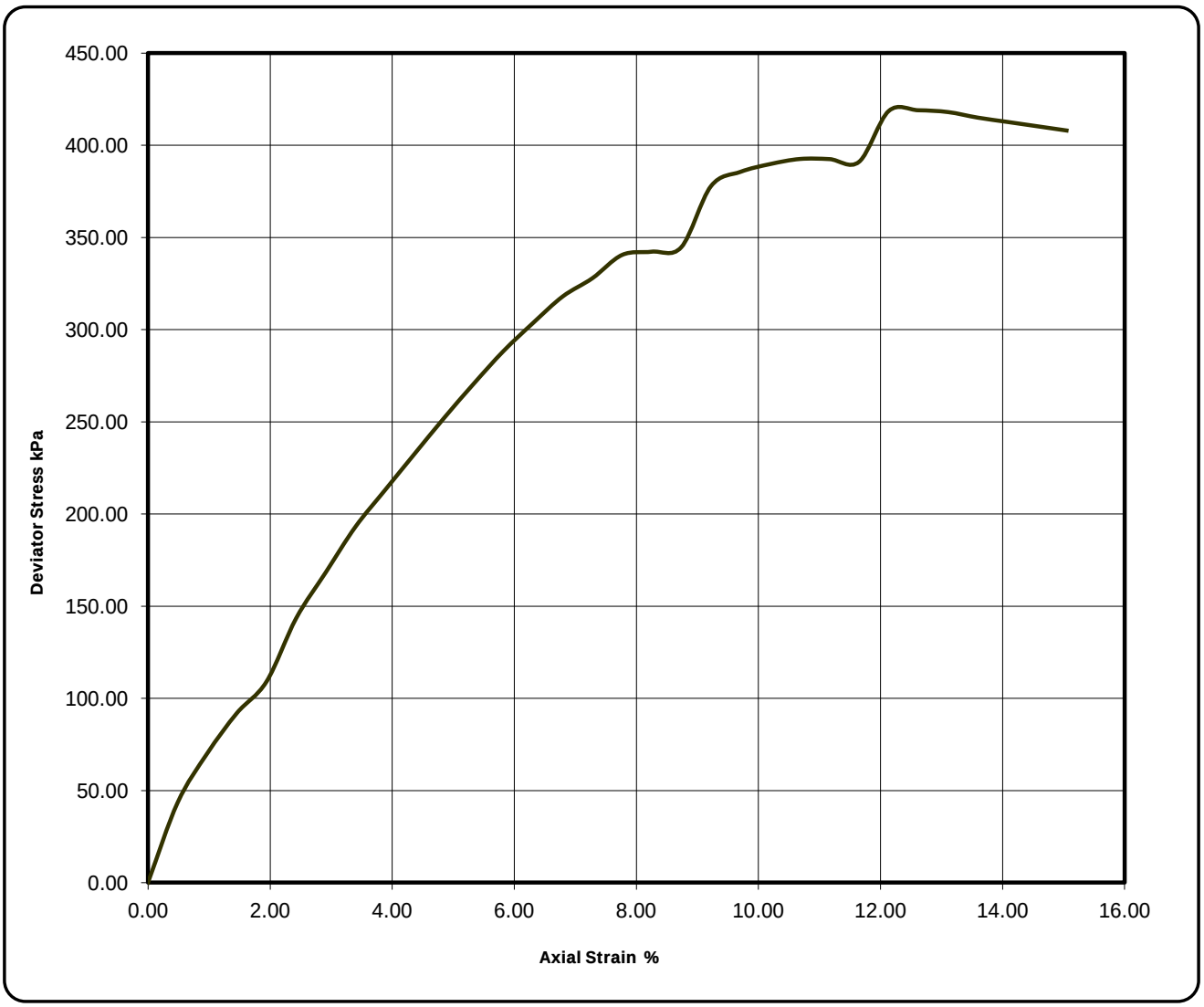
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH303**
Sample Number:	**17**
Depth (m) :	**10.00 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	23.7	2.10	1.70	100	345	172	8.7	Compound	Rate of strain = 2 %/min
				200	393	196	10.7		Latex Membrane used mm thickness
				300	419	210	12.6		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH303**
Sample Number:	**17**
Depth (m) :	**10.00**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	23.7	2.10	1.70	100	345	172	8.7	Compound	Rate of strain = 2 %/min
				200	393	196	10.7		Latex Membrane used mm thickness
				300	419	210	12.6		

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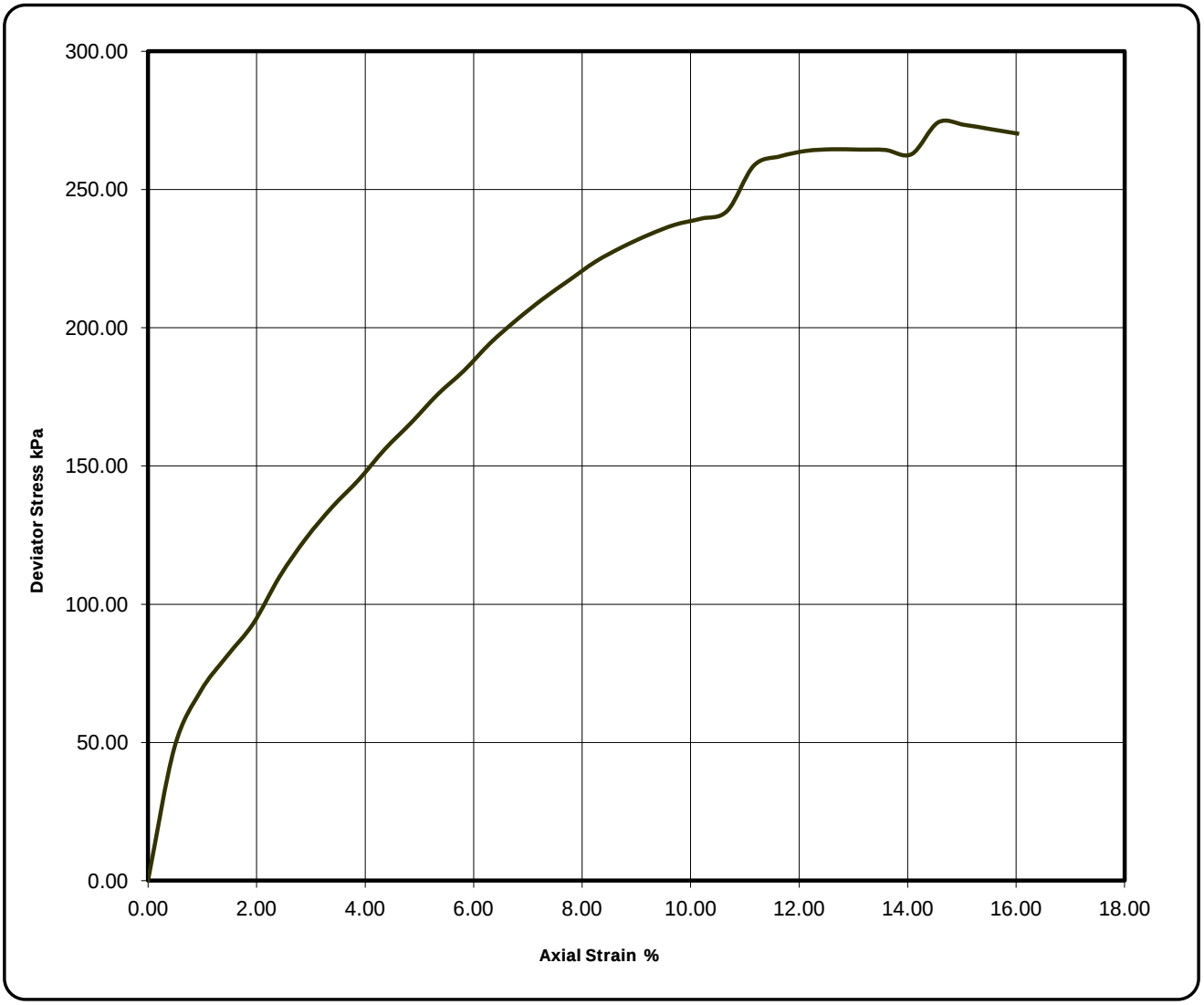
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH304**
Sample Number:	**16**
Depth (m) :	**10.50 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	26.2	2.06	1.63	100	242	121	10.7	Compound	Rate of strain = 2 %/min
				200	265	132	12.6		Latex Membrane used mm thickness
				300	274	137	14.6		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH304**
Sample Number:	**16**
Depth (m) :	**10.50**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	26.2	2.06	1.63	100	242	121	10.7	Compound	Rate of strain = 2 %/min
				200	265	132	12.6		Latex Membrane used mm thickness
				300	274	137	14.6		

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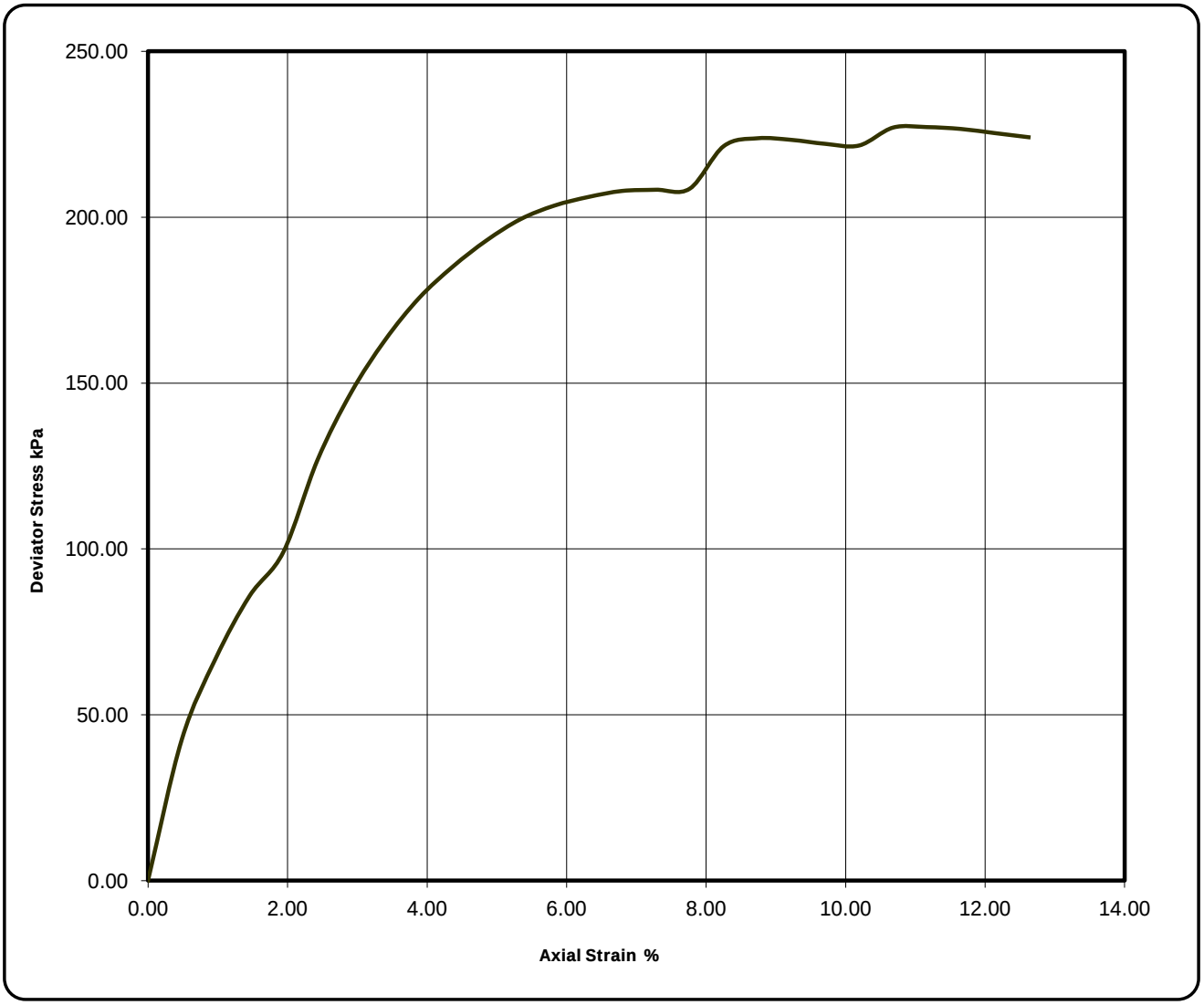
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH305**
Sample Number:	**16**
Depth (m) :	**10.20 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	27.7	1.99	1.56	100	209	104	7.8	Compound	Rate of strain = 2 %/min
				200	224	112	8.7		Latex Membrane used mm thickness
				300	227	114	11.2		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH305**
Sample Number:	**16**
Depth (m) :	**10.20**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	27.7	1.99	1.56	100	209	104	7.8	Compound	Rate of strain = 2 %/min
				200	224	112	8.7		Latex Membrane used mm thickness
				300	227	114	11.2		

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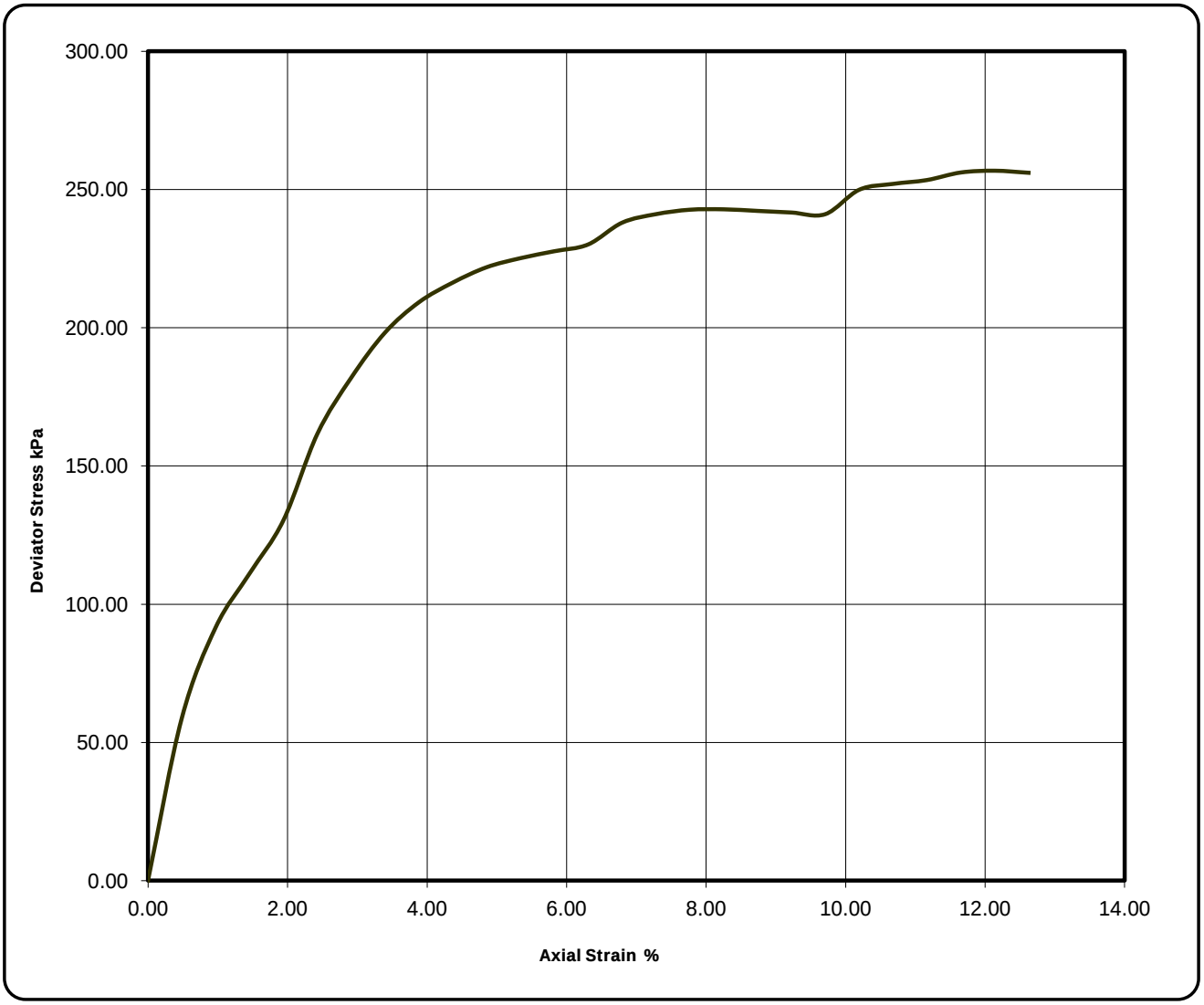
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH306**
Sample Number:	**15**
Depth (m) :	**10.00 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	25.2	2.10	1.68	100	230	115	6.3	Compound	Rate of strain = 2 %/min
				200	243	121	8.3		Latex Membrane used mm thickness
				300	257	128	12.1		

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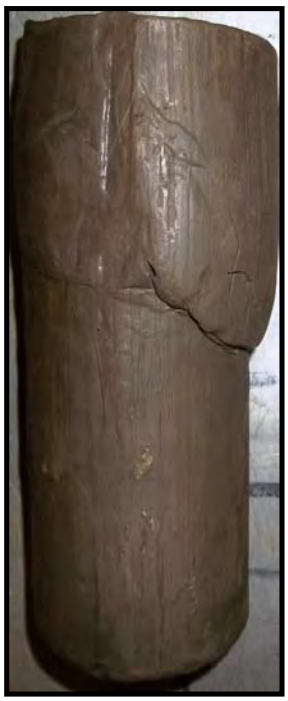
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH306**
Sample Number:	**15**
Depth (m) :	**10.00**



Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	25.2	2.10	1.68	100	230	115	6.3	Compound	Rate of strain = 2 %/min
				200	243	121	8.3		Latex Membrane used mm thickness
				300	257	128	12.1		

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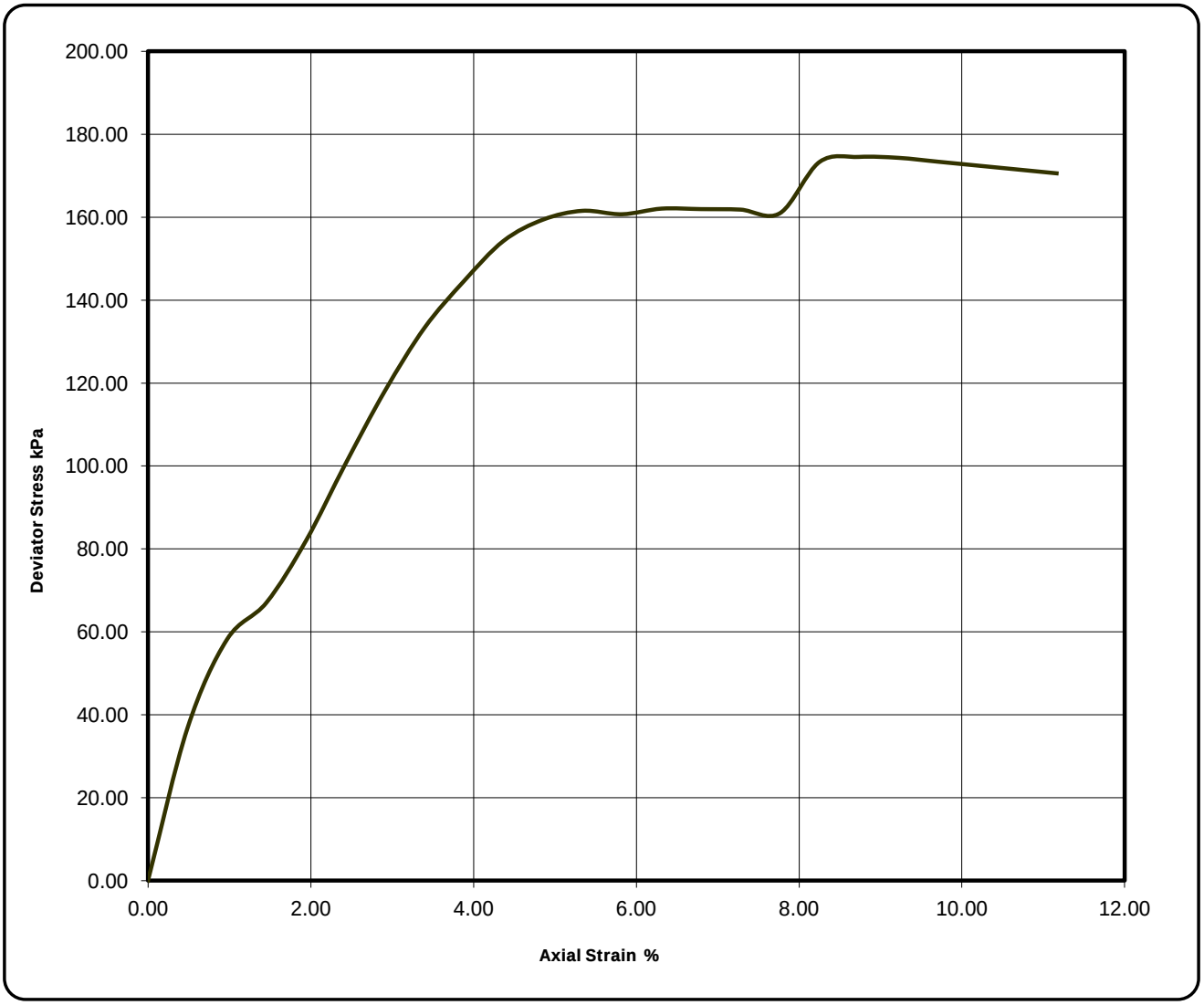
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH307**
Sample Number:	**13**
Depth (m) :	**7.00 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	30.4	1.95	1.50	75	162	81	5.3	Compound	Rate of strain = 2 %/min
				150	162	81	6.3		Latex Membrane used mm thickness
				300	175	87	8.7		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH307**
Sample Number:	**13**
Depth (m) :	**7.00**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	30.4	1.95	1.50	75	162	81	5.3	Compound	Rate of strain = 2 %/min
				150	162	81	6.3		Latex Membrane used mm thickness
				300	175	87	8.7		

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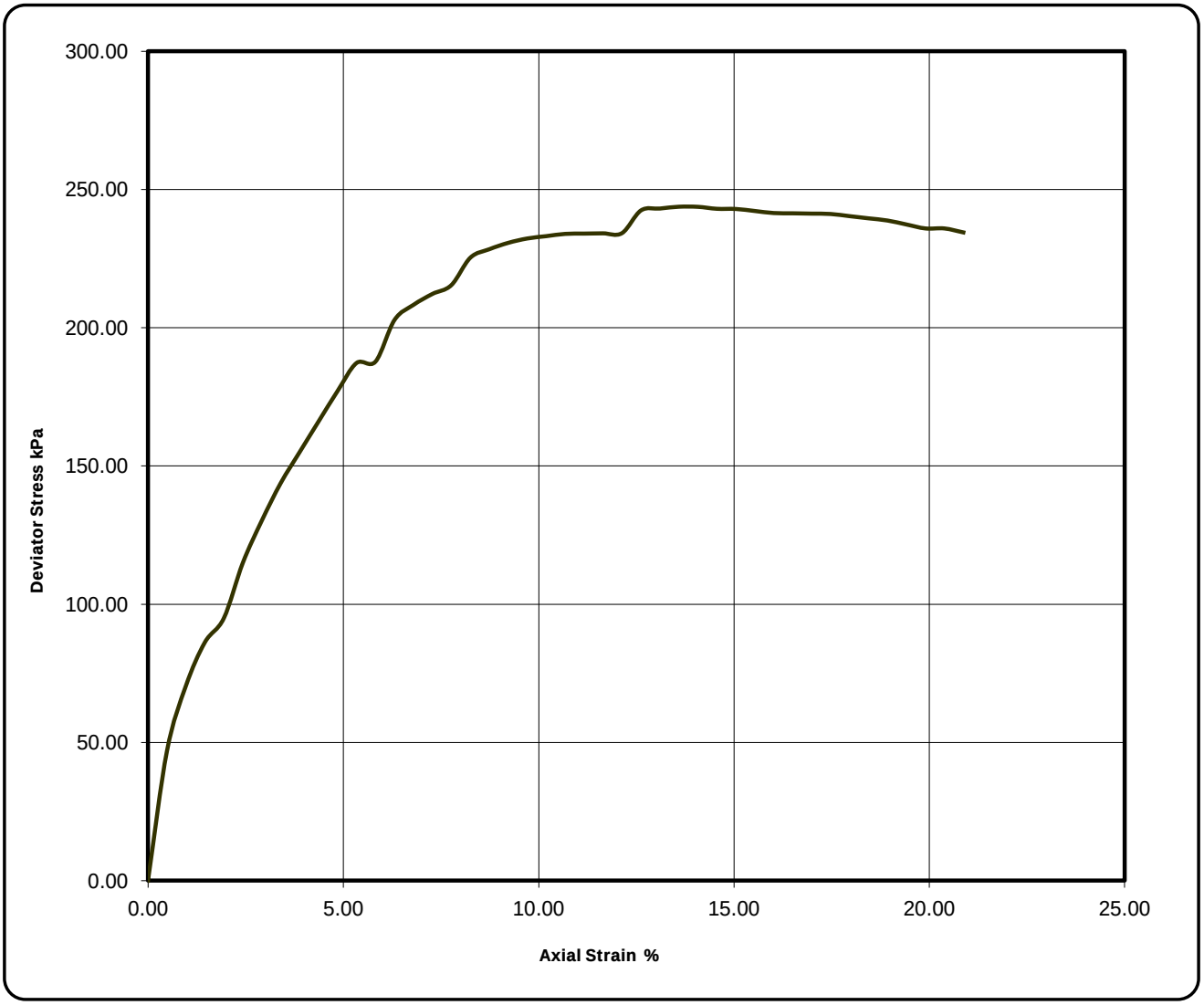
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH308**
Sample Number:	**16**
Depth (m) :	**8.00 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	27.3	2.06	1.62	75	215	108	7.8	Compound	Rate of strain = 2 %/min
				150	234	117	12.1		Latex Membrane used mm thickness
				300	244	122	13.6		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref: 35180
Location: Edmonton Ecopark
Contract Number: 23719-010714
Hole Number BH308
Sample Number: 16
Depth (m) : 8.00

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	27.3	2.06	1.62	75	215	108	7.8	Compound	Rate of strain = 2 %/min
				150	234	117	12.1		Latex Membrane used mm thickness
				300	244	122	13.6		

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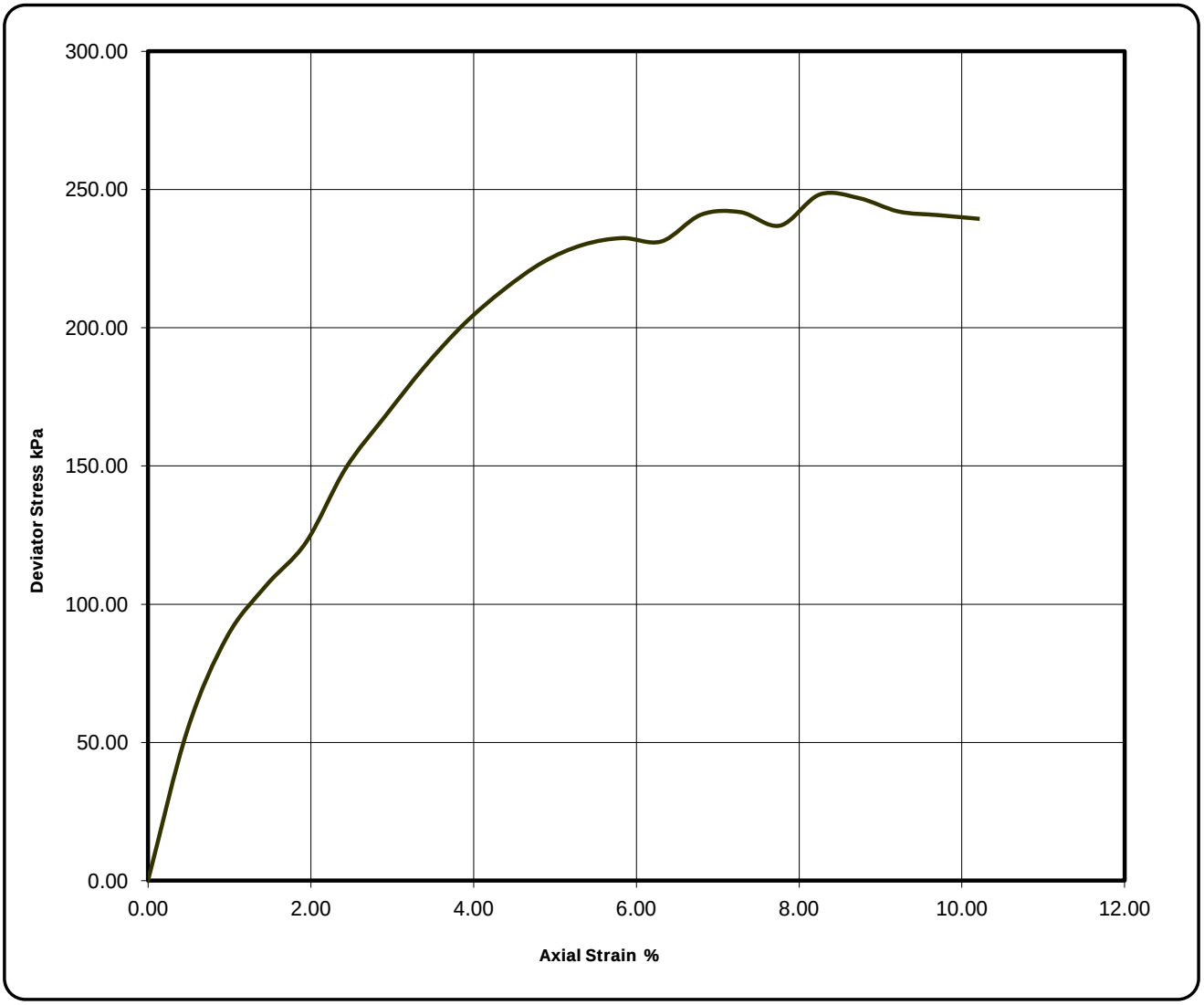
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH309**
Sample Number:	**12**
Depth (m) :	**7.50 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	26.8	2.13	1.68	75	232	116	5.8	Compound	Rate of strain = 2 %/min
				150	242	121	7.3		Latex Membrane used mm thickness
				300	248	124	8.3		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH309**
Sample Number:	**12**
Depth (m) :	**7.50**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	26.8	2.13	1.68	75	232	116	5.8	Compound	Rate of strain = 2 %/min
				150	242	121	7.3		Latex Membrane used mm thickness
				300	248	124	8.3		

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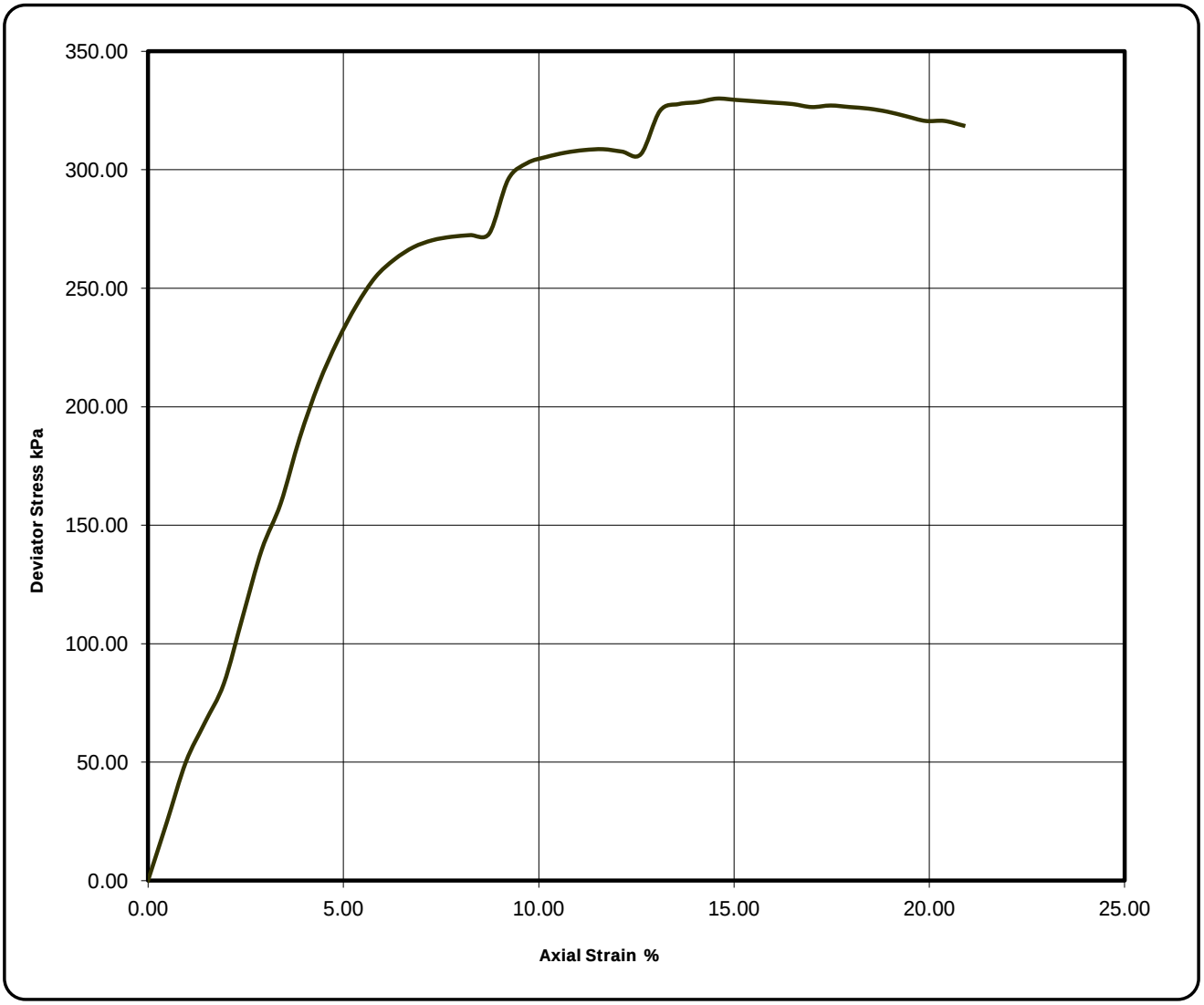
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH310**
Sample Number:	**10**
Depth (m) :	**8.50 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	24.9	2.06	1.65	100	273	137	8.7	Compound	Rate of strain = 2 %/min
				200	309	154	11.7		Latex Membrane used mm thickness
				300	330	165	14.6		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH310**
Sample Number:	**10**
Depth (m) :	**8.50**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	24.9	2.06	1.65	100	273	137	8.7	Compound	Rate of strain = 2 %/min
				200	309	154	11.7		Latex Membrane used mm thickness
				300	330	165	14.6		

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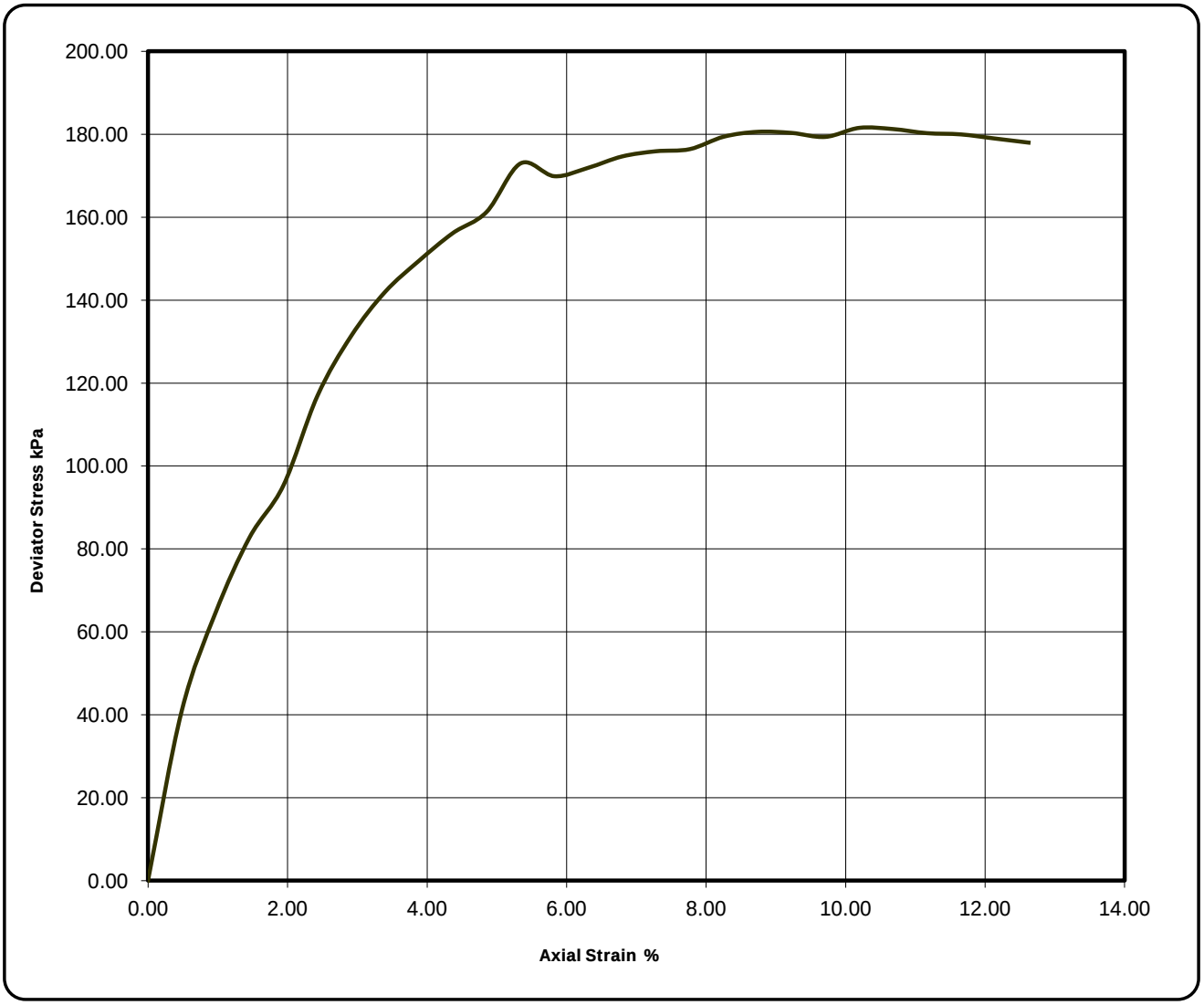
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH311**
Sample Number:	**18**
Depth (m) :	**8.50 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	24.9	1.96	1.57	100	176	88	7.8	Compound	Rate of strain = 2 %/min
				200	181	90	8.7		Latex Membrane used mm thickness
				300	182	91	10.2		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH311**
Sample Number:	**18**
Depth (m) :	**8.50**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	24.9	1.96	1.57	100	176	88	7.8	Compound	Rate of strain = 2 %/min
				200	181	90	8.7		Latex Membrane used mm thickness
				300	182	91	10.2		

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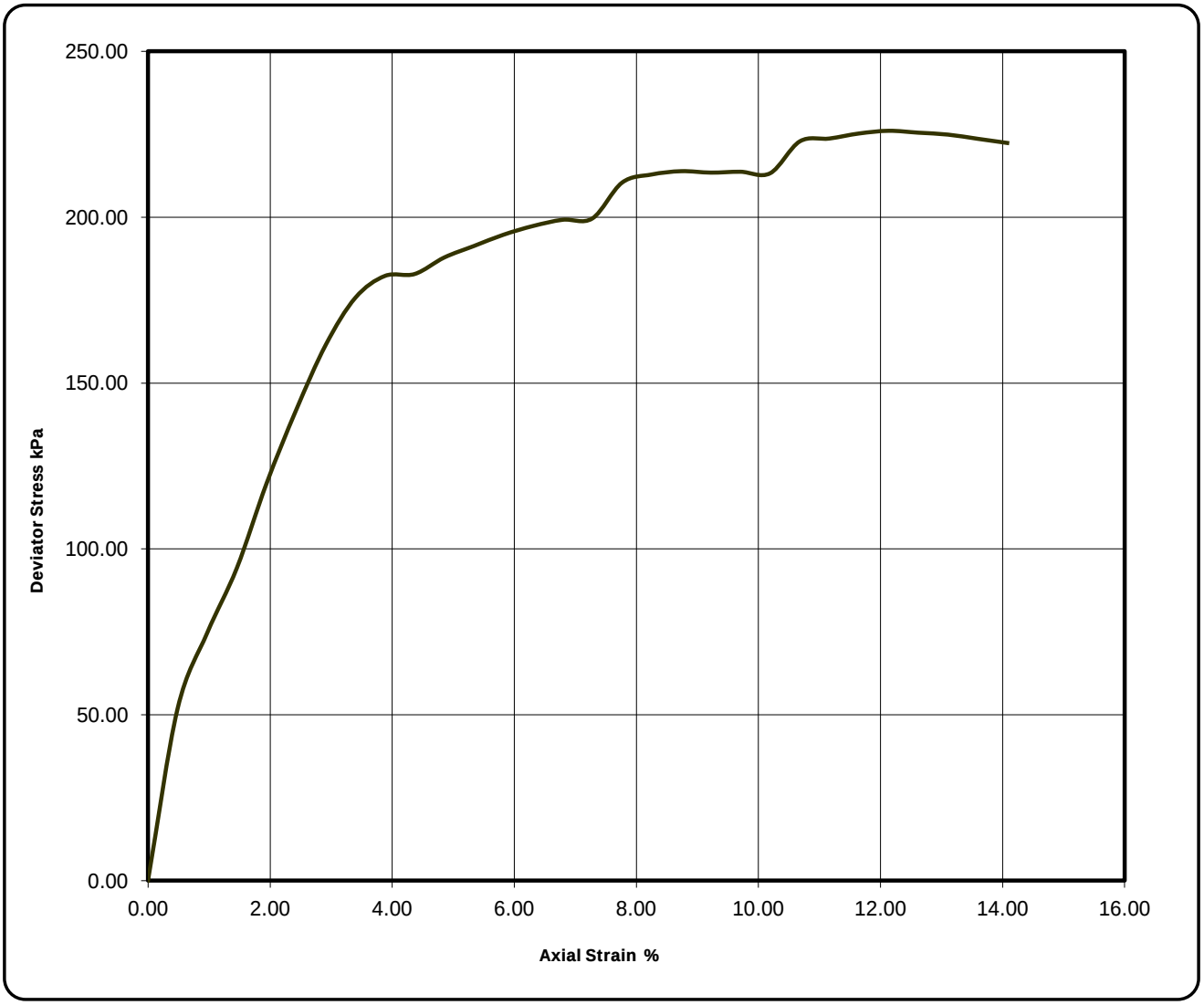
Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH312**
Sample Number:	**3**
Depth (m) :	**13.50 to N/A**
Sample Description :	**Very Firm silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	32.5	1.97	1.48	100	200	100	7.3	Compound	Rate of strain = 2 %/min
				200	214	107	8.7		Latex Membrane used mm thickness
				300	226	113	12.1		

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Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole Number	**BH312**
Sample Number:	**3**
Depth (m) :	**13.50**

Post Test Specimen

Specimen Split

Diameter (mm): 103			Height (mm): 200		Test: 100mm Multistage				
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	32.5	1.97	1.48	100	200	100	7.3	Compound	Rate of strain = 2 %/min
				200	214	107	8.7		Latex Membrane used mm thickness
				300	226	113	12.1		

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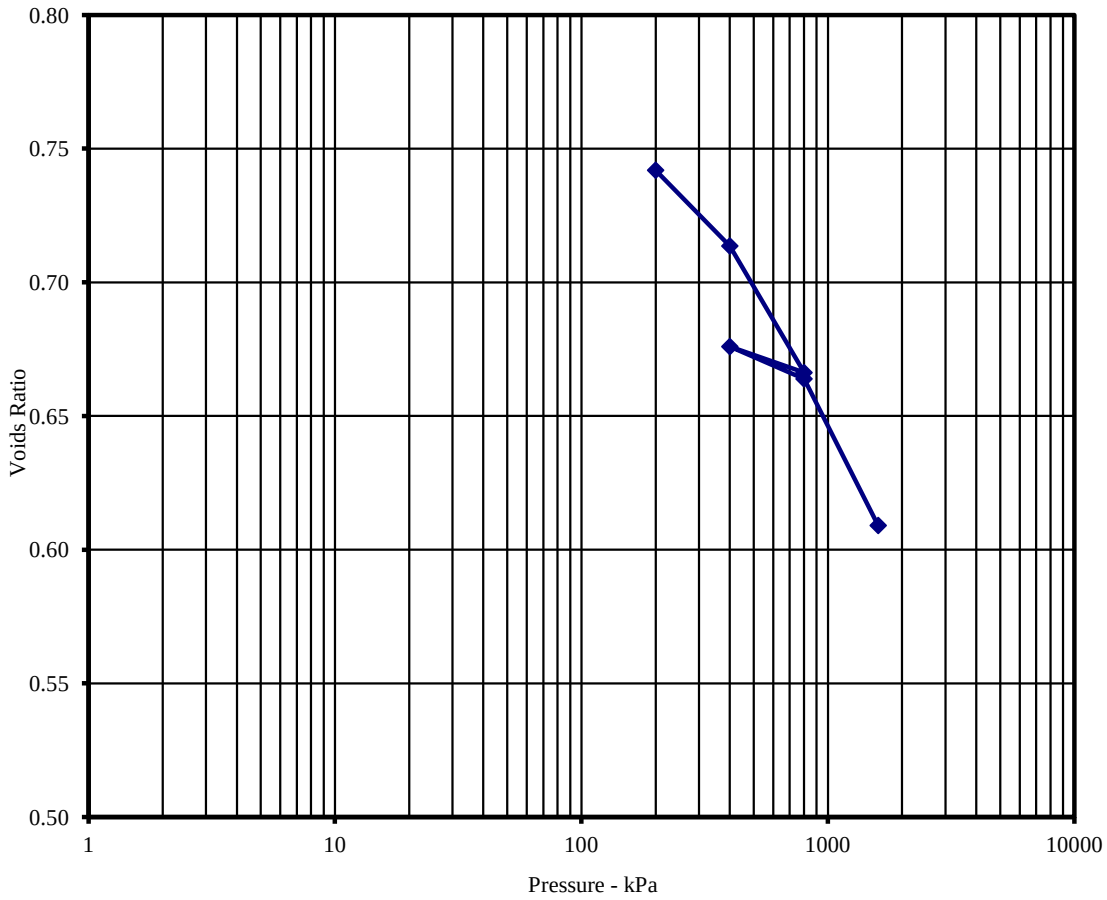
BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**
Contract Number: **23719-010714**
Hole/Sample Number: **BH301**
Depth (m) : **2.00 - N/A**
Sample Type: **U**

Hole Number: **BH301** Depth (m): **2.00 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	27						
Bulk Density (Mg/m3):	1.92	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.51	100	-	200	0.08	10.27	20'C
Voids Ratio:	0.7493	200	-	400	0.08	6.71	Location of specimen with sample
Degree of saturation:	95.1	400	-	800	0.07	4.51	top
Height (mm):	20.13	800	-	400	0.01	3.38	Remarks:
Diameter (mm)	50.01	400	-	800	0.02	9.36	
Particle Density (Mg/m3):	2.65	800	-	1600	0.04	2.38	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

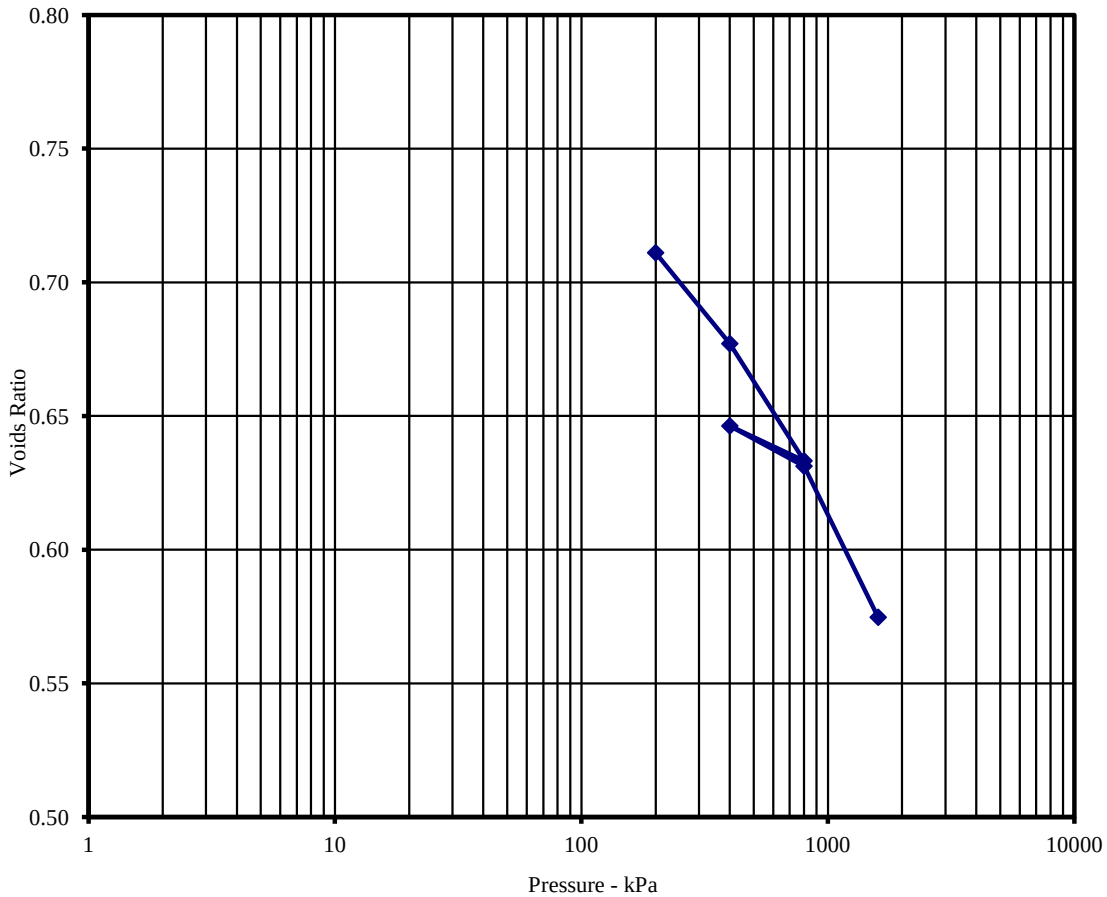
Hole/Sample Number: **BH302**

Depth (m) : **10.00 - N/A**

Sample Type: **U**

Hole Number: **BH302** Depth (m): **10.00 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	28						
Bulk Density (Mg/m3):	1.95	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.53	100	-	200	0.10	9.91	20'C
Voids Ratio:	0.7305	200	-	400	0.10	6.44	Location of specimen with sample
Degree of saturation:	100.2	400	-	800	0.07	3.36	top
Height (mm):	19.9	800	-	400	0.02	9.01	Remarks:
Diameter (mm)	75.13	400	-	800	0.02	6.03	
Particle Density (Mg/m3):	2.65	800	-	1600	0.04	2.28	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

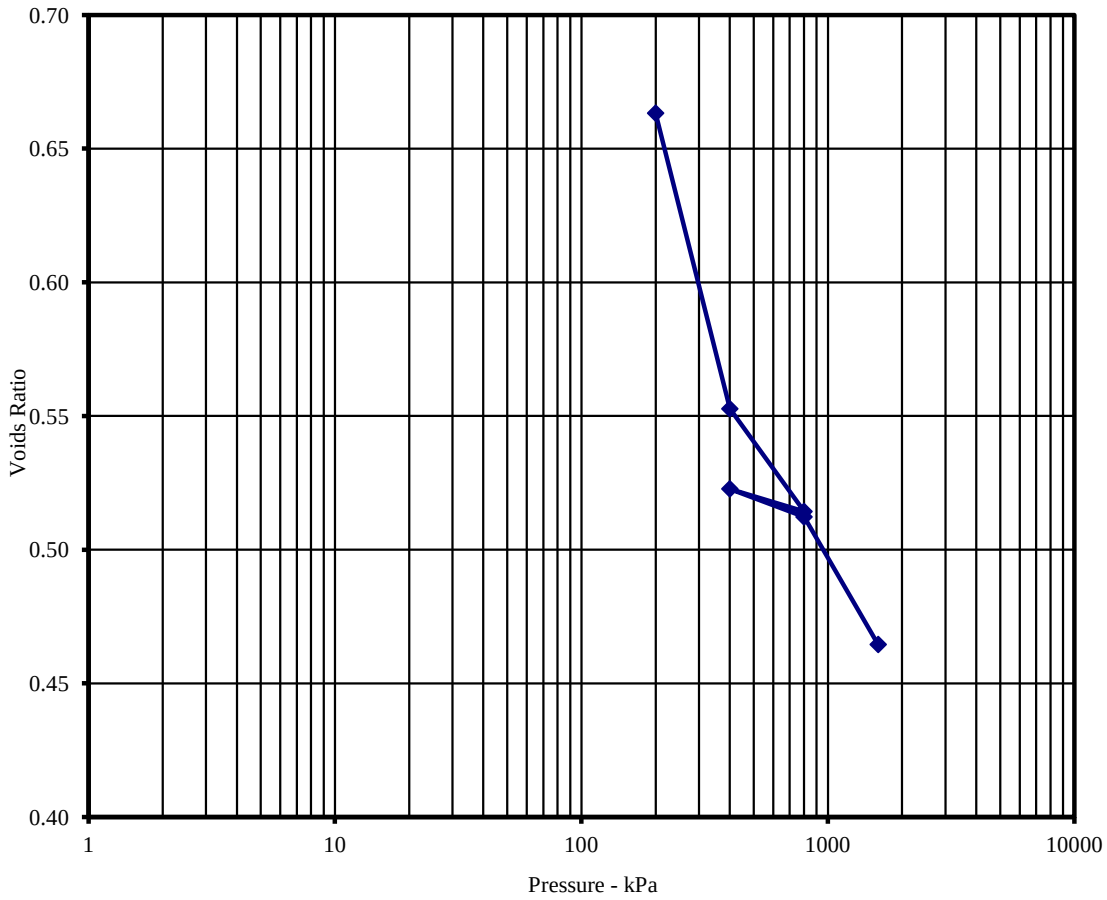
Hole/Sample Number: **BH303**

Depth (m) : **10.00 - N/A**

Sample Type: **U**

Hole Number: **BH303** Depth (m): **10.00 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	24						
Bulk Density (Mg/m3):	1.96	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.58	100	-	200	0.07	22.27	20'C
Voids Ratio:	0.6769	200	-	400	0.33	10.28	Location of specimen with sample
Degree of saturation:	92.8	400	-	800	0.06	8.81	top
Height (mm):	19.82	800	-	400	0.01	13.49	Remarks:
Diameter (mm)	74.98	400	-	800	0.02	15.66	
Particle Density (Mg/m3):	2.65	800	-	1600	0.04	5.76	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

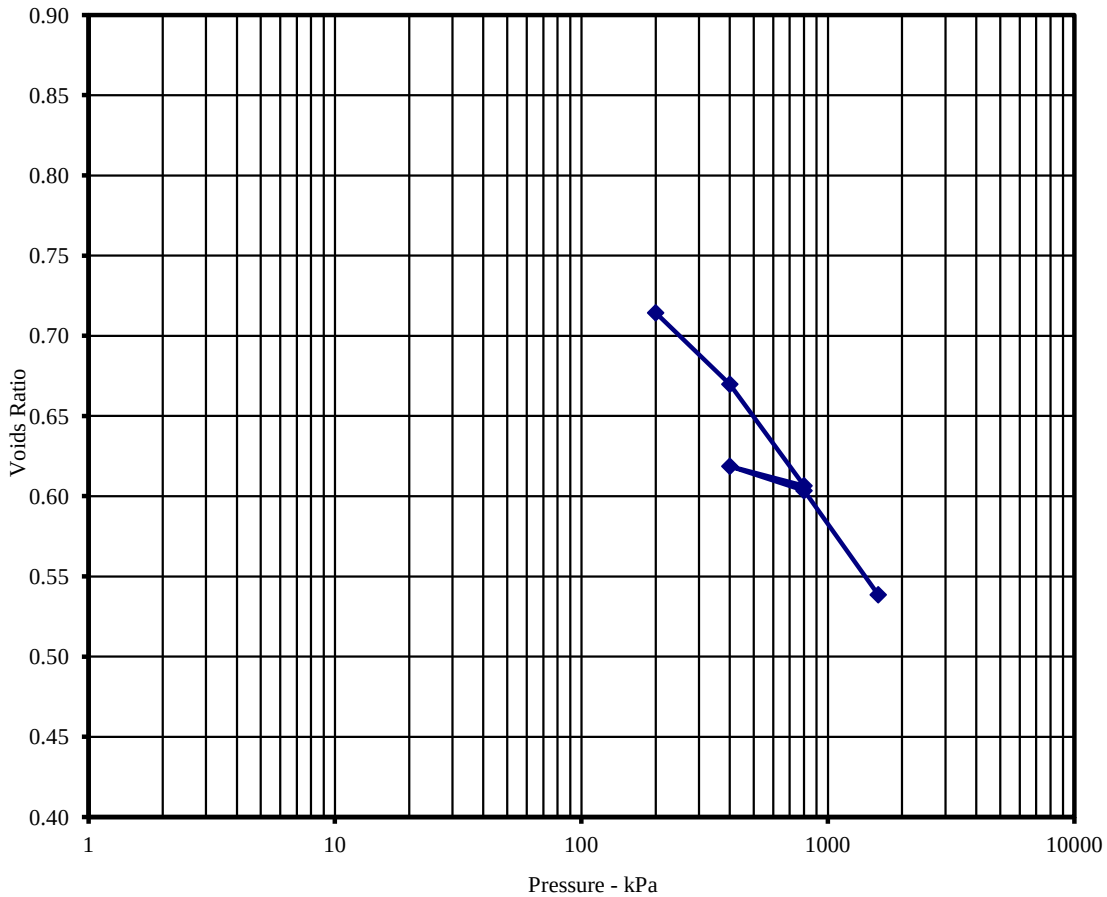
Hole/Sample Number: **BH304**

Depth (m) : **10.50 - N/A**

Sample Type: **U**

Hole Number: **BH304** Depth (m): **10.50 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	26						
Bulk Density (Mg/m3):	1.92	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.52	100	-	200	0.13	9.87	20'C
Voids Ratio:	0.7411	200	-	400	0.13	3.42	Location of specimen with sample
Degree of saturation:	94.3	400	-	800	0.09	9.41	top
Height (mm):	19.91	800	-	400	0.02	4.13	Remarks:
Diameter (mm)	75.09	400	-	800	0.02	3.31	
Particle Density (Mg/m3):	2.65	800	-	1600	0.05	2.40	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

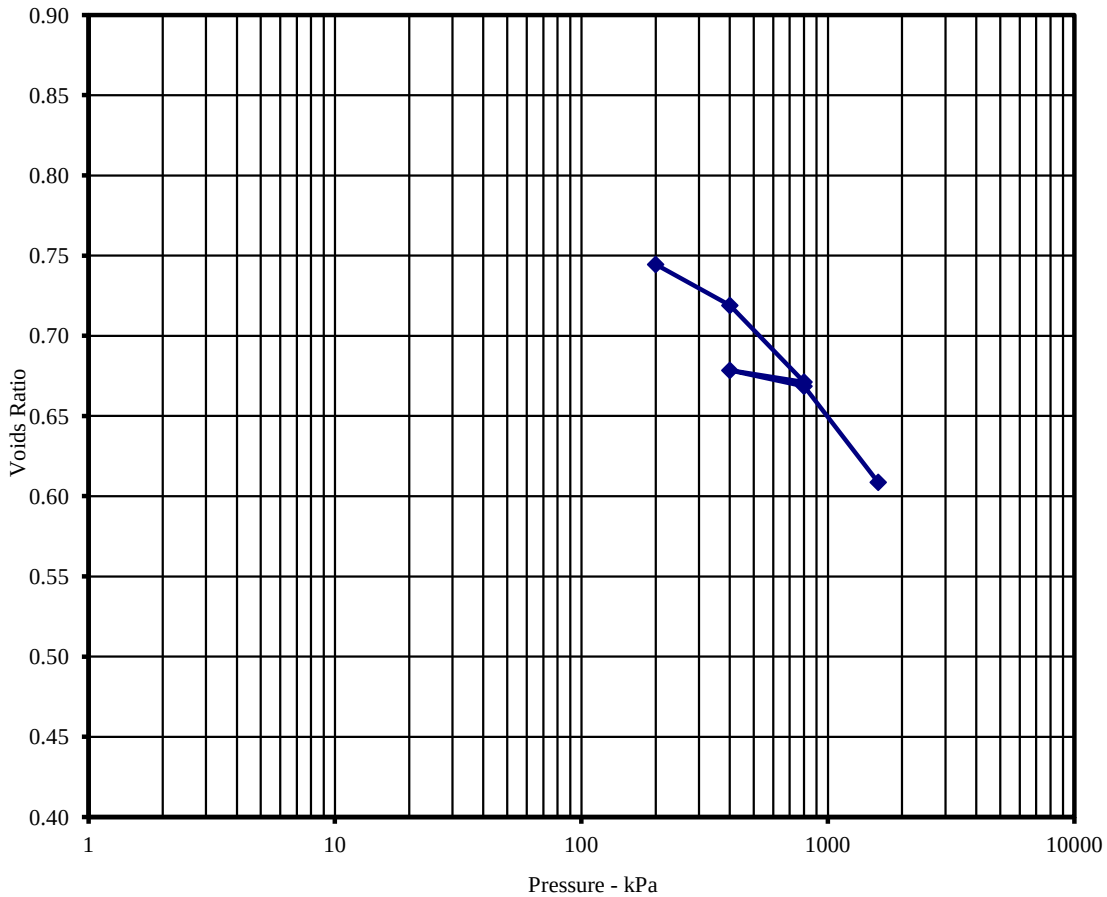
Hole/Sample Number: **BH305**

Depth (m) : **10.20 - N/A**

Sample Type: **U**

Hole Number: **BH305** Depth (m): **10.20 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	28						
Bulk Density (Mg/m3):	1.93	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.51	100	-	200	0.06	22.91	20'C
Voids Ratio:	0.7516	200	-	400	0.07	11.16	Location of specimen with sample
Degree of saturation:	98.4	400	-	800	0.07	10.07	top
Height (mm):	20.03	800	-	400	0.01	9.30	Remarks:
Diameter (mm)	50	400	-	800	0.01	10.42	
Particle Density (Mg/m3):	2.65	800	-	1600	0.04	2.35	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

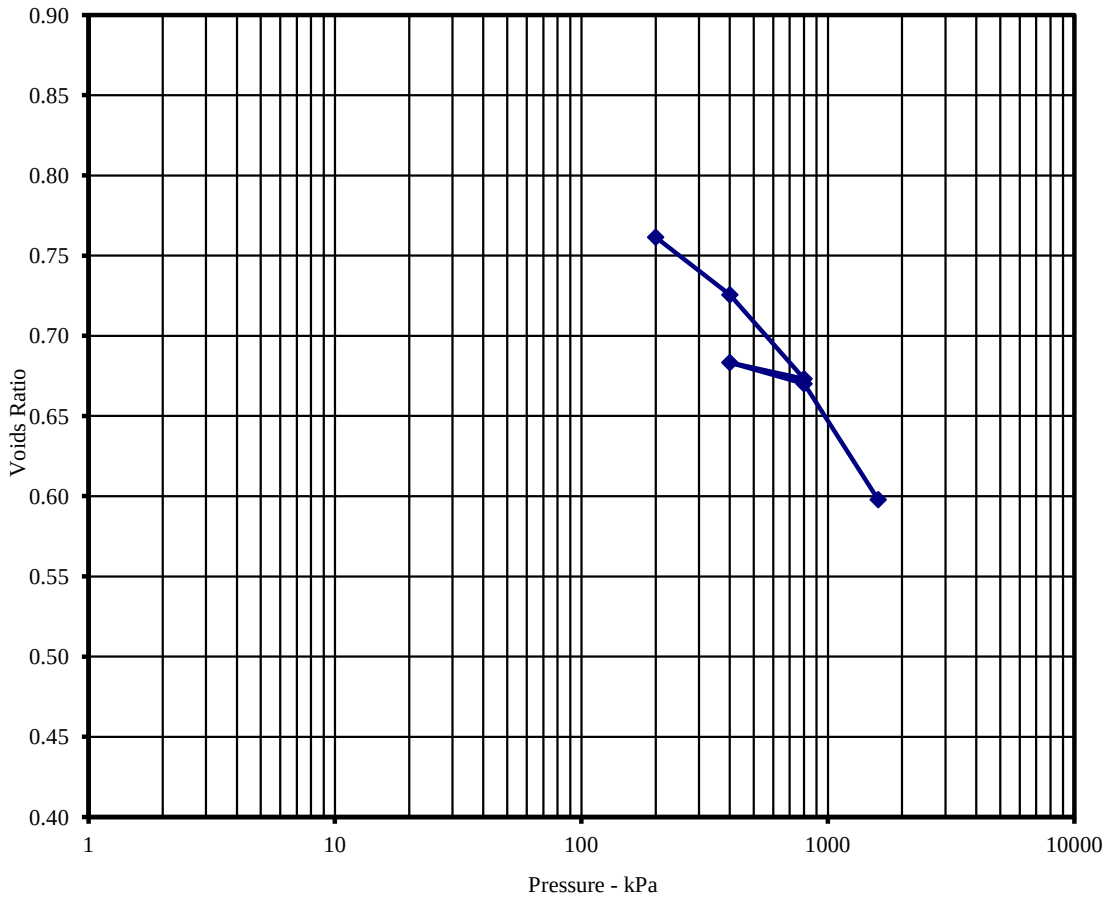
Hole/Sample Number: **BH306**

Depth (m) : **10.00 - N/A**

Sample Type: **U**

Hole Number: **BH306** Depth (m): **10.00 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	26						
Bulk Density (Mg/m3):	1.85	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.47	100	-	200	0.12	9.02	20'C
Voids Ratio:	0.8049	200	-	400	0.10	9.81	Location of specimen with sample
Degree of saturation:	84.9	400	-	800	0.08	6.10	top
Height (mm):	19.22	800	-	400	0.02	3.88	Remarks:
Diameter (mm)	75.07	400	-	800	0.02	15.52	
Particle Density (Mg/m3):	2.65	800	-	1600	0.05	2.81	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

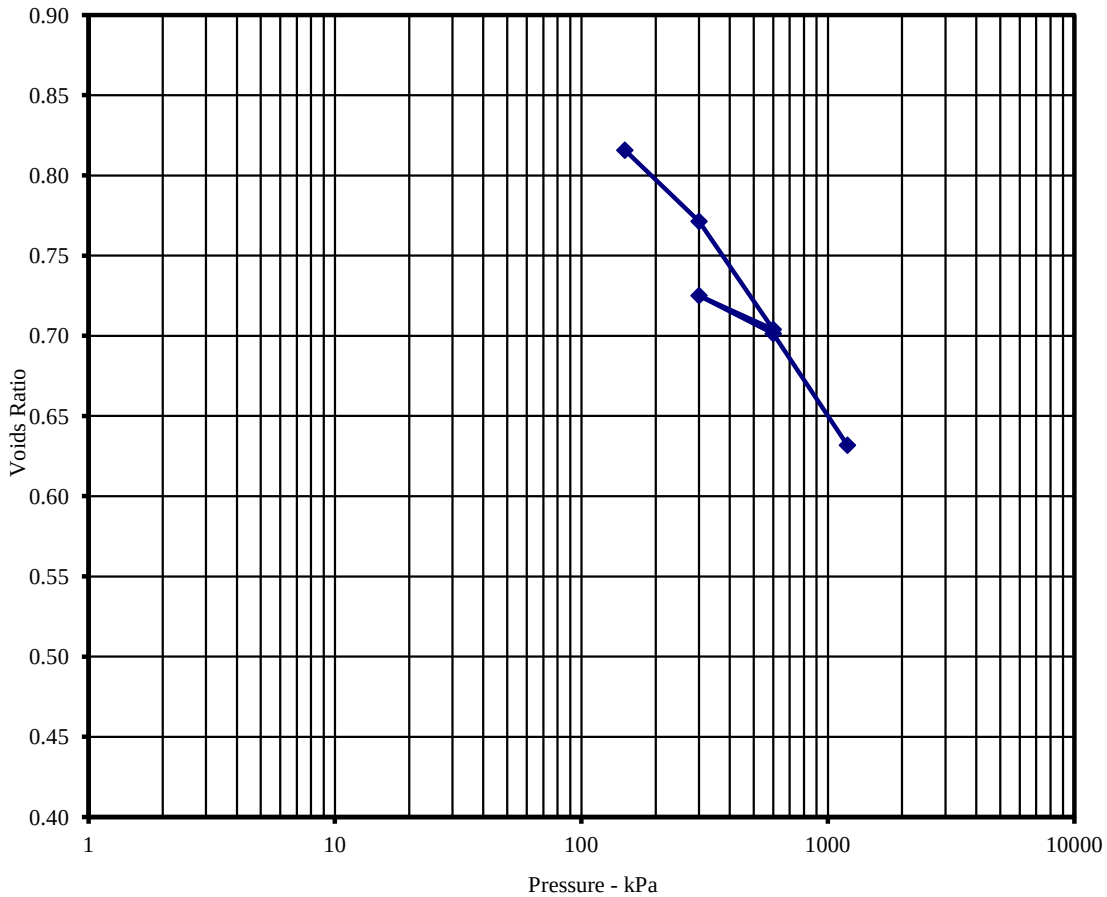
Hole/Sample Number: **BH307**

Depth (m) : **7.00 - N/A**

Sample Type: **U**

Hole Number: **BH307** Depth (m): **7.00 to N/A**

Initial Conditions		Pressure Range			Mv	Cv	Method of time fitting used
Moisture Content (%):	30	kPa			m2/MN	m2/yr	Cv Calculated using t90
Bulk Density (Mg/m3):	1.90	0	-	75	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.45	75	-	150	0.18	9.97	20'C
Voids Ratio:	0.8215	150	-	300	0.16	2.69	Location of specimen with sample
Degree of saturation:	98.3	300	-	600	0.13	0.82	top
Height (mm):	19.76	600	-	300	0.04	0.61	Remarks:
Diameter (mm)	74.91	300	-	600	0.05	1.53	
Particle Density (Mg/m3):	2.65	600	-	1200	0.07	0.58	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

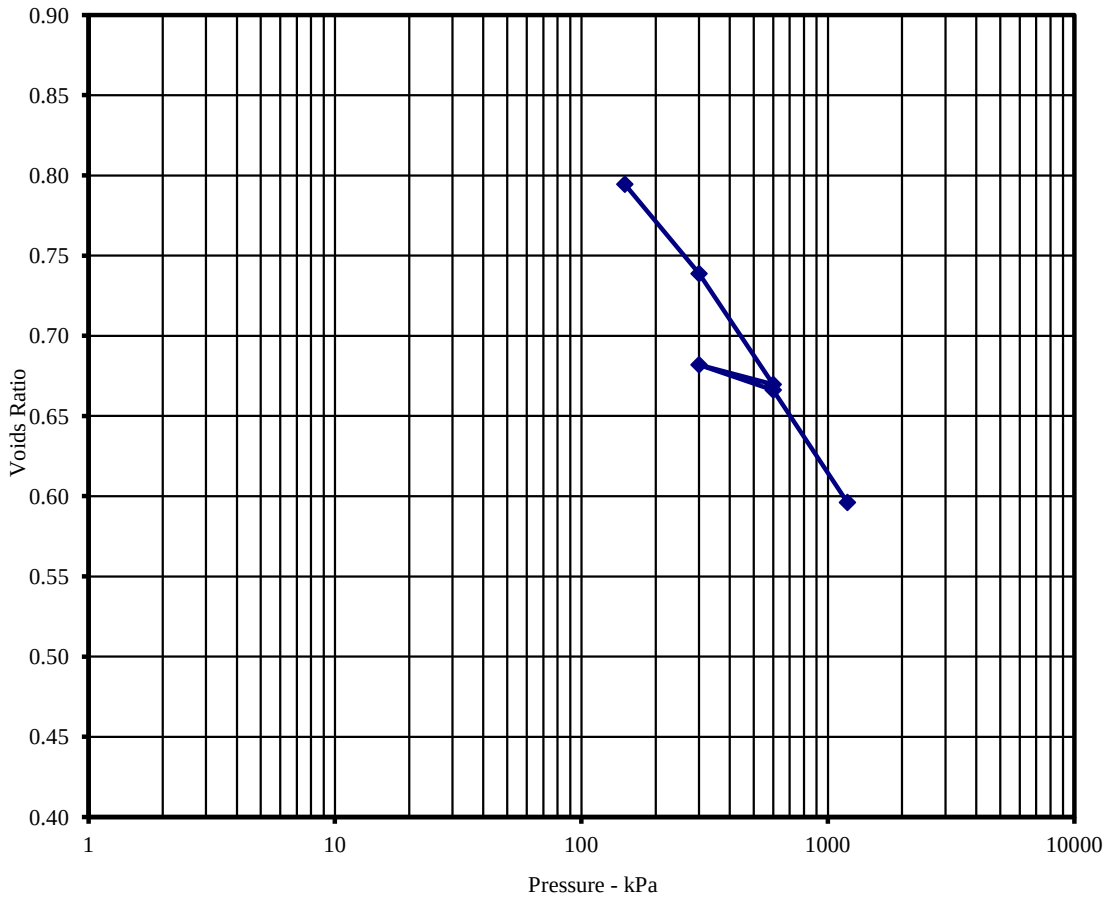
Hole/Sample Number: **BH308**

Depth (m) : **8.00 - N/A**

Sample Type: **U**

Hole Number: **BH308** Depth (m): **8.00 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	28						
Bulk Density (Mg/m3):	1.85	0	-	75	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.45	75	-	150	0.19	22.33	20'C
Voids Ratio:	0.8264	150	-	300	0.21	6.94	Location of specimen with sample
Degree of saturation:	88.9	300	-	600	0.13	6.46	top
Height (mm):	19.96	600	-	300	0.02	2.38	Remarks:
Diameter (mm)	50.06	300	-	600	0.03	9.53	
Particle Density (Mg/m3):	2.65	600	-	1200	0.07	1.01	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

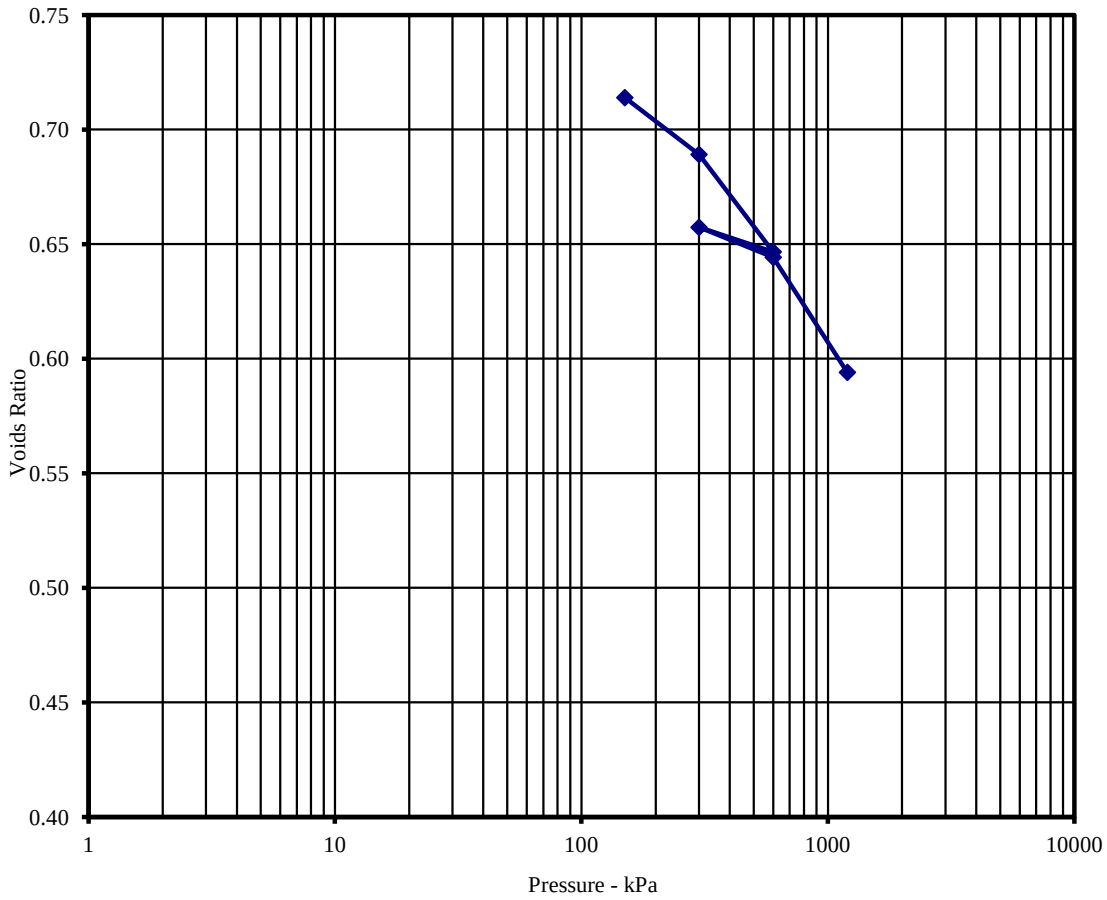
Hole/Sample Number: **BH309**

Depth (m) : **7.50 - N/A**

Sample Type: **U**

Hole Number: **BH309** Depth (m): **7.50 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	27						
Bulk Density (Mg/m3):	1.96	0	-	75	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.55	75	-	150	0.07	7.52	20'C
Voids Ratio:	0.7136	150	-	300	0.10	2.65	Location of specimen with sample
Degree of saturation:	99.4	300	-	600	0.08	1.13	top
Height (mm):	20.04	600	-	300	0.02	1.58	Remarks:
Diameter (mm)	50.02	300	-	600	0.03	2.65	
Particle Density (Mg/m3):	2.65	600	-	1200	0.05	0.60	
Assumed							



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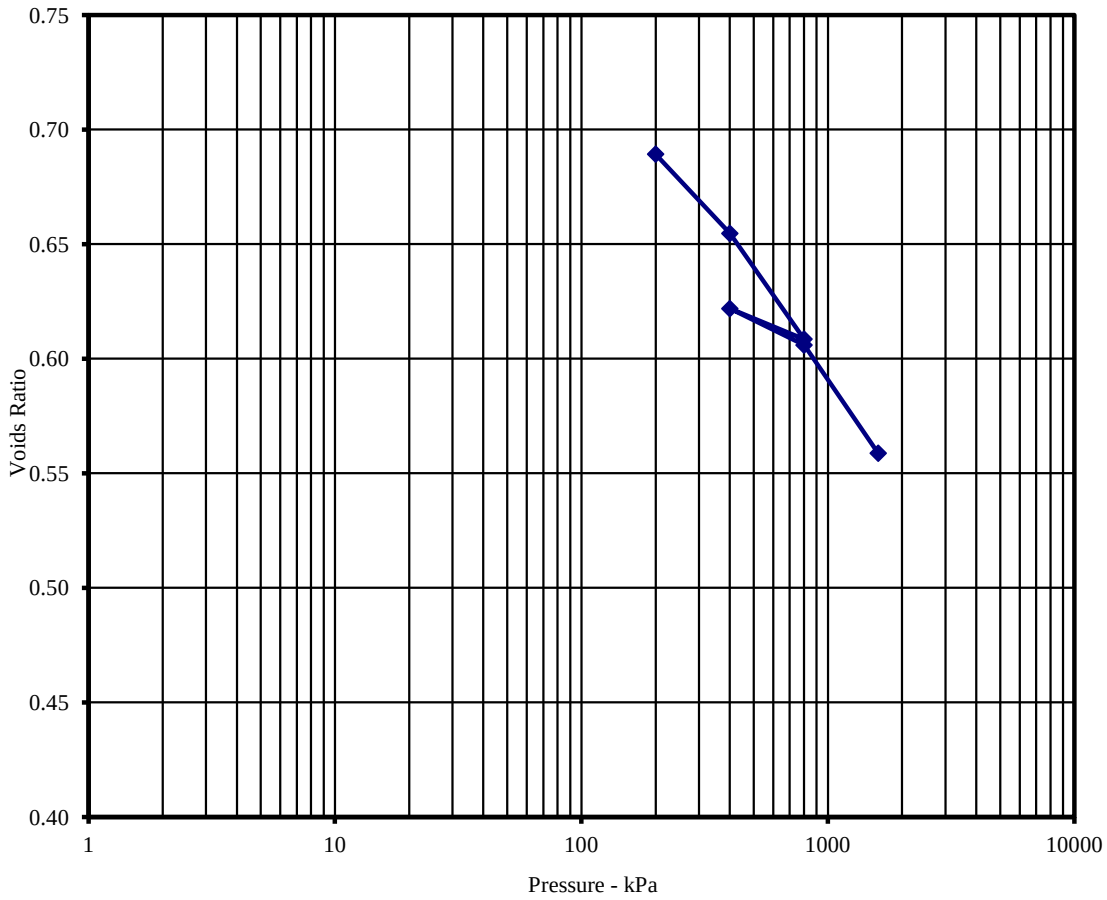
BS1377: Part 5: 1990

Client ref:	**35180**
Location:	**Edmonton Ecopark**
Contract Number:	**23719-010714**
Hole/Sample Number:	**BH310**
Depth (m) :	**8.50 - N/A**
Sample Type:	**U**

Hole Number: **BH310** Depth (m): **8.50 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	26						
Bulk Density (Mg/m3):	1.95	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.55	100	-	200	0.11	6.65	20'C
Voids Ratio:	0.7133	200	-	400	0.10	1.09	Location of specimen with sample
Degree of saturation:	96.6	400	-	800	0.07	1.05	top
Height (mm):	19.06	800	-	400	0.02	1.50	Remarks:
Diameter (mm)	74.93	400	-	800	0.02	2.94	
Particle Density (Mg/m3):	2.65	800	-	1600	0.04	0.99	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

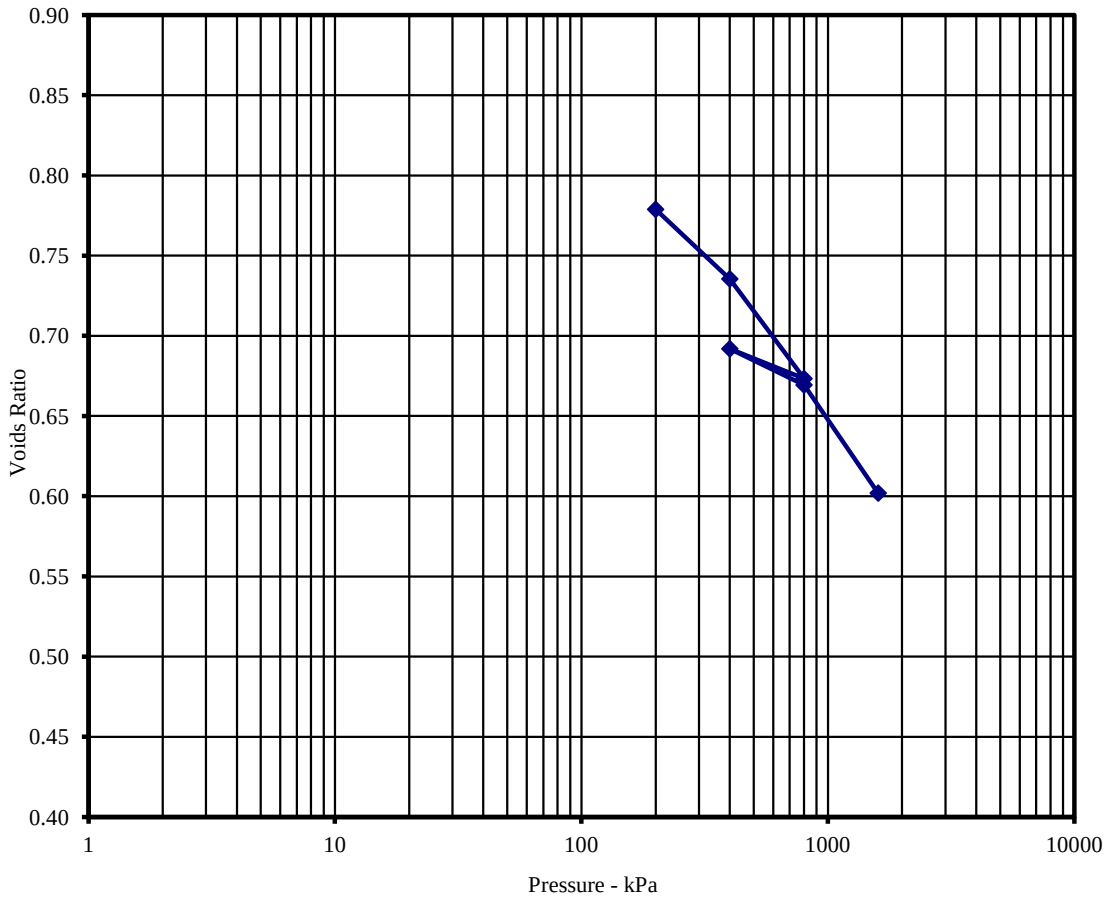
Hole/Sample Number: **BH311**

Depth (m) : **8.50 - N/A**

Sample Type: **U**

Hole Number: **BH311** Depth (m): **8.50 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	31						
Bulk Density (Mg/m3):	1.94	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.48	100	-	200	0.12	7.46	20'C
Voids Ratio:	0.7904	200	-	400	0.12	0.91	Location of specimen with sample
Degree of saturation:	105.2	400	-	800	0.09	0.53	top
Height (mm):	20.02	800	-	400	0.03	1.65	Remarks:
Diameter (mm)	50.05	400	-	800	0.03	0.83	
Particle Density (Mg/m3):	2.65	800	-	1600	0.05	0.78	
Assumed							



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BS1377: Part 5: 1990

Client ref: **35180**

Location: **Edmonton Ecopark**

Contract Number: **23719-010714**

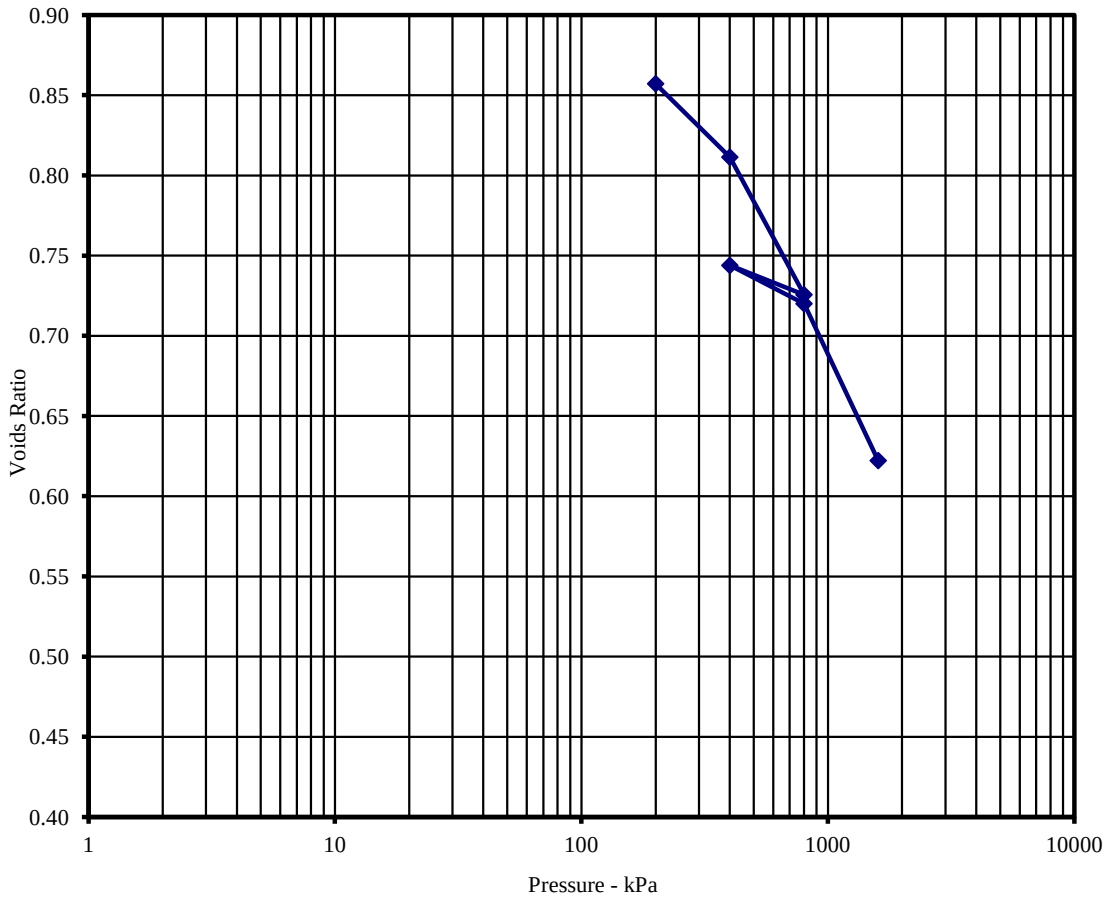
Hole/Sample Number: **BH312**

Depth (m) : **13.50 - N/A**

Sample Type: **U**

Hole Number: **BH312** Depth (m): **13.50 to N/A**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	33						
Bulk Density (Mg/m3):	1.90	0	-	100	Swelling	Stage	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.43	100	-	200	0.11	5.77	20'C
Voids Ratio:	0.8491	200	-	400	0.12	2.77	Location of specimen with sample
Degree of saturation:	101.8	400	-	800	0.12	1.56	top
Height (mm):	19.92	800	-	400	0.03	1.36	Remarks:
Diameter (mm)	50.02	400	-	800	0.03	1.55	
Particle Density (Mg/m3):	2.65	800	-	1600	0.07	0.57	
Assumed							



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Laboratory Report

GEO Site & Testing Services Ltd

Contract Number: 24743

Client's Reference: **GTS-14-403 SCH 14**

Report Date: **31-10-2014**

Client **Ground Technology Services**
Maple Road
Kings Lynn
Norfolk
PE34 3AF

Contract Title: **Edmonton Ecopark**

For the attention of: **Ben Armstrong**

Date Received: **09-10-2014**

Date Commenced: **09-10-2014**

Date Completed: **31-10-2014**

Test Description	Qty
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	4
Extra Over Item (4 Days Over)	26

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:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Williams (Office Manager) - Paul Evans (Quality/Technical Manager)

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

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH301
Sample No.		U31
Depth	m	16
Date		29/10/2014
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown sl silty CLAY

Initial Specimen Conditions

Height	mm	102.00
Diameter	mm	103.00
Area	mm^2	8332.29
Volume	cm^3	849.89
Mass	g	1704.90
Dry Mass	g	1345.30
Density	Mg/m^3	2.01
Dry Density	Mg/m^3	1.58
Moisture Content	%	26.7
Voids Ratio		0.674
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	28.66
Density	Mg/m^3	2.07
Dry Density	Mg/m^3	1.61

Test Setup

Date started	13/10/2014
Date Finished	28/10/2014
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P8
Cell Number	C8

Checked and Approved By

29/10/14
Date

Client Ref

GTS-14-403

Contract No

24743-091014

Edmonton Ecopark

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GEO Site & Testing Services Limited

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH301
Sample No.		U31
Depth	m	16
Date		29/10/2014

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	48.00
Differential Pressure	kPa	2.00
Final Cell Pressure	kPa	400.00
Final Pore Pressure	kPa	377.20
Final B Value		0.96

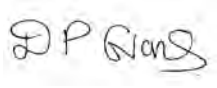
Consolidation

Effective Pressure	kPa	50.00
Cell Pressure	kPa	400.00
Back Pressure	kPa	350.00
Excess Pore Pressure	kPa	50.00
Pore Pressure at End	kPa	350.00
Consolidated Volume	cm^3	835.09
Consolidated Height	mm	101.41
Consolidated Area	mm^2	8235.56
Vol. Compressibility	m^2/MN	1.8874
Consolidation Coef.	$m^2/yr.$	0.3483
Final Voids Ratio		0.645

Permeability

Cell Pressure	kPa	400.00
Effective Cell Pressure	kPa	50.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00068
Average Temperature	'C	20

Vertical Permeability | m/s	**6.78 x 10-11**



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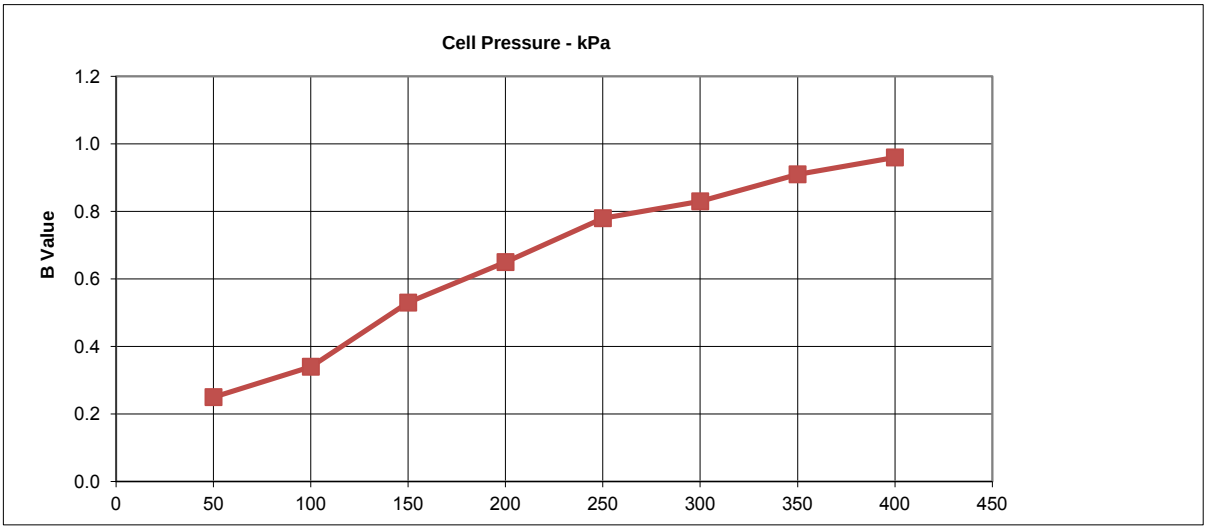
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

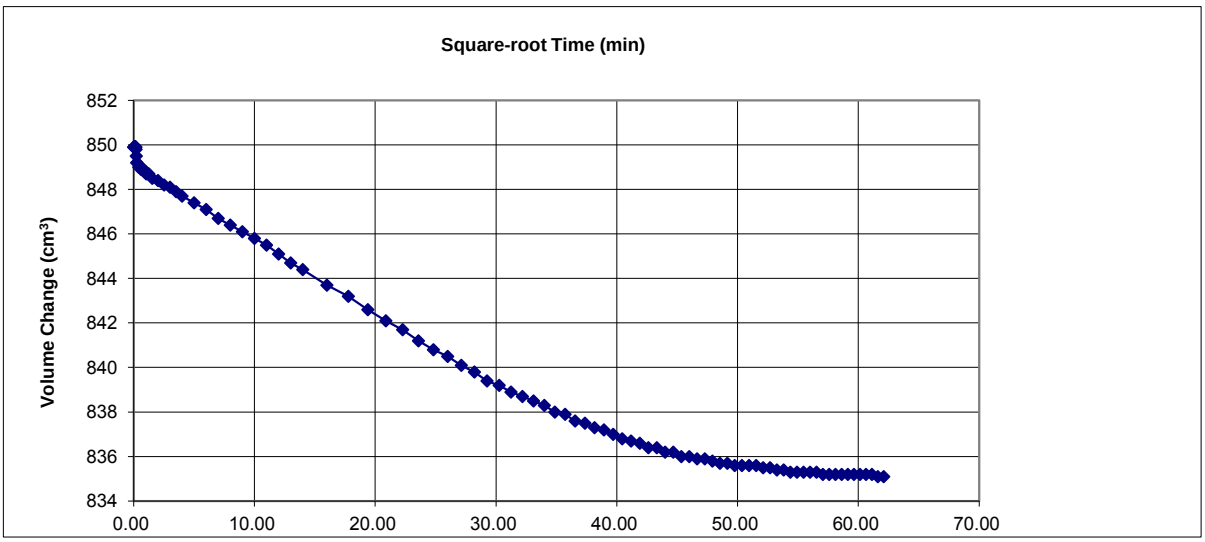
Specimen Details

Borehole		BH301
Sample No.		U31
Depth	m	16
Date		29/10/2014

Saturation Stage



Consolidation Stage



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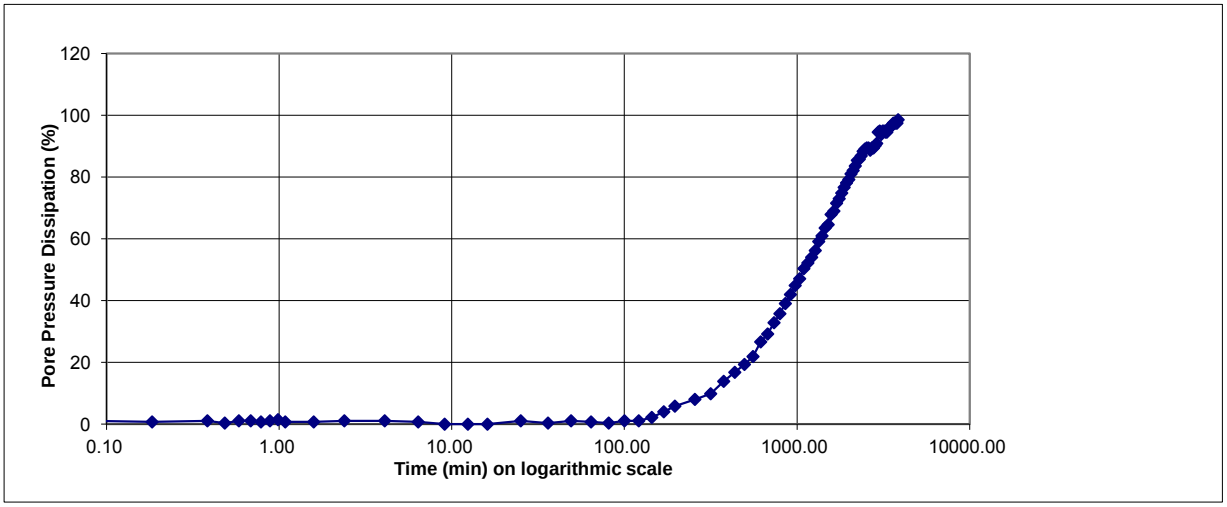
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

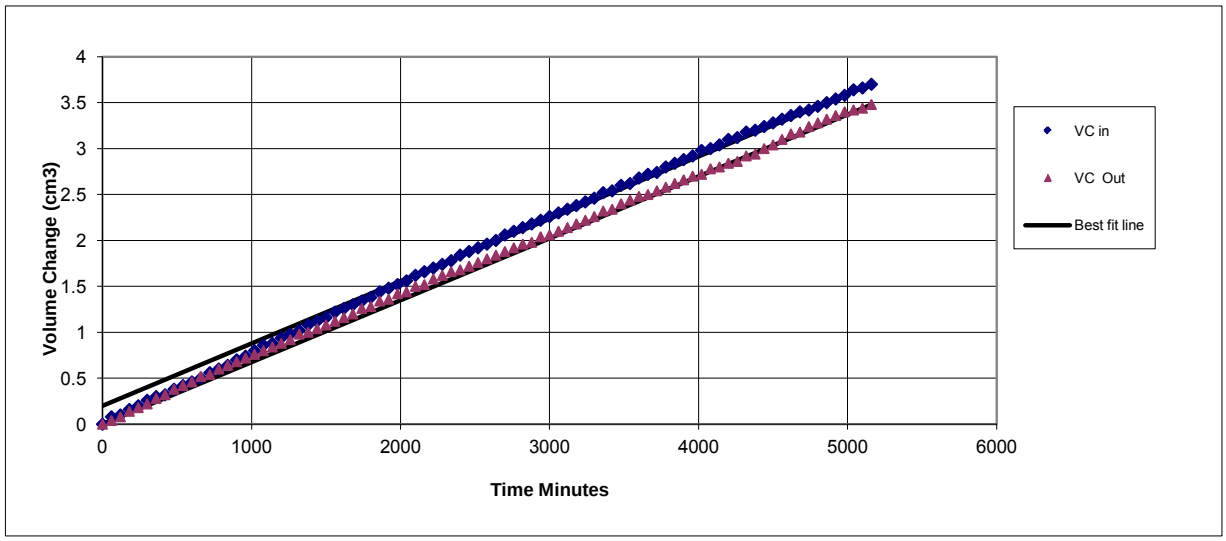
Specimen Details

Borehole		BH301
Sample No.		U31
Depth	m	16
Date		29/10/2014

Consolidation Stage



Permeability Stage



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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH306
Sample No.		U30
Depth	m	21.59M
Date		29/10/2014
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown sl silty CLAY

Initial Specimen Conditions

Height	mm	100.00
Diameter	mm	104.00
Area	mm^2	8494.87
Volume	cm^3	849.49
Mass	g	1715.60
Dry Mass	g	1359.20
Density	Mg/m^3	2.02
Dry Density	Mg/m^3	1.60
Moisture Content	%	26.2
Voids Ratio		0.656
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	27.07
Density	Mg/m^3	2.17
Dry Density	Mg/m^3	1.71

Test Setup

Date started	13/10/2014
Date Finished	28/10/2014
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P10
Cell Number	C10

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH306
Sample No.		U30
Depth	m	21.59M
Date		29/10/2014

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	50.00
Differential Pressure	kPa	0.00
Final Cell Pressure	kPa	200.00
Final Pore Pressure	kPa	238.00
Final B Value		1.00

Consolidation

Effective Pressure	kPa	50.00
Cell Pressure	kPa	250.00
Back Pressure	kPa	200.00
Excess Pore Pressure	kPa	38.00
Pore Pressure at End	kPa	200.00
Consolidated Volume	cm^3	795.29
Consolidated Height	mm	97.87
Consolidated Area	mm^2	8133.53
Vol. Compressibility	m^2/MN	0.7541
Consolidation Coef.	$m^2/yr.$	1.6790
Final Voids Ratio		0.551

Permeability

Cell Pressure	kPa	250.00
Effective Cell Pressure	kPa	50.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00425
Average Temperature	'C	20

Verticle Permiability Kv m/s	**4.16 x 10-11**

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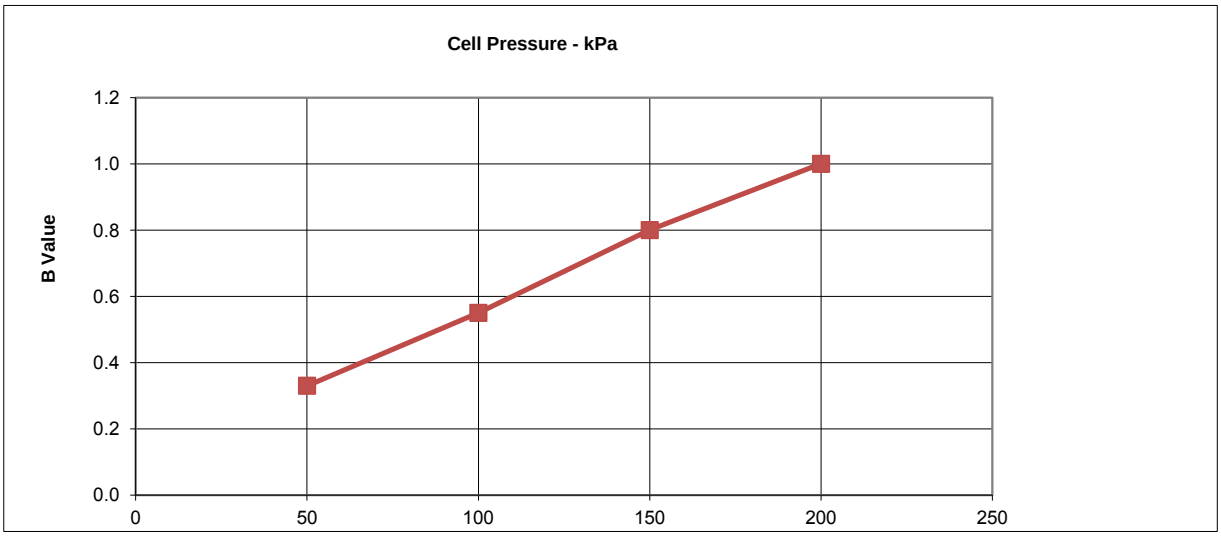
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

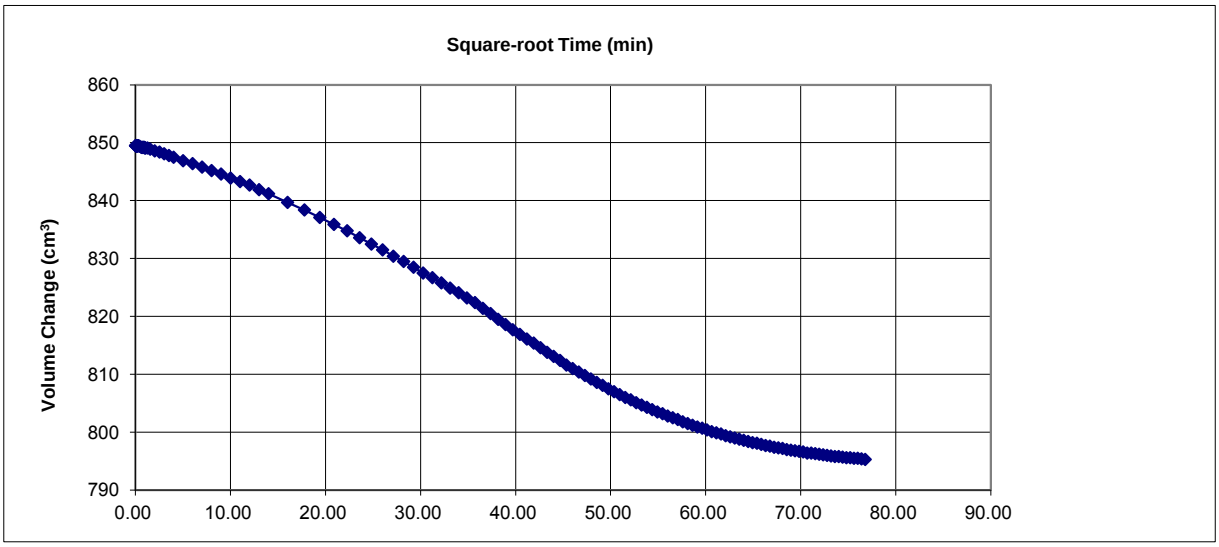
Specimen Details

Borehole		BH306
Sample No.		U30
Depth	m	21.59M
Date		29/10/2014

Saturation Stage



Consolidation Stage



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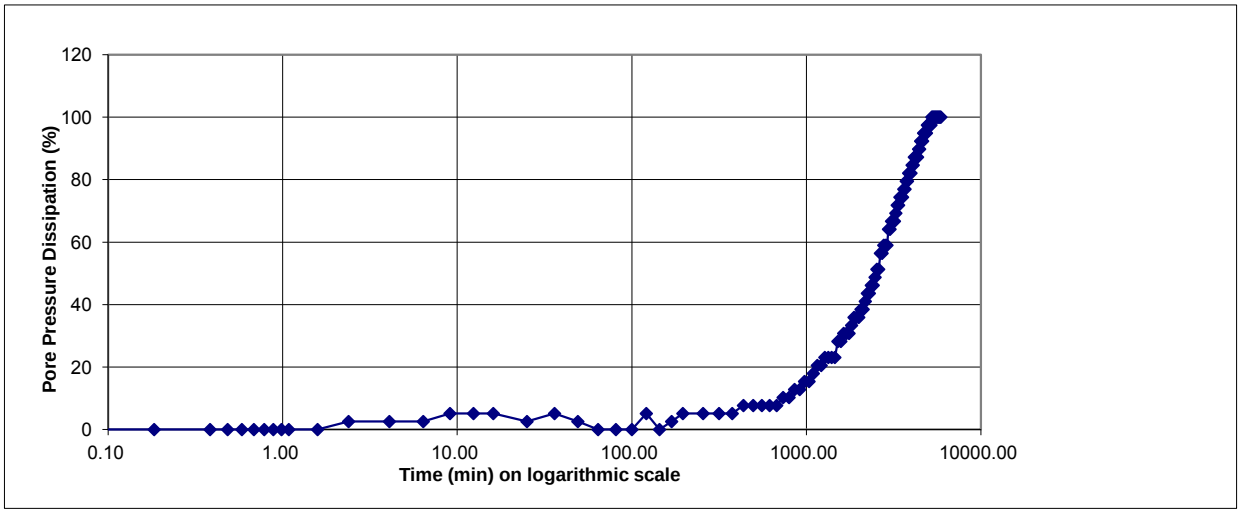
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

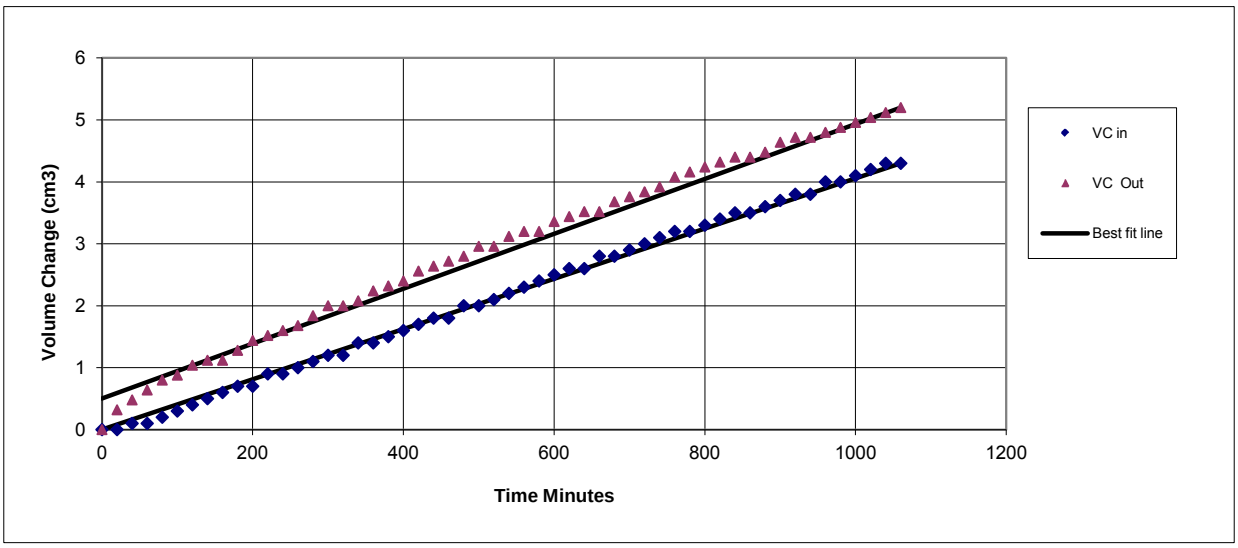
Specimen Details

Borehole		BH306
Sample No.		U30
Depth	m	21.59M
Date		29/10/2014

Consolidation Stage



Permeability Stage



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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH307
Sample No.		U32
Depth	m	20.5
Date		29/10/2014
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown sl silty CLAY

Initial Specimen Conditions

Height	mm	102.00
Diameter	mm	105.00
Area	mm^2	8659.01
Volume	cm^3	883.22
Mass	g	1739.20
Dry Mass	g	1390.50
Density	Mg/m^3	1.97
Dry Density	Mg/m^3	1.57
Moisture Content	%	25.1
Voids Ratio		0.683
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	26.40
Density	Mg/m^3	2.12
Dry Density	Mg/m^3	1.67

Test Setup

Date started	13/10/2014
Date Finished	28/10/2014
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P2
Cell Number	C2

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH307
Sample No.		U32
Depth	m	20.5
Date		29/10/2014

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	50.00
Differential Pressure	kPa	0.00
Final Cell Pressure	kPa	200.00
Final Pore Pressure	kPa	199.40
Final B Value		1.00

Consolidation

Effective Pressure	kPa	50.00
Cell Pressure	kPa	200.00
Back Pressure	kPa	150.00
Excess Pore Pressure	kPa	49.40
Pore Pressure at End	kPa	151.80
Consolidated Volume	cm^3	830.92
Consolidated Height	mm	99.99
Consolidated Area	mm^2	8317.18
Vol. Compressibility	m^2/MN	3.3111
Consolidation Coef.	$m^2/yr.$	1.2440
Final Voids Ratio		0.584

Permeability

Cell Pressure	kPa	200.00
Effective Cell Pressure	kPa	50.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00096
Average Temperature	'C	20

Vertical Permeability I m/s	**9.39 x 10-11**

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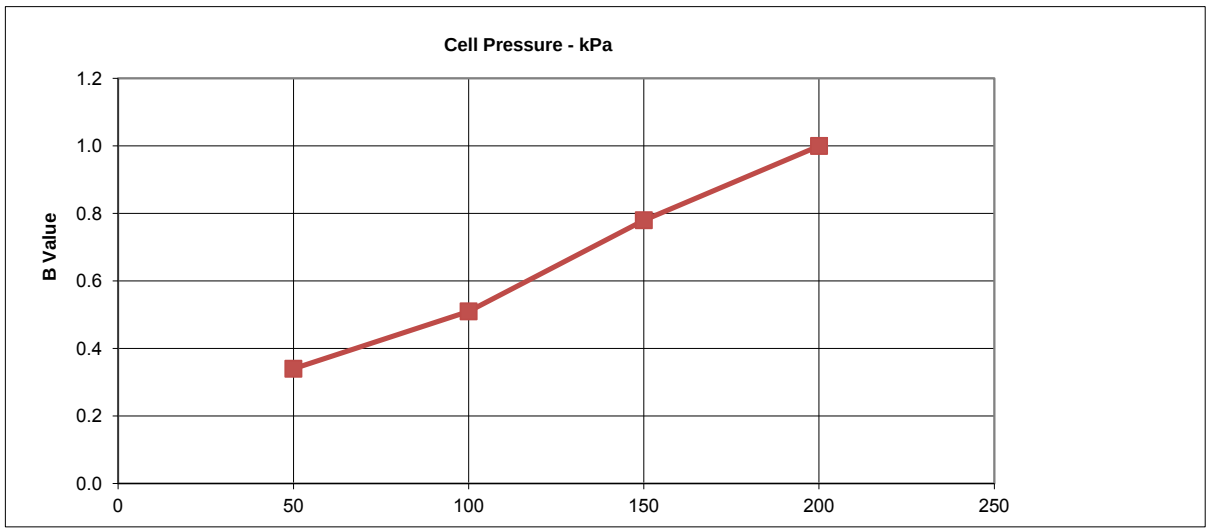
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

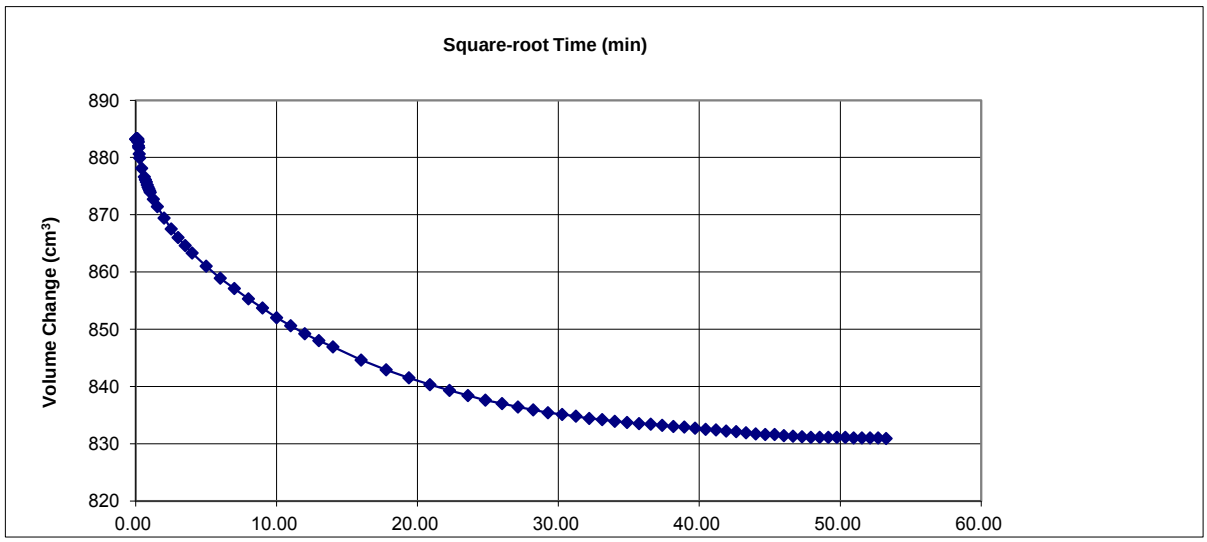
Specimen Details

Borehole		BH307
Sample No.		U32
Depth	m	20.5
Date		29/10/2014

Saturation Stage



Consolidation Stage



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Permeability in a Triaxial Cell

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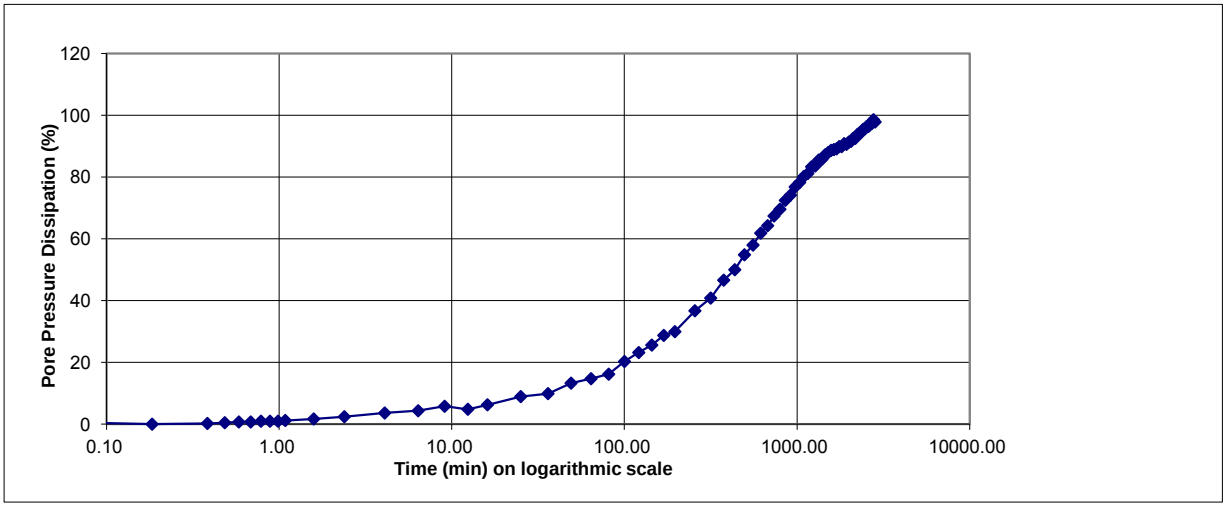
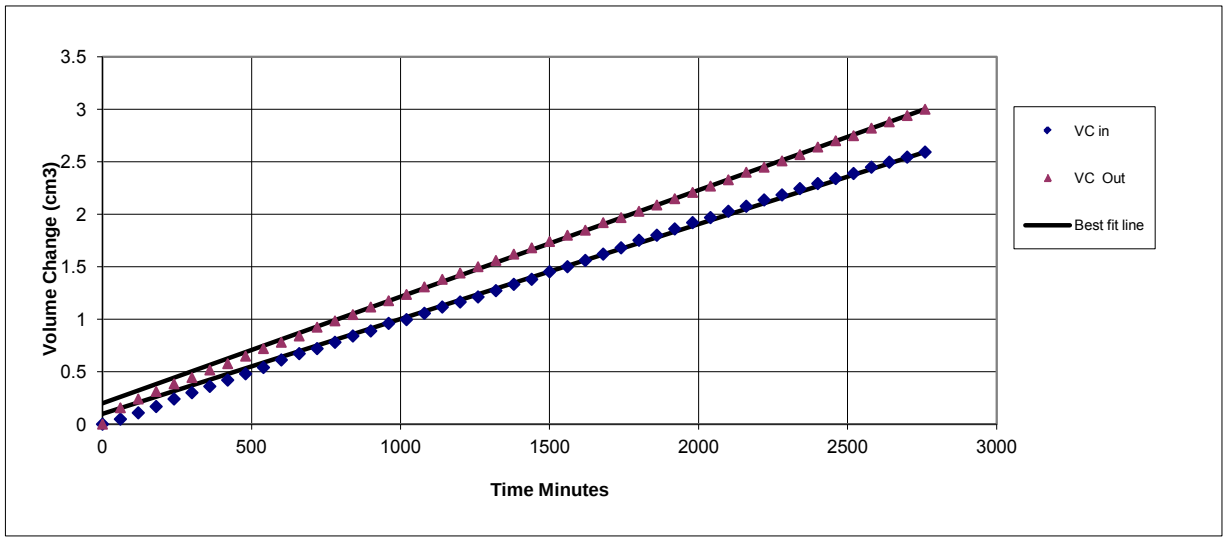
Specimen Details

Borehole		BH307
Sample No.		U32
Depth	m	20.5
Date		29/10/2014

Consolidation Stage



Permeability Stage



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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH309
Sample No.		U24
Depth	m	15.19
Date		31/10/2014
Disturbed / Undisturbed		Undisutrbed

Description of Specimen

Dark greyish brown slightly silty CLAY

Initial Specimen Conditions

Height	mm	102.00
Diameter	mm	105.00
Area	mm^2	8659.01
Volume	cm^3	883.22
Mass	g	1839.50
Dry Mass	g	1458.20
Density	Mg/m^3	2.08
Dry Density	Mg/m^3	1.65
Moisture Content	%	26.1
Voids Ratio		0.605
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	27.07
Density	Mg/m^3	2.18
Dry Density	Mg/m^3	1.72

Test Setup

Date started	13/10/2014
Date Finished	30/10/2014
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P1
Cell Number	C1

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		BH309
Sample No.		U24
Depth	m	15.19
Date		31/10/2014

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	395.00
Final Pore Pressure	kPa	490.00
Final B Value		0.95

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	500.00
Back Pressure	kPa	400.00
Excess Pore Pressure	kPa	90.00
Pore Pressure at End	kPa	401.00
Consolidated Volume	cm^3	849.92
Consolidated Height	mm	100.72
Consolidated Area	mm^2	8441.37
Vol. Compressibility	m^2/MN	1.1314
Consolidation Coef.	$m^2/yr.$	0.4236
Final Voids Ratio		0.545

Permeability

Cell Pressure	kPa	500.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00036
Average Temperature	'C	20

Vertical Permeability Kv	**m/s**	**3.46 x 10-11**

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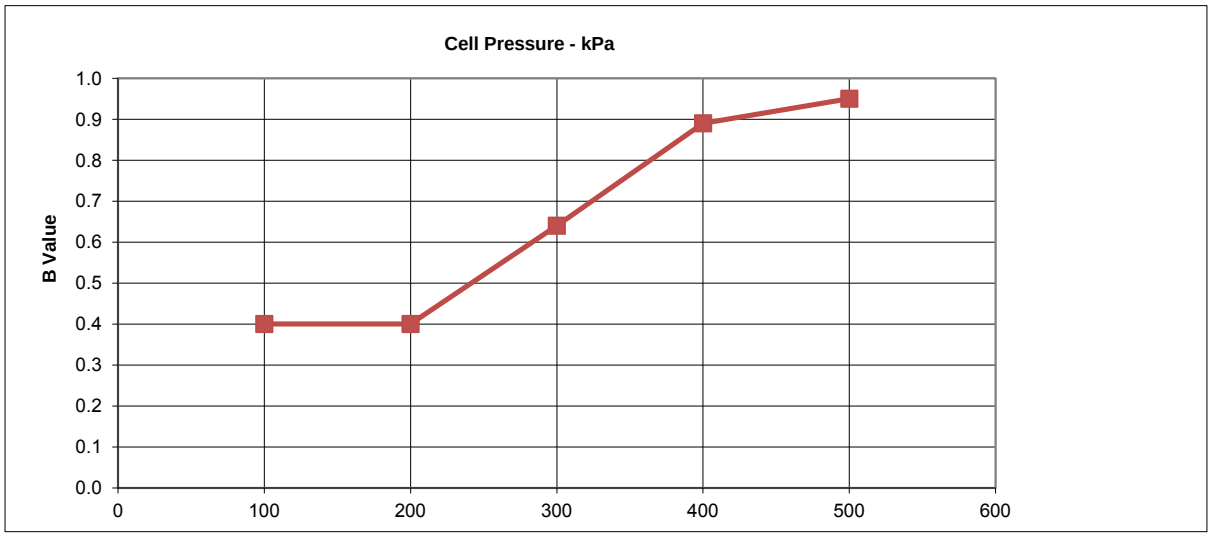
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

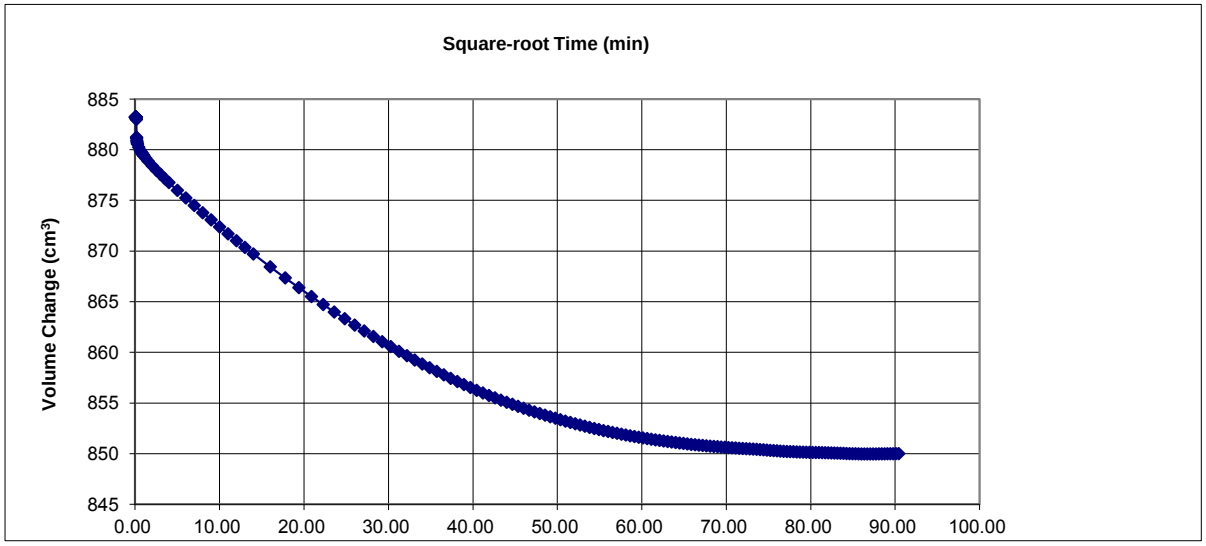
Specimen Details

Borehole		BH309
Sample No.		U24
Depth	m	15.19
Date		31/10/2014

Saturation Stage



Consolidation Stage



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Permeability in a Triaxial Cell

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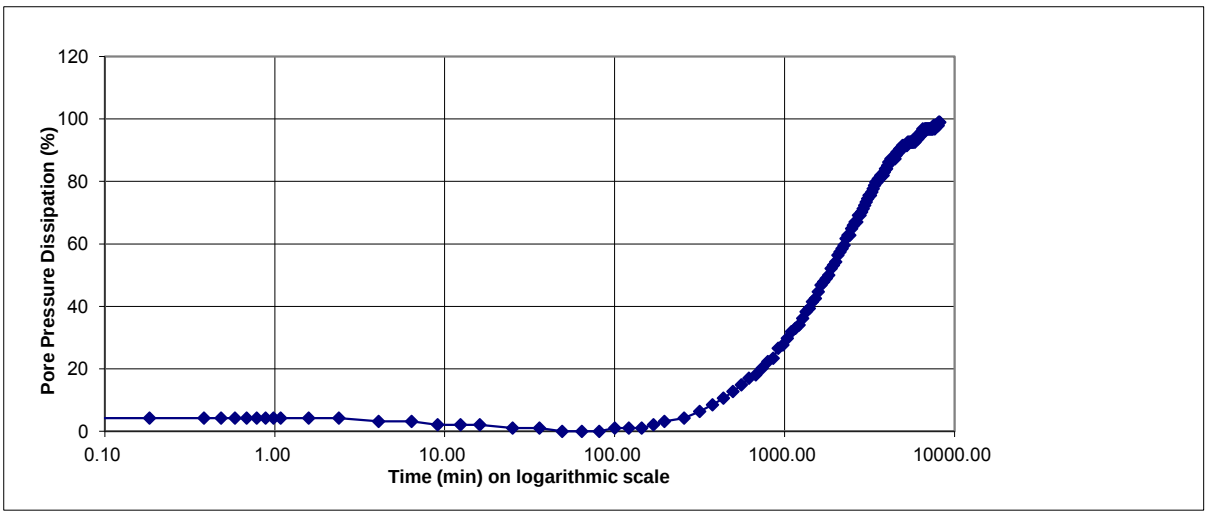
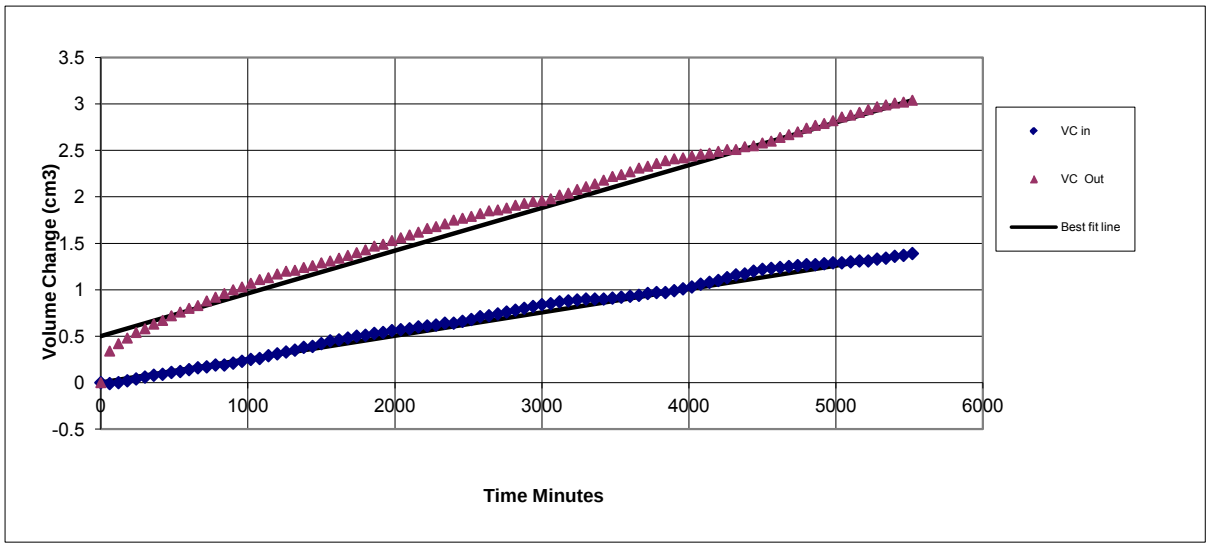
Specimen Details

Borehole		BH309
Sample No.		U24
Depth	m	15.19
Date		31/10/2014

Consolidation Stage



Permeability Stage



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