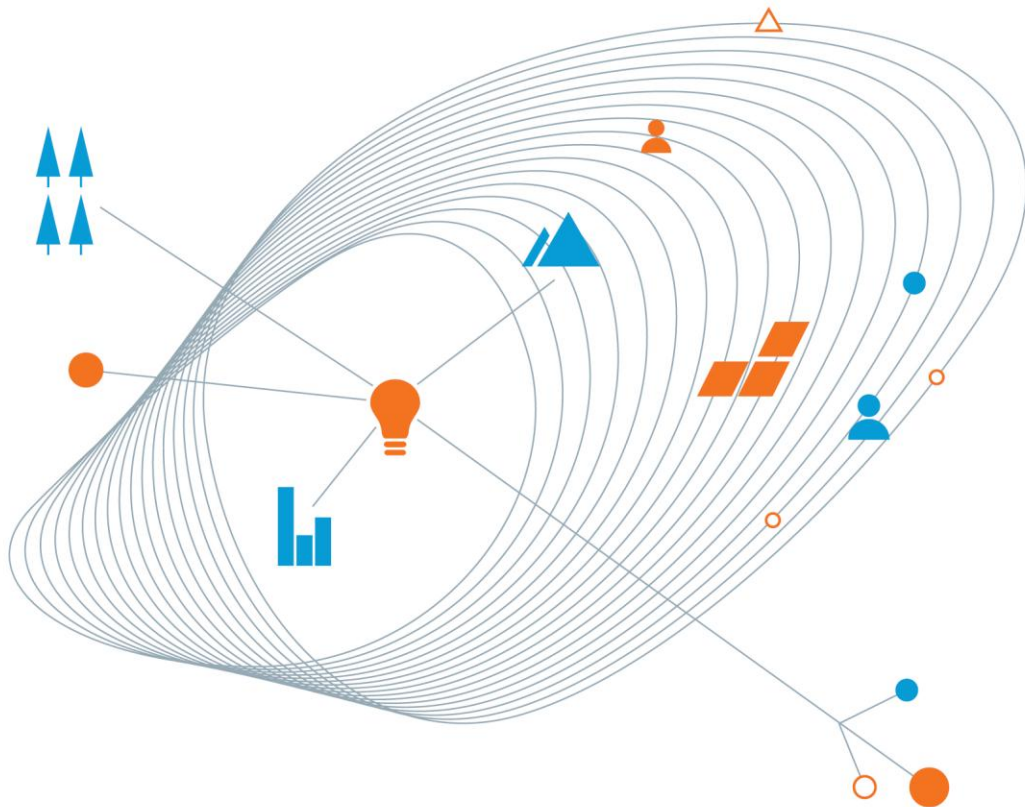


Innovation is  
finding answers  
to questions  
no one has  
asked



The Lakes (2012) Limited  
Geotechnical Completion Report  
on Stage 2QRST at The Lakes Subdivision  
GENZTAUC13086AE-AC (Revision 1)  
9 June 2014



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9 June 2014

The Lakes (2012) Limited  
C/- Mr Grant Rae  
Harrison Grierson Consultants Limited  
PO Box  
Tauranga

Email: G.Rae@HarrisonGrierson.com

Dear Grant,

**RE: Geotechnical Completion Report for The Lakes (2012) Limited at Stage 2QRST, The Lakes Subdivision, Tauriko, Tauranga**

This report presents all supporting geotechnical data and our Suitability Statement in relation to land development works undertaken at the above location.

It has been prepared in accordance with instructions received from The Lakes (2012) Limited and forms part of the documentation required by Tauranga City Council to achieve certification under Section 224(c) of the Resource Management Act.

If you have any queries or you require any further clarification on any aspect of this report, please do not hesitate to contact the undersigned.

For and on behalf of Coffey

A handwritten signature in dark ink, appearing to read "R. Telford".

**R.B. Telford**

Engineering Geologist

|               |  |          |
|---------------|--|----------|
| Distribution: | The Lakes (2012) Limited                         | 2 Copies |
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Important Information About Your Coffey Report

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## **1 INTRODUCTION AND SCOPE**

This Geotechnical Completion Report (GCR) has been prepared by Coffey Geotechnics (NZ) Ltd (Coffey) for The Lakes (2012) Limited as part of the documentation to be submitted to the Tauranga City Council following subdivision development in general accordance with the conditions of Council resource consent number RC21332. It contains a Geotechnical Suitability Statement (Appendix A), the results of site investigations and relevant quality control test data, together with as-built plans derived from Harrison Grierson Consultants Ltd (HGCL) topographical data.

This report covers bulk earthworks completed during two construction periods in 2007-2008 and 2012-2013. Minor earthworks were also undertaken in early 2014 during the civil construction period, as described herein. This report is intended to be used for certification purposes for the new lots as shown on the appended As-Built Contour Plan (Figure 05).

Lots 868 to 870 and 887 to 890 inclusive have been excluded from this GCR. Lots 868 to 870 contain a large sediment pond and topsoil stockpile which is being used for Stage 3 of the Lakes subdivision. Lots 887 to 889 received a minor amount of filling near the end of the civil construction period and are subject to on-going settlement monitoring. Lot 890 is currently being used to stockpile topsoil and is in an area that may be affected by earthworks for Stage 3. The locations of these excluded lots are shown on the attached figures.

## **2 DESCRIPTION OF SUBDIVISION**

Stages 2Q, 2R, 2S & 2T of the Lakes subdivision (collectively referred to as 2QRST) are located to the south-east of the intersection of Takitimu Drive (State Highway 36) and Kennedy Road in Tauriko, Tauranga. These stages of the subdivision consist of a total of 90 residential lots with associated access roads and reserve areas.

The new lots are located on flat or gently sloping ground that has been formed through excavation and controlled filling at the foot of a steep natural slope that rises to the east of the site. Details of these earthworks are shown on Figures 2 and 4 which cover the 2007-2008 and 2012-2013 construction seasons respectively.

Work in 2007-2008 generally involved clearing out and filling several narrow gullies at the northern end of the site and a low-lying valley at the southern end of the development. A significant thickness of peat and organic soil was removed from the low-lying parts of this site at this time, up to the peat 'win-line' shown on Figure 2. Beyond this line the peat excavation depths became too deep to continue economically. Excavation was also undertaken to lower a prominent ridge that separated stages 2Q and 2T, forming an approximately 30m high 1V:2.5H batter. The finished ground surface at the end of this earthworks stage is shown on Figure 3.

Due to the risk of possible instability on the natural (i.e. un-modified) parts of the slope to the east of the development, two sections of debris barrier were constructed at the toe of the slope in the locations shown on Figure 3.

In 2012-2013, further excavation was undertaken to complete the 1V:2.5H batter. Material from this excavation was placed as controlled fill within the subdivision area (Figure 4), forming the finished ground surface shown on Figure 5. The debris barriers constructed in 2007-2008 were extended at this time (Figure 5).

Finally, a small amount of additional filling was placed within Lots 833 & 834 in early 2014. This work is discussed in detail in Section 6.2.3 of this report.

With the exception of drainage materials used during the civil construction stage, all bulk fill materials used during this development were obtained from excavation on site.

### **3 RELATED REPORTS**

Stages 2QRST of the Lakes development have been subject to several stages of geotechnical investigation and assessment which are summarised in the following documents:

1. Shrimpton & Lipinski Ltd, "Pyes Pa West Urbanisation Development, Tauranga – Geotechnical Assessment Report", ref: 16944, dated October 2003.
2. Coffey letter, "Re Geotechnical Design – Debris Protection Bunds for Areas E, F and K, The Lakes, Pyes Pa", ref: GEOTTAUC13086, dated 11 June 2008.
3. Coffey letter, "Re: Review of existing debris barriers for The Lakes - areas 2Q and 2T", ref: GENZTAUC13086AE-AA, dated 1 February 2013.
4. Coffey letter, "Slope Stability Assessment for The Lakes Subdivision – Stage 2Q", ref: GENZTAUC13086AG-AA, dated 13 March 2013.
5. Coffey letter, "Re: Design of Debris Protection Bunds – The Lakes Stages 2QRST", ref: GENZTAUC13086AE-AB, dated 26 March 2013.

The Shrimpton & Lipinski Ltd (S&L) geotechnical assessment concluded that the subject area was generally suitable for residential development. Further investigation was recommended to assist in designing subdivision earthworks, including the removal of peat and unsuitable soils that underlay low-lying parts of the site. Additional stability assessments of the natural and engineered slopes within the development area were also recommended.

The stability analyses were undertaken by Coffey in 2007-2008 and resulted in recommendations regarding the construction of debris protection bunds at the foot of natural slopes above the subject site (see Section 8.8 for details). The construction of these bunds was subsequently reviewed by Coffey in 2013 and the length of the bunds was extended above Stage 2Q to suit a revised lot layout at this time.

The excavations to remove the peat and unsuitable soils within the site as well as the construction of the debris bunds are discussed in Sections 6.2.1 and 8.8 below.

### **4 INVESTIGATIONS COMPLETED**

Subsurface investigations for the development were completed in several stages prior to and during the two phases of earthworks. Initial investigations on the site comprised machine boreholes and test pits as shown on Figure 1. In November 2012 a second round of investigations consisting of 12 cone penetration tests (CPTs) was undertaken (Figure 3). Pore pressure dissipation tests were completed in selected layers within these CPTs.

Additional hand auger boreholes and test pits, in conjunction with in-situ shear vane and Scala penetrometer tests, were completed during and after each earthworks phase. These test locations are presented on the appended site plans (Figures 4 & 5). The results of all in-situ soil tests, together with

detailed descriptions and depths of strata encountered during the investigations are attached to this report (Appendices B to E).

## **5 OVERVIEW OF GEOLOGICAL CONDITIONS**

The original landform within the development area consisted of a series of deeply incised valleys and gullies on the low-lying areas of the site which were overlooked by a steep, approximately 30m-40m high escarpment to the east. The original ground contours are shown on Figure 1.

The valleys and gullies had eroded into volcanic ashes and ancient fluvially re-worked sediments of the Matua Sub-Group, comprising mixed and inter-bedded silt, sands and clays. After erosion, the valleys had been partially infilled with more recent sediments and colluvial soils derived from the eastern escarpment. The surface layers of this sedimentary sequence contained several metres of peat and highly organic soils.

The slopes to the east of the site and the large ridge that existed between stages 2Q and 2T comprised a sequence of volcanic ashes overlying Matua Sub-Group soils and pumice sands of the Te Ranga Ignimbrite with a surface veneer of colluvial soils on the slope face. The volcanic ash sequence on the ridge topography is common throughout the Tauranga area, consisting of the Hamilton Ash, Rotoehu Ash and Post-Rotoehu or 'younger' Ashes.

## **6 EARTHWORKS OPERATIONS**

### **6.1 Plant**

Earthworks during the 2007-2008 season were completed by Bob Hicks Earthmovers Ltd. The principal contractor for the 2012-2013 season was Higgins Group Holdings Ltd (Higgins), who sub-contracted the majority of work to Andrew Young Earthmoving Ltd. The civil construction works in 2013 and 2014 were completed by Higgins.

The main items of plant used by during each of the bulk earthworks phase comprised Terex and towed motor scrapers, hydraulic excavators, bulldozers and sheepfoot rollers.

### **6.2 Construction Programme**

The bulk earthworks for stages 2QRST were completed in two stages during the 2007-2008 and 2012-2013 earthworks seasons.

#### **6.2.1 2007-2008**

Works completed during 2007-2008 included excavations of up to 10m depth to lower a number of small ridges within Stage 2Q and the large ridge between 2Q and 2T. The peat and organic soils that existed within the gullies were also removed at this time. The limits of peat excavation are shown on Figure 2 and are referred to as the peat 'win-lines'. Beyond these lines the depth of peat was considered to be too great to be removed economically and the ground in these areas is therefore still underlain by peat and organic soils.

Once the peat and other unsuitable materials had been removed from the gullies, engineered fill was placed to form the generally flat or gently sloping ground surface shown on Figure 3. The maximum fill

depth was approximately 12m. Subsoil drains were installed beneath the fill to control seepage and elevated groundwater as required (Figure 2).

As shown on Figure 2, some non-structural filling was also placed within reserve areas within the subdivision. This non-engineered fill was not inspected nor is it certified by Coffey.

At the end of the work season, an approximately 3m high slope debris protection bund was constructed between Stage 2T and the steep eastern escarpment (see Figure 3). A smaller 1.5m deep slope debris channel was also formed around the south-eastern perimeter of Stage 2Q. The bund and channel were intended to protect the proposed lots from debris that may derive from instability or erosion of the steep slopes above these areas, as described in Section 8.8 below.

### **6.2.2 2012-2013**

The works undertaken in the 2012-2013 season included further excavation to lower the ridge between stages 2Q and 2T. Materials removed from the ridge were then placed as engineered fill within the remainder of the development area to form the existing, gently sloping ground profile shown on Figure 5. The maximum depth of fill placed during this period was approximately 2m.

Following an assessment of the slopes above Stage 2Q, the debris channel constructed in 2007-2008 was extended during this work season. The finished channel now terminates in an approximately 3m high bund above proposed Lot 837 at the location shown on Figure 5 and discussed in Section 8.8.

The earthworks in 2012-2013 included construction of a 3m high 1V:2H cut and fill batter along the site's western boundary with Takitimu Drive. As this batter is located within a reserve area, its construction was not supervised or inspected by Coffey.

No specific testing of the road subgrades or service trench backfill soils was completed under the direction of Coffey. As with the previous stage of works, some non-structural filling was also placed within the reserve area between Stages 2R and 2S of the subdivision. This filling has not been certified.

### **6.2.3 Additional Filling**

As shown on Figure 4, up to 2m of additional fill (i.e. above original ground level) was placed within Lots 833 and 834 to re-grade a shallow gully that existed in this area. While stripping the area of topsoil before filling it was found that Lot 834 was partially underlain by up to 3m of peat left over from the 2007-2008 works season. This peat was removed prior to placement of the new fill in 2014. The peat sub-excavation was extended beyond the lot's eastern boundary for a distance equal to the peat depth to avoid having to place a Building Restriction Line on these properties.

## **7 QUALITY CONTROL**

### **7.1 Undercut Inspections**

During the initial gully cleaning and excavation in 2007-2008, general topsoil stripping and removal of the peat layer was supervised by Coffey staff to confirm that the depth and extent of undercut was sufficient.

At the start of the 2012-2013 season, earthworks were undertaken to remove sparse vegetation and grass that had grown on the previous fill surface. Minor excavation was also undertaken to sub-excavate several erosion features that had formed on the fill surface in the time between the two work

seasons. The finished and cleared surface was inspected and approved by Coffey prior to any fill placement.

As described in Section 6.2.3, the ground beneath the additional filling placed in Lots 833 & 834 was also stripped of topsoil and unsuitable materials and inspected and approved by Coffey before filling.

## **7.2 Compaction Control Criteria**

Due to the variability of the subsoils identified within the subdivision cut areas, compaction control criteria were specified for quality assurance purposes predominantly using the minimum allowable shear strength and maximum allowable air voids method as defined below:

- Air voids percentage (as defined in NZS 4402:1986 and as measured by Nuclear Density Meter (NDM). Targeting an average value less than 10% and maximum single value no greater than 12%.
- Undrained shear strength (measured by hand held shear vane calibrated using NZGS 2001 method. Targeting an average value greater than 150kPa and minimum single value no less than 120kPa. The average value to be determined over any ten consecutive tests in any one fill area.

All test results are IANZ (International Accreditation New Zealand) endorsed and further details are appended.

## **7.3 Field Control**

During 2007-2008, regular in-situ density, strength and water content tests were carried out on the filling by Coffey. Testing was carried out in excess of the frequency recommended by NZS 4431 and the Tauranga City Council Code of Practice for Development 2006, this being at least 1 set of tests per 1,000 m<sup>3</sup> of earthfill volume. The locations of all tests are shown on Figure 2.

In the 2012-2013 season, NDM and shear vane tests were carried out by Opus International Consultants Ltd (Opus). Additional check testing in the form of hand-auger boreholes, field shear vane measurements and Scala penetrometer tests were completed by Coffey during and immediately after earthworks. The locations of all NDM tests and boreholes are shown on Figure 4.

The additional fill placed on Lots 833 & 834 was tested by Coffey in 2014 using a hand-auger borehole and shear vane measurements. The location of this test (HA180) is also shown on Figure 4.

Summary tables of the test results and the certified test reports provided by Coffey and Opus are included in Appendices C and D, along with logs of the Coffey boreholes showing shear vane and Scala test results. Logs and test results for the minor additional filling completed in 2014 are appended with the results for the 2012-2013 bulk earthworks season.

# **8 ENGINEERING EVALUATION AND RECOMMENDATIONS**

## **8.1 Subsoil Drainage**

During civil construction in 2013, localised shallow groundwater levels were observed at some locations in pipe trenches within the subdivision. As shallow groundwater was being encountered near or above the subsoil drains installed in 2007-2008, a test pit was excavated to intercept the subsoil drain below the Lakes Boulevard to the west of Lot 814 (i.e. near settlement markers SM1 and SM9 on Figure 2). Upon encountering the drainage metal within the subsoil drain at approximately 4m depth, the test pit

flooded rapidly and water levels within the pit rose to 2m below ground level. This indicates that this part of the drainage network may not be flowing effectively.

To determine if the reduced drainage performance and shallow water table might be affecting the strength of filling within the proposed lots, a series of test pits and hand-auger boreholes were completed (HA101 to HA106 on Figure 4 and TP101 to TP104 on Figure 5). Shear vane readings and observations of groundwater conditions were recorded in these excavations.

Shear vane measurements within the test pits indicated that some layers of fill in Stage 2T that had been placed in 2007-2008 were weaker than expected, with shear strengths of between 60kPa and 120kPa being recorded even though the area had passed the fill testing when it was placed. These low shear strengths are most likely due to shallow or perched groundwater within the fill material which can result in softening, especially in cohesive soils. The hand-auger boreholes within Stage 2Q indicate that the filling in this area is less affected, although several of the boreholes drilled to assess lot-by-lot conditions also encountered relatively weak fill layers (e.g. HA109, HA113).

It is considered possible therefore that some of the fill placed during 2007-2008 may exhibit reduced strength and bearing capacity due to shallow groundwater levels. Fill placed during 2012-2013 appears to be significantly less affected although this material may experience similar softening over time.

## **8.2 Fill Quality**

Based on the appended earth fill quality control test data (and some reliance on the diligence of the bulk earthworks contractor at times when engineering staff were not present on site) indications are that the compaction control criteria were generally met during the bulk earthworks periods in 2007-2008 and 2012-2013. However, as discussed above, post-construction testing identified some areas of filling that may be affected by shallow groundwater, resulting in reduced shear strengths.

Testing undertaken by Coffey indicates the additional fill placed within Lots 833 and 834 in 2014 also met the criteria set for engineered fill.

On the basis of the testing completed during construction, it is considered that the fill within the subdivision can be classified as engineer certified filling.

## **8.3 Static Settlement**

### **8.3.1 Introduction**

Static settlement occurs when soil materials compress and consolidate under static loading (e.g. filling and/or the weight of a building). For simplicity, the various stages of static settlement can be approximated by two components: 'consolidation settlement' and 'creep settlement'. Consolidation settlement is influenced by the magnitude of the static load; the greater the load, the more consolidation settlement is induced. The time for completion of consolidation settlement is dependent on the speed at which water can flow from the soil (soil permeability). It is common practice to assume consolidation is effectively complete when 90% of the total predicted settlement has occurred. The time required to reach 90% consolidation is termed ' $t_{90}$ '.

Soils may also settle over time under their own weight, termed creep settlement. Creep settlement is essentially independent of static load meaning that the development of creep settlement is unaffected by cutting and filling. Theoretically, creep settlement can continue indefinitely as microscopic realignment and material decay take place, hence for this report the analysis of creep has been limited

to a period of 50 years to coincide with the lifespan of a typical residential dwelling. Organic and soft soils are particularly susceptible to consolidation and creep settlements. It should be noted however that organic creep settlement due to decay in organic materials is particularly difficult to predict with any accuracy due to the inherent variability of these materials.

### **8.3.2 Methodology**

For this report, separate assessments of static settlement have been completed for the 2007-2008 and 2012-2013 earthworks seasons.

Static settlements due to 2007-2008 filling were assessed using the results of a settlement monitoring programme which began in February 2008. The locations of settlement markers used for this assessment are shown on Figure 2.

Settlements due to 2012-2013 filling were assessed by analysing the CPT and dissipation data obtained in November 2012. This information was also used to estimate settlements that may occur as a result of the future buildings.

Settlements due to the additional fill placed on Lots 833 & 834 during civil construction were monitored from January to May, 2014.

### **8.3.3 2007-2008 Earthworks**

As depicted on Figure 2, the 2007-2008 earthworks program involved cuts and fills of up to 10m and 12m respectively throughout the development area. Typically, cuts were in the range 1m to 5m and fills were in the range 2m to 7m.

Settlement markers were installed on the surface of the subgrade at nine locations (SM1 to SM9, inclusive) prior to filling. Monitoring of settlement marker SM1 began in October 2007 until it was damaged around November 2007. SM1 was then replaced with a new marker, SM9, to allow continued monitoring at this location. The remaining settlement markers were monitored periodically from February 2008 until March 2009.

When works recommenced in 2012, the settlement monitoring programme was reinstated. Settlement markers SM2, SM3, SM4 and SM9 were destroyed during construction of Lakes Boulevard at the end of the latest earthworks season. Markers SM5, SM6 and SM8 remained operational and were monitored periodically up to April 2014. SM7 was damaged in around April 2013 and was not replaced.

## **Results**

The results of the settlement monitoring program are summarised and appended in Appendix F. Below is a summary of the estimated consolidation settlement induced by the 2008-2009 earthworks along with an estimate of creep settlement over the next 50 years extrapolated from observed settlements.

**Table 1: 2008-2009 Settlement Monitoring Results**

| Marker | Approximate Fill Height (m) | Interpreted Consolidation Settlement (mm) | Interpreted Creep Settlement Over Next 50 years (mm) |
|--------|-----------------------------|---|--|
| SM1    | 2                           | Marker damaged and replaced with SM9      |  |
| SM2    | 6                           | 120                                       | 30   |
| SM3    | 6                           | 255                                       | 30   |
| SM4    | 4.5                         | 55  | 20   |
| SM5    | 4.5                         | 20  | 20   |
| SM6    | 3.5                         | 145                                       | 10   |
| SM7    | 3                           | 60  | 20   |
| SM8    | 3                           | 40  | 20   |
| SM9    | 2.5                         | 20  | 20   |

**Notes:** Creep settlement to date measured from February 2008 to present

Creep settlement over next 50 years extends from present date to 2064

Due to the absence of monitoring data between April 2009 and October 2012, damage or destruction of markers and a change in surveying technique (from GPS to Level apparatus), the settlement monitoring data is only capable of producing an approximate assessment of settlement performance since the earthworks of 2007-2008.

Plots of settlement against time on a logarithmic scale were used to interpret the end of consolidation settlement and the beginning of creep settlement. Based upon these plots, consolidation settlements are estimated to have reached  $t_{90}$  within approximately 90 days to 350 days of fill placement. Measured consolidation settlements range in magnitude from 20mm to 255mm. Lines of best fit applied to the settlement – log time plots were used to assess potential future creep settlements. The best-fit lines showed close agreement in predicting approximately 10mm to 30mm of creep settlement over the following 50 years.

## Discussion

Based on the monitoring data and the approximate  $t_{90}$  periods discussed above, the consolidation settlements due to the 2007-2008 earthworks reached  $t_{90}$  around January 2009. The estimated magnitude of creep settlements over the next 50-year period ranges from 10mm to 30mm.

Variable ground conditions and fill heights are likely to produce differential settlements across the site. Based upon the results of the above assessment, differential settlements following the 2007/2008 earthworks were likely in the range 10mm to 170mm, which would have been sufficient to cause an

uneven ground surface. However, these differential settlements would have occurred by January 2009 (i.e. at the end of primary consolidation) and before the second stage of earthworks in 2012/2013. It can therefore be assumed that any adverse effects caused by differential consolidation settlements would have been addressed during the 2012/2013 earthworks.

The differential settlements due to differences in creep are addressed in Section 8.3.6.

#### 8.3.4 2012-2013 Earthworks

The 2012-2013 earthworks comprised a major cut and minor filling up to 2m depth across the proposed lots as shown on Figure 4.

The static settlements that may occur as a result of this filling have been calculated using proprietary software CPeT-IT<sup>1</sup>. The software employs a method of analysis which calculates the magnitude of two settlement components; primary and secondary settlement. Primary settlement can be interpreted as an approximation of consolidation settlement. Secondary settlement can be interpreted as an approximation of creep settlement but without the component of organic decay. Outputs from the analysis have been included in Appendix F.

Using empirical relationships between cone tip resistance ( $q_c$ ) and soil stiffness, CPeT-IT was able to calculate an estimate of static settlement at each of the twelve CPT locations (CPT01 to CPT12, inclusive). The output of the calculations is summarised in Table 2 below.

Fill heights at each CPT location were estimated from the cut/fill plan shown in Figure 4. The bulk unit weight ( $\gamma$ ) of the filling was assumed to be 17kN/m<sup>3</sup>.

**Table 2: 2012-2013 Estimate of Static Settlement**

| CPT Number | CPT Depth (m) | Cut/Fill (m) | Calculated Vertical Static Settlement (mm) |                   |
|------------|---------------|--------------|--|-------------------|
|            |               |              | Primary (Consolidation)                    | Secondary (Creep) |
| CPT01      | 15.0          | 0            | N/A  | < 10              |
| CPT02      | 15.0          | 0            | N/A  | 10                |
| CPT03      | 14.6          | 0            | N/A  | < 10              |
| CPT04      | 9.8           | 1            | 100  | 60                |
| CPT05      | 15.0          | 0.25         | 10   | 20                |
| CPT06      | 15.0          | 0            | N/A  | 30                |
| CPT07      | 7.8           | 0.5          | 40   | 30                |
| CPT08      | 15.4          | 0.5          | 30   | 30                |
| CPT09      | 5.6           | 0            | N/A  | <10               |

<sup>1</sup> GeoLogismiki Geotechnical Software. 2007: *CPeT-IT* (Version 1.7.6.42)

| CPT Number | CPT Depth (m) | Cut/Fill (m) | Calculated Vertical Static Settlement (mm) |                   |
|------------|---------------|--------------|--|-------------------|
|            |               |              | Primary (Consolidation)                    | Secondary (Creep) |
| CPT10      | 15.1          | 0.5          | 20   | 20                |
| CPT11      | 10.7          | 0            | N/A  | <10               |
| CPT12      | 15.0          | 0            | N/A  | 20                |

**Notes:** Settlement estimates to the nearest 10mm.

CPT04 is considered to be an outlier.

Secondary (Creep) settlement does not account for decay of any organic content. Where organic content may be present, creep settlements may be underestimated by this method.

## Discussion

Several of the CPT locations (CPT01 to CPT03, CPT06, CPT09, CPT11 and CPT12) were located on or near to the zero cut/fill line and were therefore modelled without fill load. Consequently, primary settlement has not been calculated at these locations as there is no load being applied to induce compression or consolidation.

The results of CPT04 show unusually high estimated magnitudes of primary and secondary settlement. As shown in the attached calculation output in Appendix F, the majority of the settlement at CPT04 is expected to occur between 6.5m and 8.5m below finished ground level. This interval coincides with a layer of possible organic soil identified by the CPT. Prior experience of conducting CPTs in the Tauranga area has found that standard CPT techniques are occasionally unable to correctly characterise layers within the volcanic and pumiceous sedimentary materials, leading to an overestimate of static settlement. The results of CPT04 are considered to be an example of such an occasion and are therefore treated with caution.

In the analysis of the remaining CPTs loading was applied proportionate to fill heights of 0.25m to 0.5m. Excluding CPT04, estimated primary settlements are in the range 10mm to 40mm which are considered to be relatively significant for such small quantities of filling.

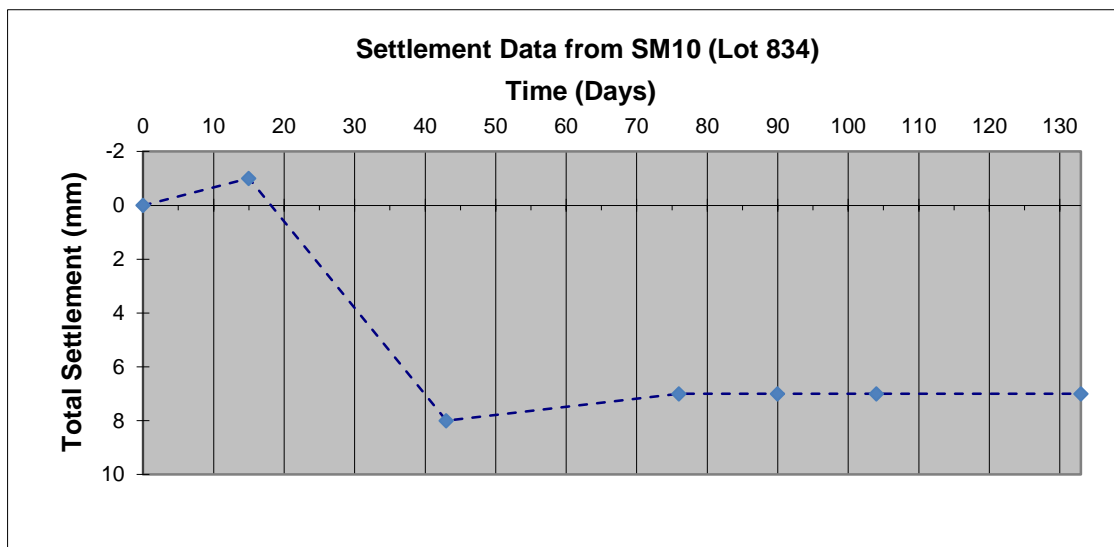
To assess the time required for primary consolidation to occur, a series of dissipation tests were conducted at CPT04, CPT06, CPT07, CPT08 and CPT12. Analysis of these test data indicates that the horizontal coefficient of consolidation ( $C_h$ ) for the natural soils beneath the site is approximately  $10^{-6} \text{ m}^2/\text{s}$ . This value is typical of a sandy silt material and suggests that water can flow relatively quickly from the soil. Using this value of  $C_h$ ,  $t_{90}$  for the filling placed in 2012-2013 can be estimated at approximately 250 days, which is roughly equivalent to the range of 90 to 350 days estimated from the settlement monitoring data for the previous stage of filling.

Based on these calculations, and noting that the fill was placed over 12 months ago, consolidation settlements due to the 2012-2013 filling should have reached  $t_{90}$  at the time of writing. Estimates of secondary settlement are in the range of less than 10mm to approximately 30mm. These settlements are expected to occur over the next 50-year period, equating to an average annual settlement of less than 1mm per year. Comparing the results of the CPeT-IT assessment of secondary settlement with the estimates of creep settlement from the monitoring programme, both sets of results indicate that 10mm to 30mm of secondary/creep settlement can be expected over the next 50 years.

### 8.3.5 Lots 833 & 834

A new monitoring point was installed in early 2014 at the site of the deepest filling in Lot 834, to monitor settlements due to the fill placed (SM10 on Figure 4). Data from SM10 are presented on Chart 1 below.

**Chart 1: Lot 834 Settlement Monitoring Data**



The results indicate the fill placed on Lots 833 and 834 settled approximately 8mm within the first 50 to 70 days after being placed (within the limits of survey accuracy (i.e.  $\pm 2$ mm). No further settlement was measured within the period from 70 to 130 days after fill placement (i.e. 2 April to 29 May 2014).

Based on these results, it is considered that the consolidation settlement due to the additional fill placed on these lots is effectively complete at the time of writing. These sites may however be subject to future creep settlements as discussed below.

### 8.3.6 Future Settlements

Dwellings on the new lots will be affected by future settlement as a result of the on-going creep discussed above as well as by future building and earthworks (i.e. fill) loads. The potential for differential settlements affecting the proposed buildings largely depends on the slope of the individual site. Assuming that the individual sites are levelled before construction, steep sites will require deeper cuts and fills to form a level building platform, leading to a greater degree of differential settlement on these lots. Gently sloping sites on the other hand will require less filling beneath the building, resulting in reduced differential settlement effects

With regard to finished ground slopes, the subdivision generally consists of two zones. Lots within stages 2R, 2S and 2T are gently sloping, having less than approximately 1m of fall across a typical building platform (approx. 15m to 20m long). Lots 824 to 828 within Stage 2Q are also gently sloping. In contrast, the remaining lots within Stage 2Q have a greater site slope, with falls in excess of 1m and in some places over 3m across a typical building area.

Calculations indicate that where less than 300mm of filling is placed to form a level platform, predicted differential settlements should be within accepted limits recommended in Clause B1.0.2 of Ministry of

Business, Innovation and Employment (MBIE) compliance document B1 (i.e. max. 25mm differential settlement per 6m length). For fill depths in the 200mm to 300mm range however the settlements may lie at the upper end of the acceptable scale, depending on several factors including the true weight of fill applied.

Sites on which more than 300mm of filling is placed may experience differential settlements greater than the accepted limits recommended by MBIE.

### **Gently Sloping Sites (Stages 2R, 2S & 2T and Lots 824 to 828 inclusive)**

Due to the gently slope of these sites, it is expected to be relatively easy to build without exceeding the max 300mm fill thickness. The recommendations given in Section 8.7 with respect to creep settlement effects still apply.

### **Steeply Sloping Sites**

With the exception of Lots 824 to 828, the remaining lots within Stage 2Q generally comprise greater than 1.0m fall across the lot, and up to 4m in places. They are therefore likely to require greater depths of cut and fill to create level building platforms. To reduce the risk of adverse effects due to differential settlement on these sites, it is generally recommended that the building platforms be formed entirely within cut to avoid the need for complex foundation systems.

Where filling of more than 300mm depth is proposed, guidance would need to be sought from a TCC Category 1 Geo-Professional. If necessary, fill loads and resulting settlements may be reduced by using light-weight fill materials (e.g. lightweight pumice fill or specifically designed polystyrene underfill), by terracing the building into the slope or by designing elevated parts of the building as a suspended timber structure as outlined in Section 8.7.

## **8.4 Seismic Liquefaction**

### **8.4.1 Background**

Cyclic liquefaction is a phenomenon in which loose, saturated, cohesionless soils are subject to temporary but essentially full loss of shear strength due to pore pressure build-up as a result of earthquake loading.

While liquefied (and for a time afterwards) the soil is susceptible to vertical and lateral deformations in the form of flow slides, lateral spreading, ground settlements, ground oscillation and sand boils. The magnitude and mode of deformation is governed by landform, spatial continuity of the liquefiable material, soil density and the intensity and duration of cyclic loading.

Although not susceptible to “classic” cyclic liquefaction, under the right conditions of cyclic load intensity and duration fine-grained cohesive soils can undergo strength loss during an earthquake event. This phenomenon is referred to as cyclic softening. Although less prevalent than cyclic liquefaction, it can result in significant deformations and therefore needs to be considered in a site liquefaction analysis.

#### 8.4.2 Methodology

For this assessment it has been assumed that any building development within Stage 2QRST will be an Importance Level 2 (IL2) structure as defined in Table 3.1 of NZS1170.0<sup>2</sup>. As such, the Serviceability Limit State (SLS) seismic event has a return period of 1 in 25 years. In an SLS magnitude earthquake a building designed to current New Zealand codes may suffer minor damage but should be suitable for continued use without major structural repairs.

The Ultimate Limit State (ULS) event for an IL2 structure has a return period of 1 in 500 years. A ULS earthquake is considered to be a rare, extreme event. A building designed to current New Zealand codes may be severely damaged by such an earthquake, requiring major repairs or complete replacement. The building must however remain safe for occupants until it can be evacuated.

The peak ground accelerations for the site were derived using the criteria provided in NZS 1170.5<sup>3</sup>. The findings of the field investigation are not sufficient to clearly define the subsurface conditions beneath this site as either Class C (shallow soils) or Class D (deep soils). This report has conservatively adopted soil Class C conditions for the purposes of the liquefaction assessment. Structural engineers working on the new lots may choose to adopt Site Class D as the more conservative approach for structural design purposes.

The calculated peak ground accelerations for the site under SLS and ULS events are therefore 0.07g and 0.27g, respectively.

The assessment of liquefaction risk and estimates of liquefaction-induced ground deformation were made using a computer software package called CLiq<sup>4</sup> and the analysis methods recommended by the NCEER<sup>5</sup>. Cyclic resistance, liquefaction triggering and liquefaction-induced vertical displacements were calculated using a modified NCEER method<sup>6</sup> which captures the behaviour of fine-grained soils and their potential for cyclic softening.

#### 8.4.3 Results

Analysis was completed using the CPT data from November 2012. The data from the CPTs were first screened using proprietary computer software CPeT-IT<sup>7</sup> to identify anomalies or inconsistencies before being imported in CLiq for liquefaction assessment.

The depth to groundwater was determined from the hand-auger boreholes and test pits completed on site. The recorded elevations were used to establish a prevailing groundwater model for design, conservatively set at 5m below ground level at the western site boundary, reducing to 3m at the toe of the eastern slope.

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<sup>2</sup> AS/NZS1170.0:2002 *Structural Design Actions Part 0: General Principles*

<sup>3</sup> NZS1170.5:2004 *Structural Design Actions Part 5: Earthquake Actions – New Zealand*

<sup>4</sup> GeoLogismiki Geotechnical Software. 2006: *CLiq* (Version 1.7.4.34)

<sup>5</sup> Youd, T. L. and Idriss, I.M. 1998 *Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils*

<sup>6</sup> Robertson, P.K. 2009 *Performance Based Earthquake Design Using the CPT*, Keynote Lecture, International Conference on Performance-based Design in Earthquake Geotechnical Engineering – from Case History to Practice, IS-Tokyo

<sup>7</sup> GeoLogismiki Geotechnical Software. 2007: *CPeT-IT* (Version 1.7.6.19)

Based upon cut/fill plans supplied by HGCL (Figure 4), three of the CPTs (CPT07, CPT08 and CPT10) were completed at locations which received engineered fill during the 2012-2013 earthworks season. Accordingly, layers of fill were incorporated into the liquefaction model to account for the additional loading. The remaining CPTs were carried out at locations at, or near to finished ground level and therefore did not require alteration.

**Table 4: Vertical Settlements Due to Liquefaction**

| CPT Number                              | SLS Settlement (mm) | ULS Settlement (mm) | Depth to Significant ULS Liquefaction (m) |
|---|---------------------|---------------------|---|
| CPT01                                   | <10                 | 30                  | 12.5                                      |
| CPT02                                   | <10                 | 200                 | 9   |
| CPT03                                   | <10                 | 150                 | 3   |
| CPT04                                   | 10                  | 15                  | 6.5                                       |
| CPT05                                   | 10                  | 15                  | 5   |
| CPT06                                   | <10                 | 15                  | 7   |
| CPT07                                   | <10                 | 20                  | 3   |
| CPT08                                   | <10                 | 15                  | 5   |
| CPT09                                   | <10                 | <10                 | 5   |
| CPT10                                   | <10                 | 45                  | 6   |
| CPT11                                   | <10                 | 50                  | 6   |
| CPT12                                   | <10                 | <10                 | 5   |
| Estimated Differential Settlements (mm) | Up to 20mm          | Up to 100mm         |   |

**Notes:** As a general rule, differential settlements may be assumed to be in the order of one half to two thirds of the total settlements<sup>8</sup>.

Selected outputs from the liquefaction analyses showing the computed response to SLS and ULS events are included in Appendix G and the calculated vertical settlements predicted at ground level are summarised in Table 4.

#### 8.4.4 Discussion – SLS Conditions

The results of the analyses indicate that at the majority of CPT locations, cyclic liquefaction and cyclic softening is unlikely to occur under SLS conditions. Liquefaction is predicted in CPT04, with potentially liquefiable material identified between 6.5m and 9m depth. Although liquefaction is not expected in the remaining CPTs, some small isolated deformations are predicted in sensitive clay-like materials.

Given the depth at which liquefaction and/or cyclic softening may occur, the deformations predicted should be contained at depth and are unlikely to become manifest at the ground surface. The

<sup>8</sup> Martin, G.R. et al. (1999). *Recommended procedure for implementation of DMG Special Publication 117: Guidelines for Analysing and mitigating liquefaction in California*, SCEC, University of Southern California.

magnitudes of settlements shown on Table 4 are therefore considered to satisfy the SLS differential settlement requirements in Clause B1.0.2 of MBIE compliance document B1<sup>9</sup>.

#### 8.4.5 Discussion – ULS Conditions

Under design ULS conditions, liquefaction is predicted at numerous depths in each of the CPT traces. The resulting liquefaction-induced settlements range from 10mm to 200mm, with values typically in the range of 10mm to 50mm.

In some cases (such as CPT01, CPT9 and CPT12) the thickness of liquefied material is negligible and can be discounted on the grounds that deformation of these layers would be contained by the surrounding un-liquefied material. In CPT02 and CPT03 the thickness of liquefied layers is greater and could produce more significant deformations. However, the expression of liquefaction at these locations should be much reduced at the ground surface due to the depth at which liquefaction occurs (9m and 3m respectively below finished ground level).

Provided buildings on the new lots are supported on raft type foundations or specifically designed suspended timber structures, the risk of excessive or 'life-threatening' deformations as a result of liquefaction induced settlements during a ULS event is considered to be low.

### 8.5 Lateral Spreading

#### 8.5.1 Background & Methodology

Liquefaction-induced lateral spreading may occur where areas of gently sloping ground or level ground adjacent to a free face are underlain by laterally extensive liquefiable soils. As the underlying soils liquefy, surficial materials stretch and displace downslope. In many cases the free face comprises a stream bank or harbour's edge.

At the subject site, the finished ground level within Stages 2R and 2T is relatively flat. These stages are also located at least 50m from the nearest free face. The risk of lateral spreading within Stages 2R and 2T is therefore considered to be low and lateral spreading calculations were not performed for these areas.

Within Stage 2Q, the ground slopes gently westward and requires an assessment of lateral spreading for sloping ground. The batter between Stage 2S and Takitimu Drive also constitutes a possible free face that must be considered.

Site specific analyses were therefore undertaken on the CPTs within Stages 2Q and 2S (CPT01, CPT02, CPT04 to CPT07, CPT09 and CPT10) using the same earthquake parameters referenced in Section 8.4.2. The Zhang method<sup>10</sup> for gently sloping ground was used to estimate potential lateral displacements for all of the above CPTs except CPT10. Lateral displacements for CPT10 were calculated assuming a 3m high free face located 25m west of the test location.

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<sup>9</sup> Ministry of Building, Innovation and Employment 2011 *Compliance Document for New Zealand Building Code Clause B1 Structure*

<sup>10</sup> Zhang, G.; Robertson, P.K.; and Brachman, R.W.I. 2004, *Estimating Liquefaction-Induced Lateral Displacement Using the Standard Penetration Test or Cone Penetration Test* Journal of Geotechnical and Geoenvironmental Engineering, Vol. 130, No. 8, 861-871.

The results of the calculations are given in Appendix G. It should be understood that calculation of lateral spreading potential is based on empirical models derived from past international earthquake case histories and do not account for local geological and hydrogeological conditions. The magnitudes of lateral spreading given by the calculations are therefore considered to be a guide to overall risk only, rather than a quantitative measure of actual ground displacements.

## **8.5.2 Discussion of Results**

### **8.5.2.1 SLS Conditions**

In Stage 2S, the results from CPT10 indicate that less than 10mm of lateral ground movement should occur near the batter between the site and Takitimu Drive under SLS conditions.

The majority of CPTs within Stage 2Q are not triggered into liquefaction and experience only minor ground deformation. The results from CPT04 indicate liquefaction may occur at between 6.5m and 9.1m depth at this location. As this liquefaction is restricted to an isolated pocket at depth and does not appear to be laterally extensive, the risk of large scale lateral spreading in Stage 2Q under SLS conditions is not considered to be significant.

Based on the above, the risk of excessive lateral ground movement within the development area as a result of a SLS earthquake is considered to be acceptably low.

### **8.5.2.2 ULS Conditions**

As discussed above in Section 8.5.1 Stages 2R and 2T comprise relatively flat ground and are considered unlikely to undergo lateral spreading in a ULS event.

In Stage 2S, the results from CPT10 indicate that a ULS event may cause up to 40mm of lateral movement within the building sites adjacent to the Takitimu Drive batter. The magnitude of displacement is expected to diminish exponentially with increasing distance from the free face. With specifically designed foundations, deformations of this kind are considered unlikely to pose a risk to life-safety, satisfying the ULS design requirements.

The calculations for ULS earthquake conditions suggest there is a potential risk of lateral spreading within Stage 2Q during a large earthquake. The results indicate that discrete layers of liquefaction may be triggered at differing depths beneath this part of the site. However, as the indicated liquefaction occurs in discrete pockets and lenses, any significant lateral spreading observed at the ground surface would need to propagate through layers and zones of non-liquefiable ground, including up to 8m depth of engineered fill within the old gully features.

The depth to significant liquefaction and lateral spreading indicated at each CPT location within Stage 2Q is in excess of 4m to 5m and often more than 9m below finished ground level. As such the development of wide-spread lateral spreading is generally considered to be unlikely.

The risk of excessive lateral ground movement within Stage 2Q is therefore considered to be acceptably low.

## **8.6 Building Restriction Lines**

As discussed in Section 6.2, part of the site is underlain by a significant thickness of peat which was left in place in 2007-2008 where the depth of excavation was considered to be too great to be economically

viable. To protect new dwellings on lots adjacent to the peat areas, a Building Restriction Line (BRL) has been applied, as illustrated on Figure 5. This BRL has been constructed by projecting a 45° line from the base of the 'win-line' surveyed at the time of excavation.

Construction beyond the BRL may only be undertaken with specific geotechnical input from a TCC Category 1 Geo-Professional, possibly requiring ground improvement and/or piled foundations for the parts of the building beyond the BRL.

## **8.7 Foundation Design & Bearing Capacity**

As discussed in preceding sections, the new lots may be affected by on-going creep and minor load induced settlements. These settlements may be exacerbated by possible weak horizons within the older filling (see Sections 8.1 & 8.2) and variable ground conditions where building platforms span between cut and filled ground. The site may also experience vertical and horizontal deformations as a result of seismically induced liquefaction during a ULS earthquake (Sections 8.4 & 8.5).

It is therefore recommended that buildings within Stages 2QRST and inside (i.e. east of) the BRL discussed above be supported on raft type foundations (e.g. 'rib-raft' or similar) specifically designed for an ultimate bearing capacity of 210kPa. Alternatively, dwellings may be supported on specifically designed suspended timber foundations. In this case, the foundation bearing capacity should be confirmed by a Chartered Professional Engineer (CPEng) at the design stage.

As discussed in Section 8.6, building beyond the BRL in Stages 2R and 2S may be possible but would require specific input from a TCC Category 1 Geo-Professional.

Where soft soils are encountered during routine foundation construction or inspections, undercutting and replacement of the problem soils or simple widening of building foundations may be required, necessitating the involvement of a Chartered Professional Engineer.

Foundations within a 45 degree zone of influence from pipe inverts or service trenches will require engineering design input in accordance with the specifications in the TCC Infrastructure Development Code.

As outlined in Sections 8.3 and 8.4, dwellings on the new lots may be affected by differential ground movement as a result of variable ground conditions, and/or seismic effects. While predicted settlements and lateral displacements are within allowable limits recommended by the NZ Building Code, significant localised movement cannot be ruled out, particularly during a large earthquake. In the event of such movement, the dwellings may need to be re-levelled by either injecting grout beneath raft slabs or by re-levelling the shallow piles beneath suspended timber structures. It is noted that in this case, suspended timber floors are generally the easiest and least costly foundation type to re-level.

### **8.7.1 Strength Reduction Factor**

As required by Section B1/VM4 of the New Zealand Building Code Handbook, a strength reduction factor of 0.50 or 0.80 should be applied to all recommended geotechnical ultimate soil capacities in conjunction with their use in factored design load cases for static and earthquake overload conditions respectively.

## **8.8 Slope Stability Considerations**

The majority of new lots within Stage 2QRST are on flat or gently sloping ground that should not be directly affected by slope instability.

### **8.8.1 Lots Adjacent to Takitimu Drive**

As shown on Figure 5, Lots 851 to 867 are located near the 3m high batter along the site's western boundary. Development on the lots adjacent to this batter is already restricted by the BRL described in Section 8.6. Where appropriate, the BRL setback distance has been increased slightly to provide additional protection to lots from possible instability of the batter (i.e. to a line projected at 1V:3H from the toe of the batter).

While development beyond the BRL is not specifically precluded, such development would need to be subject to specific geotechnical review to consider the effects of instability as well as the presence of underlying peat.

### **8.8.2 Debris Bunds & Channels**

The natural slopes above (i.e. east of) the new lots may be affected by future instability. The slope overlooking Stage 2T in particular shows evidence of past and on-going ground movement. Groundwater has been observed seeping from the toe of this slope throughout construction works.

In addition to this, two historic landslide scars were identified by Coffey on the slope above Stage 2Q in 2013. A large 'washout' feature had also formed on the slope above Lots 837 to 839 at this time. These features were described in the Coffey memo of 13 March 2013 (reference 4 in Section 3 above).

To reduce the risk of slope debris impacting and damaging dwellings on the lots below, debris collection bunds and channels were constructed at the toe of the natural slopes. These protection measures were constructed in two stages, with the first stage completed after the 2007-2008 earthworks (Figure 3) and the second stage completed in 2013 (Figure 5). Works were also undertaken during 2013 and 2014 to modify the previously constructed bund above Stage 2T after a review by Coffey determined that the down-slope batter on this bund was too steep with regard to long term slope stability (Coffey memo dated 1 February 2013). Collection drains were installed through this bund to pipe ponded water to the development's stormwater system.

Works were also carried out in 2013 to remediate the washout above Lots 837-839. The washout was cleared of loose material and debris before being backfilled with compacted earth fill sourced from site. A rock and geotextile-lined stormwater drain was installed up-slope of the original washout to direct stormwater from the adjacent property away from the steep slope. Although this work was inspected by Coffey, no specific testing or supervision of the filling was carried out nor was any certification warranted as the works were considered to be for landscaping and visual purposes only.

Based on the February 2013 review and observations during construction of the extended bund and channel during 2012-2013, it is considered that the debris protection measures have been constructed in general accordance with the original designs. Provided the bunds and channels are maintained in their current form, the risk of debris damaging properties within the development is considered to be low.

It is noted that access will need to be maintained behind the bunds and channels to allow debris to be cleared in the event of instability. Periodic maintenance of the drain inlets behind the bund in Stage 2T may also be required to avoid ponding of water behind the bunds.

## **8.9 Cut, Fill & Retaining Wall Design**

The majority of the subdivision lots are situated over gently sloping land and may therefore be subject to isolated cuts and fills as part of the development of individual lots. To reduce the risk of adverse effects due to load induced settlement, it is recommended that fills of more than 300mm depth (including topsoiling) require specific geotechnical input, as discussed in Section 8.3.5. The use of light-weight fill materials (e.g. pumice sand or 'polyrock') or suspended timber foundations may be appropriate to reduce fill loads if necessary.

Any retaining walls with a total retained height of more than 1.5m (including tiered walls on subject or neighbouring properties) or those supporting a building or accessway/parking area should be designed by a Chartered Professional Engineer giving consideration to toe slope gradients and crest surcharge slopes. Consideration must also be given to existing retaining walls on the subject or neighbouring properties. Filling within the zone of influence of any existing retaining wall will need specific engineering input to ensure the stability of the existing wall is not adversely affected.

It is generally advised that unsupported cut and fill batters should be graded no steeper than 1 vertical to 2.5 horizontal. Fills above an existing retaining wall on the subject or neighbouring property should not encroach within a distance equal to the height of the wall without geotechnical review. Excavation below an existing retaining wall should not encroach within a distance equal to twice the height of the wall without geotechnical advice.

## **8.10 Re-Spread Topsoil**

Topsoil was re-spread across the site at the completion of earthworks development. Topsoil depths were checked across the subdivision by the drilling of boreholes following final landscaping works. The results of this investigation, which are indicative only and subject to variation at other locations, show that topsoil depths vary from 0.05 to 0.3 metres (average 0.2 metres).

Building development or future earthworks will require over-excavation of these re-spread topsoil materials to expose the natural or engineer certified earthfill subgrade, followed by the placement and compaction of further subfloor filling as required to achieve design grades.

## **8.11 Service Trenches**

It should be noted that the backfilling and compaction of stormwater and sewer trenches on this subdivision were not inspected or tested by Coffey and these should accordingly be classified as uncertified filling for geotechnical purposes. Trench backfilling was inspected by HGCL as part of their supervision during civil construction.

As is normal on all subdivisions, building developments involving foundations within a 45 degree zone of influence from all service pipe inverts will require specific design by a Chartered Professional Engineer with a view to piling foundation loads to below that zone (as specified in the TCC Infrastructure Development Code).

## 8.12 Road Subgrades

It is understood that all road subgrade preparation, inspections, testing and certification was completed under the direction of HGCL.

## 8.13 Contractor's Work

This report has relied on the Contractor's diligence and construction observations to ensure that the works have been carried out in accordance with:

- (i) The approved Contract drawings and design details,
- (ii) The approved Contract specifications,
- (iii) Authorised Variations to (i) and (ii) during the execution of the works,
- (iv) The conditions of Resource and Earthworks Consents where applicable,
- (v) The relevant Geotechnical Investigation reports, recommendations and site instructions,

and that all as-built information and other details provided to the Client and/or Coffey Geotechnics (NZ) Limited are accurate and correct in all respects.

## 8.14 Suitability Statement

A copy of our suitability statement, in the form of the Tauranga City Council forms G2 and G2a are appended.

# 9 SUMMARY OF RECOMMENDATIONS

Based on the information contained in this report, it is considered that the geotechnical components of Stages 2QRST of the Lakes Subdivision have been completed in general accordance with accepted engineering practice and standards. From a geotechnical perspective, development on the new lots may therefore proceed, subject to the following recommendations:

1. All buildings on the new lots should be supported on either raft type foundations designed for an Ultimate Bearing Capacity of 210kPa or on suspended timber foundations specifically designed for a bearing capacity to be determined by a Chartered Professional Engineer (CPEng) at design stage.
2. Lots 868, 869, 870, 887, 888, 889 and 890 are excluded from this GCR as they are either being monitored for on-going settlement or are currently occupied by a stormwater pond and fill stockpiles being used for Stage 3 of the development.
3. Most lots in Stages 2R and 2S are affected by a Building Restriction Line or BRL due to the presence of buried peat along the subdivision's western boundary (Lots 848, 849, 850, 851, 852, 853, 854, 855, 856, 860, 861, 864, 865 & 867). Building beyond the BRL may only be undertaken subject to specific geotechnical input by a TCC Category 1 Geo-Professional.
4. The placement of more than 300mm thickness of additional fill on any lot (including topsoil) should be subject to geotechnical review due to the risk of inducing further settlement on the subject or neighbouring properties as outlined in Section 8.9.

5. All retaining walls with a total height of more than 1.5m (including tiered walls) or those supporting slopes or building/vehicle loads must be specifically designed by a Chartered Professional Engineer giving consideration to toe slope gradients and crest surcharge slopes. The design of any retaining wall or filling on any lot should also consider possible adverse effects on pre-existing retaining walls on the subject or neighbouring properties as discussed in Section 8.9.
6. Building development or future earthworks on the new lots will require over-excavation of the existing topsoil materials to expose the natural or engineer certified earthfill subgrade, followed by the placement and compaction of further subfloor filling as required to achieve design grades and bearing in mind the restrictions given in (6) above.
7. Building developments involving foundations within a 45 degree zone of influence from all service pipe inverts will require specific design by a Chartered Professional Engineer with a view to piling foundation loads to below that zone (as specified in the TCC Infrastructure Development Code).

## 10 LIMITATIONS

This report has been prepared solely for the use of the client, The Lakes (2012) Limited, their professional advisers and the relevant Territorial Authorities in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

The opinions, recommendations and comments given in this report result from the application of normal methods of site investigation. As the post construction factual evidence has been obtained solely from boreholes and test pits, which by their nature only provide information about a relatively small volume of subsoils, there may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report.

For and on behalf of Coffey

Prepared by:



**R.B. TELFORD**  
Project Engineering Geologist

Reviewed and Authorised by:



**S.V. HARGRAVES**  
Principal Engineering Geologist  
TCC Category 1 Geo-Professional

## Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

### **Your report is based on project specific criteria**

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

### **Subsurface conditions can change**

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

### **Interpretation of factual data**

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by

earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

### **Your report will only give preliminary recommendations**

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

### **Your report is prepared for specific purposes and persons**

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

## Important information about your **Coffey** Report

### **Interpretation by other design professionals**

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

### **Data should not be separated from the report\***

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

### **Geoenvironmental concerns are not at issue**

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

### **Rely on Coffey for additional assistance**

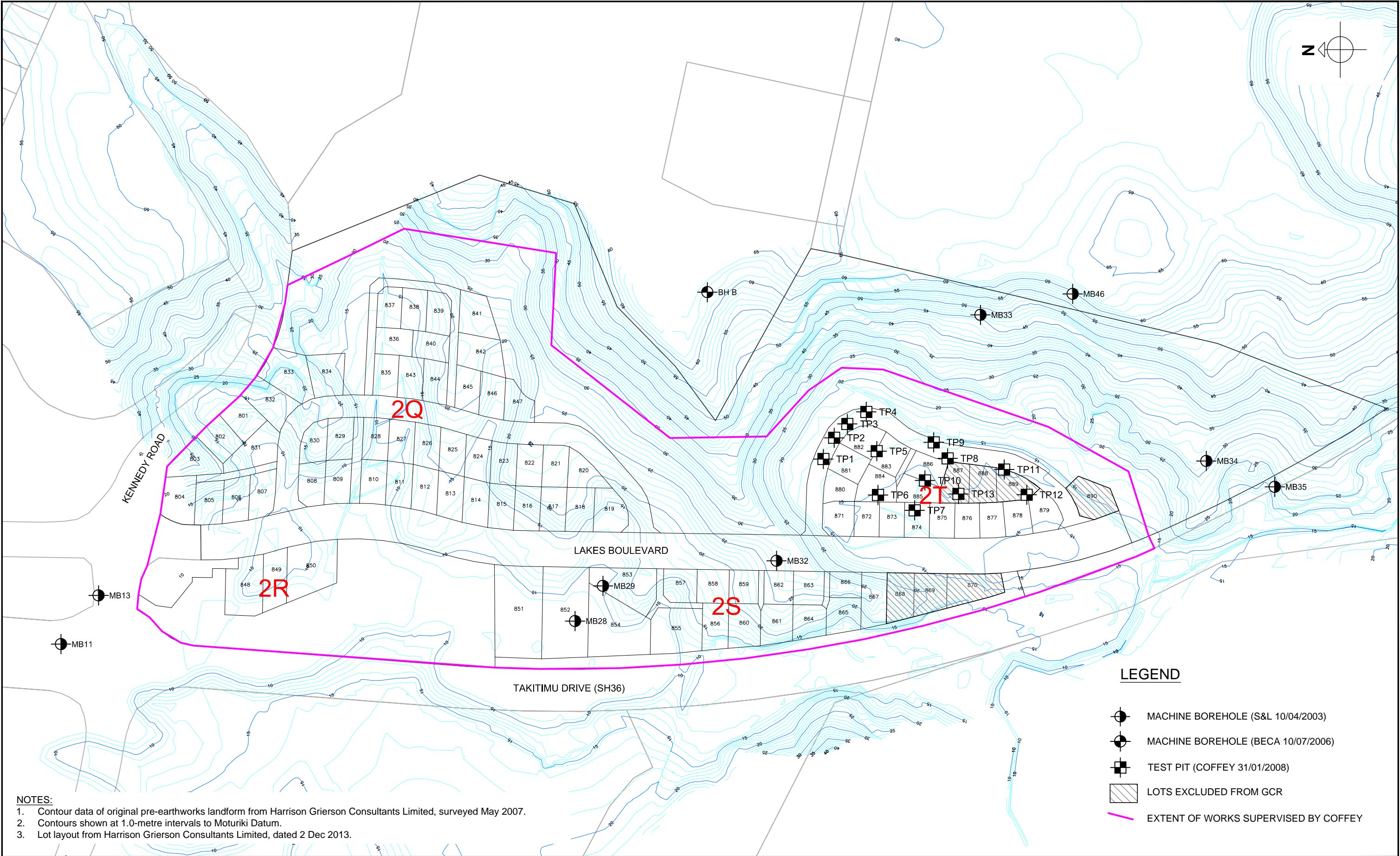
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

### **Responsibility**

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

\* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.


## Figures

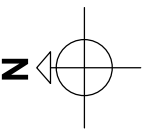
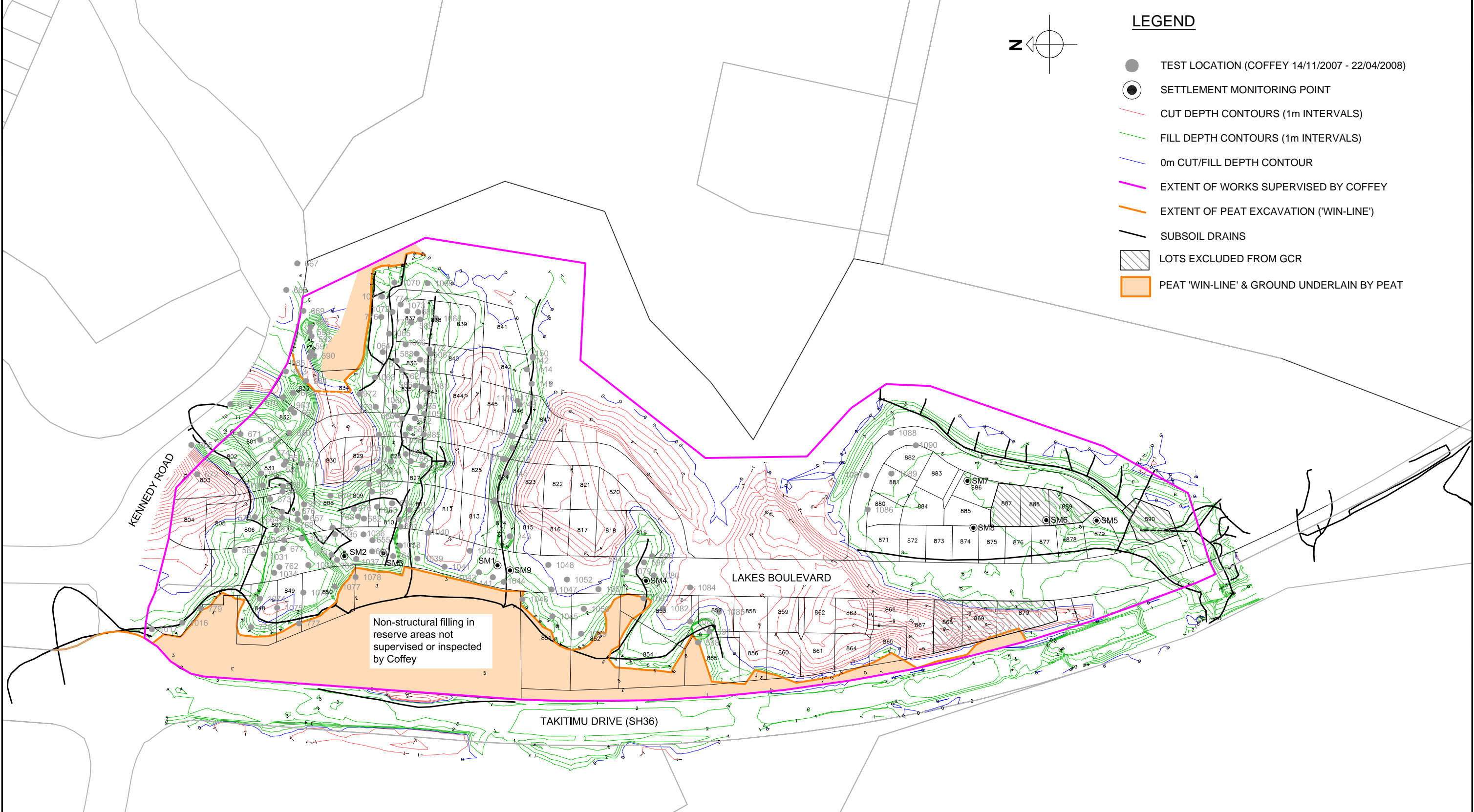


- NOTES:
1. Contour data of original pre-earthworks landform from Harrison Grierson Consultants Limited, surveyed May 2007.
  2. Contours shown at 1.0-metre intervals to Moturiki Datum.
  3. Lot layout from Harrison Grierson Consultants Limited, dated 2 Dec 2013.

LEGEND

- MACHINE BOREHOLE (S&L 10/04/2003)
- MACHINE BOREHOLE (BECA 10/07/2006)
- TEST PIT (COFFEY 31/01/2008)
- LOTS EXCLUDED FROM GCR
- EXTENT OF WORKS SUPERVISED BY COFFEY

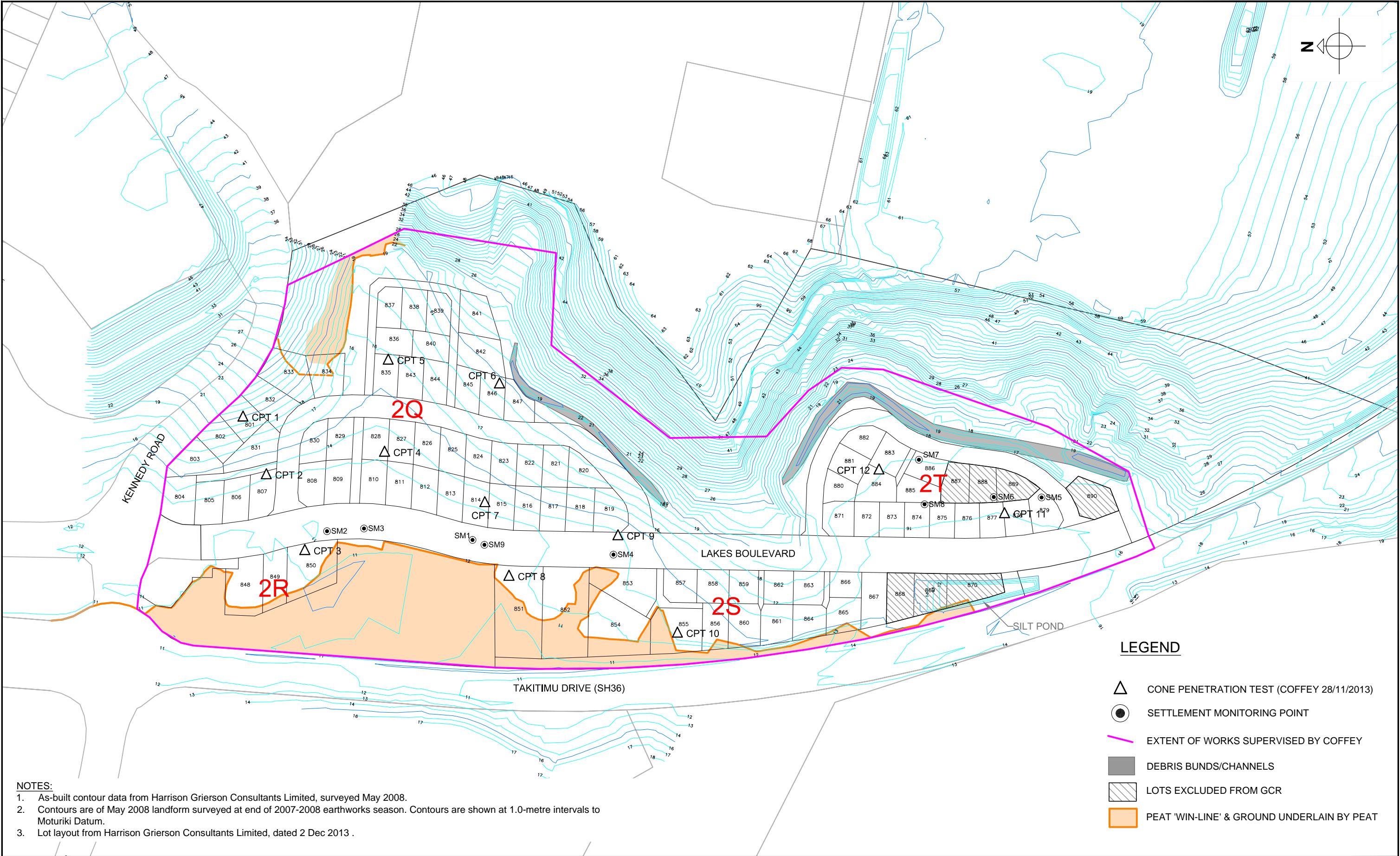
|          |     |             |       |          |      |   |               |           |   |                                     |        |  |
|----------|-----|-------------|-------|----------|------|---|---------------|-----------|---|-------------------------------------|--------|--|
| revision | rev | description | drawn | approved | date | <div><div>050.0100.0150.0</div><div>Horizontal Scale (metres)</div><div>050.0100.0150.0</div><div>Vertical Scale (metres)</div></div> | drawn         | AIP       |  | client: THE LAKES (2012) LIMITED    |        |  |
|          |     |             |       |          |      |   | approved      | RBT       |   | project: THE LAKES SUBDIVISION      |        |  |
|          |     |             |       |          |      |   | date          | 5/05/2014 |   | STAGE 2 QRST                        |        |  |
|          |     |             |       |          |      |   | scale         | 1:2500    |   | GEOTECHNICAL COMPLETION REPORT      |        |  |
|          |     |             |       |          |      |   | original size | A3        |   | title: PRE DEVELOPMENT CONTOUR PLAN |        |  |
|          |     |             |       |          |      |   |               |           | project no: GENZTAUC13086AE   | figure no: 01                       | rev: 1 |  |




- LEGEND
- TEST LOCATION (COFFEY 14/11/2007 - 22/04/2008)
- SETTLEMENT MONITORING POINT
- CUT DEPTH CONTOURS (1m INTERVALS)
- FILL DEPTH CONTOURS (1m INTERVALS)
- 0m CUT/FILL DEPTH CONTOUR
- EXTENT OF WORKS SUPERVISED BY COFFEY
- EXTENT OF PEAT EXCAVATION ('WIN-LINE')
- SUBSOIL DRAINS
- LOTS EXCLUDED FROM GCR
- PEAT 'WIN-LINE' & GROUND UNDERLAIN BY PEAT

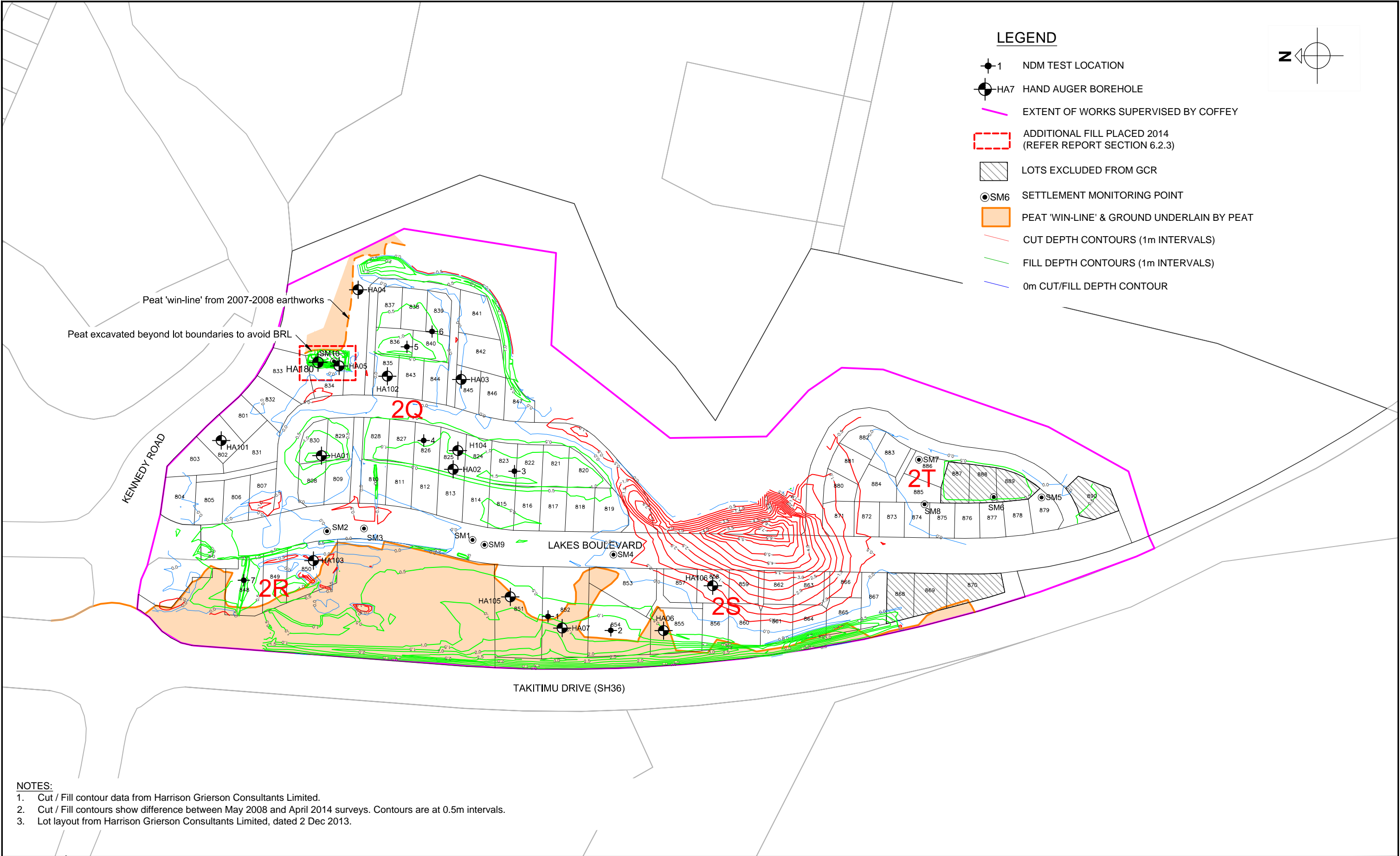
- NOTES:
1. Cut / Fill contour data from Harrison Grierson Consultants Limited.
2. Cut / Fill contours show difference between May 2007 and May 2008 surveys. Contours are at 1.0m intervals.
3. Lot layout from Harrison Grierson Consultants Limited, dated 2 Dec 2013
4. Testing conducted by Coffey and test locations surveyed by Grasshopper Farms Ltd.

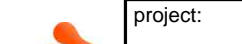
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|----------|-----|-------------|--|--|--|-------|----------|------|---|---------------|-----------|-------------------|--|--|--|
| revision | rev | description |  |  |  | drawn | approved | date | <div>050.0100.0150.0</div> <div>Horizontal Scale (metres)</div> <div>050.0100.0150.0</div> <div>Vertical Scale (metres)</div> | drawn         | AIP       | <div>coffey</div> | client: THE LAKES (2012) LIMITED   |  |  |
|          |     |             |  |  |  |       |          |      |   | approved      | RBT       |                   | project: THE LAKES SUBDIVISION<br>STAGE 2 QRST<br>GEOTECHNICAL COMPLETION REPORT |  |  |
|          |     |             |  |  |  |       |          |      |   | date          | 5/05/2014 |                   | title: 2007-2008 CUT/FILL PLAN   |  |  |
|          |     |             |  |  |  |       |          |      |   | scale         | 1:2500    |                   | project no: GENZTAUC13086AE figure no: 02 rev: 1                                 |  |  |
|          |     |             |  |  |  |       |          |      |   | original size | A3        |                   |  |  |  |

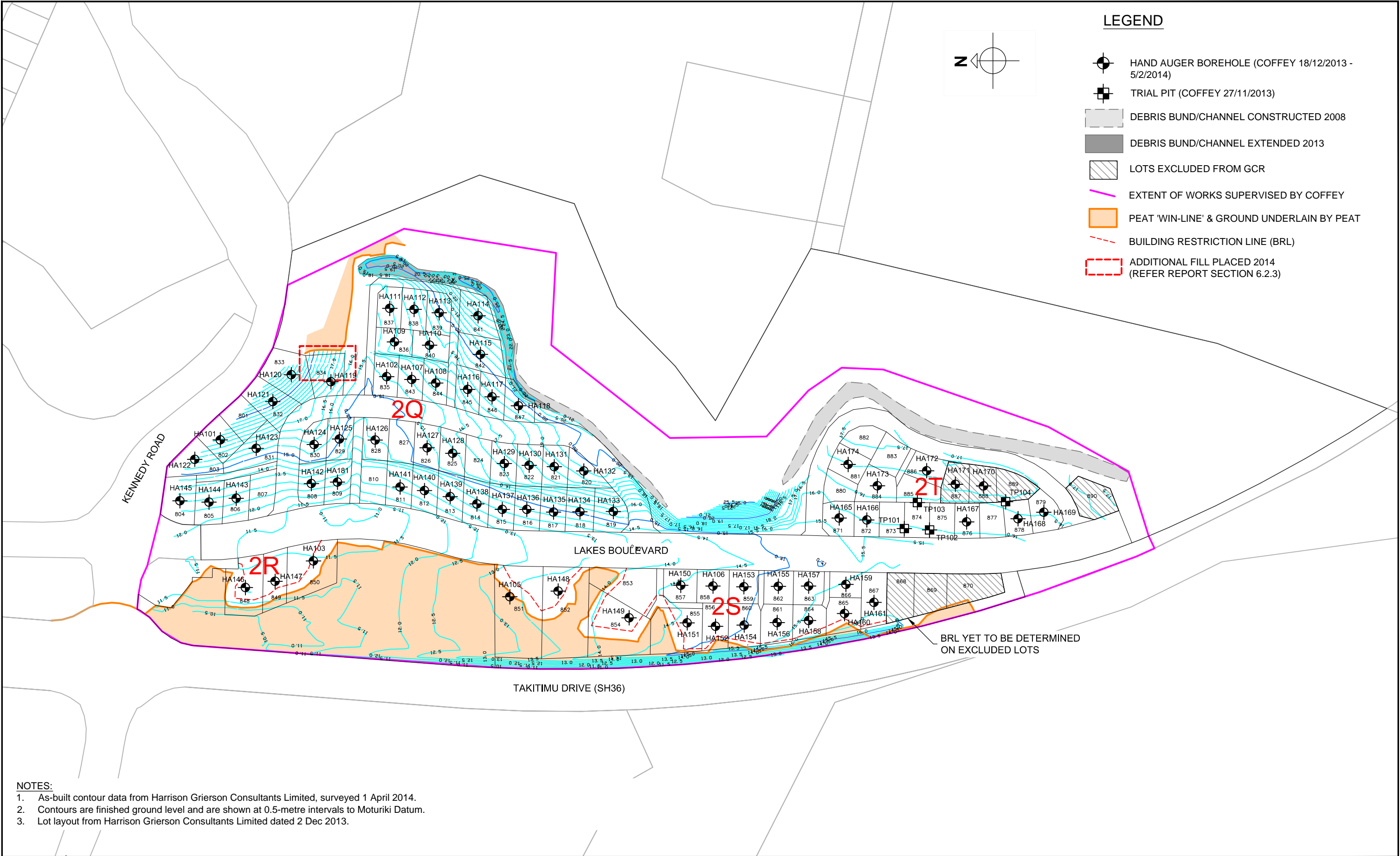


- NOTES:
1. As-built contour data from Harrison Grierson Consultants Limited, surveyed May 2008.
  2. Contours are of May 2008 landform surveyed at end of 2007-2008 earthworks season. Contours are shown at 1.0-metre intervals to Moturiki Datum.
  3. Lot layout from Harrison Grierson Consultants Limited, dated 2 Dec 2013 .

|          |     |             |       |          |      |   |               |           |   |                                  |               |        |
|----------|-----|-------------|-------|----------|------|---|---------------|-----------|---|----------------------------------|---------------|--------|
| revision | rev | description | drawn | approved | date | <div><div>050.0100.0150.0</div><div>Horizontal Scale (metres)</div><div>050.0100.0150.0</div><div>Vertical Scale (metres)</div></div> | drawn         | AIP       |  | client: THE LAKES (2012) LIMITED |               |        |
|          |     |             |       |          |      |   | approved      | RBT       |   | project: THE LAKES SUBDIVISION   |               |        |
|          |     |             |       |          |      |   | date          | 5/05/2014 |   | STAGE 2 QRST                     |               |        |
|          |     |             |       |          |      |   | scale         | 1:2500    |   | GEOTECHNICAL COMPLETION REPORT   |               |        |
|          |     |             |       |          |      |   | original size | A3        |   | title: 2007-2008 AS-BUILT PLAN   |               |        |
|          |     |             |       |          |      |   |               |           |   | project no: GENZTAUC13086AE      | figure no: 03 | rev: 1 |



|          |     |             |       |          |      |   |               |           |   |  |  |  |
|----------|-----|-------------|-------|----------|------|---|---------------|-----------|---|--|--|--|
| revision | rev | description | drawn | approved | date | <div><div>050.0100.0150.0</div><div>Horizontal Scale (metres)</div><div>050.0100.0150.0</div><div>Vertical Scale (metres)</div></div> | drawn         | AIP       |  | client: THE LAKES (2012) LIMITED   |  |  |
|          |     |             |       |          |      |   | approved      | RBT       |   | project: THE LAKES SUBDIVISION<br>STAGE 2 QRST<br>GEOTECHNICAL COMPLETION REPORT |  |  |
|          |     |             |       |          |      |   | date          | 5/05/2014 |   | title: 2012-2013 CUT/FILL PLAN   |  |  |
|          |     |             |       |          |      |   | scale         | 1:2500    |   | project no: GENZTAUC13086AEfigure no: 04rev: 1                                   |  |  |
|          |     |             |       |          |      |   | original size | A3        |   |  |  |  |



|          |     |             |  |  |  |       |  |          |  |      |  |               |  |                 |  |            |  |                                |  |
|----------|-----|-------------|--|--|--|-------|--|----------|--|------|--|---------------|--|-----------------|--|------------|--|--------------------------------|--|
| revision | rev | description |  |  |  | drawn |  | approved |  | date |  | drawn         |  | AIP             |  | client:    |  | THE LAKES (2012) LIMITED       |  |
|          |     |             |  |  |  |       |  |          |  |      |  | approved      |  | RBT             |  | project:   |  | THE LAKES SUBDIVISION          |  |
|          |     |             |  |  |  |       |  |          |  |      |  | date          |  | 5/05/2014       |  |            |  | STAGE 2 QRST                   |  |
|          |     |             |  |  |  |       |  |          |  |      |  | scale         |  | 1:2500          |  |            |  | GEOTECHNICAL COMPLETION REPORT |  |
|          |     |             |  |  |  |       |  |          |  |      |  | original size |  | A3              |  | title:     |  | 2014 AS-BUILT PLAN             |  |
|          |     |             |  |  |  |       |  |          |  |      |  | project no:   |  | GENZTAUC13086AE |  | figure no: |  | 05                             |  |
|          |     |             |  |  |  |       |  |          |  |      |  |               |  |                 |  | rev:       |  | 1                              |  |

# Appendix A

## **Geotechnical Suitability Statement**

# STATEMENT OF PROFESSIONAL OPINION AS TO THE GEOTECHNICAL SUITABILITY OF LAND FOR BUILDING

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| NAME OF SUBDIVISION                  | The Lakes Subdivision – Stages 2QRST |
| COUNCIL FILE NUMBER RC No:           | RC21332                              |
| ENGINEER RESPONSIBLE FOR DEVELOPMENT | Sally V. Hargraves                   |
| QUALIFICATIONS:                      | BSc, PhD, Category 1 Geoprofessional |

I, Sally Victoria Hargraves of Coffey Geotechnics Ltd, 141 Cameron Road, Tauranga, hereby confirm that:

- 1) I am a professional person, appropriately qualified with experience in geomechanics to ascertain the suitability of the land for building development and was retained as the Soils Engineer to the above development.
- 2) An appropriate level of site investigation and construction supervision has been carried out under my direction and is described in my development evaluation report dated 5 May 2014.
- 3) In my professional opinion, not to be construed as a guarantee, I consider that;
  - a) The areas shown in my report dated 9 June 2014 of each new allotment are suitable for the erection thereon of the building types appropriate to the zoning of the land, provided that reference is made to my Geotechnical Completion Report Ref. GENZTAUC13086AE-AC (Revision 1), dated 9 June 2014.
  - b) The earth fills shown on the attached Plans ref Figure 02 & Figure 04 have been placed in accordance with the requirements of the Infrastructure Development Code.
  - c) The completed works give due regard to all land slope and foundation stability considerations.
  - d) The filled ground is suitable for the erection thereon of residential buildings requiring specific design subject to the recommendations presented in my Geotechnical Completion Report Ref. GENZTAUC13086AE-AC (Revision 1), dated 9 June 2014.
  - e) The original ground not affected by filling is suitable for the erection thereon of residential buildings requiring specific design subject to the recommendations presented in my Geotechnical Completion Report Ref. GENZTAUC13086AE-AC (Revision 1), dated 9 June 2014.
- 4) This professional opinion is furnished to the Council and the owner for their purposes alone, on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection for any dwelling.

Signed



Date: 9 June 2014



**PRODUCER STATEMENT**  
**SUITABILITY OF LAND FOR BUILDING DEVELOPMENT**

**INFRASTRUCTURE DEVELOPMENT CODE**

**G2**

VERSION 1  
July 2011

**1**

|        |          |                  |                          |        |       |
|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                |           | Foundations  |                               | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice |  | Comments |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-----------|--|-------------------------------|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|--|----------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |           | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA | Specific Design<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |  |          |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m) |  |                               |                           |                     |             |                |                              |                           |                    |                           |                |  |          |

|     |     |      |   |    |   |   |    |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|-----|------|---|----|---|---|----|---|---|---|---|---|---|---|---|---|---|---|--|
| 801 | 595 | 150  | Y | 12 | N | N | -  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 802 | 596 | >200 | Y | 8  | N | Y | 3  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 803 | 718 | >200 | N | -  | N | Y | 12 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 804 | 762 | >200 | N | -  | N | Y | 10 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 805 | 617 | 124  | Y | 5  | N | Y | 6  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 806 | 588 | 200  | Y | 5  | N | Y | 3  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 807 | 591 | 150  | Y | 8  | N | N | -  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 808 | 576 | 200  | Y | 10 | N | N | -  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 809 | 585 | >200 | Y | 9  | N | N | -  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 810 | 581 | 150  | Y | 11 | N | N | -  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 811 | 585 | 200  | Y | 8  | N | N | -  | N | Y | N | N | N | Y | N | N | N | N | N |  |

Raft type foundations specifically designed for Ultimate Bearing Capacity = 210kPa or suspended timber foundations specifically designed for bearing capacity to be confirmed by CPEng at design stage.  
Placement of more than 300mm of additional fill on any site should be subject to specific geotechnical review.



## SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS

### INFRASTRUCTURE DEVELOPMENT CODE

**G3**

VERSION 1

Julv 2011

1

|        |          |                  |                          |        |       |
|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                | Foundations |  | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice |  | Comments |                               |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-------------|--|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|--|----------|-------------------------------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |             | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |  |          | Specific Design<br><br>Y/N/NA |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m)   |  |                           |                     |             |                |                              |                           |                    |                           |                |  |          |                               |

|     |     |      |   |     |   |   |     |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|-----|------|---|-----|---|---|-----|---|---|---|---|---|---|---|---|---|---|---|--|
| 812 | 592 | 180  | Y | 2   | N | Y | 2   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 813 | 597 | 132  | Y | 1   | N | Y | 2   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 814 | 593 | 200  | Y | 5.5 | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 815 | 591 | 200  | Y | 1.5 | N | Y | 5   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 816 | 588 | 200  | Y | 0.5 | N | Y | 6   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 817 | 584 | 174  | Y | 1   | N | Y | 5   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 818 | 631 | >200 | Y | 1.5 | N | Y | 5   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 819 | 673 | 200  | Y | 4.5 | N | Y | 2   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 820 | 526 | 200  | Y | 1   | N | Y | 4.5 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 821 | 553 | 200  | Y | 1   | N | Y | 6   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 822 | 553 | 200  | Y | 1.5 | N | Y | 6   | N | Y | N | N | N | Y | N | N | N | N | N |  |

Raft type foundations specifically designed for Ultimate Bearing Capacity = 210kPa or suspended timber foundations specifically designed for bearing capacity to be confirmed by CPEng at design stage.  
Placement of more than 300mm of additional fill on any site should be subject to specific geotechnical review.



## SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS

### INFRASTRUCTURE DEVELOPMENT CODE

**G3**

VERSION 1

Julv 2011

1

|        |          |                  |                          |        |       |
|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                | Foundations |  | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice |  | Comments |                               |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-------------|--|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|--|----------|-------------------------------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |             | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |  |          | Specific Design<br><br>Y/N/NA |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m)   |  |                           |                     |             |                |                              |                           |                    |                           |                |  |          |                               |

|     |     |      |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|-----|------|---|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 823 | 553 | 200  | Y | 2   | N | Y | 6 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 824 | 563 | 150  | Y | 5   | N | Y | 1 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 825 | 570 | >200 | Y | 1   | N | Y | 2 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 826 | 564 | >200 | Y | 5   | N | Y | 2 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 827 | 558 | 150  | Y | 6   | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 828 | 559 | >200 | Y | 8.5 | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 829 | 559 | >200 | Y | 4   | N | N | 4 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 830 | 507 | >200 | Y | 1   | N | Y | 4 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 831 | 811 | 200  | Y | 8   | N | Y | 4 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 832 | 790 | >200 | Y | 8   | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 833 | 992 | >200 | N | 8   | N | Y | 1 | N | Y | N | N | N | Y | N | N | N | N | N |  |

Raft type foundations specifically designed for Ultimate Bearing Capacity = 210kPa or suspended timber foundations specifically designed for bearing capacity to be confirmed by CPEng at design stage.  
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|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                | Foundations |  | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice |  | Comments |                               |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-------------|--|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|--|----------|-------------------------------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |             | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |  |          | Specific Design<br><br>Y/N/NA |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m)   |  |                           |                     |             |                |                              |                           |                    |                           |                |  |          |                               |

|     |     |      |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|-----|------|---|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 834 | 735 | >200 | Y | 7   | N | Y | 4 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 835 | 523 | >200 | Y | 6   | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 836 | 507 | 109  | Y | 6   | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 837 | 502 | 200  | Y | 4.5 | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 838 | 532 | 192  | Y | 4.5 | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 839 | 511 | 200  | Y | 3.5 | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 840 | 505 | 85   | Y | 5   | N | Y | 2 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 841 | 728 | 200  | Y | 1   | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 842 | 807 | 200  | Y | 3   | N | Y | 3 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 843 | 540 | 141  | Y | 6   | N | N | - | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 844 | 529 | 100  | Y | 1.5 | N | Y | 4 | N | Y | N | N | N | Y | N | N | N | N | N |  |

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Placement of more than 300mm of additional fill on any site should be subject to specific geotechnical review.



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|        |          |                  |                          |        |       |
|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                | Foundations |  | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice | Comments |                               |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-------------|--|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|----------|-------------------------------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |             | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |          | Specific Design<br><br>Y/N/NA |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m)   |  |                           |                     |             |                |                              |                           |                    |                           |                |          |                               |

|     |      |      |   |     |   |   |     |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|------|------|---|-----|---|---|-----|---|---|---|---|---|---|---|---|---|---|---|--|
| 845 | 542  | 200  | N | -   | N | Y | 4   | N | Y | N | N | N | Y | N | N | N | N | N | Raft type foundations specifically designed for Ultimate Bearing Capacity = 210kPa or suspended timber foundations specifically designed for bearing capacity to be confirmed by CPEng at design stage. Placement of more than 300mm of additional fill on any site should be subject to specific geotechnical review. |
| 846 | 555  | 200  | Y | 4   | N | y | 1   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 847 | 505  | 168  | Y | 7   | N | Y | 5   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 848 | 1056 | 150  | Y | 10  | N | Y | 1   | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 849 | 698  | 200  | Y | 5.5 | N | Y | 1   | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 850 | 1289 | 150  | Y | 2.5 | N | Y | 1   | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 851 | 2244 | 150  | Y | 7.5 | N | N | -   | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 852 | 2151 | 200  | Y | 7   | N | N | -   | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 853 | 1144 | >200 | Y | 7.5 | N | Y | 2.5 | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 854 | 1741 | 200  | Y | 7   | N | N | -   | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 855 | 1164 | 200  | Y | 8.5 | N | Y | 1   | N | Y | Y | N | N | Y | N | N | N | N | N |  |



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|        |          |                  |                          |        |       |
|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                | Foundations |  | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice |  | Comments |                               |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-------------|--|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|--|----------|-------------------------------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |             | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |  |          | Specific Design<br><br>Y/N/NA |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m)   |  |                           |                     |             |                |                              |                           |                    |                           |                |  |          |                               |

|     |     |     |   |     |   |   |      |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|-----|-----|---|-----|---|---|------|---|---|---|---|---|---|---|---|---|---|---|--|
| 856 | 619 | 137 | Y | 4.5 | N | Y | 3.5  | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 857 | 563 | 200 | N | -   | N | Y | 2    | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 858 | 552 | 135 | N | -   | N | Y | 4.5  | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 859 | 504 | 131 | N | -   | N | Y | 9    | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 860 | 708 | 200 | Y | 3   | N | Y | 7    | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 861 | 640 | 135 | Y | 3   | N | Y | 8.5  | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 862 | 504 | 200 | N | -   | N | Y | 7    | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 863 | 525 | 200 | N | -   | N | Y | 13   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 864 | 567 | 85  | Y | 3   | N | Y | 3.5  | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 865 | 607 | 109 | Y | 5.5 | N | Y | 7.5  | N | Y | Y | N | N | Y | N | N | N | N | N |  |
| 866 | 419 | 200 | N | -   | N | Y | 11.5 | N | Y | N | N | N | Y | N | N | N | N | N |  |

Raft type foundations specifically designed for Ultimate Bearing Capacity = 210kPa or suspended timber foundations specifically designed for bearing capacity to be confirmed by CPEng at design stage.  
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## SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS

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|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                | Foundations |  | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice |  | Comments |                               |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-------------|--|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|--|----------|-------------------------------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |             | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |  |          | Specific Design<br><br>Y/N/NA |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m)   |  |                           |                     |             |                |                              |                           |                    |                           |                |  |          |                               |

|     |     |      |   |     |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-----|-----|------|---|-----|---|---|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 867 | 703 | >200 | Y | 2   | N | Y | 10  | N | Y | Y | N | N | Y | N | N | N | N | N | N | Raft type foundations specifically designed for Ultimate Bearing Capacity = 210kPa or suspended timber foundations specifically designed for bearing capacity to be confirmed by CPEng at design stage.<br>Placement of more than 300mm of additional fill on any site should be subject to specific geotechnical review. |
| 871 | 543 | 200  | Y | 2   | N | Y | 2   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 872 | 450 | 200  | Y | 2   | N | Y | 0.5 | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 873 | 450 | 150  | Y | 2   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 874 | 451 | 150  | Y | 2   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 875 | 449 | 150  | Y | 2.5 | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 876 | 449 | 200  | Y | 4   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 877 | 446 | 150  | Y | 3   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 878 | 476 | 200  | Y | 6   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 879 | 545 | 200  | Y | 6   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |
| 880 | 427 | 150  | Y | 2   | N | Y | 1   | N | Y | N | N | N | Y | N | N | N | N | N | N |   |



## SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS

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|--------|----------|------------------|--------------------------|--------|-------|
| DP No: | DP463737 | Property Address | 99 Kennedy Road, Pyes Pa | RC No: | 21332 |
|--------|----------|------------------|--------------------------|--------|-------|

| Lot No: | Area (m <sup>2</sup> ) | Subsurface data                           |                     |           |  |                                | Foundations |  | Building Restriction Line | S/W Specific Design | S/W Soakage | S/W Reticulate | Designated Building Platform | Minimum Building Platform | Compressible Soils | On-Site Effluent Disposal | Consent Notice | Comments |                               |
|---------|------------------------|---|---------------------|-----------|--|--------------------------------|-------------|--|---------------------------|---------------------|-------------|----------------|------------------------------|---------------------------|--------------------|---------------------------|----------------|----------|-------------------------------|
|         |                        | Shear Strength (kPa)<br><br>at 0.5m depth | Subdivision Filling |           | Natural Topography Unworked<br><br>Y/N | Natural Topography Earthworked |             | Conventional Shallow Foundation to NZS 3604:2011<br><br>Y/N/NA |                           |                     |             |                |                              |                           |                    |                           |                |          | Specific Design<br><br>Y/N/NA |
|         |                        |   | Y/N                 | Depth (m) |  | Y/N                            | Depth (m)   |  |                           |                     |             |                |                              |                           |                    |                           |                |          |                               |

|     |     |      |   |     |   |   |     |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|-----|------|---|-----|---|---|-----|---|---|---|---|---|---|---|---|---|---|---|--|
| 881 | 507 | 200  | Y | 2   | N | Y | 0.5 | N | Y | N | N | N | Y | N | N | N | N | N | Raft type foundations specifically designed for Ultimate Bearing Capacity = 210kPa or suspended timber foundations specifically designed for bearing capacity to be confirmed by CPEng at design stage. Placement of more than 300mm of additional fill on any site should be subject to specific geotechnical review. |
| 882 | 478 | 150  | Y | 2   | N | Y | 0.5 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 883 | 509 | 150  | Y | 2.5 | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 884 | 604 | >200 | Y | 2   | N | Y | 0.5 | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 885 | 505 | 150  | Y | 3   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N |  |
| 886 | 492 | 200  | Y | 3   | N | N | -   | N | Y | N | N | N | Y | N | N | N | N | N |  |



### SUMMARY OF GOTECHNICAL DATA FOR INDIVIDUAL LOTS

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# Appendix B

## **Pre-Construction Investigation Data**



Borehole No. MB 33

Site: Pyes Pa West Urbanisation

Sheet: 1 Of: 3

Job No. 16944

Date Excavated: TH. 18/9/03

RL Ground:

Logged By: mat

| Description of Soil   | Soil Symbol | Depth (m) | Undrained Shear Strength (kPa) |     |     |
|---|-------------|-----------|--------------------------------|-----|-----|
|   |             |           | 50                             | 100 | 150 |
| SILT: very clayey, slightly cohesive<br>brown yellow, stiff, slightly moist | x x         | 0.5       |                                |     |     |
|   | x           | 1.5       |                                |     |     |
|   | x x         | 2.0       |                                |     |     |
| SAND: Sugary, pale yellow, medium Dense<br>slightly moist.                  | ASHES       | 2.5       |                                |     |     |
|   |             | 3.0       |                                |     |     |
|   |             | 3.5       |                                |     |     |
| SAND: Sugary, cream grey, loose, slightly<br>moist                          |             | 4.0       |                                |     |     |
|   |             | 4.5       |                                |     |     |
|   |             | 5.0       |                                |     |     |
|   |             | 5.5       |                                |     |     |
|   |             | 6.0       |                                |     |     |
|   |             | 6.5       |                                |     |     |
|   |             | 7.0       |                                |     |     |
|   |             | 7.5       |                                |     |     |
|   |             | 8.0       |                                |     |     |
|   |             | 8.5       |                                |     |     |
|   |             | 9.0       |                                |     |     |
|   |             | 9.5       |                                |     |     |
|   |             | 10.0      |                                |     |     |
|   |             | 10.5      |                                |     |     |
|   |             | 11.0      |                                |     |     |
|   |             | 11.5      |                                |     |     |
|   |             | 12.0      |                                |     |     |
|   |             | 12.5      |                                |     |     |
|   |             | 13.0      |                                |     |     |
|   |             | 13.5      |                                |     |     |
|   |             | 14.0      |                                |     |     |
|   |             | 14.5      |                                |     |     |
|   |             | 15.0      |                                |     |     |
|   |             | 15.5      |                                |     |     |
|   |             | 16.0      |                                |     |     |
|   |             | 16.5      |                                |     |     |
|   |             | 17.0      |                                |     |     |
|   |             | 17.5      |                                |     |     |
|   |             | 18.0      |                                |     |     |
|   |             | 18.5      |                                |     |     |
|   |             | 19.0      |                                |     |     |
|   |             | 19.5      |                                |     |     |
|   |             | 20.0      |                                |     |     |
|   |             | 20.5      |                                |     |     |
|   |             | 21.0      |                                |     |     |
|   |             | 21.5      |                                |     |     |
|   |             | 22.0      |                                |     |     |
|   |             | 22.5      |                                |     |     |
|   |             | 23.0      |                                |     |     |
|   |             | 23.5      |                                |     |     |
|   |             | 24.0      |                                |     |     |
|   |             | 24.5      |                                |     |     |
|   |             | 25.0      |                                |     |     |
|   |             | 25.5      |                                |     |     |
|   |             | 26.0      |                                |     |     |
|   |             | 26.5      |                                |     |     |
|   |             | 27.0      |                                |     |     |
|   |             | 27.5      |                                |     |     |
|   |             | 28.0      |                                |     |     |
|   |             | 28.5      |                                |     |     |
|   |             | 29.0      |                                |     |     |
|   |             | 29.5      |                                |     |     |
|   |             | 30.0      |                                |     |     |
|   |             | 30.5      |                                |     |     |
|   |             | 31.0      |                                |     |     |
|   |             | 31.5      |                                |     |     |
|   |             | 32.0      |                                |     |     |
|   |             | 32.5      |                                |     |     |
|   |             | 33.0      |                                |     |     |
|   |             | 33.5      |                                |     |     |
|   |             | 34.0      |                                |     |     |
|   |             | 34.5      |                                |     |     |
|   |             | 35.0      |                                |     |     |
|   |             | 35.5      |                                |     |     |
|   |             | 36.0      |                                |     |     |
|   |             | 36.5      |                                |     |     |
|   |             | 37.0      |                                |     |     |
|   |             | 37.5      |                                |     |     |
|   |             | 38.0      |                                |     |     |
|   |             | 38.5      |                                |     |     |
|   |             | 39.0      |                                |     |     |
|   |             | 39.5      |                                |     |     |
|   |             | 40.0      |                                |     |     |
|   |             | 40.5      |                                |     |     |
|   |             | 41.0      |                                |     |     |
|   |             | 41.5      |                                |     |     |
|   |             | 42.0      |                                |     |     |
|   |             | 42.5      |                                |     |     |
|   |             | 43.0      |                                |     |     |
|   |             | 43.5      |                                |     |     |
|   |             | 44.0      |                                |     |     |
|   |             | 44.5      |                                |     |     |
|   |             | 45.0      |                                |     |     |
|   |             | 45.5      |                                |     |     |
|   |             | 46.0      |                                |     |     |
|   |             | 46.5      |                                |     |     |
|   |             | 47.0      |                                |     |     |
|   |             | 47.5      |                                |     |     |
|   |             | 48.0      |                                |     |     |
|   |             | 48.5      |                                |     |     |
|   |             | 49.0      |                                |     |     |
|   |             | 49.5      |                                |     |     |
|   |             | 50.0      |                                |     |     |
|   |             | 50.5      |                                |     |     |
|   |             | 51.0      |                                |     |     |
|   |             | 51.5      |                                |     |     |
|   |             | 52.0      |                                |     |     |
|   |             | 52.5      |                                |     |     |
|   |             | 53.0      |                                |     |     |
|   |             | 53.5      |                                |     |     |
|   |             | 54.0      |                                |     |     |
|   |             | 54.5      |                                |     |     |
|   |             | 55.0      |                                |     |     |
|   |             | 55.5      |                                |     |     |
|   |             | 56.0      |                                |     |     |
|   |             | 56.5      |                                |     |     |
|   |             | 57.0      |                                |     |     |
|   |             | 57.5      |                                |     |     |
|   |             | 58.0      |                                |     |     |
|   |             | 58.5      |                                |     |     |
|   |             | 59.0      |                                |     |     |
|   |             | 59.5      |                                |     |     |
|   |             | 60.0      |                                |     |     |
|   |             | 60.5      |                                |     |     |
|   |             | 61.0      |                                |     |     |
|   |             | 61.5      |                                |     |     |
|   |             | 62.0      |                                |     |     |
|   |             | 62.5      |                                |     |     |
|   |             | 63.0      |                                |     |     |
|   |             | 63.5      |                                |     |     |
|   |             | 64.0      |                                |     |     |
|   |             | 64.5      |                                |     |     |
|   |             | 65.0      |                                |     |     |
|   |             | 65.5      |                                |     |     |
|   |             | 66.0      |                                |     |     |
|   |             | 66.5      |                                |     |     |
|   |             | 67.0      |                                |     |     |
|   |             | 67.5      |                                |     |     |
|   |             | 68.0      |                                |     |     |
|   |             | 68.5      |                                |     |     |
|   |             | 69.0      |                                |     |     |
|   |             | 69.5      |                                |     |     |
|   |             | 70.0      |                                |     |     |
|   |             | 70.5      |                                |     |     |
|   |             | 71.0      |                                |     |     |
|   |             | 71.5      |                                |     |     |
|   |             | 72.0      |                                |     |     |
|   |             | 72.5      |                                |     |     |
|   |             | 73.0      |                                |     |     |
|   |             | 73.5      |                                |     |     |
|   |             | 74.0      |                                |     |     |
|   |             | 74.5      |                                |     |     |
|   |             | 75.0      |                                |     |     |
|   |             | 75.5      |                                |     |     |
|   |             | 76.0      |                                |     |     |
|   |             | 76.5      |                                |     |     |
|   |             | 77.0      |                                |     |     |
|   |             | 77.5      |                                |     |     |
|   |             | 78.0      |                                |     |     |
|   |             | 78.5      |                                |     |     |
|   |             | 79.0      |                                |     |     |
|   |             | 79.5      |                                |     |     |
|   |             | 80.0      |                                |     |     |
|   |             | 80.5      |                                |     |     |
|   |             | 81.0      |                                |     |     |
|   |             | 81.5      |                                |     |     |
|   |             | 82.0      |                                |     |     |
|   |             | 82.5      |                                |     |     |
|   |             | 83.0      |                                |     |     |
|   |             | 83.5      |                                |     |     |
|   |             | 84.0      |                                |     |     |
|   |             | 84.5      |                                |     |     |
|   |             | 85.0      |                                |     |     |
|   |             | 85.5      |                                |     |     |
|   |             | 86.0      |                                |     |     |
|   |             | 86.5      |                                |     |     |
|   |             | 87.0      |                                |     |     |
|   |             | 87.5      |                                |     |     |
|   |             | 88.0      |                                |     |     |
|   |             | 88.5      |                                |     |     |
|   |             | 89.0      |                                |     |     |
|   |             | 89.5      |                                |     |     |
|   |             | 90.0      |                                |     |     |
|   |             | 90.5      |                                |     |     |
|   |             | 91.0      |                                |     |     |
|   |             | 91.5      |                                |     |     |
|   |             | 92.0      |                                |     |     |
|   |             | 92.5      |                                |     |     |
|   |             | 93.0      |                                |     |     |
|   |             | 93.5      |                                |     |     |
|   |             | 94.0      |                                |     |     |
|   |             | 94.5      |                                |     |     |
|   |             | 95.0      |                                |     |     |
|   |             | 95.5      |                                |     |     |
|   |             | 96.0      |                                |     |     |
|   |             | 96.5      |                                |     |     |
|   |             | 97.0      |                                |     |     |
|   |             | 97.5      |                                |     |     |
|   |             | 98.0      |                                |     |     |
|   |             | 98.5      |                                |     |     |
|   |             | 99.0      |                                |     |     |
|   |             | 99.5      |                                |     |     |
|   |             | 100.0     |                                |     |     |
|   |             | 100.5     |                                |     |     |
|   |             | 101.0     |                                |     |     |
|   |             | 101.5     |                                |     |     |
|   |             | 102.0     |                                |     |     |
|   |             | 102.5     |                                |     |     |
|   |             | 103.0     |                                |     |     |
|   |             | 103.5     |                                |     |     |
|   |             | 104.0     |                                |     |     |
|   |             | 104.5     |                                |     |     |
|   |             | 105.0     |                                |     |     |
|   |             | 105.5     |                                |     |     |
|   |             | 106.0     |                                |     |     |
|   |             | 106.5     |                                |     |     |
|   |             | 107.0     |                                |     |     |
|   |             | 107.5     |                                |     |     |
|   |             | 108.0     |                                |     |     |
|   |             | 108.5     |                                |     |     |
|   |             | 109.0     |                                |     |     |
|   |             | 109.5     |                                |     |     |
|   |             | 110.0     |                                |     |     |
|   |             | 110.5     |                                |     |     |
|   |             | 111.0     |                                |     |     |
|   |             | 111.5     |                                |     |     |
|   |             | 112.0     |                                |     |     |
|   |             | 112.5     |                                |     |     |
|   |             | 113.0     |                                |     |     |
|   |             | 113.5     |                                |     |     |
|   |             | 114.0     |                                |     |     |
|   |             | 114.5     |                                |     |     |
|   |             | 115.0     |                                |     |     |
|   |             | 115.5     |                                |     |     |
|   |             | 116.0     |                                |     |     |
|   |             | 116.5     |                                |     |     |
|   |             | 117.0     |                                |     |     |
|   |             | 117.5     |                                |     |     |
|   |             | 118.0     |                                |     |     |
|   |             | 118.5     |                                |     |     |
|   |             | 119.0     |                                |     |     |
|   |             | 119.5     |                                |     |     |
|   |             | 120.0     |                                |     |     |
|   |             | 120.5     |                                |     |     |
|   |             | 121.0     |                                |     |     |
|   |             | 121.5     |                                |     |     |
|   |             | 122.0     |                                |     |     |
|   |             | 122.5     |                                |     |     |
|   |             | 123.0     |                                |     |     |
|   |             | 123.5     |                                |     |     |
|   |             | 124.0     |                                |     |     |
|   |             | 124.5     |                                |     |     |
|   |             | 125.0     |                                |     |     |
|   |             | 125.5     |                                |     |     |
|   |             | 126.0     |                                |     |     |
|   |             | 126.5     |                                |     |     |
|   |             | 127.0     |                                |     |     |
|   |             | 127.5     |                                |     |     |
|   |             | 128.0     |                                |     |     |
|   |             | 128.5     |                                |     |     |
|   |             | 129.0     |                                |     |     |
|   |             | 129.5     |                                |     |     |
|   |             | 130.0     |                                |     |     |
|   |             | 130.5     |                                |     |     |
|   |             | 131.0     |                                |     |     |
|   |             | 131.5     |                                |     |     |
|   |             | 132.0     |                                |     |     |
|   |             | 132.5     |                                |     |     |
|   |             | 133.0     |                                |     |     |
|   |             | 133.5     |                                |     |     |
|   |             | 134.0     |                                |     |     |
|   |             | 134.5     |                                |     |     |
|   |             | 135.0     |                                |     |     |
|   |             | 135.5     |                                |     |     |
|   |             | 136.0     |                                |     |     |
|   |             | 136.5     |                                |     |     |
|   |             | 137.0     |                                |     |     |
|   |             | 137.5     |                                |     |     |
|   |             | 138.0     |                                |     |     |
|   |             | 138.5     |                                |     |     |
|   |             | 139.0     |                                |     |     |
|   |             | 139.5     |                                |     |     |
|   |             | 140.0     |                                |     |     |
|   |             | 140.5     |                                |     |     |
|   |             | 141.0     |                                |     |     |
|   |             | 141.5     |                                |     |     |
|   |             | 142.0     |                                |     |     |
|   |             | 142.5     |                                |     |     |
|   |             | 143.0     |                                |     |     |
|   |             | 143.5     |                                |     |     |
|   |             | 144.0     |                                |     |     |
|   |             | 144.5     |                                |     |     |
|   |             | 145.0     |                                |     |     |
|   |             | 145.5     |                                |     |     |
|   |             | 146.0     |                                |     |     |
|   |             | 146.5     |                                |     |     |
|   |             | 147.0     |                                |     |     |
|   |             | 147.5     |                                |     |     |
|   |             | 148.0     |                                |     |     |
|   |             | 148.5     |                                |     |     |
|   |             | 149.0     |                                |     |     |
|   |             | 149.5     |                                |     |     |
|   |             | 150.0     |                                |     |     |
|   |             | 150.5     |                                |     |     |
|   |             |           |                                |     |     |

Borehole No. **MS 33**Site: **Pyes Pa West Urbanisation**Sheet: **2** Of: **3**Job No. **16944**Date Excavated: **TH 18/9/03**

RL Ground:

Logged By: **MAA**

| Description of Soil  | Soil Symbol | Depth (m) | SPT   | CORRECTION | Undrained Shear Strength (kPa) |     |     |
|--|-------------|-----------|-------|------------|--------------------------------|-----|-----|
|  |             |           |       |            | 50                             | 100 | 150 |
| <b>SAND: Sugary, cream grey, medium Dense</b><br><b>Dry</b><br><br>- homogeneous<br>- firm Drilling<br>- Dry |             | 4.5       | 2     | 100%       |                                |     |     |
|  |             | 4.7       | 2     |            |                                |     |     |
|  |             | 4.9       | 3 N=5 |            |                                |     |     |
| <b>SAND: Sugary, grey, medium Dense</b><br><b>Dry</b><br><br>homogeneous grey sand, Dry                      |             | 6.0       | 1     | 100%       |                                |     |     |
|  |             | 6.2       | 2     |            |                                |     |     |
|  |             | 6.4       | 4 N=6 |            |                                |     |     |
| <b>SAND: Sugary, grey, Dense</b>   |             | 7.0       |       | 100%       |                                |     |     |
|  |             | 7.5       | 1     |            |                                |     |     |
|  |             | 7.7       | 3     |            |                                |     |     |
|  |             | 7.9       | 4 N=7 | 100%       |                                |     |     |
|  |             | 8.0       |       |            |                                |     |     |
|  |             | 8.5       |       |            |                                |     |     |
|  |             | 9.0       |       |            |                                |     |     |

EXCAVATION METHOD: **75mm Ø MACHINE AUGER + HOLLOW SPT.**

EXCAVATION METHOD: 75mm  $\phi$  MACHINE AUGER.



Borehole No. MB 34

Site:

Pyes Pa West Urbanisation

Sheet: 1 Of: 3

Job No. 16944

Date Excavated: TU 13/5/03

RL Ground:

Logged By: M.H.

| Description of Soil   | Soil Symbol | Depth (m) | SPT | GROUNDWATER | CORE RECOVERY | Undrained Shear Strength (kPa) |     |     |
|---|-------------|-----------|-----|-------------|---------------|--------------------------------|-----|-----|
|   |             |           |     |             |               | 50                             | 100 | 150 |
| Topsoil   | WW          | 0.0       |     |             |               |                                |     |     |
|   | WW          | 0.1       |     |             |               |                                |     |     |
|   | WW          | 0.2       |     |             |               |                                |     |     |
| SILT: Very clayey, moderately cohesive<br>Dark brown yellow, stiff, slightly moist        | X           | 0.3       |     |             |               |                                |     |     |
|   | X           | 0.4       |     |             |               |                                |     |     |
|   | X           | 0.5       |     |             |               |                                |     |     |
|   | X           | 0.6       |     |             |               |                                |     |     |
|   | X           | 0.7       |     |             |               |                                |     |     |
|   | X           | 0.8       |     |             |               |                                |     |     |
|   | X           | 0.9       |     |             |               |                                |     |     |
|   | X           | 1.0       |     |             |               |                                |     |     |
|   | X           | 1.1       |     |             |               |                                |     |     |
|   | X           | 1.2       |     |             |               |                                |     |     |
|   | X           | 1.3       |     |             |               |                                |     |     |
|   | X           | 1.4       |     |             |               |                                |     |     |
|   | X           | 1.5       |     |             |               |                                |     |     |
| SPT 450 : Very clayey, moderately cohesive brown yellow silt<br>RECOVERY stiff, sensitive | X           | 1.6       |     |             |               |                                |     |     |
|   | X           | 1.7       |     |             |               |                                |     |     |
|   | X           | 1.8       |     |             |               |                                |     |     |
|   | X           | 1.9       |     |             |               |                                |     |     |
|   | X           | 2.0       |     |             |               |                                |     |     |
|   | X           | 2.1       |     |             |               |                                |     |     |
|   | X           | 2.2       |     |             |               |                                |     |     |
|   | X           | 2.3       |     |             |               |                                |     |     |
|   | X           | 2.4       |     |             |               |                                |     |     |
|   | X           | 2.5       |     |             |               |                                |     |     |
|   | X           | 2.6       |     |             |               |                                |     |     |
|   | X           | 2.7       |     |             |               |                                |     |     |
|   | X           | 2.8       |     |             |               |                                |     |     |
|   | X           | 2.9       |     |             |               |                                |     |     |
|   | X           | 3.0       |     |             |               |                                |     |     |
| SPT 300 : Sandy pale yellow orange<br>RECOVERY silt, loose, moist                         | X           | 3.1       |     |             |               |                                |     |     |
|   | X           | 3.2       |     |             |               |                                |     |     |
|   | X           | 3.3       |     |             |               |                                |     |     |
|   | X           | 3.4       |     |             |               |                                |     |     |
|   | X           | 3.5       |     |             |               |                                |     |     |
|   | X           | 3.6       |     |             |               |                                |     |     |
|   | X           | 3.7       |     |             |               |                                |     |     |
|   | X           | 3.8       |     |             |               |                                |     |     |
|   | X           | 3.9       |     |             |               |                                |     |     |
|   | X           | 4.0       |     |             |               |                                |     |     |
|   | X           | 4.1       |     |             |               |                                |     |     |
|   | X           | 4.2       |     |             |               |                                |     |     |
|   | X           | 4.3       |     |             |               |                                |     |     |
|   | X           | 4.4       |     |             |               |                                |     |     |
|   | X           | 4.5       |     |             |               |                                |     |     |

EXCAVATION METHOD: 75mm  $\phi$  MACHINE AUGER + HOLLOW SPT



Borehole No. MB 34

Site:

Pyes Pa West Urbanisation

Sheet: 2 Of: 3

Job No. 16944

Date Excavated: Tu 13/5/03

RL Ground:

Logged By: MA

| Description of Soil   | Soil Symbol | Depth (m) | Undrained Shear Strength (kPa) |     |     |
|---|-------------|-----------|--------------------------------|-----|-----|
|   |             |           | 50                             | 100 | 150 |
| SPT 450<br>RECOVERY<br>Sandy cream brown Soft                               | X X         | 0         |                                |     |     |
|   | X           | 1         |                                |     |     |
| Silty sand, loose   | X           | 1         |                                |     |     |
|   |             | 1         |                                |     |     |
| SAND: very silty, non cohesive, pale cream brown, loose, Sensitive Dilatent |             | 5.0       |                                |     |     |
|   |             | 5.5       |                                |     |     |
|   |             | 6.0       |                                |     |     |
| SPT 450<br>RECOVERY<br>pumice sand, grey, loose                             |             | 6.0       |                                |     |     |
|   |             | 6.5       |                                |     |     |
| Fine grained pumice cream, firm, Sensitive Dilatent                         | P P         | 6.5       |                                |     |     |
|   | P           | 7.0       |                                |     |     |
|   | P P         | 7.0       |                                |     |     |
|   | P           | 7.5       |                                |     |     |
| SPT 450<br>RECOVERY<br>grey pumice sand medium Dense                        |             | 7.5       |                                |     |     |
|   |             | 8.0       |                                |     |     |
| cream pumice, Dense   | P P         | 8.0       |                                |     |     |
|   |             | 8.5       |                                |     |     |
| SILT: very sandy, cream, Dense solid drilling.                              | X X         | 8.5       |                                |     |     |
|   | X           | 9.0       |                                |     |     |
|   | X X         | 9.0       |                                |     |     |

EXCAVATION METHOD: 75 mm  $\phi$  MACHINE AUGER & HOLLOW SPT

| Description of Soil   |  | Soil Symbol   | Depth (m)   | SPT         | GROUNDWATER | CORE RECOVERY | Undrained Shear Strength (kPa) |     |     |
|---|--|---------------|-------------|-------------|-------------|---------------|--------------------------------|-----|-----|
|   |  |               |             |             |             |               | 50                             | 100 | 150 |
| SPT 450<br>RECOVERY   | Pumiceous clayey silt, cream<br>Dense  | XX            | 2<br>4<br>5 | 2<br>4<br>5 |             |               |                                |     |     |
| SILT: Very clayey, cream, very<br>stiff, sensitive, Dilatant            |  | XX            | 5           | 5           | N=9         |               |                                |     |     |
|   |  | XX            | 10          |             | SEE PAGE ?  | 100%          |                                |     |     |
| SPT 450<br>RECOVERY   | Very fine grained pumiceous<br>silt, pale grey cream, very<br>stiff, sensitive, slightly moist | XX<br>X<br>XX | 3<br>1<br>4 | 3<br>1<br>4 |             |               |                                |     |     |
| Pumice sand: fines content is low,<br>grey, medium dense, very<br>moist |  | XX            | 10          |             |             |               |                                |     |     |
|   |  | XX            | 15          |             |             | 100%          |                                |     |     |
| SPT 350<br>RECOVERY   | MEDIUM DENSE<br>DENSE pumice sand<br>grey with yellow<br>banding                               | XX            | 5<br>8<br>8 | 5<br>8<br>8 | N=16        |               |                                |     |     |
| EOB @ 12.5m: TARGET DEPTH.  |  |               | 12.5        |             |             |               |                                |     |     |
| EXCAVATION METHOD: 75mm Ø MACHINE AUGER Et Hollow SPT                   |  |               |             |             |             |               |                                |     |     |



Borehole No. MB 35

Site:

Pyes Pa West Urbanisation

Sheet: 1 Of: 3

Job No. 16944

Date Excavated: W. 14/5/03

RL Ground:

Logged By: MA

| Description of Soil   | Soil Symbol | Depth (m) | SPT | GROUNDWATER | CORE RECOVERY | Undrained Shear Strength (kPa) |     |     |
|---|-------------|-----------|-----|-------------|---------------|--------------------------------|-----|-----|
|   |             |           |     |             |               | 50                             | 100 | 150 |
| TOPSOIL   | EE          | 0         |     |             |               |                                |     |     |
| Sand; very silty, grey, loose   | EE          | 0.5       |     |             |               |                                |     |     |
|   | EE          | 1         |     |             |               |                                |     |     |
|   | EE          | 1.5       |     |             |               |                                |     |     |
|   | EE          | 2         |     |             |               |                                |     |     |
|   | EE          | 2.5       |     |             |               |                                |     |     |
| SPT 450 : Grey pumice sand<br>RECOVERY loose<br>Medium Dense            | EE          | 3         |     |             |               |                                |     |     |
|   | EE          | 3.5       |     |             |               |                                |     |     |
|   | EE          | 4         |     |             |               |                                |     |     |
|   | EE          | 4.5       |     |             |               |                                |     |     |
|   | EE          | 5         |     |             |               |                                |     |     |
| Silty grey pumice sand<br>medium Dense : Core in<br>excellent condition | EE          | 5.5       |     |             |               |                                |     |     |
|   | EE          | 6         |     |             |               |                                |     |     |
|   | EE          | 6.5       |     |             |               |                                |     |     |
|   | EE          | 7         |     |             |               |                                |     |     |
|   | EE          | 7.5       |     |             |               |                                |     |     |
| SPT 450 : Silty grey pumice sand<br>RECOVERY medium Dense               | EE          | 8         |     |             |               |                                |     |     |
|   | EE          | 8.5       |     |             |               |                                |     |     |
|   | EE          | 9         |     |             |               |                                |     |     |
|   | EE          | 9.5       |     |             |               |                                |     |     |
|   | EE          | 10        |     |             |               |                                |     |     |
| SAND : Very silty, brown orange   | EE          | 10.5      |     |             |               |                                |     |     |
|   | EE          | 11        |     |             |               |                                |     |     |
|   | EE          | 11.5      |     |             |               |                                |     |     |
|   | EE          | 12        |     |             |               |                                |     |     |
|   | EE          | 12.5      |     |             |               |                                |     |     |
| grey  | EE          | 13        |     |             |               |                                |     |     |
|   | EE          | 13.5      |     |             |               |                                |     |     |
|   | EE          | 14        |     |             |               |                                |     |     |
|   | EE          | 14.5      |     |             |               |                                |     |     |
|   | EE          | 15        |     |             |               |                                |     |     |

EXCAVATION METHOD: 75mm  $\phi$  MACHINE AUGER ET HOLLOW SPT



Borehole No. MB 35

Site:

Pyes Pa West Urbanisation

Sheet: 2 Of: 3

Job No. 16944

Date Excavated: W. 14/5/03

RL Ground:

Logged By: MA

| Description of Soil  | Soil Symbol | Depth (m)   | SPT  | CORE RECOVERY | Undrained Shear Strength (kPa) |     |     |
|--|-------------|-------------|------|---------------|--------------------------------|-----|-----|
|  |             |             |      |               | 50                             | 100 | 150 |
| SPT 450 : Cream grey pumice Sand<br>RECOVERY medium Dense  |             | 3<br>3<br>3 | N=6  | 100           |                                |     |     |
| pale brown yellow  |             | 40-50%      |      |               |                                |     |     |
|  |             | 50-60%      |      |               |                                |     |     |
|  |             | 60-70%      |      |               |                                |     |     |
|  |             | 70-80%      |      |               |                                |     |     |
| SPT 450 : pale yellow pumice Sand<br>RECOVERY medium Dense |             | 2<br>6<br>7 | N=13 |               |                                |     |     |
| Grey Sand Dense  |             | 80-90%      |      |               |                                |     |     |
| SAND: pumice, pale brown yellow; medium<br>Dense to Dense  |             | 85-90%      |      |               |                                |     |     |
| SPT SITS ON SAND BACKFILL DOWN TO 9.0m                     |             | 1<br>2<br>6 | N=8  |               |                                |     |     |
| 450 RECOVERY: Grey pumice sand, Dense                      |             |             |      |               |                                |     |     |

EXCAVATION METHOD: 75mm  $\phi$  Machine Auger Et Hollow SPT



Borehole No. MB 35

Site:

Pyes Pa West Urbanisation

Sheet: 3 Of: 3

Job No. 16944

Date Excavated: W 14/5/03

RL Ground:

Logged By: MAA

| Description of Soil                                    | Soil Symbol | Depth (m) | SPT          | CORE RECOVERY | Undrained Shear Strength (kPa) |     |     |
|--|-------------|-----------|--------------|---------------|--------------------------------|-----|-----|
|  |             |           |              |               | 50                             | 100 | 150 |
| pumice sand, grey, Dense                               |             | 0         |              |               |                                |     |     |
|  |             | 0.5       |              |               |                                |     |     |
|  |             | 1.0       |              |               |                                |     |     |
|  |             | 1.5       |              |               |                                |     |     |
|  |             | 2.0       |              |               |                                |     |     |
|  |             | 2.5       |              |               |                                |     |     |
|  |             | 3.0       |              |               |                                |     |     |
|  |             | 3.5       |              |               |                                |     |     |
|  |             | 4.0       |              |               |                                |     |     |
|  |             | 4.5       |              |               |                                |     |     |
| SPT 450 : Grey pumice Sand; Dense<br>RECOVERY          |             | 5.0       | 1<br>3<br>10 | N=13          |                                |     |     |
|  |             | 5.5       |              |               |                                |     |     |
|  |             | 6.0       |              |               |                                |     |     |
|  |             | 6.5       |              |               |                                |     |     |
|  |             | 7.0       |              |               |                                |     |     |
|  |             | 7.5       |              |               |                                |     |     |
|  |             | 8.0       |              |               |                                |     |     |
|  |             | 8.5       |              |               |                                |     |     |
|  |             | 9.0       |              |               |                                |     |     |
|  |             | 9.5       |              |               |                                |     |     |
| Backfall prevents SPT<br>from being undertaken @ 12.0m |             | 10.0      |              |               |                                |     |     |
|  |             | 10.5      |              |               |                                |     |     |
|  |             | 11.0      |              |               |                                |     |     |
|  |             | 11.5      |              |               |                                |     |     |
|  |             | 12.0      |              |               |                                |     |     |
|  |             | 12.5      |              |               |                                |     |     |
|  |             | 13.0      |              |               |                                |     |     |
|  |             | 13.5      |              |               |                                |     |     |
|  |             | 14.0      |              |               |                                |     |     |
|  |             | 14.5      |              |               |                                |     |     |
| pumice Sands, grey<br>Dense                            |             | 15.0      |              |               |                                |     |     |
|  |             | 15.5      |              |               |                                |     |     |
|  |             | 16.0      |              |               |                                |     |     |
|  |             | 16.5      |              |               |                                |     |     |
|  |             | 17.0      |              |               |                                |     |     |
|  |             | 17.5      |              |               |                                |     |     |
|  |             | 18.0      |              |               |                                |     |     |
|  |             | 18.5      |              |               |                                |     |     |
|  |             | 19.0      |              |               |                                |     |     |
|  |             | 19.5      |              |               |                                |     |     |
| FOR @ 13.5m : TARGET DEPTH                             |             | 20.0      |              |               |                                |     |     |
|  |             | 20.5      |              |               |                                |     |     |
|  |             | 21.0      |              |               |                                |     |     |
|  |             | 21.5      |              |               |                                |     |     |
|  |             | 22.0      |              |               |                                |     |     |
|  |             | 22.5      |              |               |                                |     |     |
|  |             | 23.0      |              |               |                                |     |     |
|  |             | 23.5      |              |               |                                |     |     |
|  |             | 24.0      |              |               |                                |     |     |
|  |             | 24.5      |              |               |                                |     |     |



Borehole No. MB46

Site: Pyes Pa West Urbanisation

Sheet: 1 Of: 4

Job No. 16944

Date Excavated: TH. 18/9/03

RL Ground:

Logged By: MAA

| Description of Soil   | Soil Symbol | Depth (m) | CORE RECOVERY | Undrained Shear Strength (kPa) |     |     |
|---|-------------|-----------|---------------|--------------------------------|-----|-----|
|   |             |           |               | 50                             | 100 | 150 |
| Topsoil   |             | 0         |               |                                |     |     |
| SILT: clayey, slightly cohesive, brown yellow, stiff, moist       | xx          | 0.5       |               |                                |     |     |
|   | x           | 1.0       |               |                                |     |     |
|   | xx          | 1.5       |               |                                |     |     |
|   | x           | 2.0       |               |                                |     |     |
| pumiceous silt, non cohesive, cream stiff, slightly moist         | pp          | 2.5       |               |                                |     |     |
|   | p           | 3.0       |               |                                |     |     |
|   |             | 3.5       |               |                                |     |     |
| pumice sand, pale grey, Dry                                       |             | 3.5       |               |                                |     |     |
| SILT: Very clayey, cohesive, Dark brown orange, very stiff, moist | xx          | 4.0       |               |                                |     |     |
|   |             | 4.5       |               |                                |     |     |
|   |             | 5.0       |               |                                |     |     |
|   |             | 5.5       |               |                                |     |     |
| Stiff   |             | 6.0       |               |                                |     |     |
|   |             | 6.5       |               |                                |     |     |
|   |             | 7.0       |               |                                |     |     |
|   |             | 7.5       |               |                                |     |     |

EXCAVATION METHOD: 75mm  $\phi$  MACHINE AUGER + HOLLOW SPOT



SHRIMPTON &amp; LIPINSKI

Borehole No. **MB 46**

Site:

Pyes Pa West Urbanisation

Sheet: **2** Of: **4**Job No. **16944**Date Excavated: **TH. 18/9/03**

RL Ground:

Logged By: **MAA**

| Description of Soil   | Soil Symbol | Depth (m) | CORE<br>REMARKS | Undrained Shear Strength (kPa) |     |     |
|---|-------------|-----------|-----------------|--------------------------------|-----|-----|
|   |             |           |                 | 50                             | 100 | 150 |
| SILT: Very clayey, cohesive, Dark brown orange, stiff, moist                              | X           | 4.0       | 100%            |                                |     |     |
|   |             | 4.2       |                 |                                |     |     |
|   |             | 4.4       |                 |                                |     |     |
|   |             | 4.6       |                 |                                |     |     |
|   |             | 4.8       |                 |                                |     |     |
|   |             | 5.0       |                 |                                |     |     |
|   |             | 5.2       |                 |                                |     |     |
|   |             | 5.4       |                 |                                |     |     |
|   |             | 5.6       |                 |                                |     |     |
|   |             | 5.8       |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 6.0       | 100%            |                                |     |     |
|   |             | 6.2       |                 |                                |     |     |
|   |             | 6.4       |                 |                                |     |     |
|   |             | 6.6       |                 |                                |     |     |
|   |             | 6.8       |                 |                                |     |     |
|   |             | 7.0       |                 |                                |     |     |
|   |             | 7.2       |                 |                                |     |     |
|   |             | 7.4       |                 |                                |     |     |
|   |             | 7.6       |                 |                                |     |     |
|   |             | 7.8       |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 8.0       | 100%            |                                |     |     |
|   |             | 8.2       |                 |                                |     |     |
|   |             | 8.4       |                 |                                |     |     |
|   |             | 8.6       |                 |                                |     |     |
|   |             | 8.8       |                 |                                |     |     |
|   |             | 9.0       |                 |                                |     |     |
|   |             | 9.2       |                 |                                |     |     |
|   |             | 9.4       |                 |                                |     |     |
|   |             | 9.6       |                 |                                |     |     |
|   |             | 9.8       |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 10.0      | 100%            |                                |     |     |
|   |             | 10.2      |                 |                                |     |     |
|   |             | 10.4      |                 |                                |     |     |
|   |             | 10.6      |                 |                                |     |     |
|   |             | 10.8      |                 |                                |     |     |
|   |             | 11.0      |                 |                                |     |     |
|   |             | 11.2      |                 |                                |     |     |
|   |             | 11.4      |                 |                                |     |     |
|   |             | 11.6      |                 |                                |     |     |
|   |             | 11.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 12.0      | 100%            |                                |     |     |
|   |             | 12.2      |                 |                                |     |     |
|   |             | 12.4      |                 |                                |     |     |
|   |             | 12.6      |                 |                                |     |     |
|   |             | 12.8      |                 |                                |     |     |
|   |             | 13.0      |                 |                                |     |     |
|   |             | 13.2      |                 |                                |     |     |
|   |             | 13.4      |                 |                                |     |     |
|   |             | 13.6      |                 |                                |     |     |
|   |             | 13.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 14.0      | 100%            |                                |     |     |
|   |             | 14.2      |                 |                                |     |     |
|   |             | 14.4      |                 |                                |     |     |
|   |             | 14.6      |                 |                                |     |     |
|   |             | 14.8      |                 |                                |     |     |
|   |             | 15.0      |                 |                                |     |     |
|   |             | 15.2      |                 |                                |     |     |
|   |             | 15.4      |                 |                                |     |     |
|   |             | 15.6      |                 |                                |     |     |
|   |             | 15.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 16.0      | 100%            |                                |     |     |
|   |             | 16.2      |                 |                                |     |     |
|   |             | 16.4      |                 |                                |     |     |
|   |             | 16.6      |                 |                                |     |     |
|   |             | 16.8      |                 |                                |     |     |
|   |             | 17.0      |                 |                                |     |     |
|   |             | 17.2      |                 |                                |     |     |
|   |             | 17.4      |                 |                                |     |     |
|   |             | 17.6      |                 |                                |     |     |
|   |             | 17.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 18.0      | 100%            |                                |     |     |
|   |             | 18.2      |                 |                                |     |     |
|   |             | 18.4      |                 |                                |     |     |
|   |             | 18.6      |                 |                                |     |     |
|   |             | 18.8      |                 |                                |     |     |
|   |             | 19.0      |                 |                                |     |     |
|   |             | 19.2      |                 |                                |     |     |
|   |             | 19.4      |                 |                                |     |     |
|   |             | 19.6      |                 |                                |     |     |
|   |             | 19.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 20.0      | 100%            |                                |     |     |
|   |             | 20.2      |                 |                                |     |     |
|   |             | 20.4      |                 |                                |     |     |
|   |             | 20.6      |                 |                                |     |     |
|   |             | 20.8      |                 |                                |     |     |
|   |             | 21.0      |                 |                                |     |     |
|   |             | 21.2      |                 |                                |     |     |
|   |             | 21.4      |                 |                                |     |     |
|   |             | 21.6      |                 |                                |     |     |
|   |             | 21.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 22.0      | 100%            |                                |     |     |
|   |             | 22.2      |                 |                                |     |     |
|   |             | 22.4      |                 |                                |     |     |
|   |             | 22.6      |                 |                                |     |     |
|   |             | 22.8      |                 |                                |     |     |
|   |             | 23.0      |                 |                                |     |     |
|   |             | 23.2      |                 |                                |     |     |
|   |             | 23.4      |                 |                                |     |     |
|   |             | 23.6      |                 |                                |     |     |
|   |             | 23.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 24.0      | 100%            |                                |     |     |
|   |             | 24.2      |                 |                                |     |     |
|   |             | 24.4      |                 |                                |     |     |
|   |             | 24.6      |                 |                                |     |     |
|   |             | 24.8      |                 |                                |     |     |
|   |             | 25.0      |                 |                                |     |     |
|   |             | 25.2      |                 |                                |     |     |
|   |             | 25.4      |                 |                                |     |     |
|   |             | 25.6      |                 |                                |     |     |
|   |             | 25.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 26.0      | 100%            |                                |     |     |
|   |             | 26.2      |                 |                                |     |     |
|   |             | 26.4      |                 |                                |     |     |
|   |             | 26.6      |                 |                                |     |     |
|   |             | 26.8      |                 |                                |     |     |
|   |             | 27.0      |                 |                                |     |     |
|   |             | 27.2      |                 |                                |     |     |
|   |             | 27.4      |                 |                                |     |     |
|   |             | 27.6      |                 |                                |     |     |
|   |             | 27.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 28.0      | 100%            |                                |     |     |
|   |             | 28.2      |                 |                                |     |     |
|   |             | 28.4      |                 |                                |     |     |
|   |             | 28.6      |                 |                                |     |     |
|   |             | 28.8      |                 |                                |     |     |
|   |             | 29.0      |                 |                                |     |     |
|   |             | 29.2      |                 |                                |     |     |
|   |             | 29.4      |                 |                                |     |     |
|   |             | 29.6      |                 |                                |     |     |
|   |             | 29.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 30.0      | 100%            |                                |     |     |
|   |             | 30.2      |                 |                                |     |     |
|   |             | 30.4      |                 |                                |     |     |
|   |             | 30.6      |                 |                                |     |     |
|   |             | 30.8      |                 |                                |     |     |
|   |             | 31.0      |                 |                                |     |     |
|   |             | 31.2      |                 |                                |     |     |
|   |             | 31.4      |                 |                                |     |     |
|   |             | 31.6      |                 |                                |     |     |
|   |             | 31.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 32.0      | 100%            |                                |     |     |
|   |             | 32.2      |                 |                                |     |     |
|   |             | 32.4      |                 |                                |     |     |
|   |             | 32.6      |                 |                                |     |     |
|   |             | 32.8      |                 |                                |     |     |
|   |             | 33.0      |                 |                                |     |     |
|   |             | 33.2      |                 |                                |     |     |
|   |             | 33.4      |                 |                                |     |     |
|   |             | 33.6      |                 |                                |     |     |
|   |             | 33.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 34.0      | 100%            |                                |     |     |
|   |             | 34.2      |                 |                                |     |     |
|   |             | 34.4      |                 |                                |     |     |
|   |             | 34.6      |                 |                                |     |     |
|   |             | 34.8      |                 |                                |     |     |
|   |             | 35.0      |                 |                                |     |     |
|   |             | 35.2      |                 |                                |     |     |
|   |             | 35.4      |                 |                                |     |     |
|   |             | 35.6      |                 |                                |     |     |
|   |             | 35.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 36.0      | 100%            |                                |     |     |
|   |             | 36.2      |                 |                                |     |     |
|   |             | 36.4      |                 |                                |     |     |
|   |             | 36.6      |                 |                                |     |     |
|   |             | 36.8      |                 |                                |     |     |
|   |             | 37.0      |                 |                                |     |     |
|   |             | 37.2      |                 |                                |     |     |
|   |             | 37.4      |                 |                                |     |     |
|   |             | 37.6      |                 |                                |     |     |
|   |             | 37.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 38.0      | 100%            |                                |     |     |
|   |             | 38.2      |                 |                                |     |     |
|   |             | 38.4      |                 |                                |     |     |
|   |             | 38.6      |                 |                                |     |     |
|   |             | 38.8      |                 |                                |     |     |
|   |             | 39.0      |                 |                                |     |     |
|   |             | 39.2      |                 |                                |     |     |
|   |             | 39.4      |                 |                                |     |     |
|   |             | 39.6      |                 |                                |     |     |
|   |             | 39.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 40.0      | 100%            |                                |     |     |
|   |             | 40.2      |                 |                                |     |     |
|   |             | 40.4      |                 |                                |     |     |
|   |             | 40.6      |                 |                                |     |     |
|   |             | 40.8      |                 |                                |     |     |
|   |             | 41.0      |                 |                                |     |     |
|   |             | 41.2      |                 |                                |     |     |
|   |             | 41.4      |                 |                                |     |     |
|   |             | 41.6      |                 |                                |     |     |
|   |             | 41.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 42.0      | 100%            |                                |     |     |
|   |             | 42.2      |                 |                                |     |     |
|   |             | 42.4      |                 |                                |     |     |
|   |             | 42.6      |                 |                                |     |     |
|   |             | 42.8      |                 |                                |     |     |
|   |             | 43.0      |                 |                                |     |     |
|   |             | 43.2      |                 |                                |     |     |
|   |             | 43.4      |                 |                                |     |     |
|   |             | 43.6      |                 |                                |     |     |
|   |             | 43.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 44.0      | 100%            |                                |     |     |
|   |             | 44.2      |                 |                                |     |     |
|   |             | 44.4      |                 |                                |     |     |
|   |             | 44.6      |                 |                                |     |     |
|   |             | 44.8      |                 |                                |     |     |
|   |             | 45.0      |                 |                                |     |     |
|   |             | 45.2      |                 |                                |     |     |
|   |             | 45.4      |                 |                                |     |     |
|   |             | 45.6      |                 |                                |     |     |
|   |             | 45.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 46.0      | 100%            |                                |     |     |
|   |             | 46.2      |                 |                                |     |     |
|   |             | 46.4      |                 |                                |     |     |
|   |             | 46.6      |                 |                                |     |     |
|   |             | 46.8      |                 |                                |     |     |
|   |             | 47.0      |                 |                                |     |     |
|   |             | 47.2      |                 |                                |     |     |
|   |             | 47.4      |                 |                                |     |     |
|   |             | 47.6      |                 |                                |     |     |
|   |             | 47.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 48.0      | 100%            |                                |     |     |
|   |             | 48.2      |                 |                                |     |     |
|   |             | 48.4      |                 |                                |     |     |
|   |             | 48.6      |                 |                                |     |     |
|   |             | 48.8      |                 |                                |     |     |
|   |             | 49.0      |                 |                                |     |     |
|   |             | 49.2      |                 |                                |     |     |
|   |             | 49.4      |                 |                                |     |     |
|   |             | 49.6      |                 |                                |     |     |
|   |             | 49.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 50.0      | 100%            |                                |     |     |
|   |             | 50.2      |                 |                                |     |     |
|   |             | 50.4      |                 |                                |     |     |
|   |             | 50.6      |                 |                                |     |     |
|   |             | 50.8      |                 |                                |     |     |
|   |             | 51.0      |                 |                                |     |     |
|   |             | 51.2      |                 |                                |     |     |
|   |             | 51.4      |                 |                                |     |     |
|   |             | 51.6      |                 |                                |     |     |
|   |             | 51.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 52.0      | 100%            |                                |     |     |
|   |             | 52.2      |                 |                                |     |     |
|   |             | 52.4      |                 |                                |     |     |
|   |             | 52.6      |                 |                                |     |     |
|   |             | 52.8      |                 |                                |     |     |
|   |             | 53.0      |                 |                                |     |     |
|   |             | 53.2      |                 |                                |     |     |
|   |             | 53.4      |                 |                                |     |     |
|   |             | 53.6      |                 |                                |     |     |
|   |             | 53.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 54.0      | 100%            |                                |     |     |
|   |             | 54.2      |                 |                                |     |     |
|   |             | 54.4      |                 |                                |     |     |
|   |             | 54.6      |                 |                                |     |     |
|   |             | 54.8      |                 |                                |     |     |
|   |             | 55.0      |                 |                                |     |     |
|   |             | 55.2      |                 |                                |     |     |
|   |             | 55.4      |                 |                                |     |     |
|   |             | 55.6      |                 |                                |     |     |
|   |             | 55.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 56.0      | 100%            |                                |     |     |
|   |             | 56.2      |                 |                                |     |     |
|   |             | 56.4      |                 |                                |     |     |
|   |             | 56.6      |                 |                                |     |     |
|   |             | 56.8      |                 |                                |     |     |
|   |             | 57.0      |                 |                                |     |     |
|   |             | 57.2      |                 |                                |     |     |
|   |             | 57.4      |                 |                                |     |     |
|   |             | 57.6      |                 |                                |     |     |
|   |             | 57.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 58.0      | 100%            |                                |     |     |
|   |             | 58.2      |                 |                                |     |     |
|   |             | 58.4      |                 |                                |     |     |
|   |             | 58.6      |                 |                                |     |     |
|   |             | 58.8      |                 |                                |     |     |
|   |             | 59.0      |                 |                                |     |     |
|   |             | 59.2      |                 |                                |     |     |
|   |             | 59.4      |                 |                                |     |     |
|   |             | 59.6      |                 |                                |     |     |
|   |             | 59.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 60.0      | 100%            |                                |     |     |
|   |             | 60.2      |                 |                                |     |     |
|   |             | 60.4      |                 |                                |     |     |
|   |             | 60.6      |                 |                                |     |     |
|   |             | 60.8      |                 |                                |     |     |
|   |             | 61.0      |                 |                                |     |     |
|   |             | 61.2      |                 |                                |     |     |
|   |             | 61.4      |                 |                                |     |     |
|   |             | 61.6      |                 |                                |     |     |
|   |             | 61.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 62.0      | 100%            |                                |     |     |
|   |             | 62.2      |                 |                                |     |     |
|   |             | 62.4      |                 |                                |     |     |
|   |             | 62.6      |                 |                                |     |     |
|   |             | 62.8      |                 |                                |     |     |
|   |             | 63.0      |                 |                                |     |     |
|   |             | 63.2      |                 |                                |     |     |
|   |             | 63.4      |                 |                                |     |     |
|   |             | 63.6      |                 |                                |     |     |
|   |             | 63.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 64.0      | 100%            |                                |     |     |
|   |             | 64.2      |                 |                                |     |     |
|   |             | 64.4      |                 |                                |     |     |
|   |             | 64.6      |                 |                                |     |     |
|   |             | 64.8      |                 |                                |     |     |
|   |             | 65.0      |                 |                                |     |     |
|   |             | 65.2      |                 |                                |     |     |
|   |             | 65.4      |                 |                                |     |     |
|   |             | 65.6      |                 |                                |     |     |
|   |             | 65.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 66.0      | 100%            |                                |     |     |
|   |             | 66.2      |                 |                                |     |     |
|   |             | 66.4      |                 |                                |     |     |
|   |             | 66.6      |                 |                                |     |     |
|   |             | 66.8      |                 |                                |     |     |
|   |             | 67.0      |                 |                                |     |     |
|   |             | 67.2      |                 |                                |     |     |
|   |             | 67.4      |                 |                                |     |     |
|   |             | 67.6      |                 |                                |     |     |
|   |             | 67.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 68.0      | 100%            |                                |     |     |
|   |             | 68.2      |                 |                                |     |     |
|   |             | 68.4      |                 |                                |     |     |
|   |             | 68.6      |                 |                                |     |     |
|   |             | 68.8      |                 |                                |     |     |
|   |             | 69.0      |                 |                                |     |     |
|   |             | 69.2      |                 |                                |     |     |
|   |             | 69.4      |                 |                                |     |     |
|   |             | 69.6      |                 |                                |     |     |
|   |             | 69.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 70.0      | 100%            |                                |     |     |
|   |             | 70.2      |                 |                                |     |     |
|   |             | 70.4      |                 |                                |     |     |
|   |             | 70.6      |                 |                                |     |     |
|   |             | 70.8      |                 |                                |     |     |
|   |             | 71.0      |                 |                                |     |     |
|   |             | 71.2      |                 |                                |     |     |
|   |             | 71.4      |                 |                                |     |     |
|   |             | 71.6      |                 |                                |     |     |
|   |             | 71.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 72.0      | 100%            |                                |     |     |
|   |             | 72.2      |                 |                                |     |     |
|   |             | 72.4      |                 |                                |     |     |
|   |             | 72.6      |                 |                                |     |     |
|   |             | 72.8      |                 |                                |     |     |
|   |             | 73.0      |                 |                                |     |     |
|   |             | 73.2      |                 |                                |     |     |
|   |             | 73.4      |                 |                                |     |     |
|   |             | 73.6      |                 |                                |     |     |
|   |             | 73.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 74.0      | 100%            |                                |     |     |
|   |             | 74.2      |                 |                                |     |     |
|   |             | 74.4      |                 |                                |     |     |
|   |             | 74.6      |                 |                                |     |     |
|   |             | 74.8      |                 |                                |     |     |
|   |             | 75.0      |                 |                                |     |     |
|   |             | 75.2      |                 |                                |     |     |
|   |             | 75.4      |                 |                                |     |     |
|   |             | 75.6      |                 |                                |     |     |
|   |             | 75.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 76.0      | 100%            |                                |     |     |
|   |             | 76.2      |                 |                                |     |     |
|   |             | 76.4      |                 |                                |     |     |
|   |             | 76.6      |                 |                                |     |     |
|   |             | 76.8      |                 |                                |     |     |
|   |             | 77.0      |                 |                                |     |     |
|   |             | 77.2      |                 |                                |     |     |
|   |             | 77.4      |                 |                                |     |     |
|   |             | 77.6      |                 |                                |     |     |
|   |             | 77.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 78.0      | 100%            |                                |     |     |
|   |             | 78.2      |                 |                                |     |     |
|   |             | 78.4      |                 |                                |     |     |
|   |             | 78.6      |                 |                                |     |     |
|   |             | 78.8      |                 |                                |     |     |
|   |             | 79.0      |                 |                                |     |     |
|   |             | 79.2      |                 |                                |     |     |
|   |             | 79.4      |                 |                                |     |     |
|   |             | 79.6      |                 |                                |     |     |
|   |             | 79.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 80.0      | 100%            |                                |     |     |
|   |             | 80.2      |                 |                                |     |     |
|   |             | 80.4      |                 |                                |     |     |
|   |             | 80.6      |                 |                                |     |     |
|   |             | 80.8      |                 |                                |     |     |
|   |             | 81.0      |                 |                                |     |     |
|   |             | 81.2      |                 |                                |     |     |
|   |             | 81.4      |                 |                                |     |     |
|   |             | 81.6      |                 |                                |     |     |
|   |             | 81.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 82.0      | 100%            |                                |     |     |
|   |             | 82.2      |                 |                                |     |     |
|   |             | 82.4      |                 |                                |     |     |
|   |             | 82.6      |                 |                                |     |     |
|   |             | 82.8      |                 |                                |     |     |
|   |             | 83.0      |                 |                                |     |     |
|   |             | 83.2      |                 |                                |     |     |
|   |             | 83.4      |                 |                                |     |     |
|   |             | 83.6      |                 |                                |     |     |
|   |             | 83.8      |                 |                                |     |     |
| SILT: Very clayey, slightly cohesive some sand greyish cream with manganese. Stiff, moist | X           | 84.0      | 100%            |                                |     |     |
|   |             | 84.2      |                 |                                |     |     |
|   |             | 84.4      |                 |                                |     |     |
|   |             | 84.6      |                 |                                |     |     |
|   |             | 84.8      |                 |                                |     |     |
|   |             | 85.0      |                 |                                |     |     |
|   |             | 85.2      |                 |                                |     |     |
|   |             | 85.4      |                 |                                |     |     |



Borehole No. MB 46

Site:

Pyes Pa West Urbanisation

Sheet: 3 Of: 4

Job No. 16944

Date Excavated: TH 18/9/03

RL Ground:

Logged By: MAA

Description of Soil

Soil Symbol

Depth (m)

SPT

CORE RECOVERY

Undrained Shear Strength (kPa)

50 100 150

SPT: SILT: very sandy, cream  
medium Dense, slightly moistpumice sand, cream, medium Dense  
Dry

~ Glassy

SPT: pumice sand, cream, medium  
Dense Drypumice sand ~ homogeneous  
- cream  
~ medium Dense  
~ Dry  
~ Glassybecoming Dense  
and grey

SPT: Dense grey pumice sand Dry

pumice sand ~ homogeneous  
~ Grey  
~ Dense  
~ Dry  
~ Glassy

TE RANGA IGIMISITE

EXCAVATION METHOD: 75 mm  $\phi$  MACHINE AUGER + HOLLOW SPT



Borehole Log. MB 4L

## Pyes Pa West Urbanisation

Sheet: 4 Of: 4

Date Excavated: TH. 10/9/03

RL Ground:

Logged By: *MAA*

| Description of Soil                           | Soil Symbol | Depth (m)   | Undrained Shear Strength (kPa) |        |     |
|---|-------------|-------------|--------------------------------|--------|-----|
|   |             |             | 50                             | 100    | 150 |
| SPT: Pumice sand, grey, Dense, Dry.           |             | 2<br>4<br>5 | N=9                            | 100g   |     |
|   |             |             |                                |        |     |
| pumice sand; Grey, Dense Dry                  |             | 40<br>45    |                                | 60-80g |     |
|   |             |             |                                |        |     |
| SPT: Pale grey, Dense pumice sand Dry         |             | 4<br>5<br>8 | N=13                           | 100g   |     |
|   |             |             |                                |        |     |
| Homogeneous Pale grey pumice sand, Dry, Dense |             | 55<br>60    |                                | 60-80g |     |
|   |             |             |                                |        |     |
| SPT: Grey Dense Pumice sand Dry               |             | 3<br>5<br>6 | N=11                           |        |     |
|   |             |             |                                |        |     |
| pumice sand; Grey, Dense, Dry                 |             | 70<br>75    |                                | 40-50g |     |
|   |             |             |                                |        |     |
| FOR @ 18.0m: SAND FALL BACK                   |             | 80          |                                |        |     |

EXCAVATION METHOD: 75mm Ø MACHINE ANGER + HOLLOW SPT

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Driveway North of Lot 881**

Trial Pit No. **TP01**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


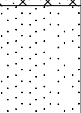
Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368143.83 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800242.63 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information |            |                                 |    |                 | material substance  |                          |   |                       |                               |   |  |
|------------------------|------------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|---|--|
| stratigraphy           | water      | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |
| Colluvium              |            |                                 |    | 1               |    | ML                       | Sandy SILT, no plasticity, orange-brown, mottled light brown, black specks; sand is fine to medium grained.   | M                     |                               |   |  |
|                        |            |                                 |    | 2               |   |                          |   |                       |                               |   |  |
| Sedimentary Deposits   | 31/01/2008 |                                 |    | 3               |  | SP                       | SAND, fine to medium grained, creamy speckled grey/green<br>- water seeping from side of test pit   | W                     |                               |   |  |
|                        |            |                                 |    | 4               |   |                          |   |                       |                               |   |  |
|                        |            |                                 |    | 5               |   |                          |   |                       |                               |   |  |
|                        |            |                                 |    | 6               |   |                          |   |                       |                               |   |  |
|                        |            |                                 |    |                 |   |                          | EOBH @ 5.5m, target depth<br>Test pit TP01 terminated at 5.5 metres.  |                       |                               |   |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
◀ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

## Engineering Log - Trial Pit

Trial Pit No. **TP02**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **31.1.2008**

**Principal:**

Date completed: **31.1.2008**

Project: ***The Lakes Stage 2qrst***

Logged by: **GW**

Trial pit location: ***Driveway North of Lot 881 & 882***

Checked by: **RBT**

| Equipment type:  |                             |                                 |    | Pit Orientation:       |             |   |  | Easting: 368163.68 m  |                               |  |    | R.L. Surface: m                      |     |   |     |     |  |
|--|-----------------------------|---------------------------------|----|------------------------|-------------|---|--|-----------------------|-------------------------------|--|----|--------------------------------------|-----|---|-----|-----|--|
| Excavation dimensions: m long    m wide  |                             |                                 |    | Vane No: not specified |             |   |  | Northing: 800235.13 m |                               |  |    | Datum: x/y: WBOPC2000; R/L: Moturiki |     |   |     |     |  |
| excavation information   |                             |                                 |    |                        |             | material substance  |  |                       |                               |  |    |                                      |     |   |     |     |  |
| stratigraphy   | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres        | graphic log | classification<br>symbol  | Material Description<br><small>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations.<br/>Rock name, grain size &amp; type, colour, fabric, inclusions &amp; minor components. Weathering, moisture, strength, defects.</small> | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa                   |    |                                      |     | structure and<br>additional observations  |     |     |  |
| Colluvium  | groundwater not encountered |                                 |    | 1                      |             | ML  | Sandy SILT, no plasticity, creamy black, speckled light brown; sand is fine to medium grained.   | M                     | F                             | 25   | 50 | 75                                   | 100 | 125   | 150 | 175 |  |
|  |                             |                                 |    |                        |             | SP  | SAND, fine to medium grained, black speckled light grey.   |                       |                               |  |    |                                      |     |   |     |     |  |
|  |                             |                                 |    |                        |             | SP  | SAND, fine to medium grained, creamy speckled dark brown.  |                       |                               |  |    |                                      |     |   |     |     |  |
|  |                             |                                 |    |                        |             | SP  | SAND, fine to medium grained, creamy speckled pale green.  |                       |                               |  |    |                                      |     |   |     |     |  |
| Sedimentary Deposits   |                             |                                 |    | 2                      |             |   |  |                       | H                             |  |    |                                      |     |   |     |     |  |
|  |                             |                                 |    | 3                      |             |   |  |                       |                               |  |    |                                      |     |   |     |     |  |
|  |                             |                                 |    | 4                      |             |   | EOBH @ 3.0m, target depth.<br>Test pit TP02 terminated at 3 metres.  |                       |                               |  |    |                                      |     |   |     |     |  |
|  |                             |                                 |    | 5                      |             |   |  |                       |                               |  |    |                                      |     |   |     |     |  |
|  |                             |                                 |    | 6                      |             |   |  |                       |                               |  |    |                                      |     |   |     |     |  |
| Sketch   |                             |                                 |    |                        |             |   |  |                       |                               |  |    |                                      |     |   |     |     |  |
| classification symbols and<br>soil description<br><small>based on New Zealand Geotechnical Society Inc 2005</small>  |                             |                                 |    |                        |             | vane shear (kPa)<br>● remoulded<br>× peak<br>×× peak greater than 200kPa<br>UTP unable to penetrate<br><br>water<br>▼ 10/1/98 water level<br>on date shown<br>▶ waterinflow<br>◀ wateroutflow |  |                       |                               | moisture<br><br>D dry<br>M moist<br>W wet<br>S saturated |    |                                      |     | consistency/ density index<br><br>VS very soft    VL very loose<br>S soft    L loose<br>F firm    MD medium dense<br>St stiff    D dense<br>VSt very stiff    VD very dense<br>H hard |     |     |  |
| notes, samples, tests<br>U <sub>50</sub> undisturbed sample 50mm diameter<br>U <sub>63</sub> undisturbed sample 63mm diameter<br>D disturbed sample<br>Bs bulk sample<br>E environmental sample<br>R refusal |                             |                                 |    |                        |             |   |  |                       |                               |  |    |                                      |     |   |     |     |  |

## Engineering Log - Trial Pit

Trial Pit No. **TP03**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **31.1.2008**

**Principal:**










Date completed: **31.1.2008**

Project: ***The Lakes Stage 2qrst***

Logged by: **GW**

Trial pit location: **Driveway North-East of Lot 852**

Checked by: **RBT**

| Equipment type:  |                             | Pit Orientation:                |    | Easting: 368170.85 m  |  | R.L. Surface: m                     |   |  |                               |   |  |
|--|-----------------------------|---------------------------------|----|-----------------------|--|-------------------------------------|---|--|-------------------------------|---|--|
| Excavation dimensions: m long m wide   |                             | Vane No: not specified          |    | Northing: 800224.14 m |  | Datum: x/y: WBOPC2000; RL: Moturiki |   |  |                               |   |  |
| excavation information   |                             |                                 |    |                       | material substance   |                                     |   |  |                               |   |  |
| stratigraphy   | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres       | graphic log  | classification<br>symbol            | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition                                | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa  | structure and<br>additional observations |
| Colluvium  | groundwater not encountered |                                 |    | 1                     |   | ML                                  | Sandy SILT, no plasticity, creamy black, speckled light brown; sand is fine to medium grained.  | M  | F                             |             |  |
|  |                             |                                 |    |                       |  |                                     |   |  |                               |   |  |
| Sedimentary Deposits   |                             |                                 |    | 2                     |   | SP                                  | SAND, fine to medium grained, black, speckled light grey.   |  | St-H                          |             |  |
|  |                             |                                 |    |                       |  |                                     |   |  |                               |   |  |
|  |                             |                                 |    | 3                     |    | ML                                  | Sandy SILT, no plasticity, creamy streaked pale green.  |  |                               |             |  |
|  |                             |                                 |    | 4                     |  |                                     | EOBH @ 3.0m, target depth<br>Test pit TP03 terminated at 3 metres.  |  |                               |   |  |
|  |                             |                                 |    | 5                     |  |                                     |   |  |                               |   |  |
|  |                             |                                 |    | 6                     |  |                                     |   |  |                               |   |  |
| Sketch   |                             |                                 |    |                       |  |                                     |   |  |                               |   |  |
| classification symbols and<br>soil description<br>based on New Zealand Geotechnical Society Inc 2005   |                             |                                 |    |                       | vane shear (kPa)<br>● remoulded<br>× peak<br>>>> peak greater than 200kPa<br>UTP unable to penetrate<br>water<br>▼ 10/1/98 water level<br>on date shown<br>▶ waterinflow<br>◀ wateroutflow |                                     |   | moisture<br>D dry<br>M moist<br>W wet<br>S saturated |                               | consistency/ density index<br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |  |
| notes, samples, tests<br>U <sub>50</sub> undisturbed sample 50mm diameter<br>U <sub>63</sub> undisturbed sample 63mm diameter<br>D disturbed sample<br>Bs bulk sample<br>E environmental sample<br>R refusal |                             |                                 |    |                       |  |                                     |   |  |                               |   |  |

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Driveway East of Lot 852**

Trial Pit No. **TP04**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368173.85 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800224.14 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information                |                             |                                 |    |                 | material substance  |                          |   |                       |                               |  |  |
|---------------------------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|--|--|
| stratigraphy                          | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | structure and<br>additional observations |
| Colluvium<br><br>Sedimentary Deposits | groundwater not encountered |                                 |    | 1               |  | SP                       | SAND, fine to medium grained, black creamy speckled light grey.   | M                     |                               |  |  |
|                                       |                             |                                 |    | 2               |  | SM                       | Silty SAND, fine to medium grained, black speckled, creamy, with wood inclusions.<br><br>- becoming creamy pale green   |                       |                               |  |  |
|                                       |                             |                                 |    | 3               |  | SP                       | SAND, fine to medium grained, creamy speckled green.  |                       |                               |  |  |
|                                       |                             |                                 |    | 4               |   |                          | EOBH @ 3.0m, target depth.<br>Test pit TP04 terminated at 3 metres.   |                       |                               |  |  |
|                                       |                             |                                 |    | 5               |   |                          |   |                       |                               |  |  |
|                                       |                             |                                 |    | 6               |   |                          |   |                       |                               |  |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
◀ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Boundary of Lot 882 & Lot 883**

Trial Pit No. **TP05**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




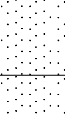
Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368154.51 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800205.31 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information |                             |                                 |    |                 | material substance   |                          |   |                       |                               |   |  |
|------------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|---|-----------------------|-------------------------------|---|--|
| stratigraphy           | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |
| Sedimentary Deposits   | groundwater not encountered |                                 |    | 1               |   | SP                       | SAND, fine to medium grained, black creamy speckled grey.   | M                     |                               |   |  |
|                        |                             |                                 |    | 1               |   | OL                       | PEAT, Organic SILT, dark brown, moist.  |                       |                               |   |  |
|                        |                             |                                 |    | 2               |   | SP                       | SAND, fine to medium grained, black creamy speckled light brown, with trace silt.   |                       |                               |   |  |
|                        |                             |                                 |    | 3               |  | SP                       | SAND, fine to medium grained, creamy speckled pale green.   |                       |                               |   |  |
|                        |                             |                                 |    | 4               |  |                          | EOBH @ 3.0m, target depth<br>P=Peat<br>C=Colluvium<br>Test pit TP05 terminated at 3 metres.   |                       |                               |   |  |
|                        |                             |                                 |    | 5               |  |                          |   |                       |                               |   |  |
|                        |                             |                                 |    | 6               |  |                          |   |                       |                               |   |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
◀ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Lot 884**

Trial Pit No. **TP06**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**





Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368117.99 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800200.15 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information               |                             |                                 |    |                 | material substance  |                          |   |                       |                               |   |  |
|--------------------------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|---|--|
| stratigraphy                         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |
| C<br><br><b>Sedimentary Deposits</b> | groundwater not encountered |                                 |    | 1               |    | SP                       | SAND, fine to medium grained, black creamy speckled grey.   | M                     |                               |   |  |
|                                      |                             |                                 |    | 2               |    | ML                       | SILT, no plasticity, light grey, creamy, with abundant wood.  |                       |                               |   |  |
|                                      |                             |                                 |    | 3               |  | SP                       | SAND, fine to medium grained, black creamy speckled pale green/grey, with some wood.  |                       |                               |   |  |
|                                      |                             |                                 |    | 4               |  | SP                       | SAND, fine to medium grained, creamy speckled green.  |                       |                               |   |  |
|                                      |                             |                                 |    | 5               |   |                          | EOBH @ 3.3m, target depth<br>C=Colluvium<br>Test pit TP06 terminated at 3.3 metres.   |                       |                               |   |  |
|                                      |                             |                                 |    | 6               |   |                          |   |                       |                               |   |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
▶ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Lot 874**

Trial Pit No. **TP07**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368118.16 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800179.32 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information                        |       |                                 |    |                 | material substance  |                          |   |                       |                               |   |  |
|---|-------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|---|--|
| stratigraphy                                  | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |
| C<br><br>Sedimentary Deposits<br>31/01/2008 ▼ |       |                                 |    | 1               |  | SP                       | SAND, fine to medium grained, black creamy speckled grey.   | M                     |                               |   |  |
|   |       |                                 |    | 2               |  | SM                       | Silty SAND, fine to medium grained, black creamy speckled grey/brown, with abundant wood inclusions.<br><br>- water seeping in site   |                       |                               |   |  |
|   |       |                                 |    | 3               |  | SM                       | Silty SAND, fine to medium grained, creamy speckled green.  |                       |                               |   |  |
|   |       |                                 |    | 4               |   |                          | EOBH @ 3.0m, target depth<br>C=Colluvium<br>Test pit TP07 terminated at 3 metres.   |                       |                               |   |  |
|   |       |                                 |    | 5               |   |                          |   |                       |                               |   |  |
|   |       |                                 |    | 6               |   |                          |   |                       |                               |   |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
◀ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Driveway South-East of Lot 886**

Trial Pit No. **TP08**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

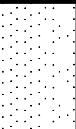


Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368147.94 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800157.58 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information |       |                                 |    |                 | material substance   |                          |   |                       |                               |   |  |
|------------------------|-------|---------------------------------|----|-----------------|--|--------------------------|---|-----------------------|-------------------------------|---|--|
| stratigraphy           | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |
| Colluvium              |       |                                 |    | 1               |   | SP                       | SAND, fine to medium grained, black cream speckled grey, with trace silt.   | M                     |                               |   |  |
| Peat                   |       |                                 |    | 2               |   | OL                       | PEAT, Organic SILT, no plasticity, fibrous, black, with abundant organic inclusions.  |                       |                               |   |  |
| SD                     |       |                                 |    | 3               |  | SP                       | - water seeping in from the side of test pit<br>SAND, fine to medium grained, black, creamy speckled grey/brown.  |                       |                               |   |  |
|                        |       |                                 |    | 4               |  |                          | EOBH @ 3.0m, target depth<br>SD=Sedimentary Deposits<br>Test pit TP08 terminated at 3 metres.   |                       |                               |   |  |
|                        |       |                                 |    | 5               |  |                          |   |                       |                               |   |  |
|                        |       |                                 |    | 6               |  |                          |   |                       |                               |   |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
◀ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Driveway East of Lot 886**

Trial Pit No. **TP09**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

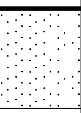


Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368159.11 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800167.7 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information |            |                                 |    |                 | material substance  |                          |   |                       |                               |   |  |  |  |  |
|------------------------|------------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|---|--|--|--|--|
| stratigraphy           | water      | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |  |  |  |
| Colluvium              |            |                                 |    | 1               |    | SP                       | SAND, fine to medium grained, black creamy speckled light brown/grey, trace silt.   | M                     |                               |   |  |  |  |  |
|                        |            |                                 |    | 2               |   | OL                       | PEAT, Organic Sandy SILT, no plasticity, dark brown/black with abundant rootlets & wood.  |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 3               |  | SP                       | - water seeping out of wall<br>SAND, fine to medium grained, creamy speckled pale green.  | W                     |                               |   |  |  |  |  |
| SD                     | 31/01/2008 |                                 |    | 4               |   |                          | EOBH @ 3.3m, target depth<br>SD=Sedimentary Deposits<br>Test pit TP09 terminated at 3.3 metres.   |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 5               |   |                          |   |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 6               |   |                          |   |                       |                               |   |  |  |  |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
◀ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Boundary of Lot 885 & Lot 886**

Trial Pit No. **TP10**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368140.74 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800171.77 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information |       |                                 |    |                 | material substance  |                          |   |                       |                               |   |  |
|------------------------|-------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|---|--|
| stratigraphy           | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |
| Colluvium              |       |                                 |    | 1               |  | SP                       | SAND, fine to medium grained, black speckled light brown/grey, with trace silt.   | M                     |                               |   |  |
|                        |       |                                 |    | 2               |   | SP                       | SAND, fine to medium grained, black speckled creamy grey.   |                       |                               |   |  |
| SD                     |       |                                 |    | 3               |   |                          | EOBH @ 2.5m, target depth<br>SD=Sedimentary Deposits<br>Test pit TP10 terminated at 2.5 metres.   |                       |                               |   |  |
|                        |       |                                 |    | 4               |   |                          |   |                       |                               |   |  |
|                        |       |                                 |    | 5               |   |                          |   |                       |                               |   |  |
|                        |       |                                 |    | 6               |   |                          |   |                       |                               |   |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▼ 10/1/98 water level  
on date shown  
▶ waterinflow  
◀ wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Eastern Boundary of Lot 889**

Trial Pit No. **TP11**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**





Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368139.76 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800117.39 m Datum: ~~xy~~ WBOPC2000; RL: Moturiki

| excavation information |            |                                 |    |                 | material substance  |                          |   |                       |                               |   |  |  |  |  |
|------------------------|------------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|---|--|--|--|--|
| stratigraphy           | water      | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |  |  |  |
| C<br><br><br><br>SD    | 31/01/2008 |                                 |    | 1               |  | SP                       | SAND, fine to medium grained, creamy speckled grey.   | M                     |                               |   |  |  |  |  |
|                        |            |                                 |    | 2               |  | SM                       | Silty SAND, fine to medium grained, black creamy speckled light brown, with abundant wood.<br><br>- becoming dark brown & fibrous   |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 3               |  | SP                       | SAND, fine to medium grained, black creamy speckled light brown/grey.<br><br>- water seeping in   | W                     |                               |   |  |  |  |  |
|                        |            |                                 |    | 4               |  | SM                       | Silty SAND, fine to medium grained, creamy speckled pale green.<br><br>EOBH @ 3.3m, target depth<br>C=Colluvium<br>SD=Sedimentary Deposits<br>Test pit TP11 terminated at 3.3 metres.   |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 5               |   |                          |   |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 6               |   |                          |   |                       |                               |   |  |  |  |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
waterinflow  
wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **South-West Corner of Lot 889**

Trial Pit No. **TP12**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368121.6 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800100.91 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information |            |                                 |    |                 | material substance   |                          |   |                       |                               |   |  |  |  |  |
|------------------------|------------|---------------------------------|----|-----------------|--|--------------------------|---|-----------------------|-------------------------------|---|--|--|--|--|
| stratigraphy           | water      | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>100<br>/peak) kPa | structure and<br>additional observations |  |  |  |
| Colluvium              |            |                                 |    | 1               |   | SP                       | SAND, fine to medium grained, creamy black.   | M                     |                               |   |  |  |  |  |
|                        |            |                                 |    | 2               |   | ML                       | SILT, no plasticity, light brown. creamy, with abundant wood & trace fine sand.   |                       |                               |   |  |  |  |  |
| SD                     | 31/01/2008 |                                 |    | 3               |  | SM                       | - water seeping into test pit<br>Silty SAND, fine to medium grained, creamy speckled pale green.  | W                     |                               |   |  |  |  |  |
|                        |            |                                 |    | 4               |  |                          | EOBH @ 3.3m, target depth.<br>Test pit TP12 terminated at 3.3 metres.   |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 5               |  |                          |   |                       |                               |   |  |  |  |  |
|                        |            |                                 |    | 6               |  |                          |   |                       |                               |   |  |  |  |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

## notes, samples, tests

U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

## vane shear (kPa)

● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

## water

10/1/98 water level  
on date shown  
waterinflow  
wateroutflow

## moisture

D dry  
M moist  
W wet  
S saturated

## consistency/ density index

VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Lot 887**

Trial Pit No. **TP13**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **31.1.2008**

Date completed: **31.1.2008**

Logged by: **GW**

Checked by: **RBT**

Equipment type: Pit Orientation: Easting: 368136.69 m R.L. Surface: m  
Excavation dimensions: m long m wide Vane No: not specified Northing: 800145.84 m Datum: ~~xy~~: WBOPC2000; RL: Moturiki

| excavation information |       |                                 |    |                 | material substance   |                          |   |                       |                               |   |  |  |  |  |
|------------------------|-------|---------------------------------|----|-----------------|--|--------------------------|---|-----------------------|-------------------------------|---|--|--|--|--|
| stratigraphy           | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | Material Description<br>Soil name: plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>(peak) kPa) | structure and<br>additional observations |  |  |  |
| Colluvium              | SD    | 31/01/2008                      |    | 1               |   | SM                       | Silty SAND, fine to medium grained, black creamy speckled light brown.  | M                     |                               |   |  |  |  |  |
|                        |       |                                 |    | 2               |   | SP                       | SAND, fine to medium grained, black speckled grey. - water seeping into test pit  | W                     |                               |   |  |  |  |  |
|                        |       |                                 |    | 3               |  | SM                       | Silty SAND, fine to medium grained, creamy speckled pale green.<br>EOBH @ 2.5m, target depth<br>SD=Sedimentary Deposits<br>Test pit TP13 terminated at 2.5 metres.  |                       |                               |   |  |  |  |  |
|                        |       |                                 |    | 4               |  |                          |   |                       |                               |   |  |  |  |  |
|                        |       |                                 |    | 5               |  |                          |   |                       |                               |   |  |  |  |  |
|                        |       |                                 |    | 6               |  |                          |   |                       |                               |   |  |  |  |  |

Sketch

classification symbols and  
soil description  
based on New Zealand Geotechnical Society Inc 2005

## notes, samples, tests

U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

## vane shear (kPa)

● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

## water

10/1/98 water level  
on date shown  
waterinflow  
wateroutflow

## moisture

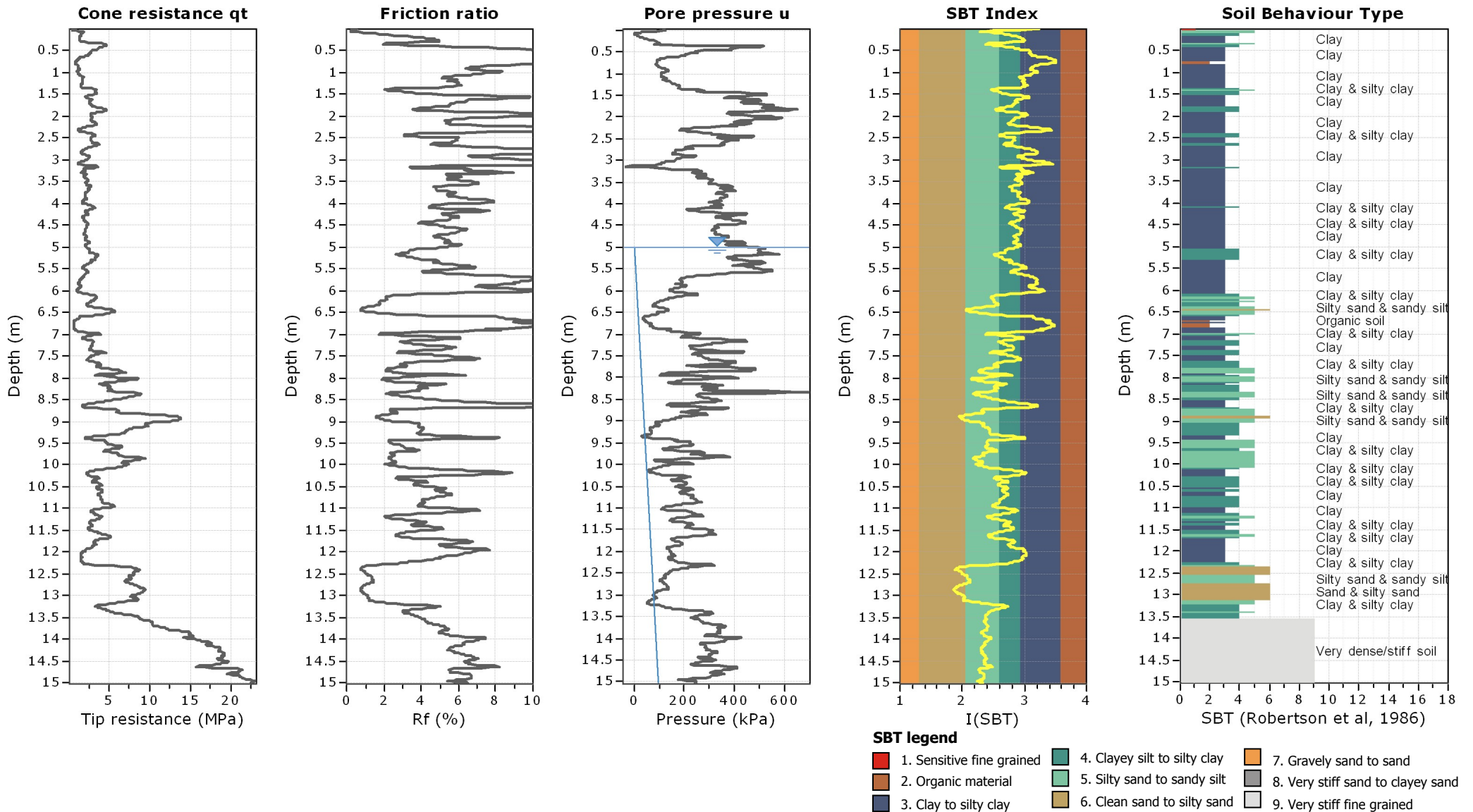
D dry  
M moist  
W wet  
S saturated

## consistency/ density index

VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

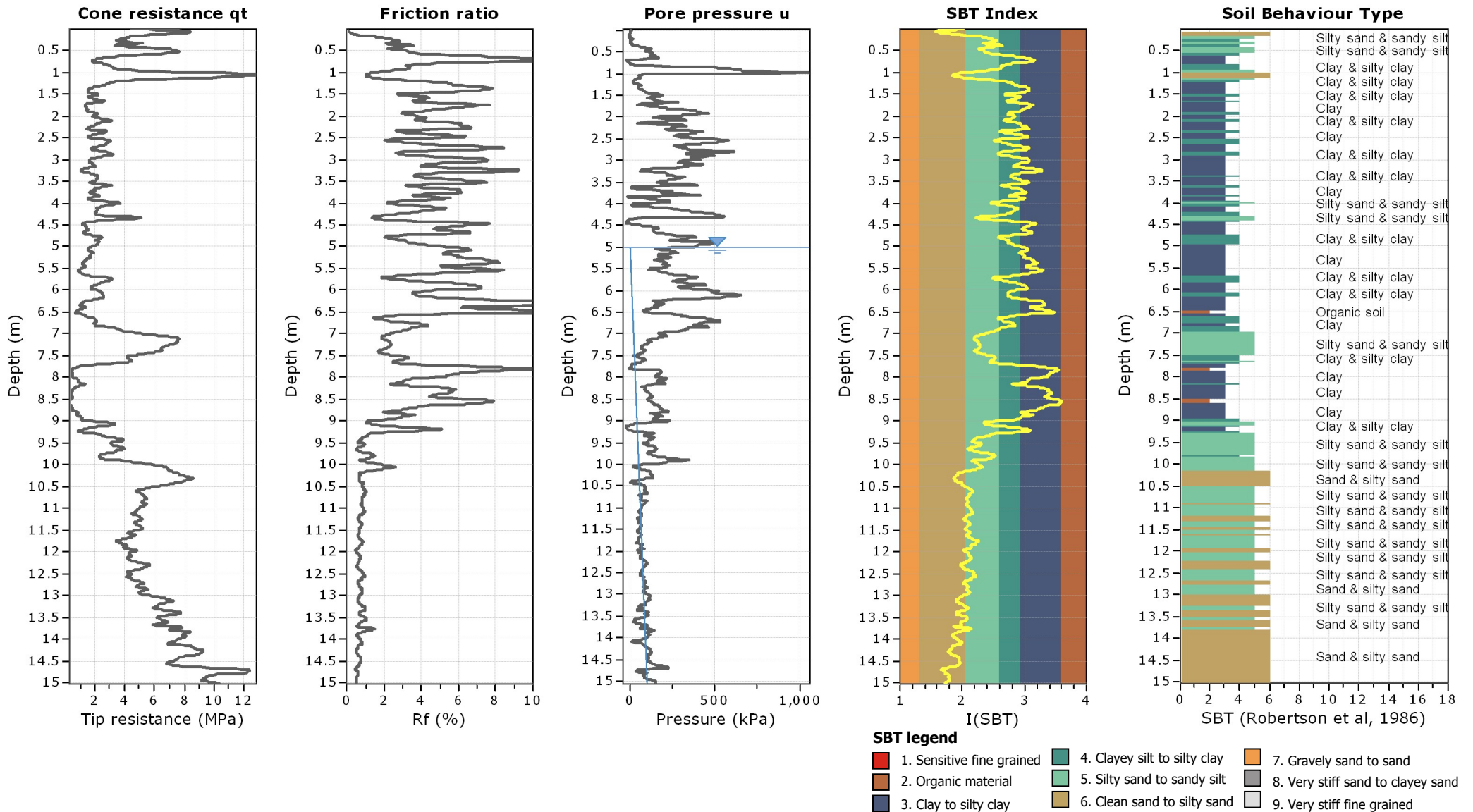
Project: The Lakes Tauranga

Location: Tauranga



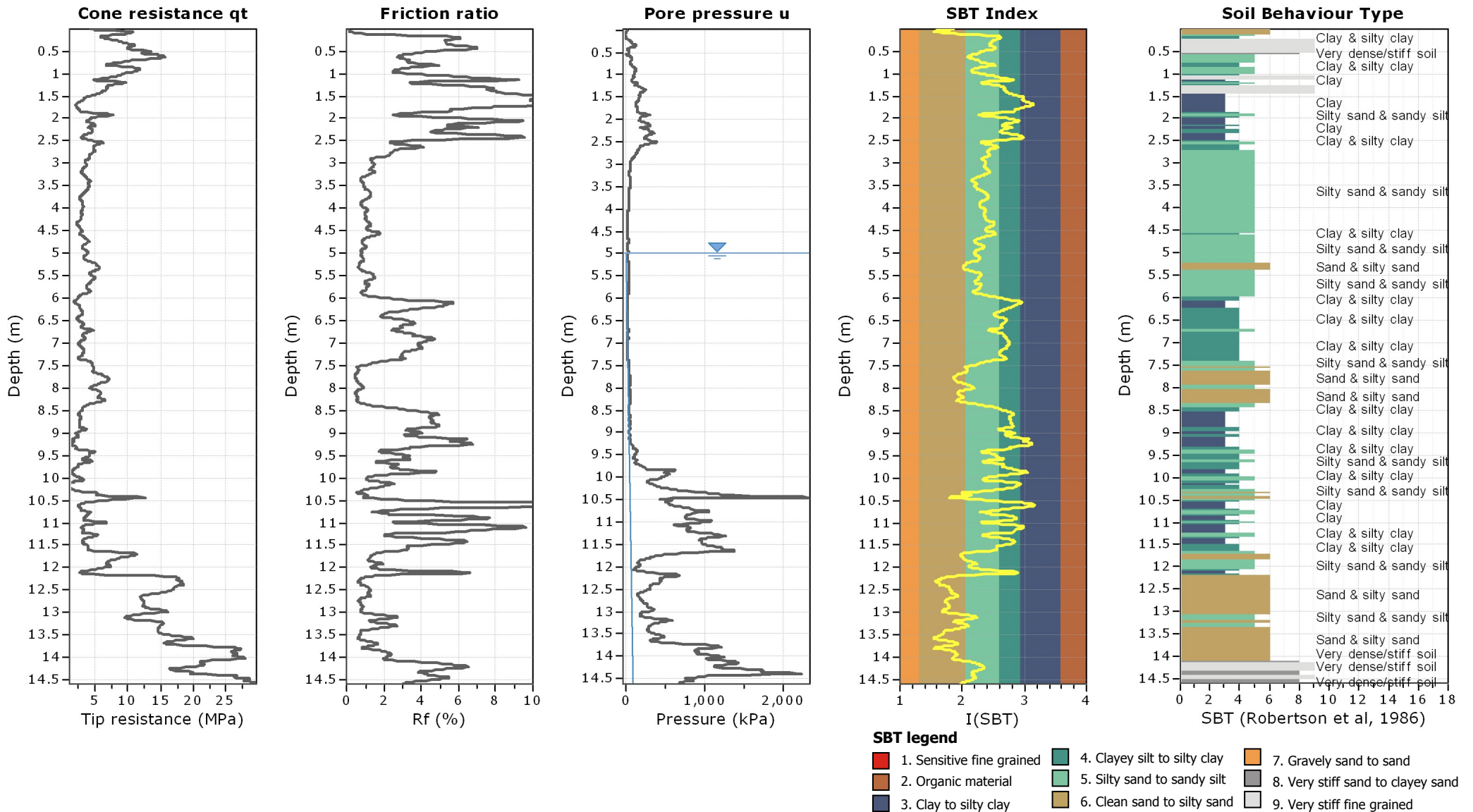
Project: The Lakes Tauranga

Location: Tauranga



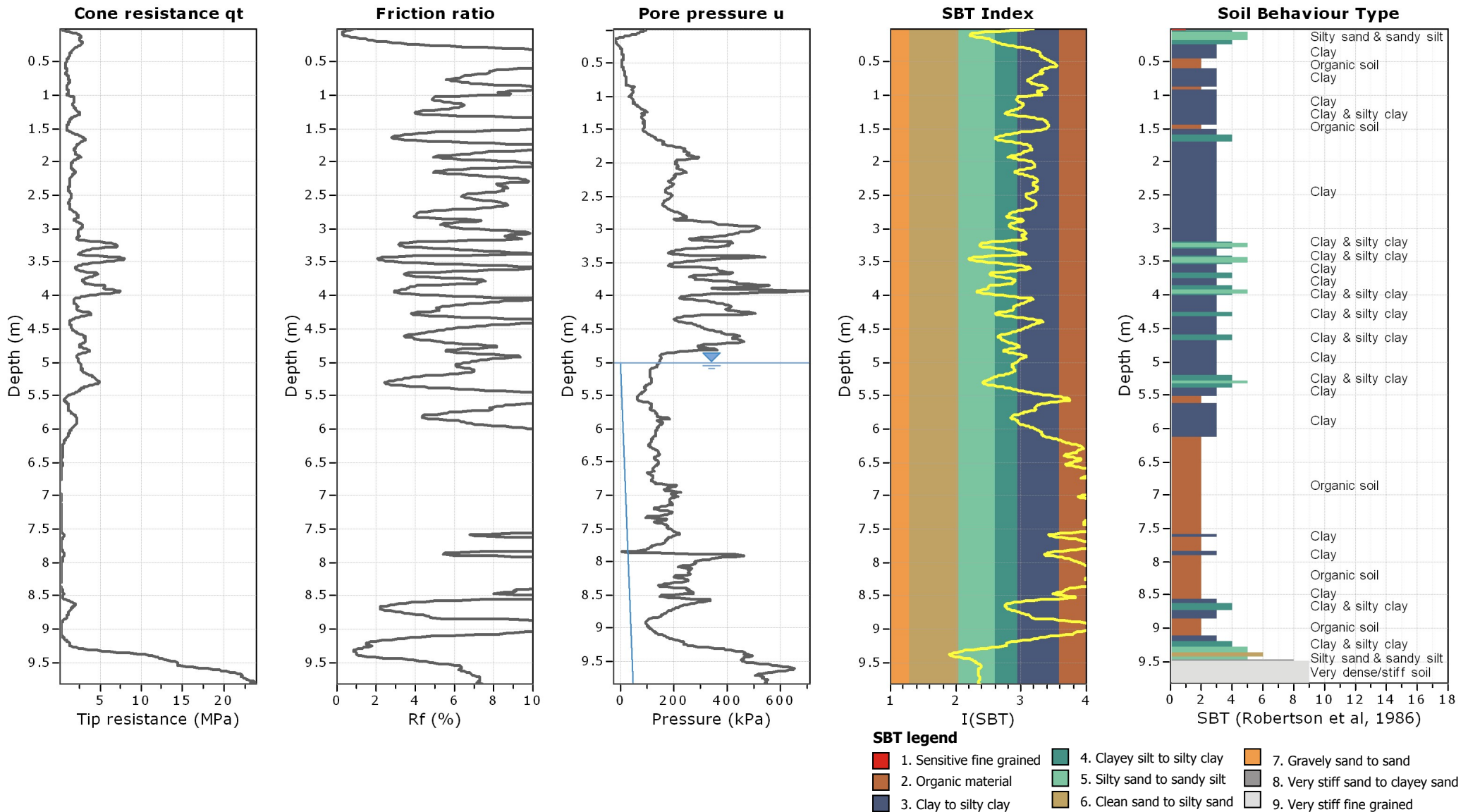
Project: The Lakes Tauranga

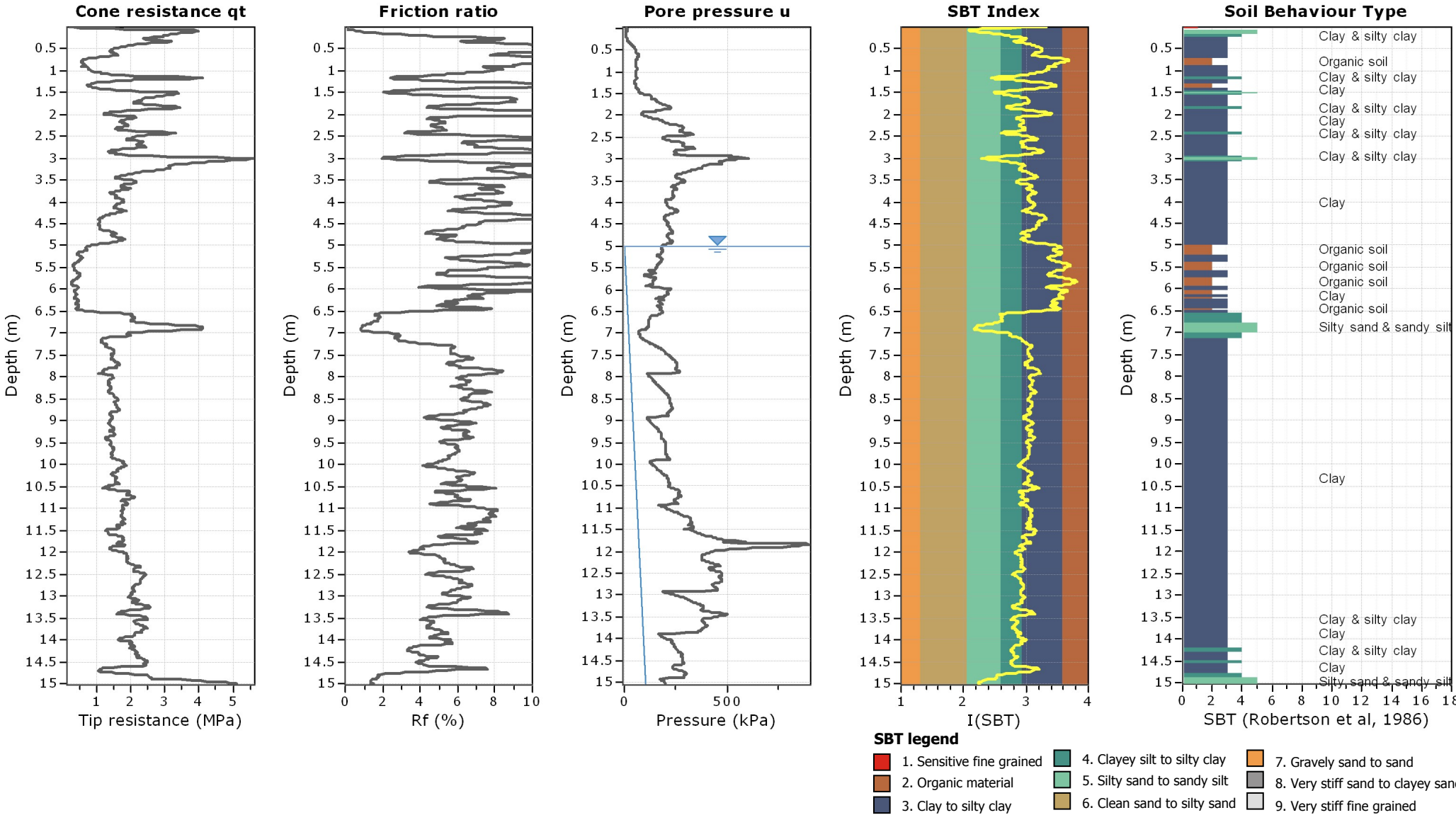
Location: Tauranga



**Project: The Lakes Tauranga**

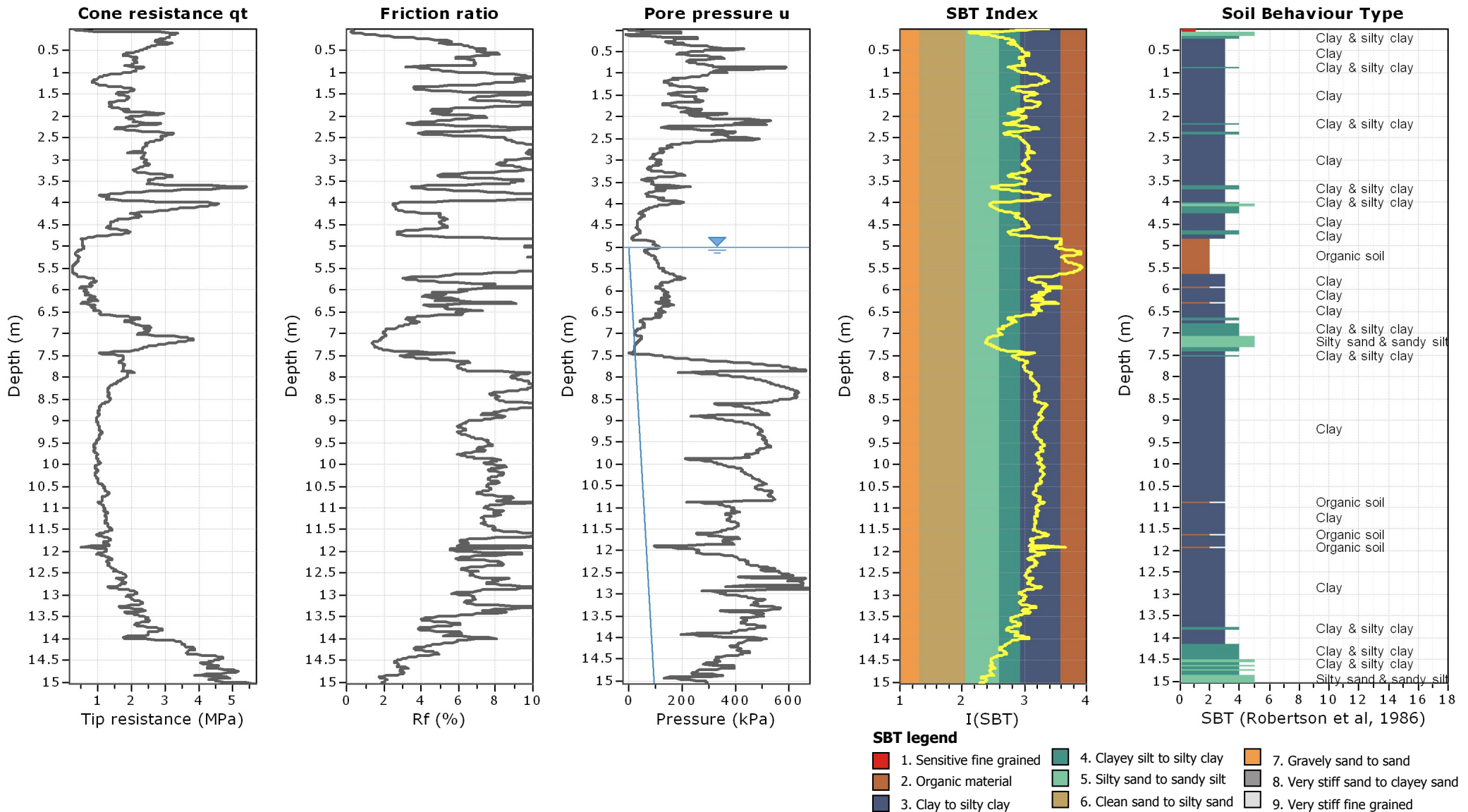
**Location: Tauranga**





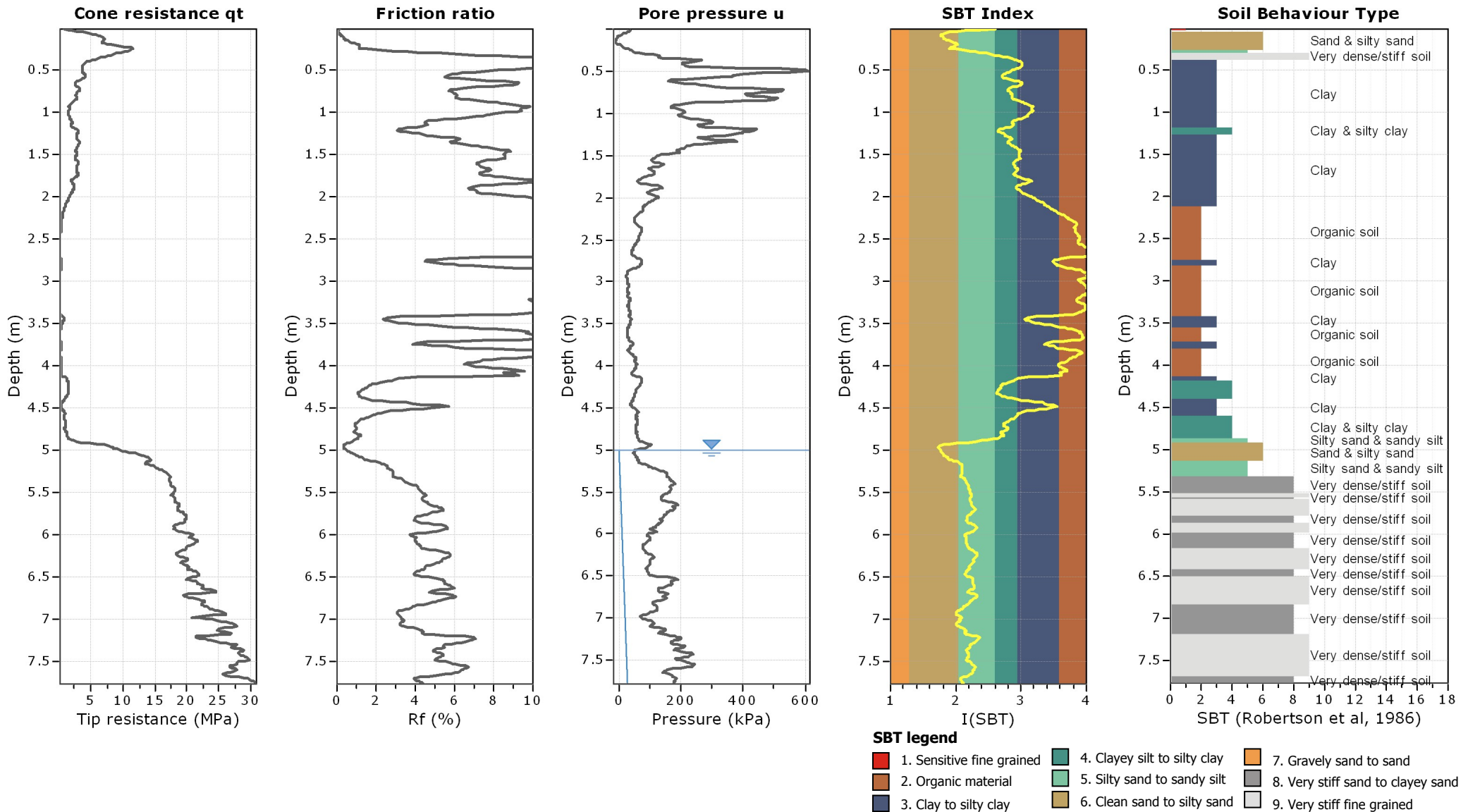
Project: The Lakes Tauranga

Location: Tauranga



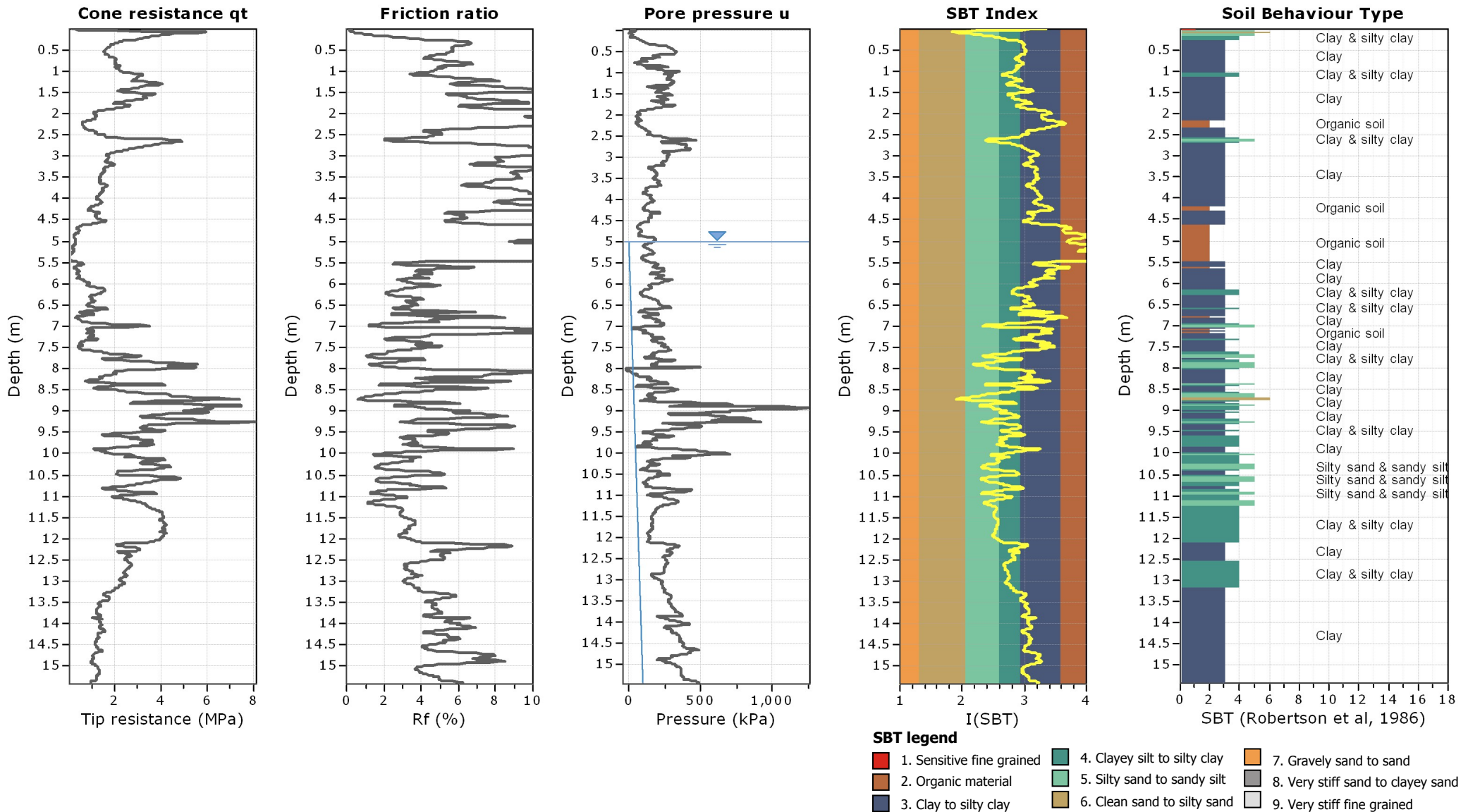
**Project: The Lakes Tauranga**

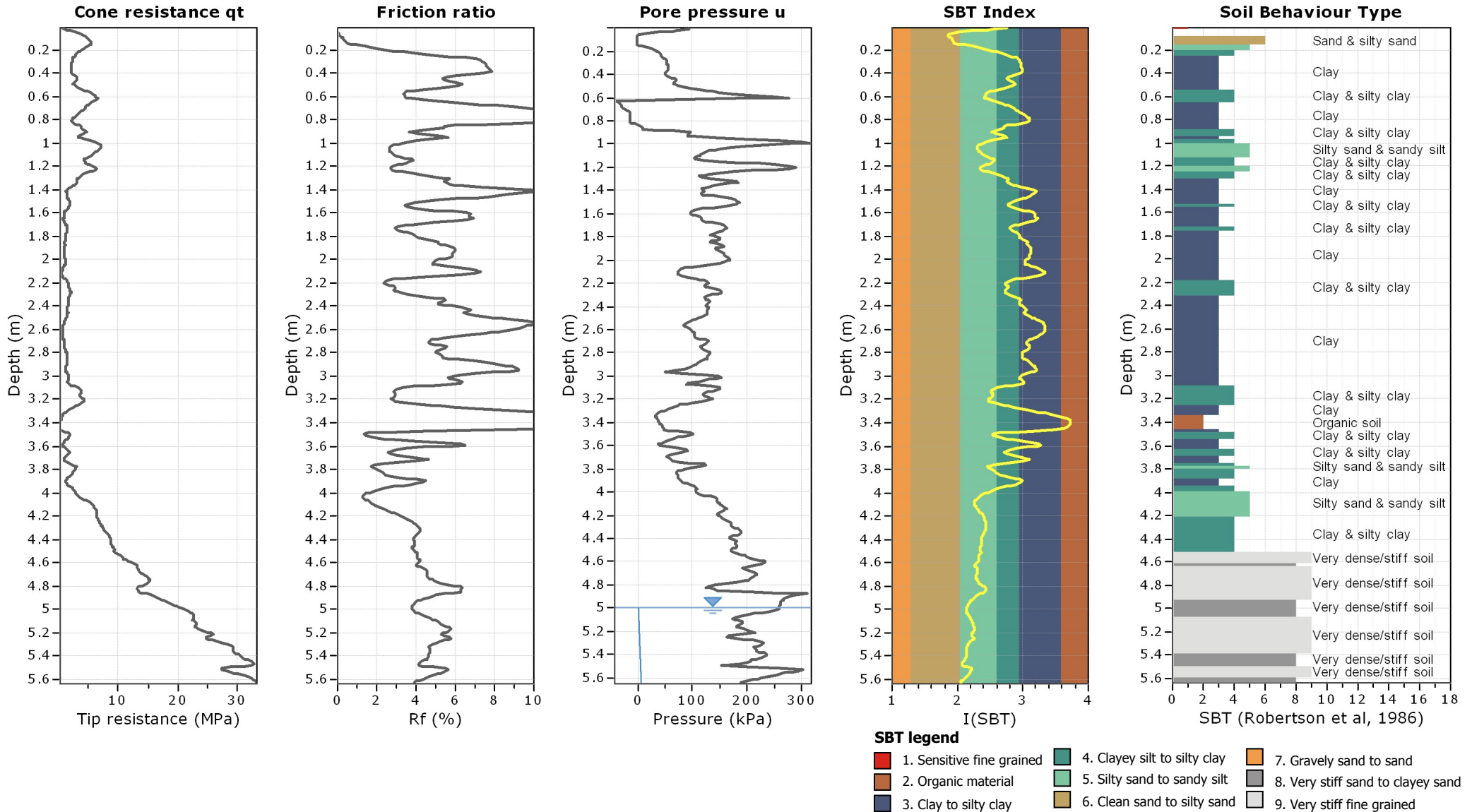
**Location: Tauranga**



Project: The Lakes Tauranga

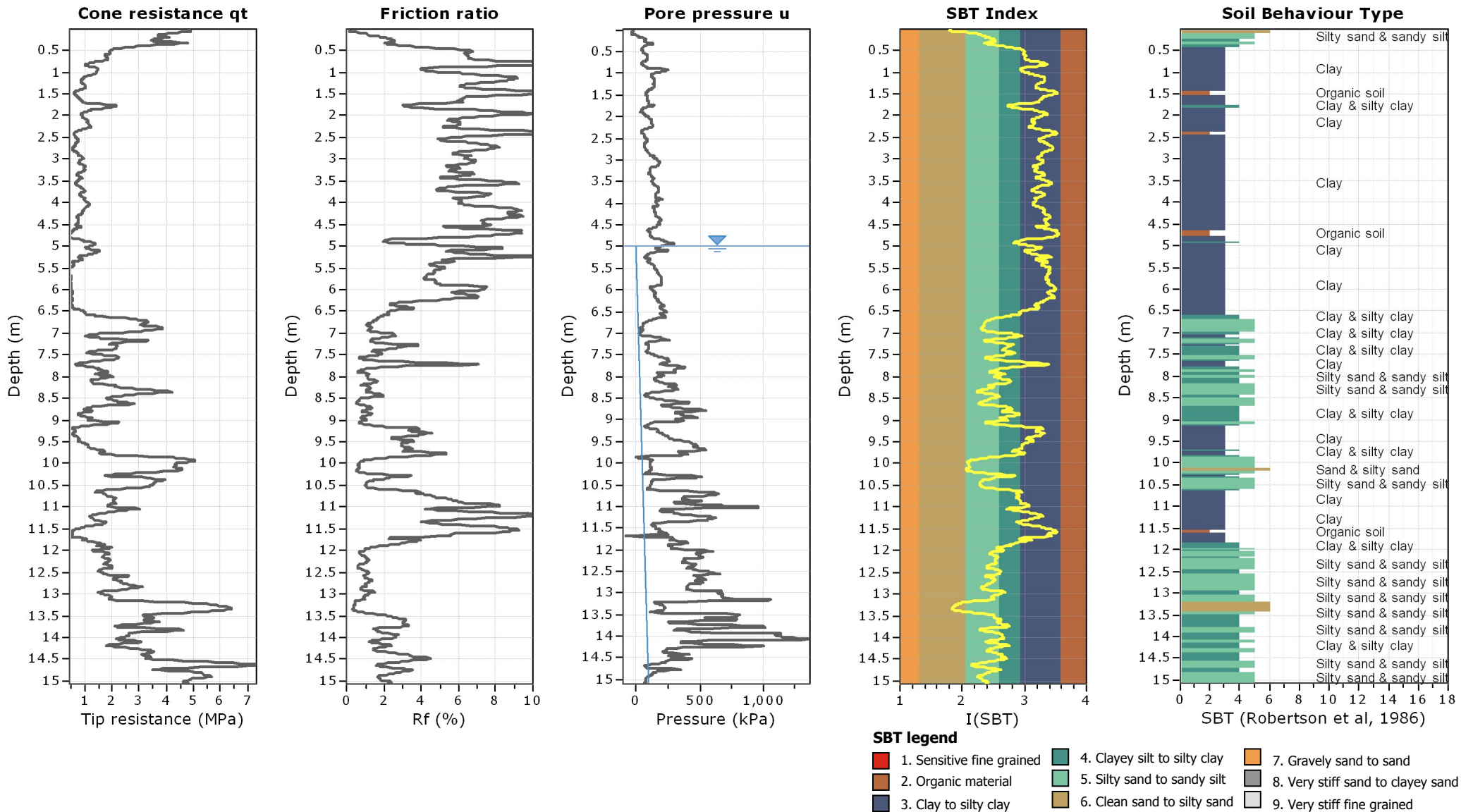
Location: Tauranga





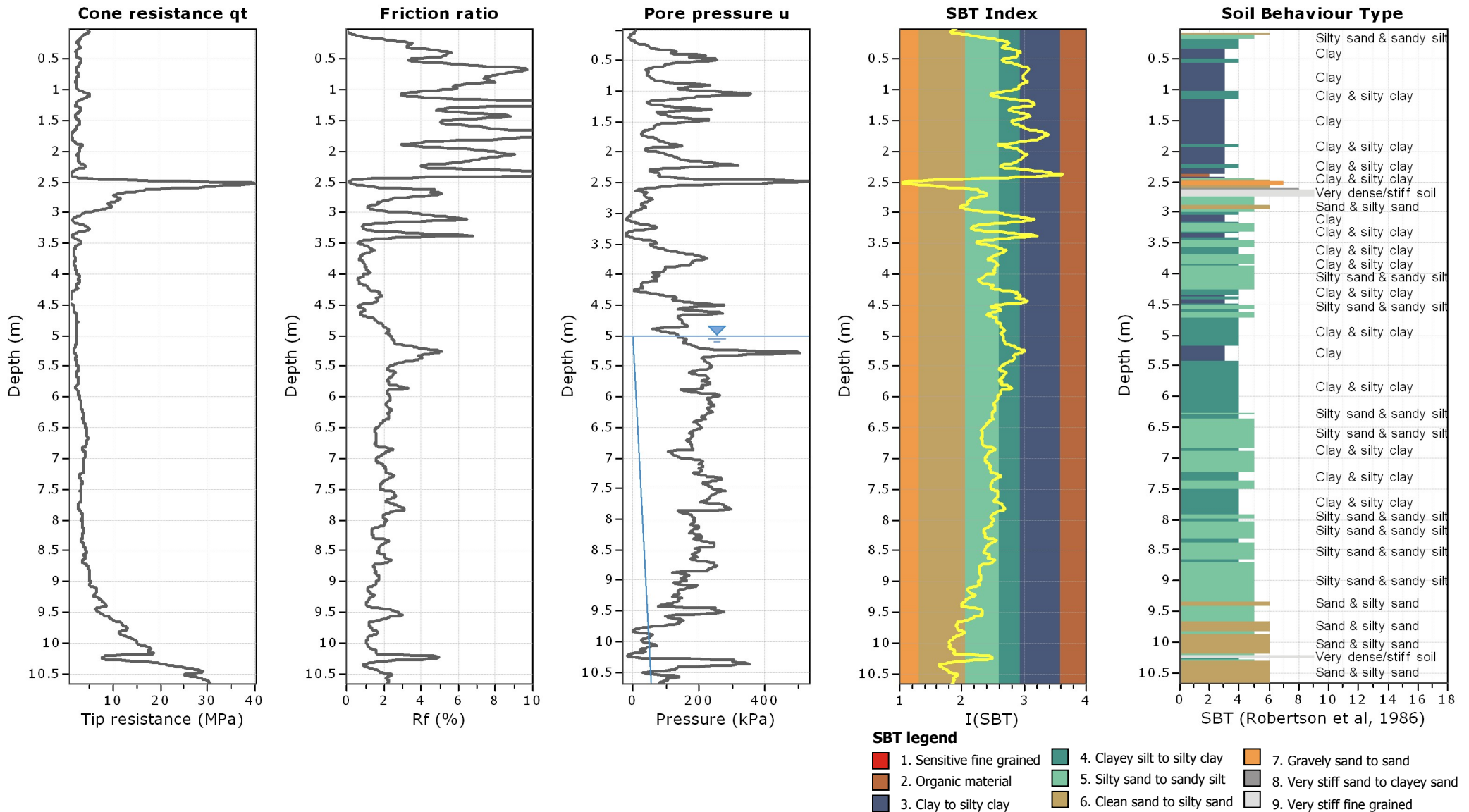
Project: The Lakes Tauranga

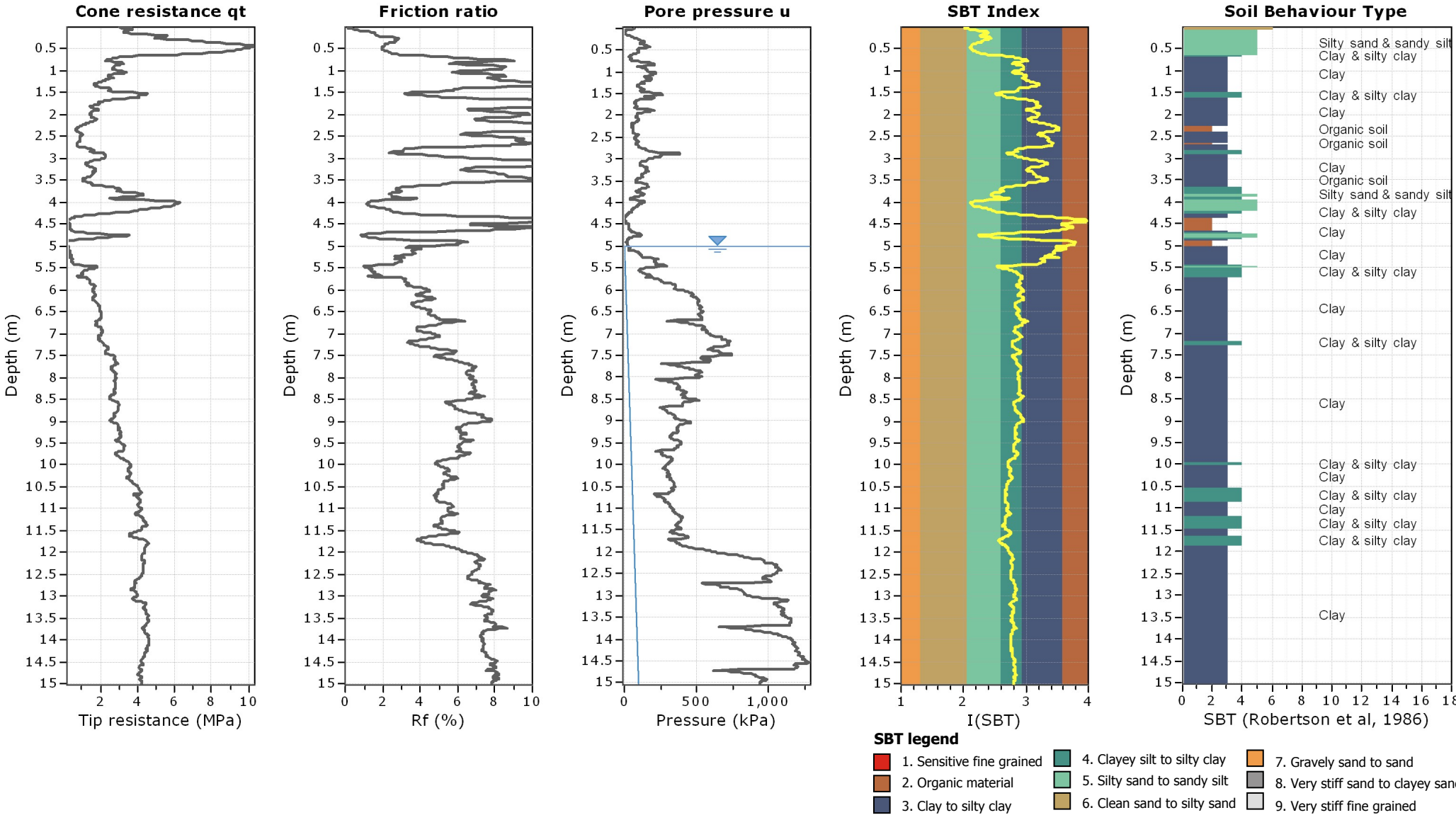
Location: Tauranga



Project: The Lakes Tauranga

Location: Tauranga





# Appendix C

**2007-2008 Earthfill Quality Control Data**

| FILL TEST RESULTS FROM 2007 / 2008 EARTHWORKS PERIOD |            |             |               |                  |                         |           |
|--|------------|-------------|---------------|------------------|-------------------------|-----------|
| Summary of earthfill test data                       |            |             |               |                  |                         |           |
| Test Number  | Date       | Test RL (m) | Result        |                  |                         | Pass/Fail |
|  |            |             | Air Voids (%) | Shear Vane (kPa) | Scala (blows per 100mm) |           |
| 141  | 14/11/2007 | 41.7        | 5.4           | 217+             | -                       | Pass      |
| 142  | 19/11/2007 | 10.0        | 1.3           | 217+             | -                       | Pass      |
| 143  |            | 20.6        | 2.7           | 217+             | -                       | Pass      |
| 144  |            | 11.8        | 3.5           | 217+             | -                       | Pass      |
| 145  |            | 13.1        | 0.2           | 213+             | -                       | Pass      |
| 146  |            | 14.4        | 4.3           | 215+             | -                       | Pass      |
| 147  |            | 15.4        | 0.0           | 217+             | -                       | Pass      |
| 148  |            | 16.5        | 2.3           | 217+             | -                       | Pass      |
| 149  |            | 17.3        | 8.6           | 217+             | -                       | Pass      |
| 150  |            | 18.5        | 1.5           | 217+             | -                       | Pass      |
| 578  | 29/01/2008 | 10.6        | 2.4           | 205+             | -                       | Pass      |
| 579  |            | 11.7        | 0.1           | 202+             | -                       | Pass      |
| 580  |            | 12.4        | 0.3           | 193+             | -                       | Pass      |
| 581  |            | 8.6         | 8.9           | 204+             | -                       | Pass      |
| 582  |            | 9.2         | 1.7           | 204+             | -                       | Pass      |
| 583  |            | 9.7         | 0.0           | 205+             | -                       | Pass      |
| 584  |            | 10.5        | 2.9           | 197+             | -                       | Pass      |
| 585  |            | 11.4        | 1.0           | 202+             | -                       | Pass      |
| 586  |            | 12.6        | 1.1           | 205+             | -                       | Pass      |
| 587  |            | 12.8        | 2.6           | 205+             | -                       | Pass      |
| 588  |            | 13.4        | 0.3           | 205+             | -                       | Pass      |
| 589  |            | 14.2        | 2.8           | 205+             | -                       | Pass      |
| 590  |            | 19.1        | 10.0          | 204+             | -                       | Pass      |
| 591  |            | 20.7        | 6.8           | 197+             | -                       | Pass      |
| 592  |            | 21.9        | 4.7           | 204+             | -                       | Pass      |
| 593  |            | 23.0        | 2.6           | 176              | -                       | Pass      |
| 594  |            | 11.1        | 2.7           | 205+             | -                       | Pass      |
| 595  |            | 11.3        | 6.3           | 205+             | -                       | Pass      |

| Test Number | Date       | Test RL (m) | Result        |                  |                         | Pass/Fail |
|-------------|------------|-------------|---------------|------------------|-------------------------|-----------|
|             |            |             | Air Voids (%) | Shear Vane (kPa) | Scala (blows per 100mm) |           |
| 596         |            | 12.0        | 8.0           | 204+             | -                       | Pass      |
| 597         |            | 10.8        | 5.5           | 205+             | -                       | Pass      |
| 598         |            | 10.3        | 1.5           | 205+             | -                       | Pass      |
| 652         | 31/01/2008 | 12.2        | 0.0           | 260+             | -                       | Pass      |
| 653         |            | 11.1        | 5.8           | 270              | -                       | Pass      |
| 654         |            | 9.1         | 0.0           | 260+             | -                       | Pass      |
| 655         |            | 6.8         | 6.0           | 283+             | -                       | Pass      |
| 656         |            | 7.8         | 3.4           | 279+             | -                       | Pass      |
| 657         |            | 10.2        | 6.0           | 286+             | -                       | Pass      |
| 658         |            | 12.5        | 4.7           | 255+             | -                       | Pass      |
| 659         |            | 14.2        | 10.0          | 255+             | -                       | Pass      |
| 660         |            | 17.6        | 3.2           | 291+             | -                       | Pass      |
| 661         |            | 19.7        | 2.5           | 278+             | -                       | Pass      |
| 662         |            | 22.2        | 2.6           | 243              | -                       | Pass      |
| 663         |            | 25.0        | 4.0           | 291+             | -                       | Pass      |
| 664         |            | 8.8         | 1.2           | 226              | -                       | Pass      |
| 665         | 7/02/2008  | 18.3        | 0.0           | 205+             | -                       | Pass      |
| 666         |            | 21.5        | 2.3           | 198+             | -                       | Pass      |
| 667         |            | 33.3        | 4.1           | 205+             | -                       | Pass      |
| 668         |            | 31.6        | 3.4           | 205+             | -                       | Pass      |
| 669         |            | 29.6        | 10.0          | 201+             | -                       | Pass      |
| 670         |            | 22.5        | 8.4           | 205+             | -                       | Pass      |
| 671         |            | 19.3        | 0.2           | 205+             | -                       | Pass      |
| 672         |            | 16.7        | 3.3           | 205+             | -                       | Pass      |
| 673         |            | 12.5        | 5.7           | 198+             | -                       | Pass      |
| 674         |            | 15.4        | 1.7           | 205+             | -                       | Pass      |
| 675         |            | 15.0        | 0.0           | 205+             | -                       | Pass      |
| 676         |            | 10.9        | 0.0           | 205+             | -                       | Pass      |
| 677         |            | 10.1        | 2.8           | 205+             | -                       | Pass      |
| 678         |            | 8.7         | 5.6           | 205+             | -                       | Pass      |
| 679         |            | 11.9        | 0.0           | 205+             | -                       | Pass      |
| 680         |            | 7.8         | 0.0           | 284+             | -                       | Pass      |
| 681         |            | 9.2         | 1.8           | 291+             | -                       | Pass      |
| 682         |            | 9.7         | 0.0           | 291+             | -                       | Pass      |
| 683         |            | 10.7        | 0.0           | 286+             | -                       | Pass      |

| Test Number | Date       | Test RL (m) | Result        |                  |                         | Pass/Fail |
|-------------|------------|-------------|---------------|------------------|-------------------------|-----------|
|             |            |             | Air Voids (%) | Shear Vane (kPa) | Scala (blows per 100mm) |           |
| 684         |            | 11.6        | 4.5           | 291+             | -                       | Pass      |
| 685         |            | 12.7        | 4.5           | 205+             | -                       | Pass      |
| 686         |            | 13.7        | 2.5           | 205+             | -                       | Pass      |
| 687         |            | 13.4        | 5.9           | 190              | -                       | Pass      |
| 688         |            | 14.2        | 6.8           | 205+             | -                       | Pass      |
| 689         |            | 15.1        | 2.5           | 205+             | -                       | Pass      |
| 762         | 18/02/2008 | 10.1        | 5.2           | 205+             | -                       | Pass      |
| 763         |            | 7.9         | 3.7           | 205+             | -                       | Pass      |
| 764         |            | 7.1         | 0             | 205+             | -                       | Pass      |
| 765         |            | 8.7         | 0.6           | 202+             | -                       | Pass      |
| 766         |            | 9.9         | 0             | 148              | -                       | Pass      |
| 767         |            | 11.6        | 0.8           | 205+             | -                       | Pass      |
| 768         |            | 9.1         | 1.9           | 205+             | -                       | Pass      |
| 769         |            | 10.4        | 0             | 205+             | -                       | Pass      |
| 770         |            | 12.2        | 3.4           | 205+             | -                       | Pass      |
| 771         |            | 12.6        | 7.6           | 205+             | -                       | Pass      |
| 772         |            | 13.1        | 1.2           | 205+             | -                       | Pass      |
| 773         |            | 13.1        | 7.5           | 205+             | -                       | Pass      |
| 774         |            | 13.4        | 3.7           | 205+             | -                       | Pass      |
| 775         |            | 12.6        | 3.9           | 205+             | -                       | Pass      |
| 776         |            | 14.1        | 1.3           | 205+             | -                       | Pass      |
| 777         |            | 6.4         | 0             | 205+             | -                       | Pass      |
| 778         |            | 6.6         | 8.3           | 205+             | -                       | Pass      |
| 779         |            | 7.8         | 3.5           | 205+             | -                       | Pass      |
| 972         | 7/04/2008  | 16.6        | 1.9           | 214+             | -                       | Pass      |
| 973         |            | 15.7        | 0             | 214+             | -                       | Pass      |
| 974         |            | 14.7        | 4.8           | 214+             | -                       | Pass      |
| 975         |            | 13.8        | 0             | 214+             | -                       | Pass      |
| 976         |            | 12.2        | 1.9           | 214+             | -                       | Pass      |
| 977         |            | 11.8        | 4.5           | 214+             | -                       | Pass      |
| 978         |            | 13.3        | 0             | 214+             | -                       | Pass      |
| 979         |            | 11.1        | 2.4           | 214+             | -                       | Pass      |
| 980         |            | 17.2        | 2.9           | 214+             | -                       | Pass      |
| 981         |            | 14.8        | 0             | 214+             | -                       | Pass      |
| 982         |            | 18.8        | 2.1           | 214+             | -                       | Pass      |

| Test Number | Date      | Test RL (m) | Result        |                  |                         | Pass/Fail |
|-------------|-----------|-------------|---------------|------------------|-------------------------|-----------|
|             |           |             | Air Voids (%) | Shear Vane (kPa) | Scala (blows per 100mm) |           |
| 983         |           | 21.0        | 0.5           | 214+             | -                       | Pass      |
| 984         |           | 22.9        | 0             | 214+             | -                       | Pass      |
| 985         |           | 24.9        | 3.5           | 214+             | -                       | Pass      |
| 986         |           | 28.2        | 5.9           | 214+             | -                       | Pass      |
| 1016        | 9/04/2008 | 9.6         | 2.7           | 209+             | -                       | Pass      |
| 1017        |           | 9.6         | 5.8           | 214+             | -                       | Pass      |
| 1031        |           | 10.6        | 0             | 214+             | -                       | Pass      |
| 1032        |           | 10.4        | 7.2           | 178+             | -                       | Pass      |
| 1033        |           | 11.3        | 2.2           | 214+             | -                       | Pass      |
| 1034        |           | 10.4        | 1.6           | 214+             | -                       | Pass      |
| 1035        |           | 10.6        | 0.5           | 214+             | -                       | Pass      |
| 1036        |           | 10.4        | 0             | 159              | -                       | Pass      |
| 1037        |           | 10.4        | 2.4           | 214+             | -                       | Pass      |
| 1038        |           | 10.4        | 1.4           | 214+             | -                       | Pass      |
| 1039        |           | 10.7        | 4.8           | 214+             | -                       | Pass      |
| 1040        |           | 11.6        | 1             | 214+             | -                       | Pass      |
| 1041        |           | 11.1        | 4             | 214+             | -                       | Pass      |
| 1042        |           | 11.8        | 4.7           | 214+             | -                       | Pass      |
| 1043        |           | 11.6        | 3.1           | 214+             | -                       | Pass      |
| 1044        |           | 11.8        | 2             | 214+             | -                       | Pass      |
| 1045        |           | 11.8        | 0             | 214+             | -                       | Pass      |
| 1046        |           | 11.7        | 0             | 214+             | -                       | Pass      |
| 1047        |           | 12.2        | 0             | 214+             | -                       | Pass      |
| 1048        |           | 12.3        | 4.2           | 214+             | -                       | Pass      |
| 1049        |           | 11.2        | 0             | 214+             | -                       | Pass      |
| 1050        |           | 11.9        | 1.5           | 214+             | -                       | Pass      |
| 1051        |           | 12.4        | 7.4           | 214+             | -                       | Pass      |
| 1052        |           | 12.5        | 0             | 214+             | -                       | Pass      |
| 1053        |           | 11.3        | 6.3           | 184              | -                       | Pass      |
| 1054        |           | 11.3        | 5.4           | 210+             | -                       | Pass      |
| 1055        |           | 13.8        | 0             | 190+             | -                       | Pass      |
| 1056        |           | 12.6        | 2             | 214+             | -                       | Pass      |
| 1057        |           | 12.7        | 0             | 214+             | -                       | Pass      |
| 1058        |           | 13.2        | 4.7           | 214+             | -                       | Pass      |
| 1059        |           | 15.0        | 0.6           | 190+             | -                       | Pass      |

| Test Number | Date       | Test RL (m) | Result        |                  |                         | Pass/Fail |
|-------------|------------|-------------|---------------|------------------|-------------------------|-----------|
|             |            |             | Air Voids (%) | Shear Vane (kPa) | Scala (blows per 100mm) |           |
| 1060        | 10/04/2008 | 14.4        | 0.6           | 214+             | -                       | Pass      |
| 1061        |            | 14.4        | 0             | 214+             | -                       | Pass      |
| 1062        |            | 14.6        | 0             | 214+             | -                       | Pass      |
| 1063        |            | 15.3        | 3.1           | 214+             | -                       | Pass      |
| 1064        |            | 15.0        | 0.3           | 214+             | -                       | Pass      |
| 1065        |            | 14.8        | 1             | 173              | -                       | Pass      |
| 1066        |            | 15.1        | 0             | 205+             | -                       | Pass      |
| 1067        |            | 15.2        | 3.7           | 214+             | -                       | Pass      |
| 1068        |            | 16.1        | 6.9           | 214+             | -                       | Pass      |
| 1069        |            | 16.9        | 0.4           | 214+             | -                       | Pass      |
| 1070        |            | 16.5        | 0             | 198+             | -                       | Pass      |
| 1071        |            | 16.4        | 4.6           | 214+             | -                       | Pass      |
| 1072        |            | 15.6        | 7.4           | 181              | -                       | Pass      |
| 1073        |            | 16.8        | 0.1           | 184              | -                       | Pass      |
| 1074        | 10/04/2008 | 10.3        | 7             | 195+             | -                       | Pass      |
| 1075        |            | 10.2        | 0.7           | 214+             | -                       | Pass      |
| 1076        |            | 10.6        | 9.2           | 218+             | -                       | Pass      |
| 1077        |            | 9.6         | 5.4           | 218+             | -                       | Pass      |
| 1078        |            | 10.1        | 5.4           | 218+             | -                       | Pass      |
| 1079        |            | 12.8        | 2.9           | 218+             | -                       | Pass      |
| 1080        |            | 13.2        | 7.1           | 218+             | -                       | Pass      |
| 1081        |            | 12.0        | 1.7           | 218+             | -                       | Pass      |
| 1082        |            | 12.3        | 0             | 218+             | -                       | Pass      |
| 1083        |            | 12.0        | 0             | 218+             | -                       | Pass      |
| 1084        |            | 13.9        | 5.2           | 218+             | -                       | Pass      |
| 1085        |            | 13.8        | 1.6           | 218+             | -                       | Pass      |
| 1086        |            | 15.9        | 2.2           | 218+             | -                       | Pass      |
| 1087        |            | 16.6        | 2.5           | 218+             | -                       | Pass      |
| 1088        |            | 17.3        | 2.3           | 218+             | -                       | Pass      |
| 1089        |            | 16.2        | 4.5           | 198+             | -                       | Pass      |
| 1090        |            | 16.6        | 3.4           | 191+             | -                       | Pass      |
| 1091        |            | 17.0        | 4.9           | 183+             | -                       | Pass      |
| 1114        | 10/04/2008 | 21.2        | 1.1           | 214+             | -                       | Pass      |
| 1115        |            | 18.4        | 4.7           | 214+             | -                       | Pass      |
| 1116        |            | 17.4        | 5.6           | 214+             | -                       | Pass      |

| Test Number | Date       | Test RL (m) | Result        |                  |                         | Pass/Fail |
|-------------|------------|-------------|---------------|------------------|-------------------------|-----------|
|             |            |             | Air Voids (%) | Shear Vane (kPa) | Scala (blows per 100mm) |           |
| 1117        | 22/04/2008 | 16.7        | 5             | 214+             | -                       | Pass      |
| 1118        |            | 15.7        | 3.3           | 196+             | -                       | Pass      |
| 1119        |            | 15.5        | 1.3           | 214+             | -                       | Pass      |
| 1120        |            | 14.5        | 0             | 214+             | -                       | Pass      |
| 1121        |            | 13.6        | 5.3           | 189+             | -                       | Pass      |

#### Notes

- 1 Shear strength for NDM tests calculated from average of 3 vane tests at each test location. UTP = unable to penetrate.
- 2 A target Soilds Density of 2.4 t/m<sup>3</sup> was assumed for pumice sand fill, 2.6 t/m<sup>3</sup> for silt/ash fill and 2.5 t/m<sup>3</sup> for blended fills.
- 3 UTP = Unable to Penetrate
- 4 Isolated low shear strength readings in sandy soils not reported.

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## FIELD DENSITY TEST RESULTS

NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001



Tests / comments indicated <sup>NE</sup> are outside the scope of the laboratory's accreditation

**M.J. Packard** Approved Signatory

JOB NO

13685

PROJECT

### Stage 3 The Lakes, State Highway 29, Tauriko

## CLIENT

**Grasshopper Farms Limited**

## MATERIAL

### Compacted Fill

[illegible]

## FIELD DENSITY TEST RESULTS

NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001


 Tests / comments indicated <sup>NE</sup> are  
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 JOB NO  
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 MATERIAL

13685

Stage 3 The Lakes, State Highway 29, Tauriko

Grasshopper Farms Limited

Compacted Fill




| DATE     | TEST NO | TEST LOCATION         |          |      | FIELD TESTS |  |      |      |      |      | FIELD DENSITY GAUGE READINGS |                     |                     |                    |                              | Oven Dried Water Content |                    |                              | Solid Density<br>(Assumed)<br>t/m³ | COMMENTS <sup>NE</sup> |
|----------|---------|-----------------------|----------|------|-------------|--|------|------|------|------|------------------------------|---------------------|---------------------|--------------------|------------------------------|--------------------------|--------------------|------------------------------|------------------------------------|------------------------|
|          |         |                       |          |      | Soil Class  | Vane Shear Strengths kPa<br><i>Note: ++'s indicate UTP</i> |      |      |      |      | BS or Depth<br>mm            | Wet Density<br>t/m³ | Dry Density<br>t/m³ | Water Content<br>% | Air Voids <sup>NE</sup><br>% | Dry Density<br>t/m³      | Water Content<br>% | Air Voids <sup>NE</sup><br>% |                                    |                        |
|          |         | Individual Values kPa |          |      |             | Average  |      |      |      |      |                              |                     |                     |                    |                              |                          |                    |                              |                                    |                        |
| 19.11.07 | 142     | 800497.2              | 368078.6 | 10.0 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.67                | 1.17                | 43.5               | 4.5                          | 1.12                     | 50.1               | 1.3                          | 2.60                               |                        |
|          | 143     | 800470.0              | 368227.8 | 20.6 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.64                | 1.18                | 39.0               | 8.3                          | 1.09                     | 50.7               | 2.7                          | 2.60                               |                        |
|          | 144     | 800485.5              | 368106.5 | 11.8 | SM          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.63                | 1.18                | 38.0               | 5.6                          | 1.15                     | 42.5               | 3.5                          | 2.40                               |                        |
|          | 145     | 800496.4              | 368130.1 | 13.1 | SM          | 207  | 210  | 217+ | 217+ | 213+ | 250                          | 1.65                | 1.18                | 40.0               | 3.6                          | 1.12                     | 47.0               | 0.2                          | 2.40                               |                        |
|          | 146     | 800487.8              | 368149.4 | 14.4 | ML          | 217+   | 217+ | 209  | 217+ | 215+ | 250                          | 1.65                | 1.18                | 40.5               | 7.3                          | 1.13                     | 46.5               | 4.3                          | 2.60                               |                        |
|          | 147     | 800483.9              | 368166.7 | 15.4 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.74                | 1.28                | 36.5               | 4.3                          | 1.16                     | 49.8               | 0                            | 2.60                               |                        |
|          | 148     | 800475.2              | 368181.0 | 16.5 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.70                | 1.26                | 35.5               | 7.1                          | 1.18                     | 44.5               | 2.3                          | 2.60                               |                        |
|          | 149     | 800478.8              | 368196.0 | 17.3 | SM          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.63                | 1.17                | 39.5               | 5.1                          | 1.23                     | 32.9               | 8.6                          | 2.40                               |                        |
|          | 150     | 800470.7              | 368210.3 | 18.5 | SM          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.64                | 1.20                | 36.5               | 6.4                          | 1.11                     | 46.8               | 1.5                          | 2.40                               |                        |
|          | 151     | 800469.9              | 368228.8 | 20.7 | SM          | 174  | 207  | 217  | 217  | 204  | 250                          | 1.55                | 1.17                | 33.0               | 13                           | 1.11                     | 40.4               | 9.3                          | 2.40                               |                        |
|          | 152     | 799877.4              | 368451.2 | 53.0 | ML          | 190  | 180  | 170  | 166  | 177  | 250                          | 1.77                | 1.26                | 41.0               | 0.3                          | 1.29                     | 36.9               | 2.6                          | 2.60                               |                        |
|          | 153     | 799835.1              | 368437.2 | 48.8 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.76                | 1.24                | 42.5               | 0.3                          | 1.23                     | 42.5               | 0.1                          | 2.60                               |                        |
|          | 154     | 799892.3              | 368445.2 | 53.8 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.68                | 1.24                | 36.0               | 7.8                          | 1.19                     | 41.8               | 4.8                          | 2.60                               |                        |
|          | 155     | 799899.4              | 368425.4 | 53.6 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.72                | 1.22                | 42.0               | 2.4                          | 1.20                     | 43.6               | 1.5                          | 2.60                               |                        |
|          | 156     | 799888.0              | 368401.7 | 51.6 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.73                | 1.23                | 40.5               | 2.8                          | 1.22                     | 41.9               | 2.1                          | 2.60                               |                        |
|          | 157     | 799865.1              | 368378.7 | 48.8 | ML          | 180  | 217  | 217  | 217  | 208  | 250                          | 1.67                | 1.19                | 39.5               | 6.9                          | 1.15                     | 44.3               | 4.5                          | 2.60                               |                        |
|          | 158     | 799841.4              | 368357.5 | 46.4 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.76                | 1.33                | 33.0               | 5.2                          | 1.22                     | 44.3               | 0                            | 2.60                               |                        |
|          | 159     | 799788.6              | 368337.6 | 40.5 | ML          | 178  | 190  | 207  | 214  | 197  | 250                          | 1.71                | 1.19                | 44.5               | 1.8                          | 1.13                     | 51.9               | 0                            | 2.60                               |                        |
|          | 160     | 799812.6              | 368338.8 | 43.2 | ML          | 222  | 215  | 197  | 231  | 216  | 250                          | 1.73                | 1.23                | 40.0               | 3.5                          | 1.14                     | 51.9               | 0                            | 2.60                               |                        |
|          | 161     | 799814.7              | 368368.8 | 44.1 | ML          | 217+   | 217+ | 217+ | 217+ | 217+ | 250                          | 1.65                | 1.11                | 48.0               | 3.8                          | 1.07                     | 54.6               | 0.8                          | 2.60                               |                        |

Date 04.03.08

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|   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  <b>coffey geotechnics</b><br>SPECIALISTS MANAGING THE EARTH                                      |  |  |  |  | 141 Cameron Road<br>TAURANGA 3110<br>www.coffey.com  |  |  |  |  | <h2 style="margin:0;">FIELD DENSITY TEST RESULTS</h2> <p style="margin:0;">NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001</p> |  |  |  |  |  |  |  |  |  |
|  Tests / comments indicated <sup>NE</sup> are outside the scope of the laboratory's accreditation |  |  |  |  | <br>M.J. Packard Approved Signatory |  |  |  |  | JOB NO 13685<br>PROJECT Stage 3 The Lakes, State Highway 29, Tauriko<br>CLIENT Grasshopper Farms Limited<br>MATERIAL Compacted Fill          |  |  |  |  |  |  |  |  |  |

| DATE     | TEST NO | TEST LOCATION<br>Surveyed by client |          |      | FIELD TESTS |  |      |      |      | FIELD DENSITY GAUGE READINGS |                                 |                                 |                    |                              | Oven Dried Water Content        |                    |                              | Solid Density<br>(Assumed)<br>t/m <sup>3</sup> | COMMENTS <sup>NE</sup> |  |
|----------|---------|-------------------------------------|----------|------|-------------|--|------|------|------|------------------------------|---------------------------------|---------------------------------|--------------------|------------------------------|---------------------------------|--------------------|------------------------------|--|------------------------|--|
|          |         |                                     |          |      | Soil Class  | Vane Shear Strengths kPa<br><i>Note: ++'s indicate UTP</i> |      |      |      | BS or Depth<br>mm            | Wet Density<br>t/m <sup>3</sup> | Dry Density<br>t/m <sup>3</sup> | Water Content<br>% | Air Voids <sup>NE</sup><br>% | Dry Density<br>t/m <sup>3</sup> | Water Content<br>% | Air Voids <sup>NE</sup><br>% |  |                        |  |
|          |         | Individual Values kPa               |          |      |             | Average  |      |      |      |                              |                                 |                                 |                    |                              |                                 |                    |                              |  |                        |  |
| 29.01.08 | 578     | 800659.0                            | 368119.5 | 10.6 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.75                            | 1.35               | 30.0                         | 5.9                             | 1.29               | 35.5                         | 2.4  | 2.50                   |  |
|          | 579     | 800653.6                            | 368141.1 | 11.7 | ML          | 205+   | 194  | 205+ | 205+ | 202+                         | 250                             | 1.70                            | 1.17               | 46.0                         | 1.6                             | 1.14               | 48.9                         | 0.1  | 2.60                   |  |
|          | 580     | 800639.2                            | 368155.1 | 12.4 | ML          | 174  | 205+ | 189  | 205+ | 193+                         | 250                             | 1.67                            | 1.18               | 42.0                         | 5.4                             | 1.10               | 52.4                         | 0.3  | 2.60                   |  |
|          | 581     | 800640.5                            | 368123.1 | 8.6  | ML          | 205+   | 205+ | 202  | 205+ | 204+                         | 250                             | 1.63                            | 1.13               | 43.5                         | 5.6                             | 1.19               | 36.4                         | 8.9  | 2.50                   |  |
|          | 582     | 800639.2                            | 368103.9 | 9.2  | ML          | 205+   | 205+ | 202  | 205+ | 204+                         | 250                             | 1.73                            | 1.26               | 37.0                         | 5.0                             | 1.21               | 43.0                         | 1.7  | 2.60                   |  |
|          | 583     | 800672.9                            | 368097.1 | 9.7  | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.74                            | 1.19               | 46.0                         | 0                               | 1.11               | 57.3                         | 0  | 2.60                   |  |
|          | 584     | 800553.7                            | 368179.9 | 10.5 | ML          | 202  | 205+ | 187  | 194  | 197+                         | 250                             | 1.78                            | 1.27               | 40.0                         | 0                               | 1.35               | 32.0                         | 2.9  | 2.50                   |  |
|          | 585     | 800547.0                            | 368194.6 | 11.4 | ML          | 194  | 205+ | 205+ | 205+ | 202+                         | 250                             | 1.73                            | 1.17               | 47.5                         | 0                               | 1.23               | 40.3                         | 1.0  | 2.50                   |  |
|          | 586     | 800549.7                            | 368209.0 | 12.6 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.81                            | 1.31               | 38.0                         | 0                               | 1.33               | 35.8                         | 1.1  | 2.60                   |  |
|          | 587     | 800545.1                            | 368219.5 | 12.8 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.71                            | 1.19               | 43.5                         | 2.2                             | 1.20               | 42.6                         | 2.6  | 2.60                   |  |
|          | 588     | 800549.0                            | 368230.7 | 13.4 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.76                            | 1.27               | 38.5                         | 0                               | 1.28               | 37.9                         | 0.3  | 2.50                   |  |
|          | 589     | 800546.7                            | 368254.0 | 14.2 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.64                            | 1.11               | 47.5                         | 4.8                             | 1.08               | 51.7                         | 2.8  | 2.60                   |  |
|          | 590     | 800618.8                            | 368229.4 | 19.1 | SM          | 202  | 205+ | 205+ | 205+ | 204+                         | 250                             | 1.55                            | 1.14               | 36.5                         | 11                              | 1.13               | 37.9                         | 10   | 2.40                   |  |
|          | 591     | 800620.6                            | 368232.0 | 20.7 | ML          | 189  | 192  | 202  | 205+ | 197+                         | 250                             | 1.64                            | 1.17               | 40.5                         | 3.9                             | 1.16               | 42.2                         | 6.8  | 2.60                   |  |
|          | 592     | 800620.5                            | 368242.6 | 21.9 | ML          | 205+   | 205+ | 202  | 205+ | 204+                         | 250                             | 1.63                            | 1.12               | 45.5                         | 2.2                             | 1.13               | 44.1                         | 4.7  | 2.50                   |  |
|          | 593     | 800621.9                            | 368245.4 | 23.0 | ML          | 158  | 154  | 194  | 198  | 176                          | 250                             | 1.67                            | 1.09               | 52.5                         | 0                               | 1.13               | 47.8                         | 2.6  | 2.60                   |  |
|          | 594     | 800406.1                            | 368086.9 | 11.1 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.72                            | 1.23               | 39.0                         | 0.5                             | 1.24               | 38.5                         | 2.7  | 2.50                   |  |
|          | 595     | 800394.4                            | 368088.7 | 11.3 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.72                            | 1.25               | 37.0                         | 1.3                             | 1.30               | 31.8                         | 6.3  | 2.50                   |  |
|          | 596     | 800388.9                            | 368093.0 | 12.0 | ML          | 205+   | 205+ | 202  | 205+ | 204+                         | 250                             | 1.66                            | 1.23               | 31.5                         | 10                              | 1.23               | 35.1                         | 8.0  | 2.50                   |  |
|          | 597     | 800349.8                            | 368041.6 | 10.8 | ML          | 205+   | 205+ | 205+ | 205+ | 205+                         | 250                             | 1.68                            | 1.17               | 43.0                         | 0.7                             | 1.22               | 37.6                         | 5.5  | 2.50                   |  |

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## FIELD DENSITY TEST RESULTS

NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001



Tests / comments indicated <sup>NE</sup> are outside the scope of the laboratory's accreditation

M.J. Packard Approved Signatory

JOB NO

13685

PROJECT

### Stage 3 The Lakes, State Highway 29, Tauriko

CLIENT

Grasshopper Farms Limited

## MATERIAL

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## FIELD DENSITY TEST RESULTS

NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001



Tests / comments indicated <sup>NE</sup> are outside the scope of the laboratory's accreditation

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JOB NO

13685

PROJECT

Pyes Pa Bypass, State Highway 29, Tauriko

CLIENT

Grasshopper Farms Limited

## MATERIAL

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Date 13.03.08

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**FIELD DENSITY TEST RESULTS**  
NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001



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*[Signature]*

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JOB NO  
PROJECT  
CLIENT  
MATERIAL

13685  
Stage 3 The Lakes, State Highway 29, Tauriko  
Grasshopper Farms Limited

Compacted Fill

| DATE     | TEST<br>NO | TEST LOCATION<br>Surveyed by client |              |         | FIELD TESTS   |                          |      |      |      |                      | FIELD DENSITY GAUGE READINGS |                        |                       |                                 |                        | Oven Dried Water Content |                                 |         | Solid Density<br>(Assumed)<br>t/m³ | COMMENTS <sup>NE</sup> |
|----------|------------|-------------------------------------|--------------|---------|---------------|--------------------------|------|------|------|----------------------|------------------------------|------------------------|-----------------------|---------------------------------|------------------------|--------------------------|---------------------------------|---------|------------------------------------|------------------------|
|          |            |                                     |              |         | Soil<br>Class | Vane Shear Strengths kPa |      |      |      | BS or<br>Depth<br>mm | Wet<br>Density<br>t/m³       | Dry<br>Density<br>t/m³ | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% | Dry<br>Density<br>t/m³ | Water<br>Content<br>%    | Air<br>Voids <sup>NE</sup><br>% |         |                                    |                        |
|          |            | Note: ++'s indicate UTP             |              |         |               |                          |      |      |      |                      |                              |                        |                       |                                 |                        |                          |                                 |         |                                    |                        |
|          |            | Northing<br>m                       | Easting<br>m | RL<br>m |               | Individual Values kPa    |      |      |      |                      |                              |                        |                       |                                 |                        |                          |                                 | Average |                                    |                        |
| 07.02.08 | 665        | 800702.2                            | 368168.6     | 18.3    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.79                   | 1.39                  | 29.0                            | 4.4                    | 1.32                     | 36.0                            | 0.0     | 2.50                               |                        |
|          | 666        | 800675.7                            | 368196.4     | 21.5    | ML            | 192                      | 189  | 205+ | 205+ | 198+                 | 250                          | 1.73                   | 1.24                  | 39.5                            | 1.2                    | 1.26                     | 37.4                            | 2.3     | 2.50                               |                        |
|          | 667        | 800630.2                            | 368292.1     | 33.3    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.66                   | 1.22                  | 35.5                            | 7.8                    | 1.16                     | 42.5                            | 4.1     | 2.50                               |                        |
|          | 668        | 800637.6                            | 368274.0     | 31.6    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.82                   | 1.40                  | 30.0                            | 2.3                    | 1.42                     | 28.2                            | 3.4     | 2.50                               |                        |
|          | 669        | 800626.0                            | 368259.8     | 29.6    | ML            | 192                      | 205+ | 205+ | 203  | 201+                 | 250                          | 1.61                   | 1.07                  | 50.5                            | 3.1                    | 1.19                     | 35.7                            | 10      | 2.50                               |                        |
|          | 670        | 800639.9                            | 368200.9     | 22.5    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.75                   | 1.36                  | 28.5                            | 6.9                    | 1.38                     | 26.1                            | 8.4     | 2.50                               |                        |
|          | 671        | 800668.8                            | 368176.1     | 19.3    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.77                   | 1.28                  | 38.0                            | 2.0                    | 1.25                     | 41.3                            | 0.2     | 2.60                               |                        |
|          | 672        | 800698.2                            | 368148.7     | 16.7    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.82                   | 1.43                  | 27.5                            | 3.6                    | 1.43                     | 27.8                            | 3.3     | 2.50                               |                        |
|          | 673        | 800648.7                            | 368131.8     | 12.5    | ML            | 192                      | 189  | 205+ | 205+ | 198+                 | 250                          | 1.73                   | 1.34                  | 29.5                            | 9.0                    | 1.29                     | 34.9                            | 5.7     | 2.60                               |                        |
|          | 674        | 800647.0                            | 368159.6     | 15.4    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.72                   | 1.14                  | 51.0                            | 0                      | 1.20                     | 43.8                            | 1.7     | 2.60                               |                        |
|          | 675        | 800627.3                            | 368155.9     | 15.0    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.67                   | 1.07                  | 55.5                            | 0                      | 1.08                     | 54.5                            | 0       | 2.50                               |                        |
|          | 676        | 800630.0                            | 368121.8     | 10.9    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.72                   | 1.16                  | 48.0                            | 0                      | 1.11                     | 54.5                            | 0       | 2.60                               |                        |
|          | 677        | 800640.0                            | 368098.1     | 10.1    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.82                   | 1.48                  | 23.0                            | 6.7                    | 1.42                     | 28.5                            | 2.8     | 2.50                               |                        |
|          | 678        | 800606.9                            | 368094.0     | 8.7     | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.84                   | 1.51                  | 21.5                            | 7.1                    | 1.49                     | 23.4                            | 5.6     | 2.50                               |                        |
|          | 679        | 800607.7                            | 368134.1     | 11.9    | ML            | 205+                     | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.80                   | 1.14                  | 48.0                            | 0                      | 1.11                     | 62.5                            | 0       | 2.60                               |                        |
|          | 680        | 800579.3                            | 368096.2     | 7.8     | ML            | 291+                     | 291+ | 291+ | 262  | 284+                 | 250                          | 1.67                   | 1.16                  | 43.0                            | 3.4                    | 1.06                     | 57.3                            | 0       | 2.60                               |                        |
|          | 681        | 800560.0                            | 368113.0     | 9.2     | ML            | 291+                     | 291+ | 291+ | 291+ | 291+                 | 250                          | 1.60                   | 1.06                  | 50.0                            | 4.2                    | 1.02                     | 56.0                            | 1.8     | 2.60                               |                        |
|          | 682        | 800584.9                            | 368118.5     | 9.7     | ML            | 291+                     | 291+ | 291+ | 291+ | 291+                 | 250                          | 1.75                   | 1.20                  | 46.0                            | 0                      | 1.11                     | 57.7                            | 0       | 2.60                               |                        |
|          | 683        | 800579.2                            | 368136.9     | 10.7    | ML            | 291+                     | 270  | 291+ | 291+ | 286+                 | 250                          | 1.72                   | 1.17                  | 46.5                            | 0                      | 1.09                     | 57.1                            | 0       | 2.60                               |                        |
|          | 684        | 800566.5                            | 368157.2     | 11.6    | ML            | 291+                     | 291+ | 291+ | 291+ | 291+                 | 250                          | 1.74                   | 1.28                  | 36.5                            | 2.4                    | 1.31                     | 32.7                            | 4.5     | 2.50                               |                        |

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## FIELD DENSITY TEST RESULTS

NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001



Tests / comments indicated <sup>NE</sup> are outside the scope of the laboratory's accreditation

Back 1

M.J. Packard Approved Signatory

JOB NO

13685

PROJECT

Stage 3 The Lakes, State Highway 29, Tauriko

CLIENT

Grasshopper Farms Limited

## MATERIAL

**Compacted Fill**

[illegible]

Date 04.03.08

Checked

12/20

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Report No 7623 Sheet 1 of 1


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## FIELD DENSITY TEST RESULTS

NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001

JOB NO 13685  
PROJECT Stage 3 The Lakes, State Highway 29, Tauriko  
CLIENT Grasshopper Farms Limited  
MATERIAL Compacted Fill

| DATE     | TEST<br><br>NO | TEST LOCATION<br>Surveyed by client |              |         | FIELD TESTS   |  |      |      |      |                      | FIELD DENSITY GAUGE READINGS |                        |                       |                                 |                        | Oven Dried Water Content |                                 |     | Solid Density<br>(Assumed)<br>t/m³ | COMMENTS <sup>NE</sup> |
|----------|----------------|-------------------------------------|--------------|---------|---------------|--|------|------|------|----------------------|------------------------------|------------------------|-----------------------|---------------------------------|------------------------|--------------------------|---------------------------------|-----|------------------------------------|------------------------|
|          |                |                                     |              |         | Soil<br>Class | Vane Shear Strengths   kPa<br><i>Note: ++'s indicate UTP</i> |      |      |      | BS or<br>Depth<br>mm | Wet<br>Density<br>t/m³       | Dry<br>Density<br>t/m³ | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% | Dry<br>Density<br>t/m³ | Water<br>Content<br>%    | Air<br>Voids <sup>NE</sup><br>% |     |                                    |                        |
|          |                | Individual Values   kPa             |              |         |               | Average  |      |      |      |                      |                              |                        |                       |                                 |                        |                          |                                 |     |                                    |                        |
|          |                | Northing<br>m                       | Easting<br>m | RL<br>m |               |  |      |      |      |                      |                              |                        |                       |                                 |                        |                          |                                 |     |                                    |                        |
| 18.02.08 | 762            | 800642.3                            | 368085.6     | 10.1    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.77                   | 1.39                  | 27.0                            | 7.0                    | 1.37                     | 29.3                            | 5.2 | 2.50                               |                        |
|          | 763            | 800603.1                            | 368090.5     | 7.9     | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.72                   | 1.30                  | 32.5                            | 6.0                    | 1.26                     | 36.5                            | 3.7 | 2.50                               |                        |
|          | 764            | 800565.0                            | 368093.0     | 7.1     | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.75                   | 1.25                  | 40.0                            | 1.9                    | 1.14                     | 53.9                            | 0   | 2.60                               |                        |
|          | 765            | 800560.8                            | 368118.0     | 8.7     | ML            | 205+   | 194  | 205+ | 205+ | 202+                 | 250                          | 1.76                   | 1.28                  | 38.5                            | 2.0                    | 1.25                     | 41.0                            | 0.6 | 2.60                               |                        |
|          | 766            | 800553.0                            | 368157.6     | 9.9     | ML            | 139  | 140  | 153  | 158  | 148                  | 250                          | 1.68                   | 1.15                  | 46.5                            | 2.7                    | 1.10                     | 53.1                            | 0   | 2.60                               |                        |
|          | 767            | 800581.2                            | 368141.9     | 11.6    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.61                   | 1.09                  | 47.0                            | 5.0                    | 1.02                     | 57.1                            | 0.8 | 2.50                               |                        |
|          | 768            | 800588.8                            | 368120.1     | 9.1     | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.69                   | 1.18                  | 42.5                            | 2.4                    | 1.17                     | 43.6                            | 1.9 | 2.50                               |                        |
|          | 769            | 800629.7                            | 368117.7     | 10.4    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.65                   | 1.13                  | 45.0                            | 5.2                    | 0.96                     | 71.0                            | 0   | 2.60                               |                        |
|          | 770            | 800558.8                            | 368186.6     | 12.2    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.69                   | 1.16                  | 45.5                            | 2.5                    | 1.18                     | 43.6                            | 3.4 | 2.60                               |                        |
|          | 771            | 800545.6                            | 368208.2     | 12.6    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.67                   | 1.24                  | 34.0                            | 8.2                    | 1.23                     | 34.9                            | 7.6 | 2.50                               |                        |
|          | 772            | 800540.5                            | 368233.8     | 13.1    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.67                   | 1.18                  | 41.5                            | 5.6                    | 1.11                     | 50.6                            | 1.2 | 2.60                               |                        |
|          | 773            | 800552.5                            | 368252.1     | 13.1    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.73                   | 1.33                  | 30.0                            | 7.0                    | 1.34                     | 29.2                            | 7.5 | 2.50                               |                        |
|          | 774            | 800559.9                            | 368264.2     | 13.4    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.72                   | 1.26                  | 37.5                            | 4.8                    | 1.23                     | 39.9                            | 3.7 | 2.60                               |                        |
|          | 775            | 800562.7                            | 368225.9     | 12.6    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.67                   | 1.19                  | 40.5                            | 6.5                    | 1.14                     | 45.6                            | 3.9 | 2.60                               |                        |
|          | 776            | 800573.1                            | 368255.7     | 14.1    | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.67                   | 1.20                  | 39.5                            | 7.1                    | 1.10                     | 51.2                            | 1.3 | 2.60                               |                        |
|          | 777            | 800629.0                            | 368047.2     | 6.4     | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.77                   | 1.31                  | 34.5                            | 4.3                    | 1.22                     | 44.9                            | 0   | 2.60                               |                        |
|          | 778            | 800661.6                            | 368044.7     | 6.6     | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.70                   | 1.34                  | 26.5                            | 13                     | 1.30                     | 30.7                            | 8.3 | 2.50                               |                        |
|          | 779            | 800695.8                            | 368057.2     | 7.8     | ML            | 205+   | 205+ | 205+ | 205+ | 205+                 | 250                          | 1.81                   | 1.35                  | 34.0                            | 2.2                    | 1.37                     | 32.0                            | 3.5 | 2.60                               |                        |
|          |                |                                     |              |         |               |  |      |      |      |                      |                              |                        |                       |                                 |                        |                          |                                 |     |                                    |                        |
|          |                |                                     |              |         |               |  |      |      |      |                      |                              |                        |                       |                                 |                        |                          |                                 |     |                                    |                        |

**FIELD DENSITY TEST RESULTS**  
NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001



Tests / comments indicated <sup>NE</sup> are  
outside the scope of the  
laboratory's accreditation

*Mack*

M.J. Packard Approved Signatory

JOB NO 13685  
PROJECT Stage 3 The Lakes, State Highway 29, Tauriko  
CLIENT Grasshopper Farms Limited  
MATERIAL Compacted Fill

| DATE     | TEST NO | TEST LOCATION<br>Surveyed by client |              |         | FIELD TESTS   |  |      |      |      |         | FIELD DENSITY GAUGE READINGS |                        |                        |                       |                                 | Oven Dried Water Content |                       |                                 | Solid Density<br>(Assumed)<br>t/m³ | COMMENTS <sup>NE</sup> |
|----------|---------|-------------------------------------|--------------|---------|---------------|--|------|------|------|---------|------------------------------|------------------------|------------------------|-----------------------|---------------------------------|--------------------------|-----------------------|---------------------------------|------------------------------------|------------------------|
|          |         | Northing<br>m                       | Easting<br>m | RL<br>m | Soil<br>Class | Vane Shear Strengths kPa<br><i>Note: ++'s indicate UTP</i> |      |      |      |         | BS or<br>Depth<br>mm         | Wet<br>Density<br>t/m³ | Dry<br>Density<br>t/m³ | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% | Dry<br>Density<br>t/m³   | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% |                                    |                        |
|          |         |                                     |              |         |               | Individual Values kPa                                      |      |      |      | Average |                              |                        |                        |                       |                                 |                          |                       |                                 |                                    |                        |
| 07.04.08 | 972     | 800587.9                            | 368203.4     | 16.6    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.86                   | 1.44                   | 29.5                  | 2.3                             | 1.43                     | 30.0                  | 1.9                             | 2.60                               |                        |
|          | 973     | 800576.8                            | 368194.5     | 15.7    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.83                   | 1.36                   | 35.0                  | 0.2                             | 1.32                     | 38.6                  | 0                               | 2.60                               |                        |
|          | 974     | 800574.6                            | 368175.6     | 14.7    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.79                   | 1.34                   | 33.0                  | 3.8                             | 1.36                     | 31.6                  | 4.8                             | 2.60                               |                        |
|          | 975     | 800589.3                            | 368152.6     | 13.8    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.71                   | 1.23                   | 39.5                  | 4.3                             | 1.12                     | 52.7                  | 0                               | 2.60                               |                        |
|          | 976     | 800591.5                            | 368125.1     | 12.2    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.74                   | 1.25                   | 39.0                  | 3.1                             | 1.23                     | 41.5                  | 1.9                             | 2.60                               |                        |
|          | 977     | 800625.6                            | 368128.3     | 11.8    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.82                   | 1.35                   | 34.5                  | 0.9                             | 1.41                     | 29.3                  | 4.5                             | 2.60                               |                        |
|          | 978     | 800640.2                            | 368136.9     | 13.3    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.84                   | 1.40                   | 31.5                  | 2.1                             | 1.28                     | 43.7                  | 0                               | 2.60                               |                        |
|          | 979     | 800644.4                            | 368110.6     | 11.1    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.81                   | 1.38                   | 31.5                  | 3.4                             | 1.36                     | 33.2                  | 2.4                             | 2.60                               |                        |
|          | 980     | 800674.0                            | 368155.5     | 17.2    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.82                   | 1.38                   | 31.5                  | 3.2                             | 1.38                     | 31.9                  | 2.9                             | 2.60                               |                        |
|          | 981     | 800654.9                            | 368149.2     | 14.8    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.84                   | 1.35                   | 36.5                  | 0                               | 1.27                     | 45.3                  | 0                               | 2.60                               |                        |
|          | 982     | 800655.4                            | 368172.1     | 18.8    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.77                   | 1.31                   | 35.5                  | 3.2                             | 1.28                     | 37.8                  | 2.1                             | 2.60                               |                        |
|          | 983     | 800634.4                            | 368192.8     | 21.0    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.76                   | 1.29                   | 36.5                  | 3.2                             | 1.25                     | 41.2                  | 0.5                             | 2.60                               |                        |
|          | 984     | 800624.3                            | 368212.1     | 22.9    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.78                   | 1.32                   | 34.5                  | 3.3                             | 1.26                     | 41.9                  | 0                               | 2.60                               |                        |
|          | 985     | 800621.7                            | 368228.4     | 24.9    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.72                   | 1.28                   | 34.5                  | 6.8                             | 1.22                     | 40.3                  | 3.5                             | 2.60                               |                        |
|          | 986     | 800621.1                            | 368249.0     | 28.2    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.69                   | 1.24                   | 36.5                  | 7.0                             | 1.22                     | 38.7                  | 5.9                             | 2.60                               |                        |
|          | 987     | 800644.4                            | 368238.0     | 27.5    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.76                   | 1.33                   | 32.0                  | 6.4                             | 1.32                     | 32.7                  | 5.9                             | 2.60                               |                        |
|          | 988     | 800657.4                            | 368213.1     | 24.7    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.87                   | 1.42                   | 31.5                  | 0.9                             | 1.43                     | 30.8                  | 1.2                             | 2.60                               |                        |
|          | 989     | 800670.3                            | 368196.7     | 22.3    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.85                   | 1.37                   | 35.0                  | 0                               | 1.35                     | 37.3                  | 0                               | 2.60                               |                        |
|          | 990     | 800692.1                            | 368175.5     | 19.3    | ML            | 214+   | 214+ | 214+ | 214+ | 214+    | 250                          | 1.75                   | 1.38                   | 27.0                  | 10                              | 1.32                     | 32.9                  | 5.9                             | 2.60                               |                        |
|          |         |                                     |              |         |               |  |      |      |      |         |                              |                        |                        |                       |                                 |                          |                       |                                 |                                    |                        |

**FIELD DENSITY TEST RESULTS**  
NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001




Tests / comments indicated <sup>NE</sup> are  
outside the scope of the  
laboratory's accreditation

M.J. Packard Approved Signatory


JOB NO 13685  
PROJECT Stage 3 The Lakes, State Highway 29, Tauriko  
CLIENT Grasshopper Farms Limited  
MATERIAL Compacted Fill

| DATE     | TEST NO | TEST LOCATION<br>Surveyed by client |          |      | FIELD TESTS   |  |      |      |      |      | FIELD DENSITY GAUGE READINGS |                        |                        |                       |                                 | Oven Dried Water Content |                       |                                 | Solid Density<br>(Assumed)<br>t/m³ | COMMENTS <sup>NE</sup> |
|----------|---------|-------------------------------------|----------|------|---------------|--|------|------|------|------|------------------------------|------------------------|------------------------|-----------------------|---------------------------------|--------------------------|-----------------------|---------------------------------|------------------------------------|------------------------|
|          |         |                                     |          |      | Soil<br>Class | Vane Shear Strengths kPa<br><i>Note: ++'s indicate UTP</i> |      |      |      |      | BS or<br>Depth<br>mm         | Wet<br>Density<br>t/m³ | Dry<br>Density<br>t/m³ | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% | Dry<br>Density<br>t/m³   | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% |                                    |                        |
|          |         | Individual Values kPa               |          |      |               | Average  |      |      |      |      |                              |                        |                        |                       |                                 |                          |                       |                                 |                                    |                        |
| 09.04.08 | 1016    | 800708.3                            | 368047.7 | 9.6  | ML            | 214+   | 214+ | 192  | 214+ | 209+ | 250                          | 1.86                   | 1.45                   | 28.0                  | 1.2                             | 1.47                     | 26.1                  | 2.7                             | 2.50                               |                        |
|          | 1017    | 800729.0                            | 368043.4 | 9.6  | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.75                   | 1.31                   | 33.0                  | 4.0                             | 1.34                     | 30.1                  | 5.8                             | 2.50                               |                        |
|          | 1018    | 800757.4                            | 368060.2 | 10.8 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.88                   | 1.48                   | 27.0                  | 3.0                             | 1.49                     | 26.2                  | 3.6                             | 2.60                               |                        |
|          | 1019    | 800781.4                            | 368051.1 | 10.1 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.87                   | 1.44                   | 30.0                  | 1.6                             | 1.43                     | 30.3                  | 1.5                             | 2.60                               |                        |
|          | 1020    | 798978.7                            | 369081.5 | 53.5 | ML            | 214+   | 214+ | 214+ | 180  | 206+ | 250                          | 1.56                   | 0.94                   | 66.0                  | 2.1                             | 0.95                     | 63.2                  | 3.0                             | 2.60                               |                        |
|          | 1021    | 798988.1                            | 369063.9 | 49.9 | ML            | 162  | 161  | 153  | 182  | 165  | 250                          | 1.57                   | 1.16                   | 35.0                  | 13                              | 1.10                     | 42.4                  | 9.1                             | 2.50                               |                        |
|          | 1022    | 799007.7                            | 369072.1 | 52.2 | ML            | 187  | 176  | 189  | 182  | 184  | 250                          | 1.41                   | 0.82                   | 72.0                  | 9.2                             | 0.57                     | 146.2                 | 0                               | 2.60                               |                        |
|          | 1023    | 799019.5                            | 369060.0 | 49.3 | ML            | 180  | 189  | 159  | 182  | 178  | 250                          | 1.60                   | 1.02                   | 56.5                  | 2.7                             | 0.98                     | 63.1                  | 0.3                             | 2.60                               |                        |
|          | 1024    | 799005.0                            | 369091.9 | 55.1 | ML            | 203  | 189  | 200  | 184  | 194  | 250                          | 1.66                   | 1.16                   | 43.0                  | 3.6                             | 1.23                     | 34.9                  | 7.7                             | 2.50                               |                        |
|          | 1025    | 799018.7                            | 369083.5 | 54.0 | ML            | 134  | 162  | 184  | 214+ | 174+ | 250                          | 1.52                   | 0.91                   | 66.5                  | 3.9                             | 0.80                     | 91.0                  | 0                               | 2.60                               |                        |
|          | 1026    | 799036.6                            | 369092.3 | 54.9 | ML            | 214+   | 214+ | 192  | 201  | 205+ | 250                          | 1.53                   | 0.97                   | 62.0                  | 2.5                             | 0.90                     | 68.9                  | 2.9                             | 2.60                               |                        |
|          | 1027    | 799075.9                            | 369020.1 | 46.0 | ML            | 214+   | 187  | 214+ | 214+ | 207+ | 250                          | 1.70                   | 1.12                   | 51.5                  | 0                               | 0.96                     | 76.6                  | 0                               | 2.60                               |                        |
|          | 1028    | 799050.2                            | 369026.6 | 46.6 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.70                   | 1.21                   | 40.5                  | 4.6                             | 1.02                     | 65.6                  | 0                               | 2.60                               |                        |
|          | 1029    | 799036.1                            | 369045.5 | 49.0 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.66                   | 1.12                   | 48.0                  | 2.9                             | 1.09                     | 51.9                  | 1.3                             | 2.60                               |                        |
|          | 1030    | 799027.4                            | 369032.6 | 47.4 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.77                   | 1.25                   | 41.5                  | 0                               | 1.16                     | 53.1                  | 0                               | 2.60                               |                        |
|          | 1031    | 800653.0                            | 368094.4 | 10.6 | ML            | 153  | 214+ | 162  | 182  | 178+ | 250                          | 1.87                   | 1.39                   | 34.5                  | 0                               | 1.35                     | 38.6                  | 0                               | 2.60                               |                        |
|          | 1032    | 800622.6                            | 368086.9 | 10.4 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.82                   | 1.46                   | 24.0                  | 8.3                             | 1.48                     | 22.7                  | 7.2                             | 2.50                               |                        |
|          | 1033    | 800627.0                            | 368105.1 | 11.3 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.85                   | 1.46                   | 27.0                  | 4.5                             | 1.42                     | 30.5                  | 2.2                             | 2.60                               |                        |
|          | 1034    | 800645.9                            | 368081.6 | 10.4 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.83                   | 1.42                   | 28.5                  | 4.5                             | 1.38                     | 33.0                  | 1.6                             | 2.60                               |                        |
|          | 1035    | 800604.4                            | 368107.9 | 10.6 | ML            | 214+   | 214+ | 214+ | 214+ | 214+ | 250                          | 1.83                   | 1.38                   | 33.0                  | 1.5                             | 1.36                     | 34.5                  | 0.5                             | 2.60                               |                        |

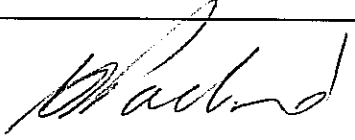


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laboratory's accreditation



M.J. Packard Approved Signatory

JOB NO  
PROJECT  
CLIENT  
MATERIAL

13685  
Stage 3 The Lakes, State Highway 29, Tauriko  
Grasshopper Farms Limited  
Compacted Fill

| DATE     | TEST NO | TEST LOCATION<br>Surveyed by client |              |         | FIELD TESTS   |  |      |      |      |                      | FIELD DENSITY GAUGE READINGS |                        |                       |                                 |                        | Oven Dried Water Content |                                 |         | Solid Density<br>(Assumed)<br>t/m³ | COMMENTS <sup>NE</sup> |
|----------|---------|-------------------------------------|--------------|---------|---------------|--|------|------|------|----------------------|------------------------------|------------------------|-----------------------|---------------------------------|------------------------|--------------------------|---------------------------------|---------|------------------------------------|------------------------|
|          |         | Northing<br>m                       | Easting<br>m | RL<br>m | Soil<br>Class | Vane Shear Strengths kPa<br><i>Note: ++'s indicate UTP</i> |      |      |      | BS or<br>Depth<br>mm | Wet<br>Density<br>t/m³       | Dry<br>Density<br>t/m³ | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% | Dry<br>Density<br>t/m³ | Water<br>Content<br>%    | Air<br>Voids <sup>NE</sup><br>% |         |                                    |                        |
|          |         |                                     |              |         |               | Individual Values kPa                                      |      |      |      |                      |                              |                        |                       |                                 |                        |                          |                                 | Average |                                    |                        |
| 09.04.08 | 1036    | 800585.1                            | 368107.7     | 10.4    | ML            | 140  | 171  | 175  | 148  | 159                  | 250                          | 1.70                   | 1.17                  | 45.5                            | 1.9                    | 1.10                     | 54.4                            | 0       | 2.60                               |                        |
|          | 1037    | 800590.1                            | 368091.1     | 10.4    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.81                   | 1.41                  | 28.5                            | 3.4                    | 1.39                     | 30.0                            | 2.4     | 2.50                               |                        |
|          | 1038    | 800560.4                            | 368100.1     | 10.4    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.75                   | 1.28                  | 37.0                            | 3.5                    | 1.24                     | 40.8                            | 1.4     | 2.60                               |                        |
|          | 1039    | 800548.5                            | 368091.3     | 10.7    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.76                   | 1.34                  | 31.5                            | 4.5                    | 1.34                     | 31.0                            | 4.8     | 2.50                               |                        |
|          | 1040    | 800540.9                            | 368108.9     | 11.6    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.63                   | 1.10                  | 48.0                            | 4.9                    | 1.03                     | 57.4                            | 1.0     | 2.60                               |                        |
|          | 1041    | 800530.1                            | 368085.7     | 11.1    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.80                   | 1.41                  | 27.5                            | 4.8                    | 1.40                     | 28.8                            | 4.0     | 2.50                               |                        |
|          | 1042    | 800512.8                            | 368096.6     | 11.8    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.78                   | 1.38                  | 29.5                            | 4.5                    | 1.38                     | 29.1                            | 4.7     | 2.50                               |                        |
|          | 1043    | 800506.6                            | 368082.1     | 11.6    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.92                   | 1.51                  | 27.5                            | 0.7                    | 1.55                     | 24.3                            | 3.1     | 2.60                               |                        |
|          | 1044    | 800489.8                            | 368075.4     | 11.8    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.85                   | 1.37                  | 35.0                            | 0                      | 1.42                     | 30.5                            | 2.0     | 2.60                               |                        |
|          | 1045    | 800456.6                            | 368052.0     | 11.8    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.71                   | 1.23                  | 40.0                            | 4.0                    | 1.15                     | 49.3                            | 0       | 2.60                               |                        |
|          | 1046    | 800477.0                            | 368063.7     | 11.7    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.70                   | 1.20                  | 42.0                            | 3.4                    | 1.13                     | 51.3                            | 0       | 2.60                               |                        |
|          | 1047    | 800457.2                            | 368070.2     | 12.2    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.63                   | 1.11                  | 47.0                            | 5.0                    | 1.01                     | 61.2                            | 0       | 2.60                               |                        |
|          | 1048    | 800459.4                            | 368087.0     | 12.3    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.67                   | 1.26                  | 33.0                            | 8.1                    | 1.19                     | 40.5                            | 4.2     | 2.50                               |                        |
|          | 1049    | 800437.2                            | 368040.2     | 11.2    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.87                   | 1.42                  | 31.5                            | 0                      | 1.40                     | 33.5                            | 0       | 2.60                               |                        |
|          | 1050    | 800435.3                            | 368057.1     | 11.9    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.73                   | 1.27                  | 36.5                            | 3.0                    | 1.21                     | 42.9                            | 1.5     | 2.60                               |                        |
|          | 1051    | 800425.3                            | 368070.5     | 12.4    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.60                   | 1.15                  | 39.0                            | 9.4                    | 1.12                     | 42.9                            | 7.4     | 2.50                               |                        |
|          | 1052    | 800446.8                            | 368077.1     | 12.5    | ML            | 214+   | 214+ | 214+ | 214+ | 214+                 | 250                          | 1.79                   | 1.29                  | 38.5                            | 0                      | 1.22                     | 46.4                            | 0       | 2.60                               |                        |
|          | 1053    | 800575.8                            | 368126.6     | 11.3    | ML            | 184  | 182  | 168  | 200  | 184                  | 250                          | 1.75                   | 1.35                  | 30.0                            | 5.6                    | 1.33                     | 32.2                            | 6.3     | 2.60                               |                        |
|          | 1054    | 800553.8                            | 368124.4     | 11.3    | ML            | 198  | 214+ | 214+ | 214+ | 210+                 | 250                          | 1.73                   | 1.27                  | 36.5                            | 2.8                    | 1.28                     | 35.5                            | 5.4     | 2.60                               |                        |
|          | 1055    | 800544.9                            | 368154.8     | 13.8    | ML            | 214+   | 192  | 176  | 178  | 190+                 | 250                          | 1.60                   | 1.04                  | 54.5                            | 2.2                    | 0.94                     | 70.7                            | 0       | 2.60                               |                        |

**FIELD DENSITY TEST RESULTS**  
NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001




Tests / comments indicated <sup>NE</sup> are  
outside the scope of the  
laboratory's accreditation

M.J. Packard Approved Signatory


JOB NO 13685  
PROJECT Stage 3 The Lakes, State Highway 29, Tauriko  
CLIENT Grasshopper Farms Limited  
MATERIAL Compacted Fill

| DATE     | TEST<br>NO | TEST LOCATION<br>Surveyed by client |              |         | FIELD TESTS   |                          |      |      |      |         | FIELD DENSITY GAUGE READINGS |                        |                        |                       |                                 | Oven Dried Water Content |                       |                                 | Solid Density<br>(Assumed)<br>t/m³ | COMMENTS <sup>NE</sup> |
|----------|------------|-------------------------------------|--------------|---------|---------------|--------------------------|------|------|------|---------|------------------------------|------------------------|------------------------|-----------------------|---------------------------------|--------------------------|-----------------------|---------------------------------|------------------------------------|------------------------|
|          |            |                                     |              |         | Soil<br>Class | Vane Shear Strengths kPa |      |      |      |         | BS or<br>Depth<br>mm         | Wet<br>Density<br>t/m³ | Dry<br>Density<br>t/m³ | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% | Dry<br>Density<br>t/m³   | Water<br>Content<br>% | Air<br>Voids <sup>NE</sup><br>% |                                    |                        |
|          |            | Note: ++'s indicate UTP             |              |         |               |                          |      |      |      |         |                              |                        |                        |                       |                                 |                          |                       |                                 |                                    |                        |
|          |            | Northing<br>m                       | Easting<br>m | RL<br>m |               | Individual Values kPa    |      |      |      | Average |                              |                        |                        |                       |                                 |                          |                       |                                 |                                    |                        |
| 09.04.08 | 1056       | 800574.6                            | 368150.6     | 12.6    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.69                   | 1.22                   | 38.0                  | 4.9                             | 1.17                     | 43.5                  | 2.0                             | 2.50                               |                        |
|          | 1057       | 800568.4                            | 368165.9     | 12.7    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.73                   | 1.21                   | 43.0                  | 1.4                             | 1.17                     | 47.7                  | 0                               | 2.60                               |                        |
|          | 1058       | 800556.6                            | 368175.8     | 13.2    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.74                   | 1.26                   | 37.5                  | 3.9                             | 1.27                     | 36.4                  | 4.7                             | 2.60                               |                        |
|          | 1059       | 800543.7                            | 368189.9     | 15.0    | ML            | 162                      | 207  | 214+ | 178  | 190+    | 250                          | 1.71                   | 1.19                   | 43.5                  | 2.4                             | 1.16                     | 47.2                  | 0.6                             | 2.60                               |                        |
|          | 1060       | 800563.9                            | 368194.6     | 14.4    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.75                   | 1.23                   | 42.0                  | 0.6                             | 1.23                     | 42.2                  | 0.6                             | 2.60                               |                        |
|          | 1061       | 800541.3                            | 368207.3     | 14.4    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.74                   | 1.22                   | 43.0                  | 0.9                             | 1.18                     | 46.9                  | 0                               | 2.60                               |                        |
|          | 1062       | 800559.0                            | 368219.6     | 14.6    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.79                   | 1.27                   | 41.0                  | 0                               | 1.26                     | 42.2                  | 0                               | 2.60                               |                        |
|          | 1063       | 800577.4                            | 368214.6     | 15.3    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.75                   | 1.32                   | 32.5                  | 6.0                             | 1.27                     | 37.6                  | 3.1                             | 2.60                               |                        |
|          | 1064       | 800572.0                            | 368231.8     | 15.0    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.69                   | 1.12                   | 50.5                  | 0.0                             | 1.13                     | 50.1                  | 0.3                             | 2.60                               |                        |
|          | 1065       | 800567.7                            | 368244.3     | 14.8    | ML            | 171                      | 184  | 162  | 176  | 173     | 250                          | 1.65                   | 1.11                   | 48.5                  | 3.4                             | 1.07                     | 53.8                  | 1.0                             | 2.60                               |                        |
|          | 1066       | 800556.5                            | 368236.9     | 15.1    | ML            | 214+                     | 214+ | 192  | 200  | 205+    | 250                          | 1.76                   | 1.24                   | 42.0                  | 0.5                             | 1.19                     | 47.8                  | 0                               | 2.60                               |                        |
|          | 1067       | 800539.3                            | 368230.7     | 15.2    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.81                   | 1.31                   | 37.5                  | 0.3                             | 1.37                     | 31.9                  | 3.7                             | 2.60                               |                        |
|          | 1068       | 800535.9                            | 368254.7     | 16.1    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.78                   | 1.32                   | 35.0                  | 3.2                             | 1.38                     | 29.2                  | 6.9                             | 2.60                               |                        |
|          | 1069       | 800541.6                            | 368278.7     | 16.9    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.76                   | 1.30                   | 35.0                  | 4.4                             | 1.24                     | 42.0                  | 0.4                             | 2.60                               |                        |
|          | 1070       | 800564.1                            | 368279.1     | 16.5    | ML            | 214+                     | 192  | 200  | 184  | 198+    | 250                          | 1.70                   | 1.13                   | 50.0                  | 0                               | 1.13                     | 50.3                  | 0                               | 2.60                               |                        |
|          | 1071       | 800572.5                            | 368269.5     | 16.4    | ML            | 214+                     | 214+ | 214+ | 214+ | 214+    | 250                          | 1.77                   | 1.28                   | 38.5                  | 1.9                             | 1.32                     | 33.8                  | 4.6                             | 2.60                               |                        |
|          | 1072       | 800565.4                            | 368259.1     | 15.6    | ML            | 192                      | 168  | 182  | 180  | 181     | 250                          | 1.75                   | 1.33                   | 32.0                  | 6.6                             | 1.34                     | 30.4                  | 7.4                             | 2.60                               |                        |
|          | 1073       | 800555.3                            | 368259.6     | 16.8    | ML            | 201                      | 182  | 161  | 192  | 184     | 250                          | 1.74                   | 1.25                   | 39.5                  | 2.7                             | 1.21                     | 44.3                  | 0.1                             | 2.60                               |                        |
|          |            |                                     |              |         |               |                          |      |      |      |         |                              |                        |                        |                       |                                 |                          |                       |                                 |                                    |                        |
|          |            |                                     |              |         |               |                          |      |      |      |         |                              |                        |                        |                       |                                 |                          |                       |                                 |                                    |                        |




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PROJECT  
CLIENT  
MATERIAL

13685  
Stage 3 The Lakes, State Highway 29, Tauriko  
Grasshopper Farms Limited  
Compacted Fill

| DATE     | TEST NO | TEST LOCATION<br>Surveyed by client |              |         | FIELD TESTS |                          |      |      |      |      | FIELD DENSITY GAUGE READINGS |                                 |                                 |                    |                              | Oven Dried Water Content        |                    |                              | Solid Density<br>(Assumed)<br>t/m <sup>3</sup> | COMMENTS <sup>NE</sup> |
|----------|---------|-------------------------------------|--------------|---------|-------------|--------------------------|------|------|------|------|------------------------------|---------------------------------|---------------------------------|--------------------|------------------------------|---------------------------------|--------------------|------------------------------|--|------------------------|
|          |         |                                     |              |         | Soil Class  | Vane Shear Strengths kPa |      |      |      |      | BS or Depth<br>mm            | Wet Density<br>t/m <sup>3</sup> | Dry Density<br>t/m <sup>3</sup> | Water Content<br>% | Air Voids <sup>NE</sup><br>% | Dry Density<br>t/m <sup>3</sup> | Water Content<br>% | Air Voids <sup>NE</sup><br>% |  |                        |
|          |         | Note: ++'s indicate UTP             |              |         |             |                          |      |      |      |      |                              |                                 |                                 |                    |                              |                                 |                    |                              |  |                        |
|          |         | Northing<br>m                       | Easting<br>m | RL<br>m |             | Individual Values kPa    |      |      |      |      |                              |                                 |                                 |                    |                              |                                 |                    |                              |  |                        |
| 10.04.08 | 1074    | 800655.6                            | 368064.1     | 10.3    | ML          | 218+                     | 194  | 181  | 186  | 195+ | 250                          | 1.73                            | 1.28                            | 34.5               | 6.5                          | 1.29                            | 33.5               | 7.0                          | 2.60   |                        |
|          | 1075    | 800643.8                            | 368057.8     | 10.2    | ML          | 218+                     | 218+ | 218+ | 201  | 214+ | 250                          | 1.80                            | 1.34                            | 34.0               | 2.4                          | 1.32                            | 37.0               | 0.7                          | 2.60   |                        |
|          | 1076    | 800626.0                            | 368068.2     | 10.6    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.71                            | 1.32                            | 29.5               | 8.4                          | 1.34                            | 28.0               | 9.2                          | 2.50   |                        |
|          | 1077    | 800604.6                            | 368072.1     | 9.6     | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.73                            | 1.34                            | 29.0               | 7.5                          | 1.31                            | 32.5               | 5.4                          | 2.50   |                        |
|          | 1078    | 800590.5                            | 368078.7     | 10.1    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.76                            | 1.32                            | 33.5               | 3.1                          | 1.36                            | 29.5               | 5.4                          | 2.50   |                        |
|          | 1079    | 800406.8                            | 368082.7     | 12.8    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.70                            | 1.23                            | 38.0               | 6.0                          | 1.18                            | 43.9               | 2.9                          | 2.60   |                        |
|          | 1080    | 800387.8                            | 368079.9     | 13.2    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.72                            | 1.24                            | 39.5               | 3.9                          | 1.29                            | 33.7               | 7.1                          | 2.60   |                        |
|          | 1081    | 800394.6                            | 368064.3     | 12.0    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.69                            | 1.18                            | 43.0               | 3.9                          | 1.15                            | 47.3               | 1.7                          | 2.60   |                        |
|          | 1082    | 800381.5                            | 368057.4     | 12.3    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.77                            | 1.29                            | 37.5               | 2.6                          | 1.23                            | 43.4               | 0                            | 2.60   |                        |
|          | 1083    | 800363.1                            | 368048.6     | 12.0    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.74                            | 1.25                            | 39.5               | 2.6                          | 1.19                            | 45.8               | 0                            | 2.60   |                        |
|          | 1084    | 800362.9                            | 368071.7     | 13.9    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.59                            | 1.15                            | 38.0               | 10                           | 1.06                            | 49.1               | 5.2                          | 2.50   |                        |
|          | 1085    | 800343.3                            | 368055.1     | 13.8    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.66                            | 1.11                            | 50.0               | 2.0                          | 1.10                            | 50.9               | 1.6                          | 2.60   |                        |
|          | 1086    | 800242.3                            | 368124.7     | 15.9    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.76                            | 1.32                            | 33.0               | 5.5                          | 1.27                            | 38.6               | 2.2                          | 2.60   |                        |
|          | 1087    | 800243.1                            | 368147.9     | 16.6    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.81                            | 1.34                            | 34.5               | 1.8                          | 1.35                            | 33.6               | 2.5                          | 2.60   |                        |
|          | 1088    | 800226.4                            | 368176.9     | 17.3    | ML          | 218+                     | 218+ | 218+ | 218+ | 218+ | 250                          | 1.77                            | 1.32                            | 34.0               | 4.1                          | 1.29                            | 37.1               | 2.3                          | 2.60   |                        |
|          | 1089    | 800226.1                            | 368149.2     | 16.2    | ML          | 218+                     | 184  | 186  | 205  | 198+ | 250                          | 1.76                            | 1.31                            | 34.5               | 4.3                          | 1.31                            | 34.3               | 4.5                          | 2.60   |                        |
|          | 1090    | 800209.5                            | 368168.4     | 16.6    | ML          | 218+                     | 167  | 184  | 194  | 191+ | 250                          | 1.76                            | 1.28                            | 37.0               | 3.1                          | 1.29                            | 36.5               | 3.4                          | 2.60   |                        |
|          | 1091    | 800216.8                            | 368188.1     | 17.0    | ML          | 169                      | 161  | 184  | 218+ | 183+ | 250                          | 1.74                            | 1.22                            | 42.0               | 1.3                          | 1.28                            | 35.6               | 4.9                          | 2.60   |                        |
|          | 1092    | 800068.7                            | 368067.8     | 13.7    | ML          | 184                      | 181  | 187  | 201  | 188  | 250                          | 1.60                            | 1.11                            | 44.0               | 8.5                          | 1.07                            | 50.0               | 4.1                          | 2.50   |                        |
|          | 1093    | 800068.4                            | 368090.9     | 13.8    | ML          | 184                      | 181  | 164  | 186  | 179  | 250                          | 1.87                            | 1.35                            | 38.0               | 0                            | 1.45                            | 29.1               | 2.3                          | 2.60   |                        |

Date23.04.08

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Report No 8098 Sheet 1 of 1

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## FIELD DENSITY TEST RESULTS

NZS 4407:1991 Test 4.2.1, NZS 4402:1986 Test 2.1, NZGS 8-2001



Tests / comments indicated <sup>NE</sup> are outside the scope of the laboratory's accreditation

**M.J. Packard Approved Signatory**

**JOB NO**

13685

PROJECT

### Stage 3 The Lakes, State Highway 29, Tauriko

CLIENT

Grasshopper Farms Limited

## MATERIAL

Compacted Fill

[illegible]

# Appendix D

**2012-2013 Earthfill Quality Control Data**

| FILL TEST RESULTS FROM 2012-2013 EARTHWORKS PERIOD (INCLUDING ADDITIONAL FILL AREAS) |            |   |               |                     |                         |               |
|--|------------|---|---------------|---------------------|-------------------------|---------------|
| Summary of earthfill test data   |            |   |               |                     |                         |               |
| Test Number  | Date       | Test RL (m)   | Result        |                     |                         | Pass/Fail     |
|  |            |   | Air Voids (%) | Shear Vane (kPa)    | Scala (blows per 100mm) |               |
| NDM 1  | 24/01/2013 |   | 6.0           | UTP                 | -                       | Pass          |
| NDM 2  |            |   | 7.7           | 250+                | -                       | Pass          |
| NDM 3  |            |   | 8.7           | 160                 | -                       | Pass          |
| NDM 4  |            |   | 11.4          | UTP                 | -                       | Marginal Pass |
| NDM 5  | 8/04/2013  |   | 6.1           | 190                 | -                       | Pass          |
| NDM 6  |            |   | 8.2           | UTP                 | -                       | Pass          |
| NDM 7  |            |   | 7.3           | 223                 | -                       | Pass          |
| HA1  | 8/03/2013  |   |               | UTP                 |                         | Pass          |
| HA2  |            |   |               | UTP                 |                         | Pass          |
| HA3  |            | Borehole encountered natural soils                      |               |                     |                         |               |
| HA4  |            | Borehole located in non-structural fill in reserve area |               |                     |                         |               |
| HA5  |            |   |               | 200+                |                         | Pass          |
| HA6  |            | Borehole located outside peat win-line                  |               |                     |                         |               |
| HA7  |            |   |               | 200+ <sup>(4)</sup> |                         | Pass          |
| HA101  | 13/11/2013 |   |               | 200+                |                         | Pass          |
| HA102  |            |   |               | 180                 |                         | Pass          |
| HA103  |            |   |               | 190 <sup>(4)</sup>  |                         | Pass          |
| HA104  |            |   |               | 190                 |                         | Pass          |
| HA105  |            |   |               | 150                 |                         | Pass          |
| HA106  |            | Borehole encountered natural soils                      |               |                     |                         |               |
| HA180  | 31/01/2014 |   |               | 150 - 200+          |                         | Pass          |
| HA182  | 13/04/2014 |   |               | 157                 |                         | Fail          |
| HA183  |            |   |               | 59                  |                         | Fail          |
| HA184  |            |   |               | 75                  |                         | Fail          |

**Notes**

- 1 Shear strength for NDM tests calculated from average of 3 vane tests at each test location. UTP = unable to penetrate.
- 2 A target Soils Density of 2.65 t/m<sup>3</sup> was used throughout testing.
- 3 UTP = Unable to Penetrate
- 4 Isolated low shear strength readings in sandy soils not reported.



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21 April 2013

Mr M Haden  
Higgins Contractors BOP Ltd  
PO Box 4473  
Mt Maunganui 3149

13/275

Dear Mike

**The Lakes Subdivision Stages 2QRST: Bulk Fill**

Attached are the results of in-situ nuclear density, water content & shear stress tests carried out on the compacted bulk fill materials at The Lakes subdivision – Stages 2QRST, Tauranga.

Regards

Bruce Hudson  
Laboratory Manager



# **EARTHWORKS COMPACTION CONTROL TEST RESULTS**



Project : The Lakes Stages 2QRST  
 Location : The Lakes Subdivision  
 Client : Higgins Contractors BOP Ltd  
 Contractor : Higgins Contractors BOP Ltd  
 Tested by : Greg Cleaver (Opus Laboratory)  
 Date tested : 24 January 2013  
 Nuclear densometer no : 3440-64130  
 Solid density (assumed) : 2.65 t/m<sup>3</sup>  
 Maximum dry density : Unknown t/m<sup>3</sup>  
 Optimum water content : Unknown %  
 Shear vane no : DR2410  
 Shear vane correction : 1.759  
 Material description : Bulk Fill

Project No : 255568.05/0TL  
 Lab Ref No : 13/034  
 Client Order No : 106386

| Nuclear Densometer Test Results |                           |         |         |         |  |  |  |
|---------------------------------|---------------------------|---------|---------|---------|--|--|--|
| Test Number                     | 1                         | 2       | 3       | 4       |  |  |  |
| Northing                        | 5816656                   | 5816611 | 5816676 | 5816740 |  |  |  |
| Easting                         | 1873397                   | 1873386 | 1873502 | 1873527 |  |  |  |
| Estimated Fill Depth            | 0.75 Metres approximately |         |         |         |  |  |  |
| Test Probe Depth (mm)           | 300                       | 300     | 300     | 300     |  |  |  |
| Wet Density (t/m <sup>3</sup> ) | 1.69                      | 1.68    | 1.75    | 1.66    |  |  |  |
| Dry Density (t/m <sup>3</sup> ) | 1.17                      | 1.20    | 1.30    | 1.18    |  |  |  |
| Water Content (%)               | 44.0                      | 40.5    | 34.5    | 40.5    |  |  |  |
| Air Voids (%)*                  | 4.2                       | 6.3     | 6.0     | 7.5     |  |  |  |
| % of MDD                        | --                        | --      | --      | --      |  |  |  |

| Oven Corrected Test Results     |      |      |      |      |  |  |  |
|---------------------------------|------|------|------|------|--|--|--|
| Dry Density (t/m <sup>3</sup> ) | 1.20 | 1.22 | 1.35 | 1.25 |  |  |  |
| Water Content (%)               | 40.6 | 38.0 | 30.1 | 33.3 |  |  |  |
| Air Voids (%)*                  | 6.0  | 7.7  | 8.7  | 11.4 |  |  |  |
| % of MDD                        | --   | --   | --   | --   |  |  |  |

| Shear Vane Test Results |     |     |     |     |  |  |  |
|-------------------------|-----|-----|-----|-----|--|--|--|
| Shear Vane Reading      | UTP | UTP | 84  | UTP |  |  |  |
| Shear Strength (kPa)    | UTP | UTP | 148 | UTP |  |  |  |
| Shear Vane Reading      | UTP | 142 | 84  | UTP |  |  |  |
| Shear Strength (kPa)    | UTP | 250 | 148 | UTP |  |  |  |
| Shear Vane Reading      | UTP | UTP | 106 | UTP |  |  |  |
| Shear Strength (kPa)    | UTP | UTP | 186 | UTP |  |  |  |

| Test Method   | Notes  |
|---|--|
| In-situ Density & Water Content : NZS 4407 : 1991, Test 4.2.1               | The test positions were selected by Higgins Contractors staff & Greg Cleaver of Opus Laboratory and are approximate only.<br>Fill depth supplied by Higgins Contractors staff. |
| Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001 |  |
| Water Content : NZS 4402 : 1986, Test 2.1                                   |  |

GPS coordinate datum = NZTM.

UTP = unable to penetrate.

This report may only be reproduced in full.

Preliminary report ONLY - subject to checking.

Date reported : 30 January 2013

Approved

Designation : Senior Civil Engineering Technician

Date : 30 January 2013

# EARTHWORKS COMPACTION CONTROL TEST RESULTS



Project : The Lakes Subdivision - Stages 2QRST  
 Location : Tauranga  
 Client : Higgins Contractors BOP Ltd  
 Contractor : Higgins Contractors BOP Ltd  
 Tested by : Greg Cleaver (Opus Laboratory)  
 Date tested : 8 April 2013  
 Nuclear densometer no : 3440-64130  
 Solid density (assumed) : 2.65 t/m<sup>3</sup>  
 Maximum dry density : Unknown  
 Optimum water content : Unknown  
 Shear vane no : DR2410  
 Shear vane correction : 1.759  
 Material description : Bulk Fill

Project No : 255568.05/OTL  
 Lab Ref No : 13/275  
 Client Order No : 106386

| Nuclear Densometer Test Results |                           |         |         |  |  |  |  |
|---------------------------------|---------------------------|---------|---------|--|--|--|--|
| Test Number                     | 5                         | 6       | 7       |  |  |  |  |
| Centre of Lot                   | 836                       | 842     | 850     |  |  |  |  |
| Northing                        | 5816750                   | 5816731 | 5816873 |  |  |  |  |
| Easting                         | 1873594                   | 1873604 | 1873432 |  |  |  |  |
| Estimated Fill Depth            | 0.75 metres approximately |         |         |  |  |  |  |
| Test Probe Depth (mm)           | 300                       | 300     | 300     |  |  |  |  |
| Wet Density (t/m <sup>3</sup> ) | 1.78                      | 1.68    | 1.69    |  |  |  |  |
| Dry Density (t/m <sup>3</sup> ) | 1.35                      | 1.21    | 1.24    |  |  |  |  |
| Water Content (%)               | 31.5                      | 39.0    | 36.0    |  |  |  |  |
| Air Voids (%)*                  | 6.4                       | 7.3     | 8.5     |  |  |  |  |
| % of MDD                        | --                        | --      | --      |  |  |  |  |

| Oven Corrected Test Results     |      |      |      |  |  |  |  |
|---------------------------------|------|------|------|--|--|--|--|
| Dry Density (t/m <sup>3</sup> ) | 1.35 | 1.22 | 1.22 |  |  |  |  |
| Water Content (%)               | 32.0 | 37.3 | 38.3 |  |  |  |  |
| Air Voids (%)*                  | 6.1  | 8.2  | 7.3  |  |  |  |  |
| % of MDD                        | --   | --   | --   |  |  |  |  |

| Shear Vane Test Results |     |     |     |  |  |  |  |
|-------------------------|-----|-----|-----|--|--|--|--|
| Shear Vane Reading      | 86  | UTP | 132 |  |  |  |  |
| Shear Strength (kPa)    | 151 | UTP | 232 |  |  |  |  |
| Shear Vane Reading      | 130 | UTP | 126 |  |  |  |  |
| Shear Strength (kPa)    | 229 | UTP | 222 |  |  |  |  |
| Shear Vane Reading      | 122 | UTP | 122 |  |  |  |  |
| Shear Strength (kPa)    | 215 | UTP | 215 |  |  |  |  |

| Test Method   | Notes   |
|---|---|
| Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1                | The test positions were selected by Higgins Contractors staff & are approximate only. |
| Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001 | Fill depth approximate only.  |
| Water Content : NZS 4402 : 1986, Test 2.1                                   | *Excluded from IANZ accreditation.  |

GPS co-ordinate datum = NZTM projection.

UTP = unable to penetrate.

This report may only be reproduced in full.

Date reported : 21 April 2013

IANZ Approved Signatory

Designation : Laboratory Manager

Date : 21 April 2013



Tests indicated as  
 not accredited are  
 outside the scope  
 of the laboratory's  
 accreditation

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Refer to site plan**

Hand Auger No. **HA1**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


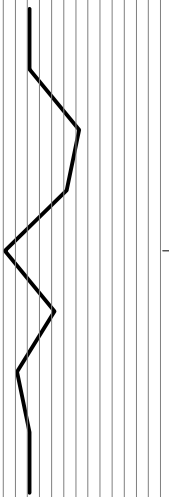
Date started: **8.3.2013**

Date completed: **8.3.2013**

Logged by: **SLC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368147 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800602 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |               |                                 |   |                 | material substance   |                          |  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |
|----------------------|---------------|---------------------------------|---|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|----|----|-----|-----|-----|-----------------------------|-----------------|--|--|--|--|--|--|--|--|
| stratigraphy         | water         | notes<br>samples,<br>tests, etc | RL  | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     |     |     | penetration resistance test |                 |  |  |  |  |  |  |  |  |
|                      |               |                                 |   |                 |  |                          |  |                       |                               | 25                                     | 50 | 75 | 100 | 125 | 150 | 175                         | blows per 100mm |  |  |  |  |  |  |  |  |
| FILL                 | None Observed |                                 |   | 0.5             |  |                          | SILT; light brown.<br>Dry, friable, low cohesion with no plasticity.   | D                     |                               |  |    |    |     |     |     |                             | UTP             |  |  |  |  |  |  |  |  |
|                      |               |                                 | Becoming more cohesive with low plasticity. |                 |  | D                        | UTP  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |
|                      |               |                                 |   |                 |  | UTP                      |  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |
|                      |               |                                 |   | UTP             |  |                          |  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |
|                      |               |                                 |   | 1.0             |  |                          | Clayey SILT; golden brown.<br>Dry to moist with moderate cohesion, minor sand fraction.  | M                     |                               |  |    |    |     |     |     |                             | UTP             |  |  |  |  |  |  |  |  |
|                      |               |                                 |   | 1.5             |  |                          | EOBH, target depth reached<br>Borehole HA1 terminated at 1 metres.   |                       |                               |  |    |    |     |     |     |                             | ×               |  |  |  |  |  |  |  |  |
|                      |               |                                 |   |                 |  |                          |  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |
|                      |               |                                 |   |                 |  |                          |  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |
|                      |               |                                 |   |                 |  |                          |  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |
|                      |               |                                 |   | 2.0             |  |                          |  |                       |                               |  |    |    |     |     |     |                             |                 |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Refer to site plan**

Hand Auger No. **HA2**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **8.3.2013**

Date completed: **8.3.2013**

Logged by: **SLC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368137 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800508 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |               |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water         | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |               |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fill                 | None Observed |                                 |    |                 |  |                          | SILT; light brown.<br>Low plasticity with some cohesion.   | D                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Refer to site plan**

Hand Auger No. **HA3**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


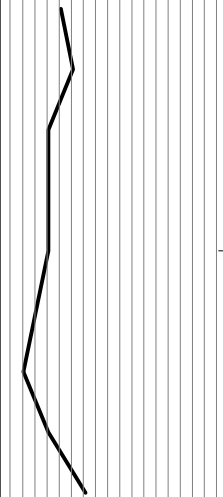

Date started: **8.3.2013**

Date completed: **8.3.2013**

Logged by: **SLC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368201 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800502 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |               |                                 |    |                 | material substance  |                          |   |                       |                               |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|----------------------|---------------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|--|--|-----------------|---|---|---|----|----|----|----|----|--|--|--|--|--|--|--|
| stratigraphy         | water         | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.        | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |               |                                 |    |                 |   |                          |   |                       |                               |  | 25<br>50<br>75<br>100<br>125<br>150<br>175   | blows per 100mm |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |               |                                 |    |                 |   |                          |   |                       |                               |  |  | 2               | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |
| Alluvial Deposits    | None Observed |                                 |    | 0.5             |          |                          | Clayey SILT; orange- brown.<br>Moderate cohesion, low plasticity, friable, dry to moist.  |                       |                               | <div><div>●</div><div>×</div></div>    |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |               |                                 |    |                 | Becoming slightly sandy and dark to orange brown with black and light brown specs, moist. |                          | <div><div>●</div><div>×</div></div>   |                       |                               |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |               |                                 |    |                 | Becoming orange- brown with moderate plasticity and cohesion, moist.                      |                          | <div><div>●</div><div>×</div></div>   |                       |                               |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |               |                                 |    | 1.0             |         |                          | Sandy SILT; light orange- brown.<br>Sand is medium grained with trace gravel <5mm, cohesive but friable in hand, can be remoulded to initial cohesion, moist. |                       |                               | <div><div>●</div><div>×</div></div>    |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |               |                                 |    | 1.5             |   |                          | EOBH, target depth reached.<br>Borehole HA3 terminated at 1 metres.   |                       |                               | UTP                                    |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |               |                                 |    | 2.0             |   |                          |   |                       |                               |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
×× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Refer to site plan**

Hand Auger No. **HA4**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

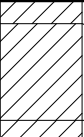
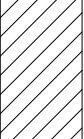
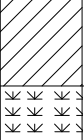
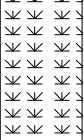
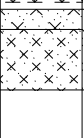
Date started: **13.6.2013**

Date completed: **13.6.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368265 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800576 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |                          |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|----------------------|--------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|-----|--|--|--|--|--|
| stratigraphy         | water                    | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.           | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |     |  |  |  |  |  |
| TS                   |                          |                                 |    |                 |    | OL                       | Sandy SILT, dark brown. Moist, rootlets.   | M                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   | ML                       | Sandy SILT, mottled brown and white orange. Moist, sensitive.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  | >>x |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
| FILL                 |                          |                                 |    | 1               |    | SP                       | Gravelly SAND, fine to coarse, dark grey. Moist, subangular, dense.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   | ML                       | Sandy SILT, mottled brown and white orange. Moist, sensitive.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  | UTP |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    | 2               |  |                          | - Becoming grey, wet below 2.0m.   |                       | St-Vst                        |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
| ORGANIC SEDIMENTS    | Measured during drilling |                                 |    | 3               |  | PT                       | Sandy SILT, dark brown with orange mottles and organic staining. Moist to wet, sensitive, rootlets and wood inclusions. Approximately 50% organic. Organic odor. | M-W                   |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  | x   |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
| MS                   |                          |                                 |    | 4               |  | SM                       | Silty SAND, fine to medium, whitish yellow/orange subangular to surrounded. Saturated, medium dense.   | S                     |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   | ML                       | Sandy SILT, brown orange with black specs. Saturated, sensitive, becomes greasy when reworked.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          | TS = Topsoil<br>MS = Matua Subgroup<br>Borehole HA4 terminated at 4 metres.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |
|                      |                          |                                 |    |                 |   |                          | </   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |     |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Refer to site plan**

Hand Auger No. **HA5**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **13.6.2013**

Date completed: **13.6.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368212 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800594 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|----------------------|-------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.  | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   |                          |   |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
| TS                   |       |                                 |    |                 |   |                          |   |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    | 1               |    | OL                       | Sandy SILT, dark brown. Moist, rootlets.  | M                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   | ML                       | Slightly sandy SILT, orange brown. Moist, sensitive, very stiff to hard.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   | ML                       | Sandy SILT, orange. Moist, sensitive, very stiff to hard. Sand is fine to medium, pumiceous.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   | SM                       | Silty SAND with trace gravel, fine to medium, orange brown, subangular to subrounded, dense, pumiceous.<br><br>- becomes grayish brown below 1.2m.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
| ORGANIC SEDIMENTS    |       |                                 |    | 2               |   | SM                       | Organic fine sandy SILT, white with green mottles. Moist to wet, sensitive, organic inclusions and odor. Approximately 25% organic.<br><br>- becomes dark brown with organic staining, rootlets and wood inclusions below 2.0m. | M-W                   | St-VSt                        |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |       |                                 |    | 3               |  | SM                       | Sandy SILT, orange and brown mottles with black specs. Moist to wet, sensitive, stiff to very stiff.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
| MS                   |       |                                 |    | 4               |   |                          | TS = Topsoil<br>MS = Matua Subgroup<br>Borehole HA5 terminated at 3.8 metres.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |       |                                 |    | 5               |   |                          |   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |       |                                 |    | 6               |   |                          |   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Refer to site plan**

Hand Auger No. **HA6**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


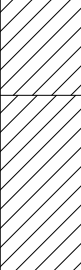


Date started: **13.6.2013**

Date completed: **13.6.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368022 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800357 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|----------------------|-------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>peak) kPa      | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    |                 |   |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |
| TS                   |       |                                 |    |                 |   |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |
| FILL                 |       |                                 |    | 1               |    | OL                       | Sandy SILT, dark brown. Moist, rootlets.   | M                     | VSt-H                         |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    |                 |   | ML                       | Sandy SILT, trace clay, orange. Moist, very stiff to hard, medium liquid limit, sensitive.<br><br>- Becoming more sandy below 0.5m.                    |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    |                 |   | SM                       | Silty SAND, well graded, white with orange streaks, subangular. Moist, subangular, dense, pumiceous.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    | 2               |   | ML                       | SILT with trace sand, medium liquid limit, light brown. Moist sensitive, very stiff to hard.<br><br>- Becoming wet below 2.6m.                         |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    | 3               |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    | 4               |   |                          | - Thin silt layer (approximately 50mm thick), organic odor.  |                       | St-VSt                        |  |                             |   |   |   |    |    |    |    |    |  |  |  |
| OS                   |       |                                 |    |                 |  | ML                       | Fine sandy SILT, white with green mottles. Moist to wet, sensitive, organic inclusions and odor.   | M-W                   |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
| MS                   |       |                                 |    | 5               |  | ML                       | Sandy SILT, orange and brown mottles with black specs. Moist to wet, sensitive, stiff to very stiff.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    |                 |   |                          | TS = Topsoil<br>OS = Organic Sediments<br>MS = Matua Subgroup<br>Borehole HA6 terminated at 5 metres.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |       |                                 |    | 6               |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Refer to site plan**

Hand Auger No. **HA7**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **13.6.2013**

Date completed: **13.6.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368024 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800430 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |   |   |  |
|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>10/1/98 water level<br>on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Lot 802**

Hand Auger No. **HA101**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **13.11.2013**

Date completed: **13.11.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368158.4 m Slope: -90° R.L. Surface: m Vane No: 2244  
Hole diameter: 50 mm Northing: 800674.7 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |            |                                 |    |                 | material substance   |  |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|----------------------|------------|---------------------------------|----|-----------------|--|--|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|-----|--|--|--|-----|-----|-----|-----|--|--|--|--|--|
| stratigraphy         | water      | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol   | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    |                 |  |  |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
| FILL                 | 13/11/2013 |                                 |    | 0.5             |  | ML   | Sandy SILT, no plasticity, friable, dark brown, dry to moist, with rootlets (TOPSOIL).   | D-M                   | H                             |  |                             |  |  |  |  |  | >>> |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | ML              |  | Sandy SILT, no plasticity, orange-brown with white mottles.            | M  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    |                 |  | - 50mm Silty SAND lense, fine to medium grained, white-grey, pumiceous |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    |                 |  | - 100mm Silty SAND lense, fine to medium grained, grey-brown           |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | 2.0             |  | ML   | SILT, non to low plasticity, dark orange-brown; with minor to some clay.   | M-W                   |                               | •  |                             |  |  |  |  |  |     |  |  |  | >>> |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | SP              |  | Silty SAND, fine to medium grained, grey-white, pumiceous.             |  |                       | •                             |  |                             |  |  |  |  |  |     |  |  |  |     | >>> |     |     |  |  |  |  |  |
|                      |            |                                 |    | ML              |  | SILT, no plasticity, light brown, minor fine sand.                     |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     | >>> |     |     |  |  |  |  |  |
|                      |            |                                 |    |                 |  | - increasing sand content  |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     | >>> |     |  |  |  |  |  |
|                      |            |                                 |    |                 |  | - minor black organic staining & wood fragments                        |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     | >>> |  |  |  |  |  |
|                      |            |                                 |    |                 |  | - sample is poorly recovered from 2.7 to 3.0m                          |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | 3.0             |  |  |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | 3.5             |  |  | EOBH @ 3.0m, target depth<br>Borehole HA101 terminated at 3 metres.  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | 4.0             |  |  |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | 4.5             |  |  |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |
|                      |            |                                 |    | 5.0             |  |  |  |                       |                               |  |                             |  |  |  |  |  |     |  |  |  |     |     |     |     |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Lot 835**

Hand Auger No. **HA102**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **13.11.2013**

Date completed: **13.11.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368203.6 m Slope: -90° R.L. Surface: m Vane No: 2244  
Hole diameter: 50 mm Northing: 800555.6 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |                             |                                 |    |                 | material substance   |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--|--|-----------------------|-------------------------------|--|----|----|-----|-----|--|-----|---|---|---|---|----|----|----|----|----|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol   | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     |     | penetration resistance test<br><br>blows per 100mm |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    |                 |  |  |  |                       |                               | 25                                     | 50 | 75 | 100 | 125 | 150  | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |
| FILL                 | Groundwater not encountered |                                 |    | 0.5             |  | ML   | Sandy SILT, no plasticity, friable, dark brown, rootlets, organic odor.  | M                     | H                             |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | ML              |  | Sandy SILT, no plasticity, friable, orange-brown with pink streaks;<br>sand is fine grained. |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 1.0             |  |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 1.5             |  |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 2.0             |  |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 2.5             |  |  | - 50mm of dark brown Sandy SILT (non organic)  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 3.0             |  |  | EOBH@2.5m, due to hole contraction & poor sample recovery.<br>Borehole HA102 terminated at 2.5 metres.   |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 3.5             |  |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 4.0             |  |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 4.5             |  |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 5.0             |  |  |  |                       |                               |  |    |    |     |     |  |     |   |   |   |   |    |    |    |    |    |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Lot 852**

Hand Auger No. **HA103**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **13.11.2013**

Date completed: **13.11.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368071.85 m Slope: -90° R.L. Surface: m Vane No: 2244  
Hole diameter: 50 mm Northing: 800608 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | Groundwater not encountered |                                 |    | 0.5             |  | MH                       | SILT, medium plasticity, mottled brown & orange.   | D-M                   | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |  | SP                       | Silty SAND, fine grained, uniformly graded, grey-black.  |                       | VSt-H                         |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | Sandy SILT, no plasticity, orange-brown.   |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.5             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.5             |  | SP                       | Silty SAND, fine grained, uniform grain size, grey-brown,  |                       | M-W                           |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 3.0             |  | SP                       | SAND, fine to medium grained, grey-brown, pumiceous, with some silt.<br>- becoming difficult to auger  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 3.5             |  |                          | EOBH @ 3.0m, target depth.<br>Note: Hole is essentially dry, with minor seepage<br>Borehole HA103 terminated at 3 metres.                              |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 4.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 4.5             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 5.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Lot 825**

Hand Auger No. **HA104**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **13.11.2013**

Date completed: **13.11.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: m Slope: -90° R.L. Surface: m Vane No: 2244  
Hole diameter: 50 mm Northing: m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |  |                       |                               |  |                                      |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test          |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  | 25<br>75<br>100<br>125<br>150<br>175 | blows per 100mm |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  |                                      | 2               | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    | 0.5             |  | ML                       | Sandy SILT, no plasticity, friable, dark brown, rootlets, organic odor.  | M                     | VSt-H                         |  |                                      |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Lot 853**

Hand Auger No. **HA105**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **13.11.2013**

Date completed: **13.11.2013**

Logged by: **GJN**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368046 m Slope: -90° R.L. Surface: m Vane No: 2244  
Hole diameter: 50 mm Northing: 800467.4 m Bearing: Datum: x/y=EBOPC2000, RL=Moturiki

| drilling information |                             |                                 |   |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|---|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL  | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | Groundwater not encountered |                                 |   | 0.5             |  | ML                       | Sandy SILT, no plasticity, friable, dark brown, rootlets, organic odor.  | M                     | VST-H                         |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             | ML                              | - sample is low to medium plasticity  |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 | SILT, no plasticity, light brown with orange mottles; with minor fine grained sand. |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             | ML                              | - 50mm layer of fine grained sand, uniform grain size, grey, organic odor.          |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             | ML                              | Sandy SILT, no plasticity, light brown-grey; sand is fine grained.                  |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 | SILT, no plasticity, orange-brown.  |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             | 1.5                             |   |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             | 2.0                             |   |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   | 2.5             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   | 3.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   | 3.5             |  |                          | EOBH @ 3.2m, target depth<br>Borehole HA105 terminated at 3.2 metres.  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   | 4.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   | 4.5             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   | 5.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Lot 858**

Hand Auger No. **HA106**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **13.11.2013**

Date completed: **13.11.2013**

Logged by: **GJN**

Checked by: **RBT**

|                            |                      |             |                                   |               |
|----------------------------|----------------------|-------------|-----------------------------------|---------------|
| Dynamic penetrometer type: | Easting: 368053.7 m  | Slope: -90° | R.L. Surface: m                   | Vane No: 2244 |
| Hole diameter: 50 mm       | Northing: 800321.8 m | Bearing:    | Datum: x/y=EBOPC2000, RL=Moturiki |               |

| drilling information |                             |                                 |    |                 | material substance |                          |  |                       |                               |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|--|--|-----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test                |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |                    |                          |  |                       |                               |  | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ALLUVIAL DEPOSITS    | Groundwater not encountered |                                 |    | 0.5             |                    | ML                       | Sandy SILT, no plasticity, friable, dark brown, rootlets.  | D-M                   | VSt-H                         |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
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Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Appendix E

## **Post-Construction Investigation Data**

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 843**

Hand Auger No. **HA107**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **18.12.2013**

Date completed: **18.12.2013**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368200.8 m Slope: -90° R.L. Surface: 16 m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800538.67 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)<br>25 50 75 100 125 150 175 | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 844**

Hand Auger No. **HA108**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **18.12.2013**

Date completed: **18.12.2013**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368197.23 m Slope: -90° R.L. Surface: 16 m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800520.49 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |   |  |  |                               |  |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|----------------------|-------|---------------------------------|----|-----------------|--------------------|---|--|--|-------------------------------|--|--|-----------------|---|---|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol  | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition  | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test                |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |                    |   |  |  |                               |  | 25<br>90<br>75<br>100<br>125<br>150<br>175 | blows per 100mm |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |                    |   |  |  |                               |  | 2  | 4               | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| VOLCANIC ASHES       |       |                                 |    | 15.5            | 0.5                |  | OL   | Sandy SILT, no plasticity, dark brown, sand is fine grained, trace gravel, rootlets (TOPSOIL). | D                             | St-<br>Vst                             |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

|   |   |   |   |  |
|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level<br>on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 836**

Hand Auger No. **HA109**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **18.12.2013**

Date completed: **18.12.2013**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368227.38 m Slope: -90° R.L. Surface: 16.5 m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800550.38 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |      |                 | material substance   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|----------------------|-----------------------------|---------------------------------|------|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |  |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |  |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |
| FILL                 | groundwater not encountered |                                 | 16.0 | 0.5             |  | ML                       | Sandy SILT, no plasticity, dark brown mottled grey; sand is fine grained.<br><br>- becoming pale yellow  | D                     | St-Vst                        |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 | 15.5 | 1.0             |  | ML                       | SILT, low plasticity, pale yellow, minor fine sand.<br><br>- mottled orange-grey   | M                     |                               | ●  | ×                           |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 | 15.0 | 1.5             |  | ML                       | Sandy SILT, no plasticity, brown with white inclusions<br><br>- increasing silt content  |                       |                               | ●  | ×                           |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 | 14.5 | 2.0             |  | SM                       | Silty SAND, fine to medium grained, brown, white inclusion, with trace fine grained gravel.<br><br>- fine to medium gravel inclusions                  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |  |                          | EOBH @ 2.0m, target depth<br>Borehole HA109 terminated at 2 metres.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 840**

Hand Auger No. **HA110**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **18.12.2013**

Date completed: **18.12.2013**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368222.95 m Slope: -90° R.L. Surface: 19 m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800526.9 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>peak) kPa      | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 837**

Hand Auger No. **HA111**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368222.95 m Slope: -90° R.L. Surface: 17 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800526.9 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |      |                 | material substance |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|----------------------|-----------------------------|---------------------------------|------|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
| TS                   |                             |                                 |      |                 |                    |                          |  |                       |                               |  | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
| FILL                 | groundwater not encountered |                                 |      |                 |                    |                          |  |                       |                               |  | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
|                      |                             |                                 | 16.5 | 0.5             |                    | OL                       | Sandy SILT, no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |      |                 |                    | ML                       | SILT, minor fine to coarse sand; orange-brown, mottled brown, low plasticity, trace clay.  | M                     |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 | 16.0 | 1.0             |                    | SM                       | Silty SAND, coarse to medium, brown-grey.  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |      |                 |                    | ML                       | SILT, minor fine to coarse sand; orange-brown, mottled brown, low plasticity, trace clay.  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 | 15.5 | 1.5             |                    | SM                       | Silty SAND, coarse to medium grained, brown-grey.  |                       | VSt                           |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |      |                 |                    | ML                       | Clayey SILT, medium plasticity, orange-brown, trace coarse sand.   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 | 15.0 | 2.0             |                    |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |      |                 |                    |                          | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA111 terminated at 2 metres.  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |

|   |   |   |   |  |
|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level<br>on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 838**

Hand Auger No. **HA112**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368248.16 m Slope: -90° R.L. Surface: 17.5 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800534.76 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| TS                   |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

|   |   |   |   |  |
|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level<br>on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 839**

Hand Auger No. **HA113**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**





Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368246.07 m Slope: -90° R.L. Surface: 19 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800518.66 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |      |                 | material substance  |  |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|----------------------|-----------------------------|---------------------------------|------|-----------------|---|--|--|-----------------------|-------------------------------|--|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log   | classification<br>symbol   | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |   |  |  |                       |                               |  | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |   |  |  |                       |                               |  | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |
| TS                   | groundwater not encountered |                                 | 18.5 | 0.5             |    | OL   | Sandy SILT, no plasticity, dark brown, organic, sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |   | ML   | Clayey SILT, medium plasticity, orange-brown, mottled brown and pale brown, minor coarse sand.   | M                     |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
| ML                   |                             |                                 |      |                 |   | Sandy SILT, no plasticity, grey-brown, sand is fine to coarse grained.                         |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
| ML                   |                             |                                 |      |                 |   | Clayey SILT, medium plasticity, orange-brown, mottled brown and pale brown, minor coarse sand. | VSt  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
| FILL                 | groundwater not encountered |                                 | 18.0 | 1.0             |  | ML   | Clayey SILT, medium plasticity, orange-brown, mottled brown and pale brown, minor coarse sand.   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |   | ML   | SILT, low plasticity, pale orange, trace clay.   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
| ML                   |                             |                                 |      |                 |   | SILT, low plasticity, pale orange, trace clay.   | St   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |   |  |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 | 17.5 | 1.5             |  | ML   | SILT, low plasticity, pale orange, trace clay.   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 | 17.0 | 2.0             |  |  |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |      |                 |   |  | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA113 terminated at 2 metres.  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 841**

Hand Auger No. **HA114**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368243.48 m Slope: -90° R.L. Surface: 22 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800493.21 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |      |                 | material substance |                          |  |   |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|----------------------|-------|---------------------------------|------|-----------------|--------------------|--------------------------|--|---|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition   | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |       |                                 |      |                 |                    |                          |  |   |                               |  | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |
| TS                   |       |                                 |      |                 |                    | OL                       | Sandy SILT, no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D   | H                             |  | 2                           | 4   | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |
| FILL                 |       |                                 | 21.5 | 0.5             |                    | ML                       | Sandy SILT, no plasticity, orange; sand is fine to coarse grained.   | M   |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |       |                                 |      |                 |                    | ML                       | SILT, low plasticity, brown, minor clay, trace medium sand.  |   |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |       |                                 |      |                 |                    |                          |  | 21.0  | 1.0                           |  | ML                          | SILT, low plasticity, pale orange, trace clay, trace fine to medium sand. | F |   |    |    |    |    |    |  |  |  |  |  |
| ALLUVIAL DEPOSITS    |       |                                 |      | 20.5            | 1.5                |                          | ML   | Sandy SILT, no plasticity, pale orange, mottled dark brown; sand is medium grained. | St                            |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |       |                                 |      |                 |                    |                          | ML   | Clayey SILT, medium plasticity, orange-brown, trace medium sand.                    | VSt                           |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |       |                                 |      |                 |                    |                          |  |   |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |       |                                 | 20.0 | 2.0             |                    |                          | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA114 terminated at 2 metres.  |   |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 842**

Hand Auger No. **HA115**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


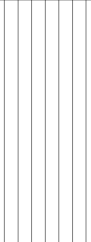
Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368218.9 m Slope: -90° R.L. Surface: 20 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800491.03 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |   |  |   |                               |  |   |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-------|---------------------------------|----|-----------------|--------------------|---|--|---|-------------------------------|--|---|----|-----|-----|-----------------------------|-----|-----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol  | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition   | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |   |    |     |     | penetration resistance test |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |   |  |   |                               | 25                                     | 50  | 75 | 100 | 125 | 150                         | 175 | blows per 100mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   | FILL  |                                 |    | 19.5            | 0.5                |  | OL   | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL). | D                             | H                                      |  |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 845**

Hand Auger No. **HA116**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**






Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368191.28 m Slope: -90° R.L. Surface: 17 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800499.87 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |      |                 | material substance  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|------|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |      |                 |   |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   |                             |                                 |      |                 |    | OL                       | Sandy SILT, no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |                             |                                 |      |                 |    | ML                       | Sandy SILT, no plasticity, orange-brown; sand is fine to medium grained.   | M                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ALLUVIAL DEPOSITS    | groundwater not encountered |                                 | 16.5 | 0.5             |   | SM                       | Silty SAND, fine to medium grained, orange-brown.  |                       | VSt                           |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 | 16.0 | 1.0             |  | ML                       | SILT, low plasticity, orange, trace fine to medium sand.   |                       | St                            |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 | 15.5 | 1.5             |  | ML                       | Sandy SILT, no plasticity, orange-brown; sand is coarse grained.   |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 | 15.0 | 2.0             |   |                          | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA116 terminated at 2 metres.  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 846**

Hand Auger No. **HA117**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368187.37 m Slope: -90° R.L. Surface: 18 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800479.44 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |      |                 | material substance  |                          |  |                       |                               |  |  |  |  |                             |                 |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |  |  |  | penetration resistance test |                 |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| TS                   |                             |                                 |      |                 |   |                          |  |                       |                               |  |  |  |  |                             | blows per 100mm |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |                             |                                 |      |                 |   |                          |  |                       |                               |  |  |  |  |                             | 25              | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| FILL                 | groundwater not encountered |                                 | 17.5 | 0.5             |  | OL                       | Sandy SILT, dark brown, no plasticity, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |  |  |  |                             |                 |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 847**

Hand Auger No. **HA118**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **19.12.2013**

Date completed: **19.12.2013**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368180.97 m Slope: -90° R.L. Surface: 19 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800462.96 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   |       |                                 |    |                 |                    | OL                       | Sandy SILT, no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | VSt                           |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 834**

Hand Auger No. **HA119**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **30.1.2014**

Date completed: **30.1.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368199.9 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800595.4 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|----|----|-----|-----|-----------------------------|-----|-----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     |     | penetration resistance test |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               | 25                                     | 50 | 75 | 100 | 125 | 150                         | 175 | blows per 100mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  |                          | Sandy SILT, friable, brown with occasional pale grey and orange brown specks. Sand is fine to medium. (Borehole completed prior to topsoiling)         | D                     | H                             |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |   |   |  |
|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level<br>— on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Hand Auger No. **HA120**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **30.1.2014**

Principal:



Date completed: **30.1.2014**

Project: ***The Lakes Stage 2qrst***

Logged by: **SC**

Hand Auger location: **Center of Lot 833**

Checked by: ***RBT***

|  |  |  |  |  |  |  |  |  |  |   |                          |  |                       |                               |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|---|--------------------------|--|-----------------------|-------------------------------|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|-------------------------------------|--|--|--|--|--|--|--|--|--|-----------------|--|--|--|--|--|--|--|--|--|
| Dynamic penetrometer type:   |  |  |  |  |  |  |  |  |  | Easting: 368204.9 m   |                          |  |                       |                               |  |  |  |  |  | Slope: -90°  |  |  |  |  |   |  |  |  |  | R.L. Surface: m                     |  |  |  |  |  |  |  |  |  | Vane No: DR4523 |  |  |  |  |  |  |  |  |  |
| Hole diameter: 50 mm   |  |  |  |  |  |  |  |  |  | Northing: 800623.85 m   |                          |  |                       |                               |  |  |  |  |  | Bearing:   |  |  |  |  |   |  |  |  |  | Datum: x/y: WBOPC2000; RL: Moturiki |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
| drilling information   |  |  |  |  |  |  |  |  |  | material substance  |                          |  |                       |                               |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
| stratigraphy<br><br>water<br><br>notes<br>samples,<br>tests, etc<br><br>RL<br><br>depth<br>metres  |  |  |  |  |  |  |  |  |  | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>100<br>125 /peak) kPa<br>25<br>50<br>75<br>150<br>175      |  |  |  |  | penetration resistance test                          |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |   |                          |  |                       |                               |  |  |  |  |  | blows per 100mm<br><br>2 4 6 8 10 12 14 16 18        |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
| FILL<br><br>groundwater not encountered  |  |  |  |  |  |  |  |  |  |                     |                          | Organic SILT, dry and friable, brown (TOPSOIL).  | D                     | H                             | UTP  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |   |                          | Sandy SILT, dry and friable, yellow brown with brown mottles. Sand<br>is fine to medium. Some pale grey specks.  |                       |                               |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |                     |                          | - some grey brown staining.  |                       |                               |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |   |                          | EOBH, target depth.<br>Borehole HA120 terminated at 2 metres.  |                       |                               |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |
| classification symbols and<br>soil description<br>based on Field Description of Soil<br>and Rock, New Zealand<br>Geotechnical Society Inc 2005 |  |  |  |  |  |  |  |  |  | vane shear (kPa)<br>● remoulded<br>× peak<br>>>>× peak greater than 200kPa<br>UTP unable to penetrate |                          |  |                       |                               | water<br>▼ 10/1/98 water level<br>— on date shown<br>▶ water inflow<br>◀ water outflow |  |  |  |  | moisture<br>D dry<br>M moist<br>W wet<br>S saturated |  |  |  |  | consistency/ density index<br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |  |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 832**

Hand Auger No. **HA121**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **30.1.2014**

Date completed: **30.1.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368186.66 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800638.7 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)           | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▽ 10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 803**

Hand Auger No. **HA122**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




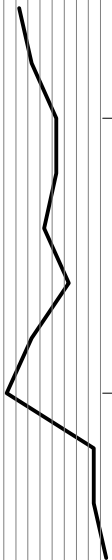
Date started: **30.1.2014**

Date completed: **30.1.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368144.3 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800693.17 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |  |                 | material substance   |                          |  |                       |                               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|--|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |  |                 |  |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |  |                 |  |                          |  |                       |                               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |
| VOLCANIC ASHES       | groundwater not encountered |                                 |  | 0.5             |   | OL                       | Sandy SILT, no plasticity, brown, organic, rootlets.   | D                     | H                             | UTP  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |   | ML              | Sandy SILT, dry and loose, pale brown grey.<br>- becoming pale brown with yellow brown and dark brown (non organic) sandy SILT inclusions. |                          |  |                       |                               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |  | SM              | Silty SAND, fine to medium, pale grey.   |                          |  |                       |                               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |  | 1.0             |  |                          | EOBH, refusal, medium gravels encountered.<br>Continued with Scala Penetration Test from 0.7 to 1.8m.<br>Borehole HA122 terminated at 0.7 metres.      |                       |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |  | 1.5             |  |                          |  |                       |                               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |  | 2.0             |  |                          |  |                       |                               |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 831**

Hand Auger No. **HA123**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **30.1.2014**

Date completed: **30.1.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368152.4 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800648.9 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)<br>25<br>50<br>75<br>100<br>125<br>150<br>175 | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| FILL                 | groundwater not encountered |                                 |    |                 |  |                          | Organic SILT, dry and friable, brown (TOPSOIL).  | D                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 830**

Hand Auger No. **HA124**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **24.1.2014**

Date completed: **24.1.2014**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368155.1 m Slope: -90° R.L. Surface: m Vane No: DR2244  
Hole diameter: 50 mm Northing: 800607.5 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |  | material substance |                          |  |                       |                               |  |                             |    |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|----------------------|-----------------------------|---------------------------------|----|--|--------------------|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|----|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres  | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |  |                    |                          |  |                       |                               |  | blows per 100mm             |    |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |  |                    |                          |  |                       |                               |  |                             | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| FILL                 | groundwater not encountered |                                 |    | 0.5<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><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|                    |                          |  |                       |                               |  |                             |    |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 829**

Hand Auger No. **HA125**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **24.1.2014**

Date completed: **24.1.2014**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368159 m Slope: -90° R.L. Surface: m Vane No: DR2244  
Hole diameter: 50 mm Northing: 800588 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>100<br>125<br>150<br>175<br>(remoulded<br>/peak) kPa | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  | OL                       | Sandy SILT, no plasticity, black, rootlets, organic odor; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 828**

Hand Auger No. **HA126**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **24.1.2014**

Date completed: **24.1.2014**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368158.4 m Slope: -90° R.L. Surface: m Vane No: DR2244  
Hole diameter: 50 mm Northing: 800563.5 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.   | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    |                 |  | ML                       | SILT, low plasticity, brown, mottling orange-brown; minor fine sand.   | D                     | VSt-H                         |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 0.5             |  | ML                       | Sandy SILT, no plasticity, pale yellow-brown, orange staining; sand is fine grained.   |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | SILT, low plasticity, orange-brown, some fine sand.<br><br>- grey silt inclusions @ 0.7m<br><br>- brown, grey & yellow mottling  | D-M                   |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |  | SP                       | SAND, fine grained, grey, black specks,  | M                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | SILT, low plasticity, orange-brown.<br><br>- grey mottles, organic odor @ 1.3m<br><br>- some fine sand, trace medium grained gravel & white mottles<br><br>- grey silt inclusion (non organic) |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       | St                            |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          | EOBH @ 2.0m, target depth<br>Borehole HA126 terminated at 2 metres.  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |   |   |  |
|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level<br>on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 826**

Hand Auger No. **HA127**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **24.1.2014**

Date completed: **24.1.2014**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368152.8 m Slope: -90° R.L. Surface: m Vane No: DR2244  
Hole diameter: 50 mm Northing: 800526.7 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  | SP                       | Silty SAND, fine grained, pale brown, organic odor, rootlets (TOPSOIL)   | D                     |                               |  | >>x                         |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   | ML                       | Sandy SILT, no plasticity, orange-brown, black specks, yellow-brown & orange-brown mottling; sand is fine grained; trace fine to medium gravel.        |                       |                               |  |                             |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  |                             | M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |   |                          | EOBH refusal, medium to coarse gravels encountered (possible old farm track).<br>Borehole HA127 terminated at 0.5 metres.                              |                       |                               |  |                             |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.5             |   |                          |  |                       |                               |  |                             |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |   |                          |  |                       |                               |  |                             |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
x peak  
>>x peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

## Engineering Log - Hand Auger

Hand Auger No. **HA128**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **24.1.2014**

Principal:

Date completed: **24.1.2014**

Project: ***The Lakes Stage 2qrst***

Logged by: **KMJ**

Hand Auger location: **Center of Lot 825**

Checked by: ***RBT***

[illegible]

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 823**

Hand Auger No. **HA129**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368141.5 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800471.2 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |    | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   | ML                       | Sandy SILT; orange-brown mottled brown, no plasticity, sand is fine to coarse grained.   | M                     |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
| ALLUVIAL DEPOSITS    |                             |                                 |    | 1.5             |  | ML                       | Sandy SILT; pale brown streaked orange, no plasticity, sand is fine to coarse grained.   |                       | Vst                           |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          | - becoming pale brown, wet   | W                     |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          | EOBH, target depth<br>Borehole HA129 terminated at 2 metres.   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |

|   |   |   |   |  |
|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level<br>on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 822**

Hand Auger No. **HA130**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368140.5 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800453.4 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
××× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 821**

Hand Auger No. **HA131**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368139.1 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800435.4 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |   |                       |                               |  |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|--|--|-----------------|---|---|----|----|----|----|----|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.                              | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test                |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |   |                       |                               |  | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |   |                       |                               |  | 2  | 4               | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |    | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).   | D                     | H                             |  |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   | ML                       | Sandy SILT; orange-brown mottled brown and white, low plasticity, sand is fine to coarse grained.<br><br>- becoming non plastic.<br><br>- becoming low plasticity.                  | M                     |                               |  |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |
| ALLUVIAL DEPOSITS    |                             |                                 |    | 1.0             |  | ML                       | Sandy SILT; orange-brown with trace black flecks, low plasticity, sand is fine to coarse grained.<br><br>- becoming pale grey-white with trace black flecks.<br><br>- becoming wet. |                       |                               |  |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |   |                       |                               |  |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          | EOBH, target depth<br>Borehole HA131 terminated at 2 metres.  |                       |                               |  |  |                 |   |   |    |    |    |    |    |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
×× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 820**

Hand Auger No. **HA132**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368136.2 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800414.2 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.                           | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |    | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 |   | ML                       | SILT, minor sand; orange-brown mottled brown, low plasticity, sand is fine to coarse grained.<br><br>- becoming sandy SILT.  | M                     |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
| ALLUVIAL DEPOSITS    |                             |                                 |    | 1.5             |  | ML                       | SILT, minor sand; orange-brown with trace black flecks, low plasticity, sand is fine to coarse grained.<br><br>- becoming orange-brown with white flecks and trace black flecks. |                       | Vst                           |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          | EOBH, target depth<br>Borehole HA132 terminated at 2 metres.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 819**

Hand Auger No. **HA133**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368106.8 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800393.3 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |  |                       |                               |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test                |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| FILL                 |       |                                 |    | 0.5             |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |   | ML                       | SILT, minor sand; orange-brown mottled white, no plasticity, sand is fine to coarse grained.   | M                     |                               |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 818**

Hand Auger No. **HA134**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**



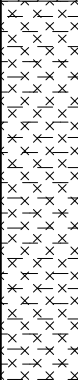

Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368107.3 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800417.1 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|----|----|-----|-----|-----------------------------|-----|-----------------|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     |     | penetration resistance test |     |                 |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               | 25                                     | 50 | 75 | 100 | 125 | 150                         | 175 | blows per 100mm |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    |                 |   | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | VSt-H                         |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 0.5             |   | ML                       | SILT, minor sand; orange mottled white, no plasticity, sand is fine grained.<br><br>- becoming pale brown  | M                     |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |  | ML                       | Clayey SILT, minor sand; pale grey streaked orange, medium plasticity, sand is fine to coarse grained.   |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.5             |  | ML                       | SILT; orange streaked pale brown, low plasticity.  |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          | Borehole HA134 terminated at 2 metres.   |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>X peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 817**

Hand Auger No. **HA135**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368106.8 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800436 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)<br>(peak)<br>25<br>50<br>75<br>100<br>125<br>150<br>175 | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    |                 |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 816**

Hand Auger No. **HA136**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **15.1.2014**




Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368108.9 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800455.1 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |  |   |  |   |  |
|---|--|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 |  | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br> 10/1/98 water level on date shown<br> water inflow<br> water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|--|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 815**

Hand Auger No. **HA137**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368108.75 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800472.6 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance   |                          |  |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     |     | penetration resistance test |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |  |                          |  |                       |                               | 25                                     | 50 | 75 | 100 | 125 | 150                         | 175 | blows per 100mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    | 0.5             |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 814**

Hand Auger No. **HA138**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**





Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368112.5 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800490.9 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |    | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   | ML                       | Sandy SILT, orange-brown mottled white and orange, low plasticity, sand is fine to coarse grained.   | M                     |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 1.0             |   |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 1.5             |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          | EOBH, target depth<br>Borehole HA138 terminated at 2 metres.   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 813**

Hand Auger No. **HA139**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368117.8 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800510 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>100 (remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  | 2 4 6 8 10 12 14 16 18      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    |                 |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 812**

Hand Auger No. **HA140**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**




Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368122.2 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800528.4 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |  |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol   | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.   | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |  |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |  |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |
| FILL                 |                             |                                 |    | 0.5             |    | OL   | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 | ML  | Sandy SILT; brown, low plasticity, sand is fine to coarse grained. | M  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
| ALLUVIAL DEPOSITS    | groundwater not encountered |                                 |    | 1.0             |   | ML   | Sandy SILT; brown, low plasticity, sand is fine to coarse grained.<br><br>- becoming pale orange-brown mottled brown.<br><br>- <100mm layer of silty SAND; pale brown-orange, sand is fie to coarse grained. |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |  |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |  | EOBH, target depth<br>Borehole HA140 terminated at 2 metres.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 811**

Hand Auger No. **HA141**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368124.8 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800545.8 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             | 25<br>50<br>75<br>100<br>125<br>150<br>175 |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | Sandy SILT; orange-brown mottled pale brown, low plasticity, sand is fine to coarse grained.   | M                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.5             |  |                          | - sand content becoming trace medium grained.  | Vst                   |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          | EOBH, target depth<br>Borehole HA141 terminated at 2 metres.   |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 808**

Hand Auger No. **HA142**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

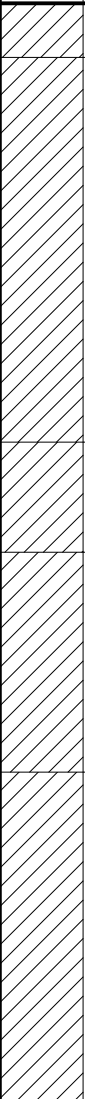
Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368127.2 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800609.4 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |   |                 | material substance   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|---|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL  | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |   |                 |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |
|                      |                             | ML                              | Sandy SILT; orange-brown mottled white and brown, low plasticity, sand is fine to coarse grained. | M               |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   | 0.5             |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |   |                 |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
▽ 10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 806**

Hand Auger No. **HA143**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**



Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368116.6 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800663.3 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.                                       | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)<br>25 50 75 100 125 150 175                         | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | Sandy SILT; orange-brown mottled white, no plasticity, trace fine angular gravel, sand is fine to medium grained.<br><br>- becoming low plasticity, no gravel.                               | M                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | SW                       | SAND; pale brown, trace fine sub-rounded pumiceous gravel, sand is fine to medium grained.   |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | SILT, minor sand; orange-brown, low plasticity, sand is fine grained.  | H                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | Sandy SILT; orange-brown mottled pale brown and orange, low plasticity, sand is fine to coarse grained.<br><br>- becoming pale orange-brown, mottled orange, with trace fine angular gravel. | W                     | St                            |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          | EOBH, target depth<br>Borehole HA143 terminated at 2 metres.   |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 805**

Hand Auger No. **HA144**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368113.8 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800682.7 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)<br>25 50 75 100 125 150 175 | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |  |                          |  |                       |                               | blows per 100mm  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    | 0.5             |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 804**

Hand Auger No. **HA145**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **15.1.2014**

Date completed: **15.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368114.8 m Slope: -90° R.L. Surface: m Vane No: SL588  
Hole diameter: 50 mm Northing: 800703.5 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-------|---------------------------------|----|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)           | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |
| F                    |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    | ML                       | Sandy SILT; orange-brown, no plasticity, trace fine angular gravel, sand is fine to coarse.  | M                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    | 0.5             |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    | SM                       | Silty SAND; brown mottled dark brown, sand is fine to coarse grained.  |                       | D                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    | 1.0             |                    |                          |  |                       | MD-D                          |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          | - becoming wet.  |                       | W                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    | 1.5             |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          | - becoming saturated   |                       | S                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    | 2.0             |                    | ML                       | Sandy SILT; pale brown streaked orange-yellow, no plasticity, sand is fine to coarse grained.<br>AD=Aluvial Deposits                                   | W                     | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          | EOBH, target depth<br>F= FILL<br>Borehole HA145 terminated at 2 metres.  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Hand Auger No. **HA146**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: **The Lakes (2012)**

Date started:

Principal:

Date completed:

Project: **The Lakes Stage 2qrst**

Logged by:

Hand Auger location: **Center of Lot 848**

Checked by:

Dynamic penetrometer type: Easting: 368053 m Slope: -90° R.L. Surface: m Vane No:  
Hole diameter: 50 mm Northing: 800656.65 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance |                          |  |                       |                               |                                  |    |    |     |     | penetration resistance test |     |   |   |   |   |    |    |    |    |    |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|----------------------------------|----|----|-----|-----|-----------------------------|-----|---|---|---|---|----|----|----|----|----|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa) |    |    |     |     | blows per 100mm             |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |                    |                          |  |                       |                               | 25                               | 50 | 75 | 100 | 125 | 150                         | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
|                      | groundwater not encountered |                                 |    | 0.5             |                    |                          | Unable to penetrate surface (gravel obstructions). Continued to<br>Scala.<br>Borehole HA146 terminated at 0.1 metres.                                  |                       |                               |                                  |    |    |     |     |                             |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 1.0             |                    |                          |  |                       |                               |                                  |    |    |     |     |                             |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 1.5             |                    |                          |  |                       |                               |                                  |    |    |     |     |                             |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 2.0             |                    |                          |  |                       |                               |                                  |    |    |     |     |                             |     |   |   |   |   |    |    |    |    |    |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Hand Auger No. **HA147**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: **The Lakes (2012)**

Date started:

Principal:

Date completed:


Project: **The Lakes Stage 2qrst**

Logged by:

Hand Auger location: **Center of Lot 849**

Checked by:

Dynamic penetrometer type: Easting: 368057.1 m Slope: -90° R.L. Surface: m Vane No:  
Hole diameter: 50 mm Northing: 800635.3 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  | ML                       | SILT, minor sand; brown-orange, mottled white and orange, low plasticity, sand is fine to coarse grained.  |                       | H                             |  |                             | x |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |  |                          | - becoming dark grey-brown (organic staining).   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.5             |  |                          | - Refusal at 1.0m (gravel obstruction) continued to scala.<br>Borehole HA147 terminated at 1 metres.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
x peak  
>>x peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 852**

Hand Auger No. **HA148**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

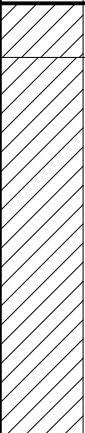
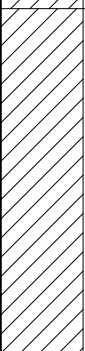
Date started: **31.1.2013**

Date completed: **31.1.2013**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368034.1 m Slope: -90° R.L. Surface: m Vane No:  
Hole diameter: 50 mm Northing: 800428.6 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |  |                 | material substance  |                          |  |   |                               |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|--|-----------------|---|--------------------------|--|---|-------------------------------|--|--|---|---|---|---|----|----|----|----|----|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition   | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test                |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  |                 |   |                          |  |   |                               |  | blows per 100mm                            |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  |                 |   |                          |  |   |                               |  | 25<br>50<br>75<br>100<br>125<br>150<br>175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |  | 0.5             |   | OL                       | Organic SILT, dry and friable, brown with pale brown mottles. Some fine grained sand (TOPSOIL FILL).   | D   | H                             |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             | ML                              | Sandy SILT, dry and friable, brown with pale grey mottles. Sand is fine to coarse grained.<br><br>- becoming pale grey and brown with some pale yellow streaks.<br><br>- becoming brown with various brown mottles.<br><br>- becoming moist. |                 |   |                          |  |   |                               |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  |                 |   |                          | SW   | Silty SAND, fine to coarse, pale grey.  | M                             |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  |                 |   |                          | ML   | Sandy SILT, low plasticity, brown with various brown mottles. Sand is fine to medium grained.<br><br>- becoming low to medium plasticity. |                               |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  | 1.0             |  |                          |  |   |                               |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  | 1.5             |   |                          |  |   |                               |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  | 2.0             |   |                          |  |   |                               |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |
|                      |                             |                                 |  |                 |   |                          | EOBH, target depth.<br>Borehole HA148 terminated at 2 metres.  |   |                               |  |  |   |   |   |   |    |    |    |    |    |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
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water  
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▶ water inflow  
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moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Eastern extent of Lot 854**

Hand Auger No. **HA149**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **31.1.2013**

Date completed: **31.1.2013**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368035.5 m Slope: -90° R.L. Surface: m Vane No:  
Hole diameter: 50 mm Northing: 800390.1 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)<br>25 50 75 100 125 150 175 | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  | OL                       | Organic SILT, dry and friable, brown with pale brown mottles. Some fine grained sand (TOPSOIL FILL).   | D                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 857**

Hand Auger No. **HA150**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**







Date started: **4.2.2014**

Date completed: **4.2.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368054.3 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800345.2 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |
| FILL                 |                             |                                 |    | 0.5             |   | OL                       | Organic SILT, dry and friable, brown with pale brown mottles. Some fine grained sand (TOPSOIL FILL).   | D                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |    |                 |  |                          | Sandy SILT, dry and friable, brown with pale brown mottles and minor black specks. Sand is fine to medium grained.                                     |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
| ALLUVIAL DEPOSITS    | groundwater not encountered |                                 |    | 1.0             |  |                          | - some pale grey silty SAND inclusions <30mm @1.0m, dry to moist.  | D-M                   |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |    | 1.5             |  |                          | - organic SILT mottles from 1.5m-1.6m.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |    |                 |  |                          | - organic dark brown and pale grey SILT inclusions <40mm.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          | - pale grey with brown mottles. Becoming moist, low plasticity. Sand is fine to coarse.  | M                     |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |
|                      |                             |                                 |    |                 |  |                          | EOBH, target depth.<br>Borehole HA150 terminated at 2 metres.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
××× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
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moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 855**

Hand Auger No. **HA151**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **31.1.2013**

Date completed: **31.1.2013**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368022.3 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800347.5 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          |  |                       |                               |  | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  | OL                       | Organic SILT, dry and friable, brown with pale brown mottles. Some fine grained sand (TOPSOIL FILL).   | D                     | H                             |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   | ML                       | Sandy SILT, non plastic, brown with various brown and pale grey mottles. Sand is fine to medium.   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 1.0             |   |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 1.5             |   |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    | 2.0             |   |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |
|                      |                             |                                 |    |                 |   |                          | EOBH, target depth.<br>Borehole HA151 terminated at 2 metres.  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
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consistency/ density index  
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S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 856**

Hand Auger No. **HA152**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**



Date started: **4.2.2014**

Date completed: **4.2.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368025 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800319.7 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | 25<br>30<br>35<br>40<br>45<br>50<br>55<br>60<br>65<br>70<br>75<br>80<br>85<br>90<br>95<br>100<br>105<br>110<br>115<br>120<br>125<br>130<br>135<br>140<br>145<br>150<br>155<br>160<br>165<br>170<br>175 | blows per 100mm |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |  | 2               | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |                             |                                 |    |                 |   | OL                       | Organic SILT, dry and friable, brown with pale brown mottles. Some fine grained sand (TOPSOIL FILL).   | D                     | H                             | UTP                                    |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          | Sandy SILT/Silty SAND, fine to coarse, dry and friable, pale brown with pale grey mottles.   |                       |                               |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ALLUVIAL DEPOSITS    | groundwater not encountered |                                 |    | 0.5             |  |                          | Sandy SILT, dry and friable, brown with some black specks. Sand is fine to medium.   | M                     | VSt-H                         |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  |  |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 859**

Hand Auger No. **HA153**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **4.2.2014**

Date completed: **4.2.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368053.4 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800300.4 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-------|---------------------------------|----|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa     | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 860**

Hand Auger No. **HA154**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **4.2.2014**

Date completed: **4.2.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368025.5 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800299.8 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |  |                       |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  | blows per 100mm                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |   |                          |  |                       |                               |  | 25<br>50<br>75<br>100<br>125<br>150<br>175 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| FILL                 |       |                                 |    | 0.5             |  | OL                       | Organic SILT, dry and friable, brown with pale brown mottles. Some fine grained sand (TOPSOIL FILL).   | D                     | VSt-H                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

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|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 862**

Hand Auger No. **HA155**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**



Date started: **5.2.2014**

Date completed: **5.2.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368052.6 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800274.8 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|---|---|---|----|----|----|----|----|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
| TS                   |                             |                                 |    |                 |  |                          |  |                       |                               |  | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |
| VOLCANIC ASHES       | groundwater not encountered |                                 |    | 0.5             |   | OL                       | Organic SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | M                     | H                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  | ML                       | Sandy SILT; pale yellow-brown, streaked orange, trace black flecks, no plasticity, sand is fine to coarse.   |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |  |                          | - becoming wet   |                       | Vst                           |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.5             |  |                          |  |                       | W                             |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |  |                          |  |                       | St                            |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA155 terminated at 2 metres.  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 861**

Hand Auger No. **HA156**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

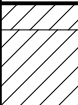
Date started: **5.2.2014**

Date completed: **5.2.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368026.2 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800276 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance  |                          |  |   |                               |                                       |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition   | consistency/<br>density index | vane shear<br>(remoulded<br>peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                      |       |                                 |    |                 |   |                          |  |   |                               |                                       | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| FILL                 |       |                                 |    |                 |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | D <td>H</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> 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classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 863**

Hand Auger No. **HA157**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **5.2.2014**

Date completed: **5.2.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368053 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800253.6 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|----------------------|-------|---------------------------------|----|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
| TS                   |       |                                 |    |                 |                    |                          |  |                       |                               |  | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
| VOLCANIC ASHES       |       |                                 |    |                 |                    |                          |  |                       |                               |  | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |
|                      |       |                                 |    |                 |                    | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | M                     | H                             |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    |                 |                    | ML                       | Sandy SILT; pale grey, trace black flecks, no plasticity, sand is fine to coarse.  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    | 0.5             |                    |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    |                 |                    |                          | - no black flecks  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    | 1.0             |                    |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    |                 |                    |                          | - becoming wet   |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    | 1.5             |                    |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    | 2.0             |                    |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |       |                                 |    |                 |                    |                          | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA157 terminated at 2 metres.  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

Checked by: **RBT**

# Engineering Log - Hand Auger

Hand Auger No. **HA159**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **5.2.2014**

Principal:

Date completed: **5.2.2014**

Project: ***The Lakes Stage 2qrst***

Logged by: **RB**

Hand Auger location: **Center of Lot 866**

Checked by: ***RBT***

|  |  |       |  |                                 |  |   |  |                 |  |                                     |  |   |  |  |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
|--|--|-------|--|---------------------------------|--|---|--|-----------------|--|-------------------------------------|--|---|--|--|--|-----------------------|--|--|--|--|--|-----------------------------|--|---|--|--|--|--|--|
| Dynamic penetrometer type:   |  |       |  |                                 |  | Easting: 368055.3 m   |  | Slope: -90°     |  | R.L. Surface: m                     |  | Vane No: DR4523   |  |  |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
| Hole diameter: 50 mm   |  |       |  |                                 |  | Northing: 800227 m  |  | Bearing:        |  | Datum: x/y: WBOPC2000; RL: Moturiki |  |   |  |  |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
| drilling information   |  |       |  |                                 |  | material substance  |  |                 |  |                                     |  |   |  |  |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
| stratigraphy   |  | water |  | notes<br>samples,<br>tests, etc |  | RL  |  | depth<br>metres |  | graphic log                         |  | classification<br>symbol  |  | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. |  | moisture<br>condition |  | consistency/<br>density index                        |  | vane shear<br>(remoulded<br>/peak) kPa     |  | penetration resistance test |  |   |  |  |  |  |  |
|  |  |       |  |                                 |  |   |  |                 |  |                                     |  |   |  |  |  |                       |  |  |  |  |  | blows per 100mm             |  |   |  |  |  |  |  |
| TS   |  |       |  |                                 |  |   |  |                 |  |                                     |  | OL  |  | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  |  | M                     |  | H  |  | 25<br>50<br>75<br>100<br>125<br>150<br>175 |  | 2 4 6 8 10 12 14 16 18      |  |   |  |  |  |  |  |
|  |  |       |  |                                 |  |   |  | 0.5             |  |                                     |  | ML  |  | Sandy SILT; pale grey-brown, trace black flecks, streaked orange, no plasticity, sand is fine to coarse.   |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
|  |  |       |  |                                 |  |   |  | 1.0             |  |                                     |  |   |  |  |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
|  |  |       |  |                                 |  |   |  | 1.5             |  |                                     |  |   |  | - becoming wet   |  | W                     |  |  |  |  |  |                             |  |   |  |  |  |  |  |
|  |  |       |  |                                 |  |   |  | 2.0             |  |                                     |  |   |  |  |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
|  |  |       |  |                                 |  |   |  |                 |  |                                     |  |   |  | EOBH @ 2.0m, target depth<br>TS = TOPSOIL.<br>Borehole HA159 terminated at 2 metres.   |  |                       |  |  |  |  |  |                             |  |   |  |  |  |  |  |
| classification symbols and soil description<br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 |  |       |  |                                 |  | vane shear (kPa)<br>● remoulded<br>× peak<br>>>>× peak greater than 200kPa<br>UTP unable to penetrate |  |                 |  |                                     |  | water<br>▼ 10/1/98 water level on date shown<br>▶ water inflow<br>◀ water outflow |  |  |  |                       |  | moisture<br>D dry<br>M moist<br>W wet<br>S saturated |  |  |  |                             |  | consistency/ density index<br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |  |  |  |  |  |

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 865**

Hand Auger No. **HA160**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **5.2.2014**

Date completed: **5.2.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368033.5 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800228.5 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-------|---------------------------------|----|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 867**

Hand Auger No. **HA161**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **1.4.2014**

Date completed: **1.4.2014**

Logged by: **SC**

Checked by:

Dynamic penetrometer type: Easting: 368044.8 m Slope: -90° R.L. Surface: m Vane No: DR2244  
Hole diameter: 50 mm Northing: 800206.4 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)           | penetration resistance test |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               | 25<br>50<br>75<br>100<br>125<br>150<br>175 | blows per 100mm             |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | 2                           | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
x peak  
>>x peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 871**

Hand Auger No. **HA165**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **8.1.2014**

Date completed: **8.1.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368098.44 m Slope: -90° R.L. Surface: 15.5 m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800233.8 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   |       |                                 |    |                 |                    |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    |                 |                    |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

## Engineering Log - Hand Auger

Hand Auger No. **HA166**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **8.1.2014**

Principal:

Date completed: **8.1.2014**

Project: ***The Lakes Stage 2qrst***

Logged by: **RB**

Hand Auger location: **Center of Lot 872**

Checked by: ***RBT***

|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|----------------------------|--|-------|--|---------------------------------|--|----|--|-----------------|--|-----------------------|--|--------------------------|--|--|--|--|--|--|--|-------------|--|--|--|-----------------------|--|-------------------------------|--|--|--|-------------------------------------|--|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|--|
| Dynamic penetrometer type: |  |       |  |                                 |  |    |  |                 |  | Easting: 368099.13 m  |  |                          |  |  |  |  |  |  |  | Slope: -90° |  |  |  |                       |  |                               |  |  |  | R.L. Surface: 15.5 m                |  |  |  |  |  |  |  |  |  | Vane No: SL588 |  |  |  |  |  |  |  |  |  |
| Hole diameter: 50 mm       |  |       |  |                                 |  |    |  |                 |  | Northing: 800212.23 m |  |                          |  |  |  |  |  |  |  | Bearing:    |  |  |  |                       |  |                               |  |  |  | Datum: x/y: WBOPC2000; RL: Moturiki |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| drilling information       |  |       |  |                                 |  |    |  |                 |  | material substance    |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| stratigraphy               |  | water |  | notes<br>samples,<br>tests, etc |  | RL |  | depth<br>metres |  | graphic log           |  | classification<br>symbol |  | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. |  |  |  |  |  |             |  |  |  | moisture<br>condition |  | consistency/<br>density index |  | vane shear<br>(remoulded<br>125 /peak) kPa |  | penetration resistance test         |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| TS                         |  |       |  |                                 |  |    |  |                 |  |                       |  | OL                       |  | Sandy SILT, no plasticity, dark brown, organic, sand is fine grained (TOPSOIL).  |  |  |  |  |  |             |  |  |  | D                     |  | H                             |  | 25<br>50<br>75<br>100<br>125<br>150<br>175 |  | blows per 100mm                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  | ML                       |  | Sandy SILT; no plasticity, orange-brown, mottled orange and dark brown; sand is fine to medium grained.  |  |  |  |  |  |             |  |  |  | M                     |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  | </   |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 876**

Hand Auger No. **HA167**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**





Date started: **8.1.2014**

Date completed: **8.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368097.17 m Slope: -90° R.L. Surface: 16 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800140.08 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |   | material substance |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|---|--------------------|--|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres   | graphic log        | classification<br>symbol   | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   |                             |                                 |    |   |                    |  |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 15.5  | 0.5                |   | OL<br>Sandy SILT, no plasticity, dark brown, organic, sand is fine grained (TOPSOIL).  | D                     | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  | ML<br>SILT, low plasticity, orange-brown, mottled brown, white and orange, minor fine to coarse sand.  | M                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 15.0 <th>1.0</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> | 1.0                |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |   |                    |  |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|---|---|---|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level<br>on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|---|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 878**

Hand Auger No. **HA168**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **8.1.2014**

Date completed: **8.1.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368100.76 m Slope: -90° R.L. Surface: 16.5 m Vane No: SL588  
Hole diameter: 50 mm Northing: 800104.27 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |      |                 | material substance   |                          |  |  |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition  | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     |     | penetration resistance test |     |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   |                             |                                 |      |                 |  |                          |  |  |                               | 25                                     | 50 | 75 | 100 | 125 | 150                         | 175 | blows per 100mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 | 16.0 | 0.5             |  | OL                       | Sandy SILT, no plasticity, dark brown, organic, sand is fine grained (TOPSOIL).  | D <td>VSt</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> 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classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Hand Auger No. **HA169**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **8.1.2014**

Principal:

Date completed: **8.1.2014**

Project: ***The Lakes Stage 2qrst***

Logged by: **RB**

Hand Auger location: **Center of Lot 879**

Checked by: ***RBT***

|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|----------------------------|--|-------|--|---------------------------------|--|----|--|-----------------|--|-----------------------|--|--------------------------|--|--|--|--|--|--|--|-------------|--|--|--|-----------------------|--|-------------------------------|--|--|--|-------------------------------------|--|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|--|
| Dynamic penetrometer type: |  |       |  |                                 |  |    |  |                 |  | Easting: 368102.88 m  |  |                          |  |  |  |  |  |  |  | Slope: -90° |  |  |  |                       |  |                               |  |  |  | R.L. Surface: 16.5 m                |  |  |  |  |  |  |  |  |  | Vane No: SL588 |  |  |  |  |  |  |  |  |  |
| Hole diameter: 50 mm       |  |       |  |                                 |  |    |  |                 |  | Northing: 800084.53 m |  |                          |  |  |  |  |  |  |  | Bearing:    |  |  |  |                       |  |                               |  |  |  | Datum: x/y: WBOPC2000; RL: Moturiki |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| drilling information       |  |       |  |                                 |  |    |  |                 |  | material substance    |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| stratigraphy               |  | water |  | notes<br>samples,<br>tests, etc |  | RL |  | depth<br>metres |  | graphic log           |  | classification<br>symbol |  | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. |  |  |  |  |  |             |  |  |  | moisture<br>condition |  | consistency/<br>density index |  | vane shear<br>(remoulded<br>/peak) kPa |  | penetration resistance test         |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| TS                         |  |       |  |                                 |  |    |  |                 |  |                       |  | OL                       |  | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  |  |  |  |  |  |             |  |  |  | D                     |  | H                             |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  | ML                       |  | Sandy SILT, no plasticity, orange-brown, mottled white, orange and brown; sand if fine to medium grained.  |  |  |  |  |  |             |  |  |  | M                     |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|                            |  |       |  |                                 |  |    |  |                 |  |                       |  |                          |  |  |  |  |  |  |  |             |  |  |  |                       |  |                               |  |  |  |                                     |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
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# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 888**

Hand Auger No. **HA170**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **5.2.2014**

Date completed: **5.2.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368125.5 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800128.1 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance |                          |   |                       |                               |  |    |    |     |     |                             |     |                 |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--------------------|--------------------------|---|-----------------------|-------------------------------|--|----|----|-----|-----|-----------------------------|-----|-----------------|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.  | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     |     | penetration resistance test |     |                 |  |  |  |  |  |  |  |
| TS                   |                             |                                 |    |                 |                    |                          |   |                       |                               | 25                                     | 50 | 75 | 100 | 125 | 150                         | 175 | blows per 100mm |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    |                 |                    | OL<br>ML                 | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).<br><br>Sandy SILT; pale grey, no plasticity, sand is fine to coarse.<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><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|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 887**

Hand Auger No. **HA171**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **5.2.2014**

Date completed: **5.2.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368126.5 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800148.1 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance  |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|---|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   |                             |                                 |    |                 |   |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  | OL                       | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).  | M                     | H                             |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   | ML                       | Sandy SILT; pale grey, no plasticity, sand is fine to coarse.  | D                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          | - becoming orange-brown, mottled white and orange  | M                     |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.0             |   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 1.5             |   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    | 2.0             |   |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |   |                          | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA171 terminated at 2 metres.  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 886**

Hand Auger No. **HA172**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **5.2.2014**

Date completed: **5.2.2014**

Logged by: **RB**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368136.4 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800168.7 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance   |                          |   |                       |                               |  |    |    |     |                             |     |     |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--|--------------------------|---|-----------------------|-------------------------------|--|----|----|-----|-----------------------------|-----|-----|-----------------|---|---|---|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information.  | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa |    |    |     | penetration resistance test |     |     |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TS                   |                             |                                 |    |                 |  | OL<br>ML                 | Sandy SILT; no plasticity, dark brown, organic; sand is fine grained (TOPSOIL).<br><br>Sandy SILT; pale grey, no plasticity, sand is fine to coarse.<br><br><br><br><br><br><br><br><br><br>- becoming orange-brown, mottled white and orange | M                     | H                             | 25                                     | 50 | 75 | 100 | 125                         | 150 | 175 | blows per 100mm |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |                             |                                 |    |                 |  |                          |   |                       |                               |  |    |    |     |                             |     |     | 2               | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 | groundwater not encountered |                                 |    | 0.5             |  |                          |   |                       |                               |  |    |    |     |                             |     |     |                 |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Hand Auger No. **HA173**

Sheet 1 of 1  
Project No: **GENZTAUC13086AE**

Client: ***The Lakes (2012)***

Date started: **8.1.2014**

Principal:

Date completed: **8.1.2014**

Project: ***The Lakes Stage 2qrst***

Logged by: **SC**

Hand Auger location: **Center of Lot 884**

Checked by: ***RBT***

|  |  |                             |  |                                 |  |      |  |                 |  |   |  |                          |  |  |  |  |  |  |  |  |  |  |  |                       |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
|--|--|-----------------------------|--|---------------------------------|--|------|--|-----------------|--|---|--|--------------------------|--|--|--|--|--|--|--|--|--|--|--|-----------------------|--|-------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| Dynamic penetrometer type:   |  |                             |  |                                 |  |      |  |                 |  | Easting: 368122.35 m  |  |                          |  |  |  |  |  |  |  | Slope: -90°  |  |  |  |                       |  |                               |  |  |  | R.L. Surface: 16.5 m                                 |  |  |  |  |  |  |  |  |  | Vane No: DR4523   |  |  |  |  |  |  |  |  |  |
| Hole diameter: 50 mm   |  |                             |  |                                 |  |      |  |                 |  | Northing: 800206.59 m   |  |                          |  |  |  |  |  |  |  | Bearing:   |  |  |  |                       |  |                               |  |  |  | Datum: x/y: WBOPC2000; RL: Moturiki                  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
| drilling information   |  |                             |  |                                 |  |      |  |                 |  | material substance  |  |                          |  |  |  |  |  |  |  |  |  |  |  |                       |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
| stratigraphy   |  | water                       |  | notes<br>samples,<br>tests, etc |  | RL   |  | depth<br>metres |  | graphic log   |  | classification<br>symbol |  | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. |  |  |  |  |  |  |  |  |  | moisture<br>condition |  | consistency/<br>density index |  | vane shear<br>(remoulded<br>/peak) kPa |  | penetration resistance test                          |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
| TS   |  |                             |  |                                 |  |      |  |                 |  |   |  | OL                       |  | Sandy SILT, no plasticity, organic,dark brown; sand is fine grained (TOPSOIL).   |  |  |  |  |  |  |  |  |  | D                     |  | H                             |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
| FILL   |  | groundwater not encountered |  |                                 |  |      |  |                 |  |   |  | ML                       |  | Sandy SILT, no plasticity, orange-brown, friable; sand is fine to coarse grained.<br><br>- becoming mottled pale grey                                  |  |  |  |  |  |  |  |  |  | M                     |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
|  |  |                             |  |                                 |  | 16.0 |  | 0.5             |  |   |  |                          |  |  |  |  |  |  |  |  |  |  |  |                       |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
|  |  |                             |  |                                 |  | 15.5 |  | 1.0             |  |   |  |                          |  |  |  |  |  |  |  |  |  |  |  |                       |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
|  |  |                             |  |                                 |  | 15.0 |  | 1.5             |  |   |  |                          |  | - 100mm dark grey lens   |  |  |  |  |  |  |  |  |  |                       |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
|  |  |                             |  |                                 |  | 14.5 |  | 2.0             |  |   |  |                          |  |  |  |  |  |  |  |  |  |  |  |                       |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
|  |  |                             |  |                                 |  |      |  |                 |  |   |  |                          |  |  |  |  |  |  |  | EOBH @ 2.0m, target depth<br>TS = TOPSOIL<br>Borehole HA173 terminated at 2 metres.  |  |  |  |                       |  |                               |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |
| classification symbols and<br>soil description<br>based on Field Description of Soil<br>and Rock, New Zealand<br>Geotechnical Society Inc 2005 |  |                             |  |                                 |  |      |  |                 |  | vane shear (kPa)<br>● remoulded<br>× peak<br>>>>× peak greater than 200kPa<br>UTP unable to penetrate |  |                          |  |  |  |  |  |  |  | water<br>▼ 10/1/98 water level<br>on date shown<br>▶ water inflow<br>◀ water outflow |  |  |  |                       |  |                               |  |  |  | moisture<br>D dry<br>M moist<br>W wet<br>S saturated |  |  |  |  |  |  |  |  |  | consistency/ density index<br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |  |  |  |  |  |  |  |  |  |

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 881**

Hand Auger No. **HA174**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **8.1.2014**

Date completed: **8.1.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368139.57 m Slope: -90° R.L. Surface: 17 m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800225.35 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |                             |                                 |    |                 | material substance |                          |  |                       |                               |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|----------------------|-----------------------------|---------------------------------|----|-----------------|--------------------|--------------------------|--|-----------------------|-------------------------------|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|--|
| stratigraphy         | water                       | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    |                 |                    |                          |  |                       |                               | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    |                 |                    |                          |  |                       |                               | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |
| FILL                 | groundwater not encountered |                                 |    | 16.5            | 0.5                | ML                       | Sandy SILT, no plasticity, orange-brown, friable; sand is fine to coarse grained.  | D                     | H                             |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    |                 |                    |                          | - becoming pale brown, mottled pale grey   |                       |                               |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    |                 |                    |                          | - becoming brown   |                       |                               |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 16.0            | 1.0                |                          | - becoming moist, low plasticity   | M                     |                               |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 15.5            | 1.5                |                          | - becoming grey, moist to wet, sand becoming fine  |                       |                               |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    | 15.0            | 2.0                |                          |  |                       |                               |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |
|                      |                             |                                 |    |                 |                    |                          | EOBH @ 2.0m, target depth<br>Borehole HA174 terminated at 2 metres.  |                       |                               |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **North west corner of Lot 834**

Hand Auger No. **HA180**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

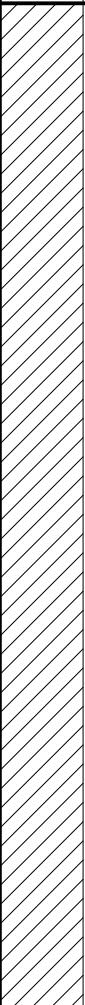
Date started: **31.1.2014**

Date completed: **31.1.2014**

Logged by: **SC**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368221.6 m Slope: -90° R.L. Surface: m Vane No: DR4523  
Hole diameter: 50 mm Northing: 800604.2 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                   | material substance   |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|-------|---------------------------------|----|-------------------|--|--------------------------|--|-----------------------|-------------------------------|--|-----------------------------|----|----|-----|-----|-----|-----|---|---|---|---|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres   | graphic log  | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | penetration resistance test |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  | blows per 100mm             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  | 25                          | 50 | 75 | 100 | 125 | 150 | 175 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FILL                 |       |                                 |    | 0.5               |  | ML                       | Sandy SILT, dry and friable, brow with various brown mottles and specks. Sand is fine to coarse. Minor fine to medium road gravels throughout.         | D                     | H                             |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    | - becoming moist. |  |                          | M  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | VSt-H |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                   |  |                          |  |                       |                               |  |                             |    |    |     |     |     |     |   |   |   |   |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|   |   |  |   |  |
|---|---|--|---|--|
| <b>classification symbols and soil description</b><br>based on Field Description of Soil and Rock, New Zealand<br>Geotechnical Society Inc 2005 | <b>vane shear (kPa)</b><br>● remoulded<br>× peak<br>>>× peak greater than 200kPa<br>UTP unable to penetrate | <b>water</b><br>▽ 10/1/98 water level on date shown<br>► water inflow<br>◄ water outflow | <b>moisture</b><br>D dry<br>M moist<br>W wet<br>S saturated | <b>consistency/ density index</b><br>VS very soft<br>S soft<br>F firm<br>St stiff<br>VSt very stiff<br>H hard<br>VL very loose<br>L loose<br>MD medium dense<br>D dense<br>VD very dense |
|---|---|--|---|--|

# Engineering Log - Hand Auger

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Hand Auger location: **Center of Lot 809**

Hand Auger No. **HA181**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **28.1.2014**

Date completed: **28.1.2014**

Logged by: **KMJ**

Checked by: **RBT**

Dynamic penetrometer type: Easting: 368128.2 m Slope: -90° R.L. Surface: m Vane No: DR2244  
Hole diameter: 50 mm Northing: 800590.78 m Bearing: Datum: x/y: WBOPC2000; RL: Moturiki

| drilling information |       |                                 |    |                 | material substance |                          |  |                       |                               |  |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| stratigraphy         | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log        | classification<br>symbol | material<br><br>Soil type; colour, structure. Grading; bedding;<br>plasticity, sensitivity. Secondary and minor<br>components, additional information. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>kPa)           | penetration resistance test |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                      |       |                                 |    |                 |                    |                          |  |                       |                               |  | blows per 100mm             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| TOPSOIL              |       |                                 |    |                 |                    | SM                       | Silty SAND, fine grained, black, rootlets, organic odor (TOPSOIL).   | D                     | VST-H                         | 25<br>50<br>75<br>100<br>125<br>150<br>175 |                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

classification symbols and  
soil description  
based on Field Description of Soil  
and Rock, New Zealand  
Geotechnical Society Inc 2005

vane shear (kPa)  
● remoulded  
x peak  
>>x peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
▶ water inflow  
◀ water outflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Boundary of Lots 873 & 874**

Trial Pit No. **TP101**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**


Date started: **27.11.2013**

Date completed: **27.11.2013**

Logged by: **KMJ**

Checked by: **RBT**

|  |                  |                       |                                   |
|--|------------------|-----------------------|-----------------------------------|
| Equipment type:                        | Pit Orientation: | Easting: 368093.26 m  | R.L. Surface: 16                  |
| Excavation dimensions: 4m long 1m wide | Vane No: DR4523  | Northing: 800185.07 m | Datum: x/y=EBOPC2000, RL=Moturiki |

| excavation information |       |                                 |    |                 | material substance  |                          |   |                       |                               |  |  |
|------------------------|-------|---------------------------------|----|-----------------|---|--------------------------|---|-----------------------|-------------------------------|--|--|
| stratigraphy           | water | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log   | classification<br>symbol | Material Description<br>Soil name; plasticity or grading, colour, secondary<br>components. Moisture, sensitivity, strength. Structure,<br>bedding, cementation, defects. Origin, additional observations.<br>Rock name, grain size & type, colour, fabric, inclusions &<br>minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa   | structure and<br>additional observations |
| FILL                   |       |                                 | 15 | 1               |  | OL                       | SILT, no plasticity, black, rootlets, organic odor (TOPSOIL).   | M                     | Vst                           | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><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|  |

Sketch

classification symbols and soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level  
on date shown  
waterinflow  
wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Boundary of Lots 874 & 875**

Trial Pit No. **TP102**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **27.11.2013**

Date completed: **27.11.2013**

Logged by: **KMJ**

Checked by: **RBT**

|  |                  |                       |                                   |
|--|------------------|-----------------------|-----------------------------------|
| Equipment type:                        | Pit Orientation: | Easting: 368092.67 m  | R.L. Surface: 16                  |
| Excavation dimensions: 4m long 1m wide | Vane No: DR4523  | Northing: 800166.76 m | Datum: x/y=EBOPC2000, RL=Moturiki |

| excavation information |               |                           |    |              | material substance |                       |   |                    |                            |
|------------------------|---------------|---------------------------|----|--------------|--------------------|-----------------------|---|--------------------|----------------------------|
| stratigraphy           | water         | notes samples, tests, etc | RL | depth metres | graphic log        | classification symbol | Material Description<br>Soil name: plasticity or grading, colour, secondary components. Moisture, sensitivity, strength. Structure, bedding, cementation, defects. Origin, additional observations. Rock name, grain size & type, colour, fabric, inclusions & minor components. Weathering, moisture, strength, defects. | moisture condition | consistency/ density index |
| FILL                   | None Observed |                           | 15 | 1            |                    | OL                    | SILT, no plasticity, black, rootlets, organic odor (TOPSOIL).   | M                  | St                         |
|                        |               |                           | 14 | 2            |                    | ML                    | SILT, low plasticity, brown, with white & black specks, trace fine sand.<br><br>- white pumiceous silt pockets<br>- becoming orange-brown<br>- occasional pockets/layers of organic silts with organic odor<br>- increasing plasticity  |                    |                            |
|                        |               |                           | 13 | 3            |                    | ML                    | SILT, medium plasticity, interbedded brown, grey & light brown.   |                    |                            |
|                        |               |                           | 12 | 4            |                    | SP                    | - tree trunks & rootlets<br>Silty SAND, fine grained, grey.   |                    |                            |
| ALLUVIAL DEPOSITS      |               |                           | 11 | 5            |                    | ML                    | Clayey SILT/Clayey SAND, medium plasticity, blue-grey, sensitive, organic odor, sand is fine grained.   |                    |                            |
|                        |               |                           | 10 | 6            |                    |                       | EOBH @ 4.2m, target depth.<br>Test pit TP102 terminated at 4.2 metres.  |                    |                            |

Sketch

classification symbols and soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
>>× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level on date shown  
waterinflow  
wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Boundary of Lots 874 & 885**

Trial Pit No. **TP103**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **27.11.2013**

Date completed: **27.11.2013**

Logged by: **KMJ**

Checked by: **RBT**

|  |                  |                       |                                   |
|--|------------------|-----------------------|-----------------------------------|
| Equipment type:                        | Pit Orientation: | Easting: 368113.82 m  | R.L. Surface: 16.5                |
| Excavation dimensions: 4m long 1m wide | Vane No: DR4523  | Northing: 800175.79 m | Datum: x/y=EBOPC2000, RL=Moturiki |

| excavation information |               |                                 |  |                 | material substance  |  |   |                       |                               |  |  |
|------------------------|---------------|---------------------------------|--|-----------------|---|--|---|-----------------------|-------------------------------|--|--|
| stratigraphy           | water         | notes<br>samples,<br>tests, etc | RL   | depth<br>metres | graphic log   | classification<br>symbol   | Material Description<br>Soil name; plasticity or grading, colour, secondary<br>components. Moisture, sensitivity, strength. Structure,<br>bedding, cementation, defects. Origin, additional observations.<br>Rock name, grain size & type, colour, fabric, inclusions &<br>minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remoulded<br>/peak) kPa | structure and<br>additional observations |
| FILL                   | None Observed |                                 | 16   | 1               |   | OL   | SILT, no plasticity, black, rootlets, organic odor (TOPSOIL).   | M                     | St-<br>Vst                    | 25                                     |  |
|                        |               | ML                              | Sandy SILT, low plasticity, brown, with white specks, with fine gravel & fine to medium grained sand.<br>- silt pockets, white, with black specks.<br>- becoming orange-brown with black specks<br>- grey inclusion<br>- grey silt lenses & occasional organic pockets | 50              |   |  |   |                       |                               |  |  |
|                        |               |                                 |  | 100             |   |  |   |                       |                               |  |  |
|                        |               | 15                              | 2  | ML              | - decreasing sand content<br>SILT, low plasticity, orange-brown, white inclusion & black specks.<br>- becoming pale orange-brown<br>- tree trunks | 125  |   |                       |                               |  |  |
| AD                     |               |                                 | 14   |                 |   | ML   | Sandy SILT, low plasticity, grey, trace clay & fine sand.<br>- abundant tree trunks from 2.9 to 3.5m  |                       |                               | 150                                    |  |
|                        |               | 13                              | 3  | ML              |   | Clayey SILT, medium plasticity, blue-grey, sensitive, organic odor.<br>EOBH @ 3.5m, target depth<br>AD = ALLUVIAL DEPOSITS<br>Test pit TP103 terminated at 3.5 metres. |   |                       | 175                           |  |  |
|                        |               |                                 | 12   | 4               |   |  |   |                       |                               |  |  |
|                        |               |                                 | 11   | 5               |   |  |   |                       |                               |  |  |
|                        |               |                                 |  | 6               |   |  |   |                       |                               |  |  |

Sketch

classification symbols and soil description  
based on New Zealand Geotechnical Society Inc 2005

notes, samples, tests  
U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

vane shear (kPa)  
● remoulded  
× peak  
××× peak greater than 200kPa  
UTP unable to penetrate

water  
10/1/98 water level on date shown  
waterinflow  
wateroutflow

moisture  
D dry  
M moist  
W wet  
S saturated

consistency/ density index  
VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

# Engineering Log - Trial Pit

Client: **The Lakes (2012)**

Principal:

Project: **The Lakes Stage 2qrst**

Trial pit location: **Boundary of Lots878 & 889**

Trial Pit No. **TP104**

Sheet 1 of 1

Project No: **GENZTAUC13086AE**

Date started: **27.11.2013**

Date completed: **27.11.2013**

Logged by: **KMJ**

Checked by: **RBT**

|  |                  |                       |                                   |
|--|------------------|-----------------------|-----------------------------------|
| Equipment type:                        | Pit Orientation: | Easting: 368114.25 m  | R.L. Surface: 16.5                |
| Excavation dimensions: 4m long 1m wide | Vane No: DR4523  | Northing: 800111.63 m | Datum: x/y=EBOPC2000, RL=Moturiki |

| excavation information |               |                                 |    |                 | material substance   |                          |   |                       |                               |   |  |
|------------------------|---------------|---------------------------------|----|-----------------|--|--------------------------|---|-----------------------|-------------------------------|---|--|
| stratigraphy           | water         | notes<br>samples,<br>tests, etc | RL | depth<br>metres | graphic log  | classification<br>symbol | Material Description<br><br>Soil name; plasticity or grading, colour, secondary<br>components. Moisture, sensitivity, strength. Structure,<br>bedding, cementation, defects. Origin, additional observations.<br>Rock name, grain size & type, colour, fabric, inclusions &<br>minor components. Weathering, moisture, strength, defects. | moisture<br>condition | consistency/<br>density index | vane shear<br>(remouldled<br>/peak) kPa | structure and<br>additional observations |
| FILL                   | None Observed |                                 | 16 | 1               | XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>XXXXXX<br>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|                          |   |                       |                               |   |  |

Sketch

classification symbols and soil description  
based on New Zealand Geotechnical Society Inc 2005

## notes, samples, tests

U<sub>50</sub> undisturbed sample 50mm diameter  
U<sub>63</sub> undisturbed sample 63mm diameter  
D disturbed sample  
Bs bulk sample  
E environmental sample  
R refusal

## vane shear (kPa)

● remoulded  
× peak  
>>> peak greater than 200kPa  
UTP unable to penetrate

## water

10/1/98 water level on date shown  
waterinflow  
wateroutflow

## moisture

D dry  
M moist  
W wet  
S saturated

## consistency/ density index

VS very soft VL very loose  
S soft L loose  
F firm MD medium dense  
St stiff D dense  
VSt very stiff VD very dense  
H hard

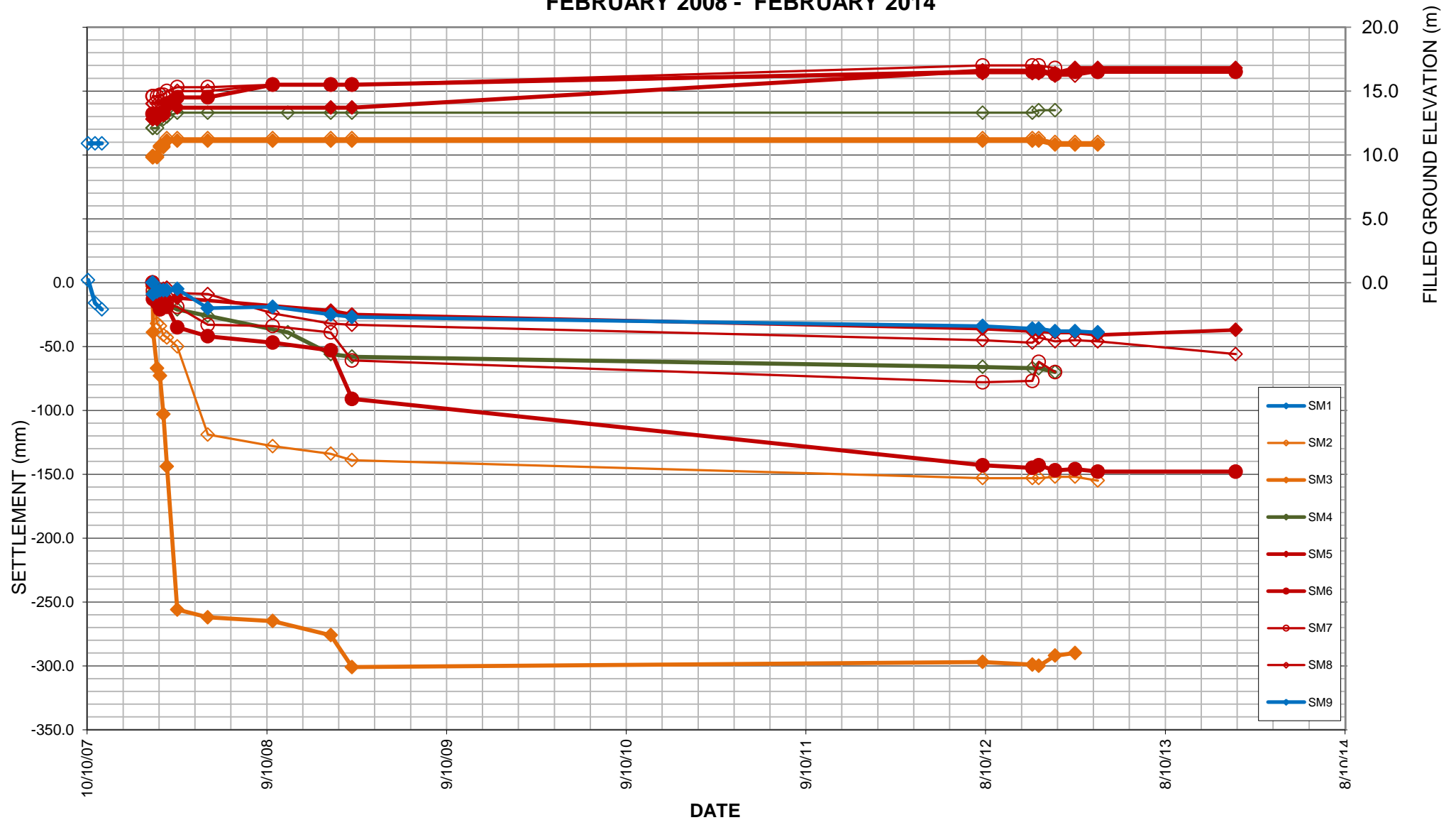
# Appendix F

## **Static Settlement Analyses**

**Table F1: 2008-2009 Settlement Monitoring Results**

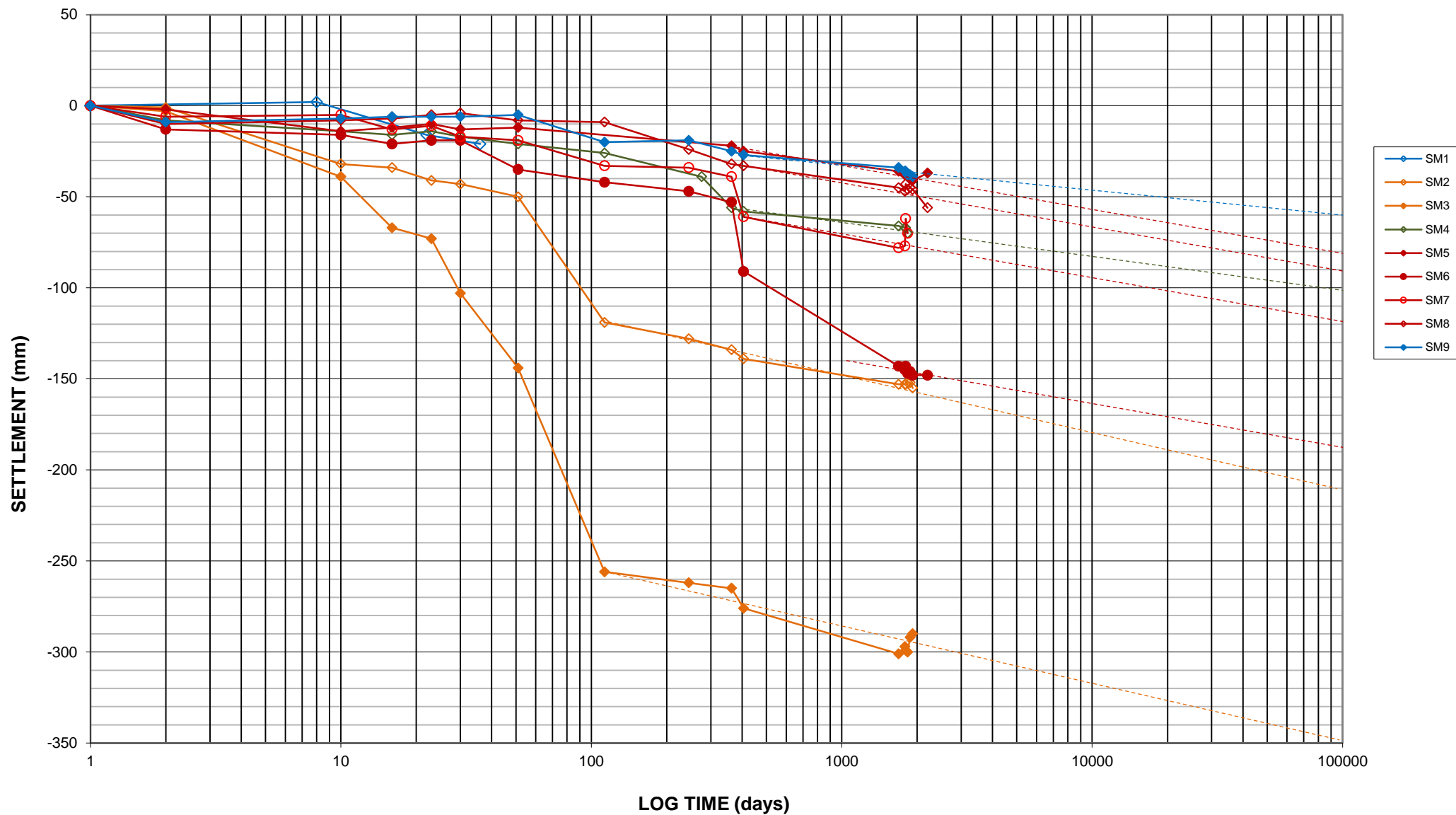
| Marker | Approximate<br>Fill Height<br>(m) | Interpreted<br>Consolidation<br>Settlement (mm) | Interpreted<br>Creep<br>Settlement to<br>Date (mm) | Interpreted<br>Creep<br>Settlement<br>Over Next 50<br>years (mm) |
|--------|-----------------------------------|---|--|--|
| SM1    | 2                                 | Marker damaged and replaced with SM9            |  |  |
| SM2    | 6                                 | 120   | 35   | 30   |
| SM3    | 6                                 | 255   | 40   | 30   |
| SM4    | 4.5                               | 55  | 15   | 20   |
| SM5    | 4.5                               | 20  | 20   | 20   |
| SM6    | 3.5                               | 145   | 10   | 10   |
| SM7    | 3                                 | 60  | 25   | 20   |
| SM8    | 3                                 | 40  | 10   | 20   |
| SM9    | 2.5                               | 20  | 15   | 20   |

SETTLEMENT & FILLED GROUND ELEVATION VS DATE  
FEBRUARY 2008 - FEBRUARY 2014

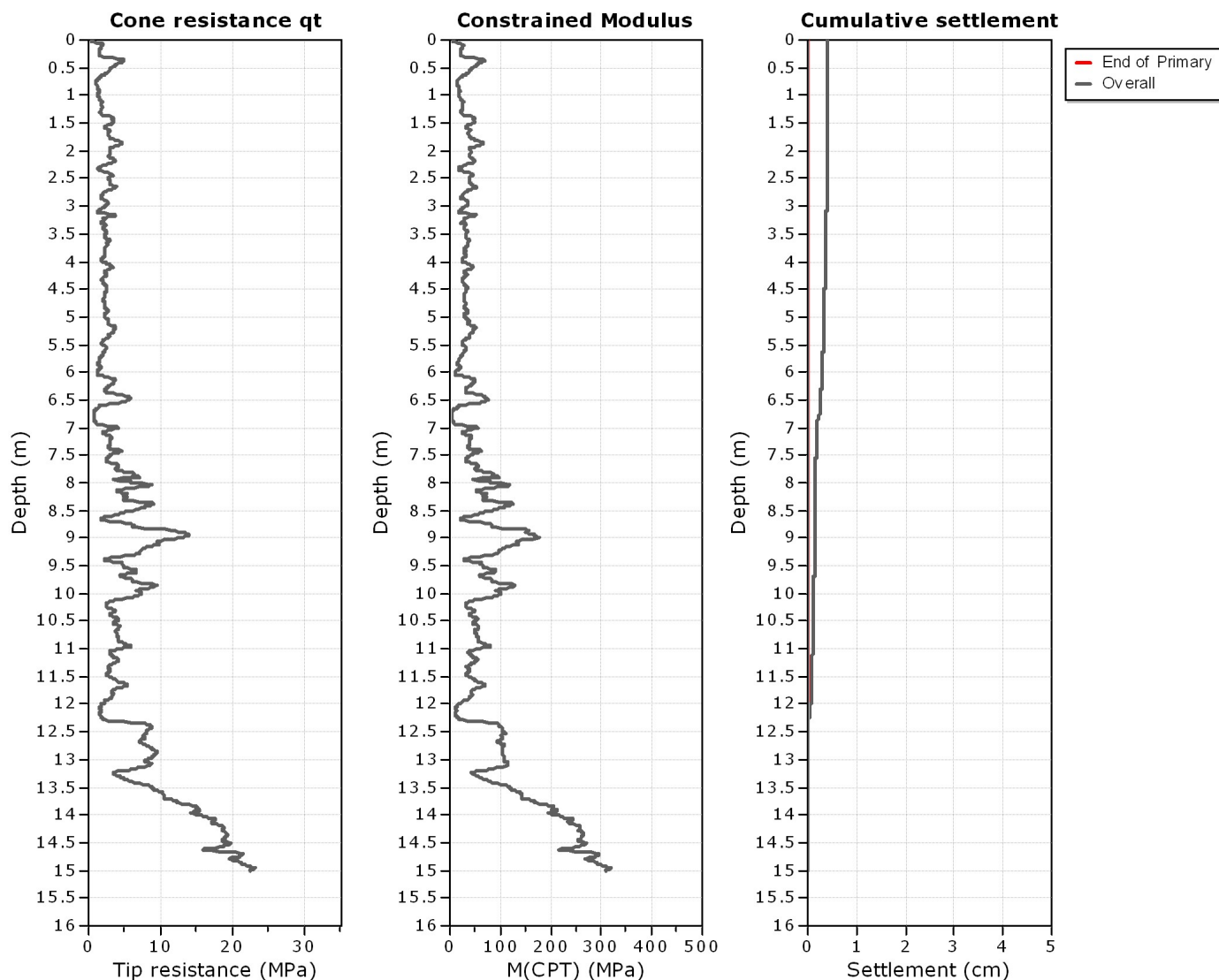


THE LAKES (2012) LTD  
THE LAKES STAGE 2 QRST, TAURANGA  
GEOTECHNICAL COMPLETION REPORT  
**SETTLEMENT VS LOG TIME**  
**FEBRUARY 2008 - FEBRUARY 2014**

GENZTAUC13086AE  
SETTLEMENT MONITORING DATA



**Settlements calculation according to theory of elasticity\***



**Calculation properties**

Footing type: Rectangular

Footing width: 200.00 (m)

L/B: 10.0

Footing pressure: 0.00 (kPa)

Embedment depth: 0.00 (m)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: Yes

Time period for primary consolidation: 1 months

Time period for second. settlements: 12 months

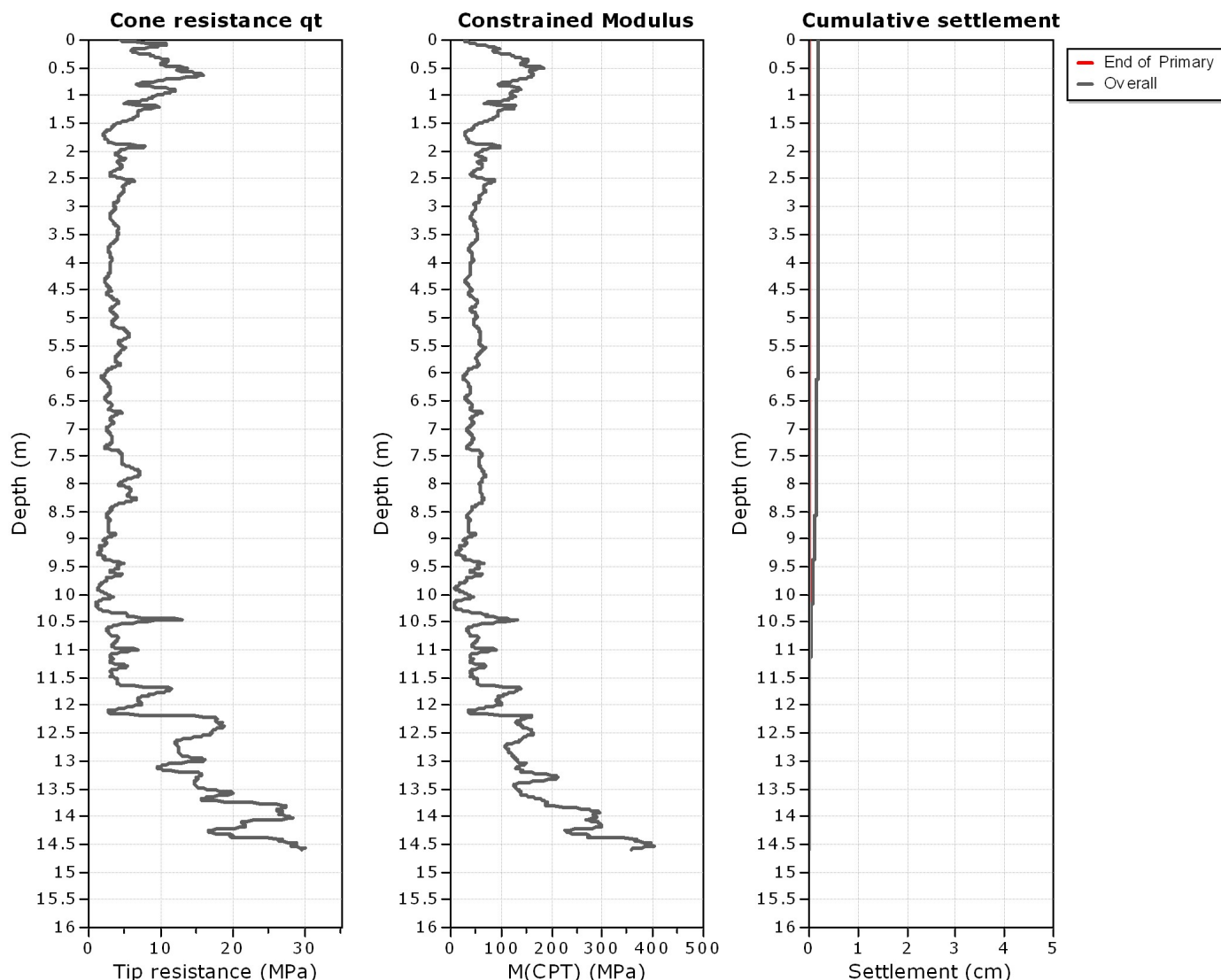
\* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

**Settlements calculation according to theory of elasticity\***



**Caclulation properties**

Footing type: Rectangular

Footing width: 200.00 (m)

L/B: 10.0

Footing pressure: 0.00 (kPa)

Embedment depth: 0.00 (m)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: Yes

Time period for primary consolidation: 1 months

Time period for second. settlements: 12 months

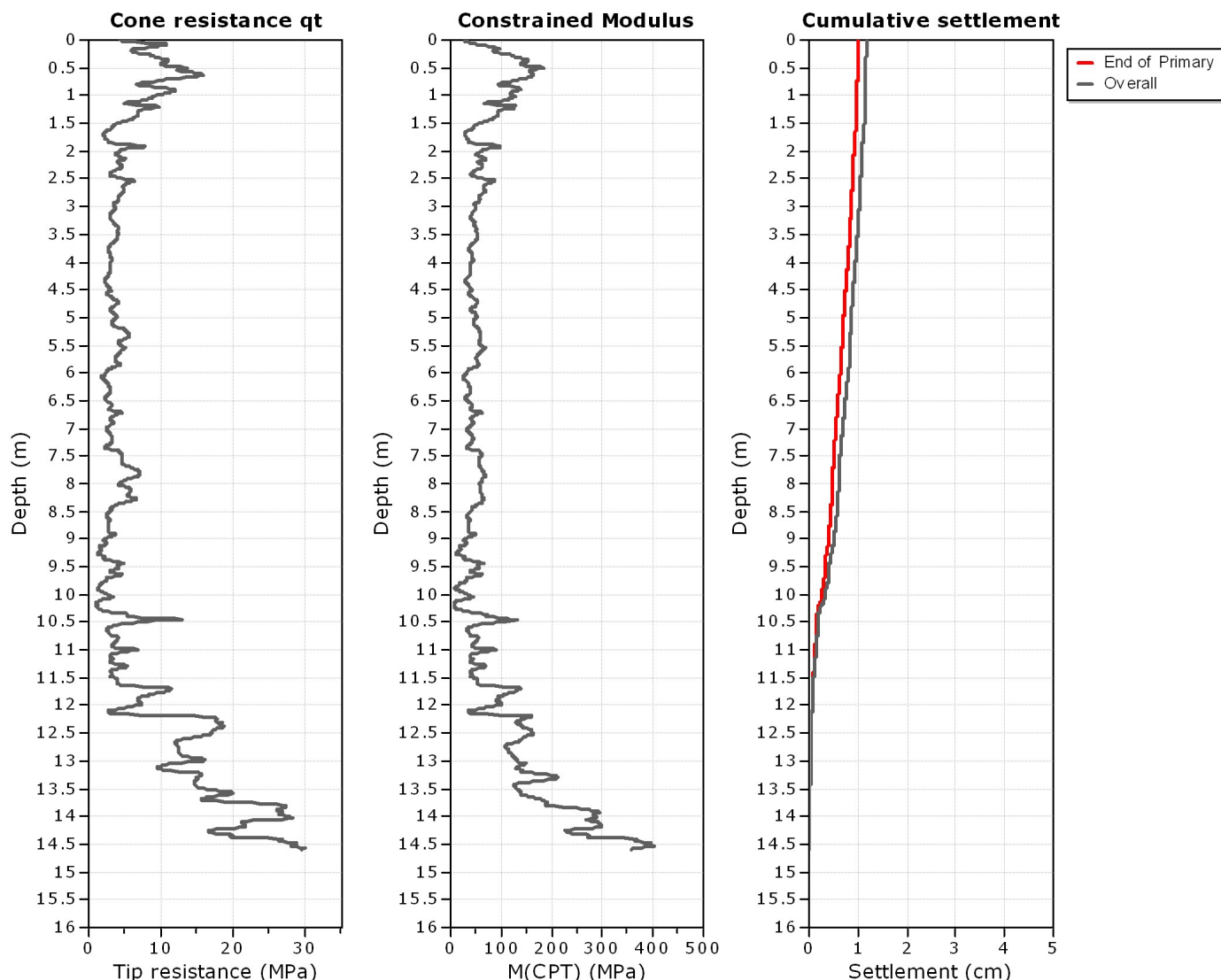
\* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

**Settlements calculation according to theory of elasticity\***



**Caclulation properties**

Footing type: Rectangular

Footing width: 200.00 (m)

L/B: 10.0

Footing pressure: 34.00 (kPa)

Embedment depth: 0.00 (m)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: Yes

Time period for primary consolidation: 1 months

Time period for second. settlements: 12 months

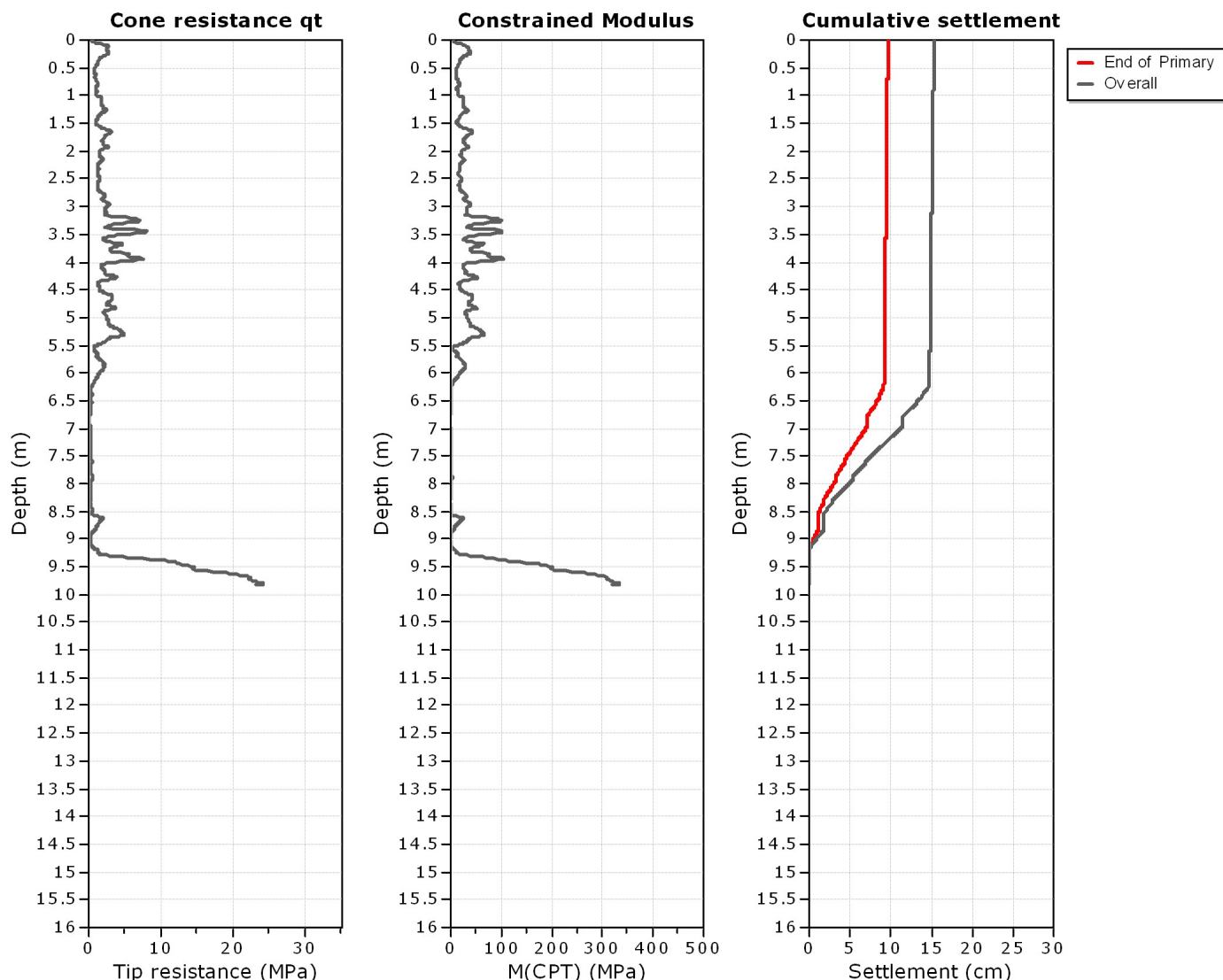
\* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

**Settlements calculation according to theory of elasticity\***



**Caclulation properties**

Footing type: Rectangular  
Footing width: 200.00 (m)  
L/B: 10.0  
Footing pressure: 17.00 (kPa)  
Embedment depth: 0.00 (m)  
Footing is rigid: No  
Remove excavation load: No  
Apply 20% rule: No  
Calculate secondary settlements: Yes  
Time period for primary consolidation: 1 months  
Time period for second. settlements: 12 months

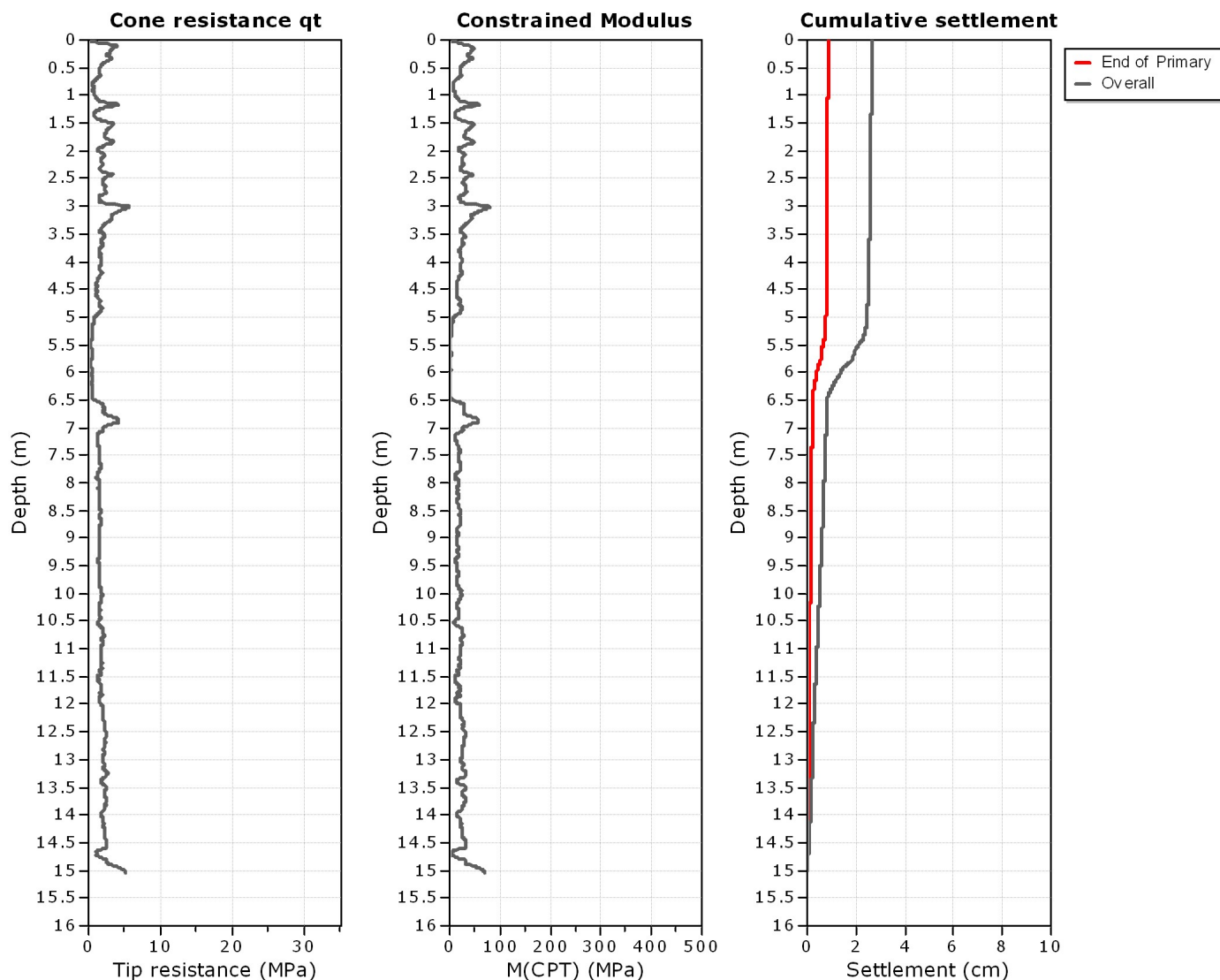
\* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

**Settlements calculation according to theory of elasticity\***



**Caclulation properties**

Footing type: Rectangular

Footing width: 200.00 (m)

L/B: 10.0

Footing pressure: 4.25 (kPa)

Embedment depth: 0.00 (m)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: Yes

Time period for primary consolidation: 1 months

Time period for second. settlements: 12 months

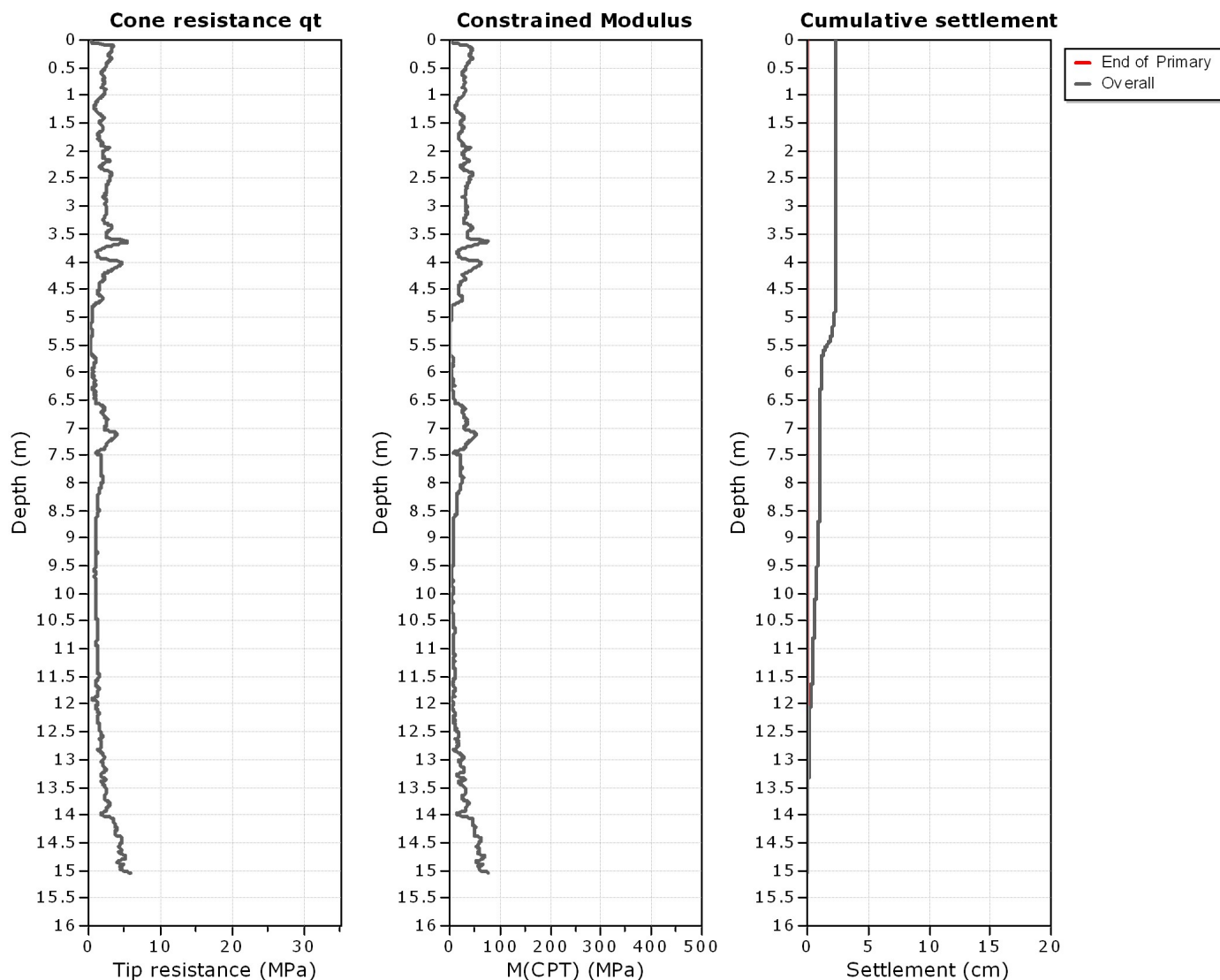
\* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

**Settlements calculation according to theory of elasticity\***



**Caclulation properties**

Footing type: Rectangular

Footing width: 200.00 (m)

L/B: 10.0

Footing pressure: 0.00 (kPa)

Embedment depth: 0.00 (m)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: Yes

Time period for primary consolidation: 1 months

Time period for second. settlements: 12 months

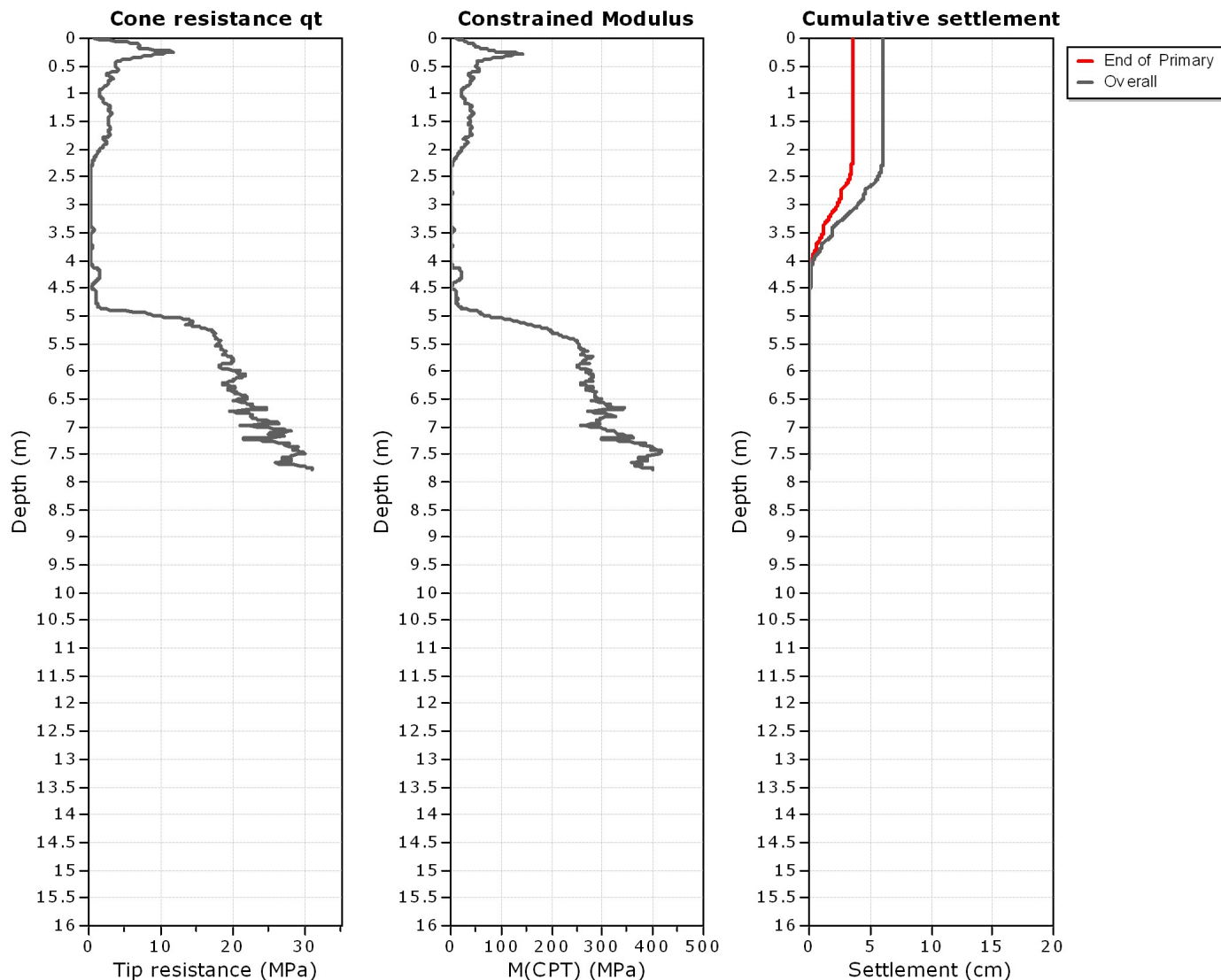
\* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

**Settlements calculation according to theory of elasticity\***



**Caclulation properties**

Footing type: Rectangular  
Footing width: 200.00 (m)  
L/B: 10.0  
Footing pressure: 8.50 (kPa)  
Embedment depth: 0.00 (m)  
Footing is rigid: No  
Remove excavation load: No  
Apply 20% rule: No  
Calculate secondary settlements: Yes  
Time period for primary consolidation: 1 months  
Time period for second. settlements: 12 months

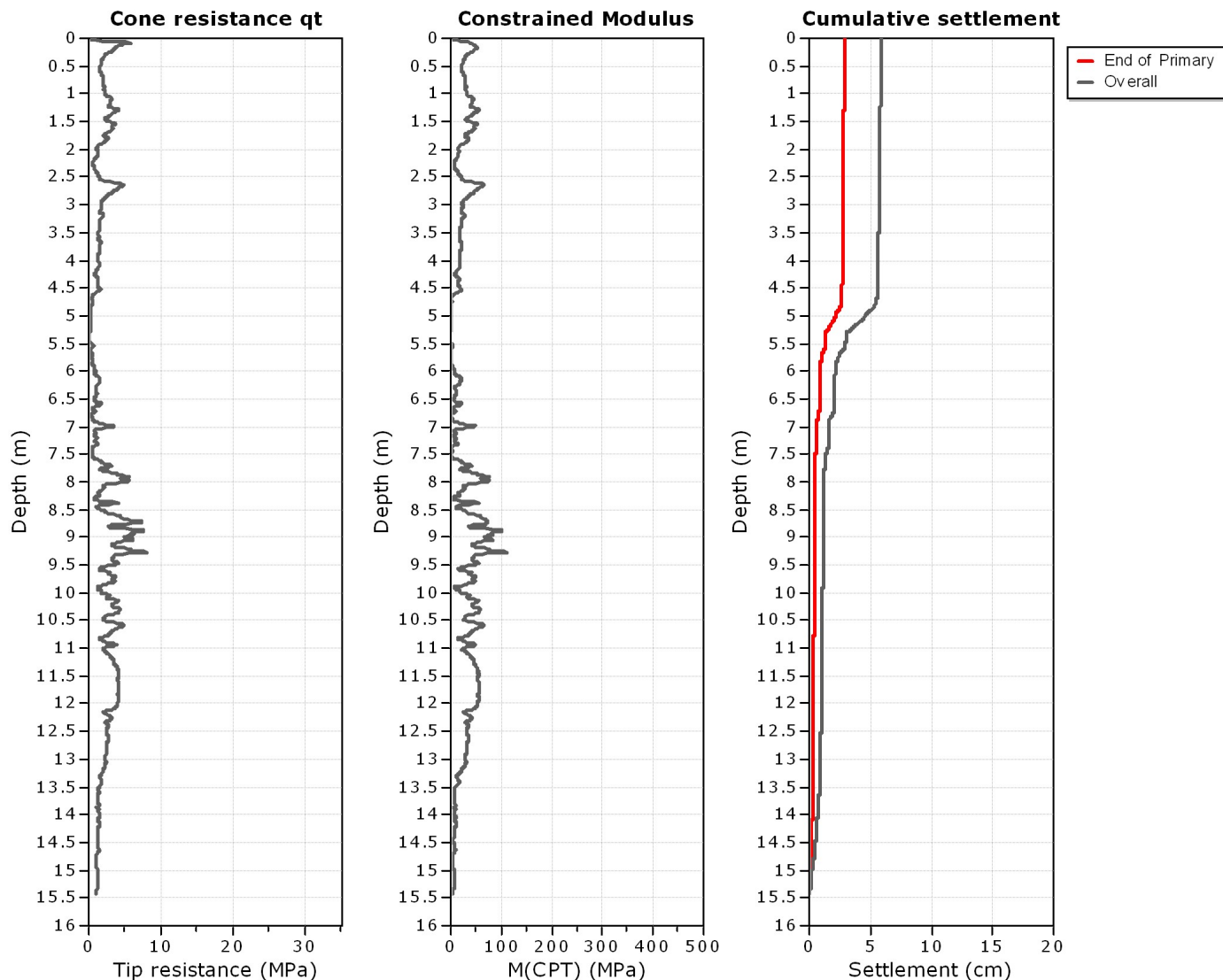
\* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

**Settlements calculation according to theory of elasticity\***



**Calculation properties**

Footing type: Rectangular

Footing width: 200.00 (m)

L/B: 10.0

Footing pressure: 8.50 (kPa)

Embedment depth: 0.00 (m)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: Yes

Time period for primary consolidation: 1 months

Time period for second. settlements: 12 months

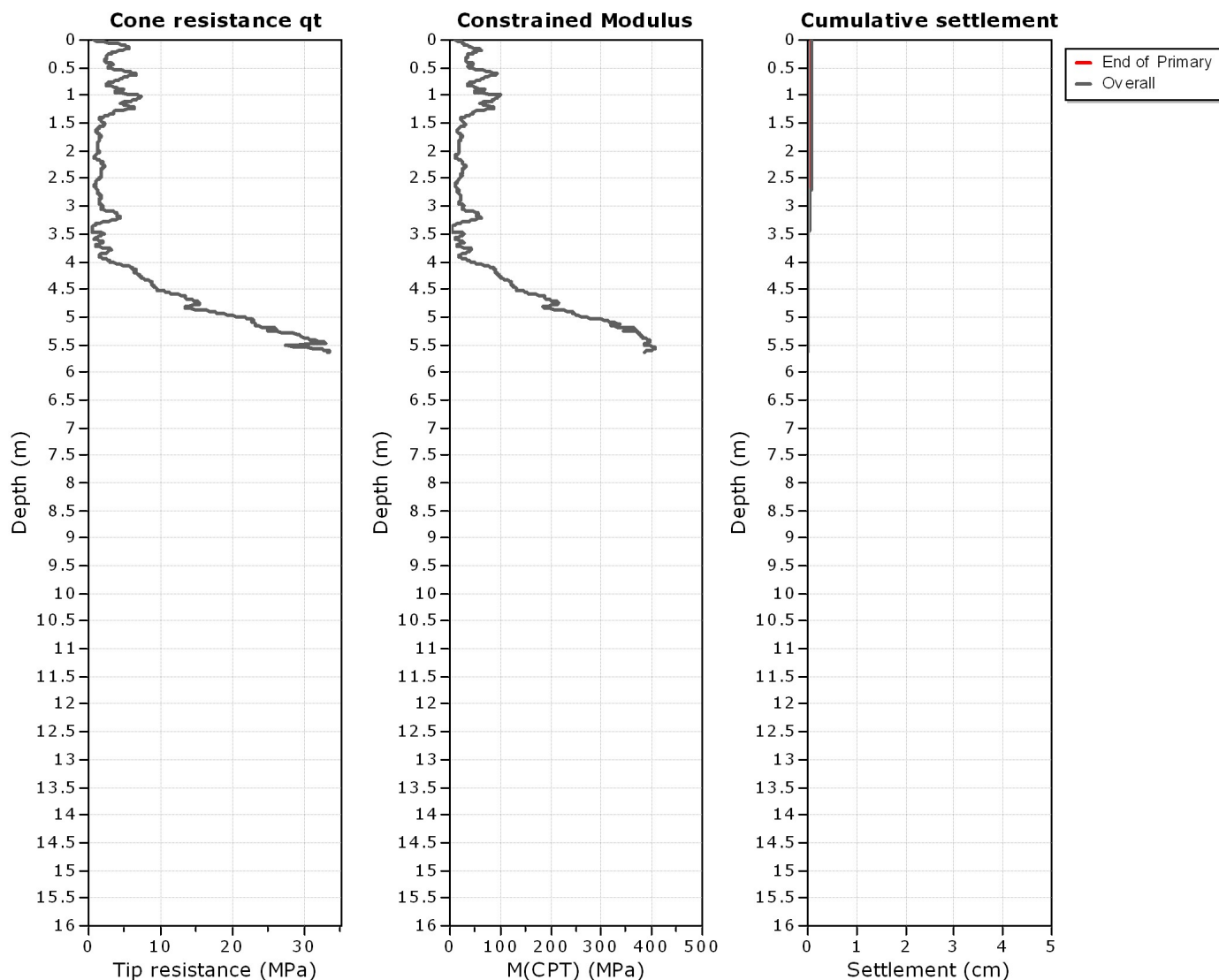
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**Settlements calculation according to theory of elasticity\***



**Caclulation properties**

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Footing width: 200.00 (m)  
L/B: 10.0  
Footing pressure: 0.00 (kPa)  
Embedment depth: 0.00 (m)  
Footing is rigid: No  
Remove excavation load: No  
Apply 20% rule: No  
Calculate secondary settlements: Yes  
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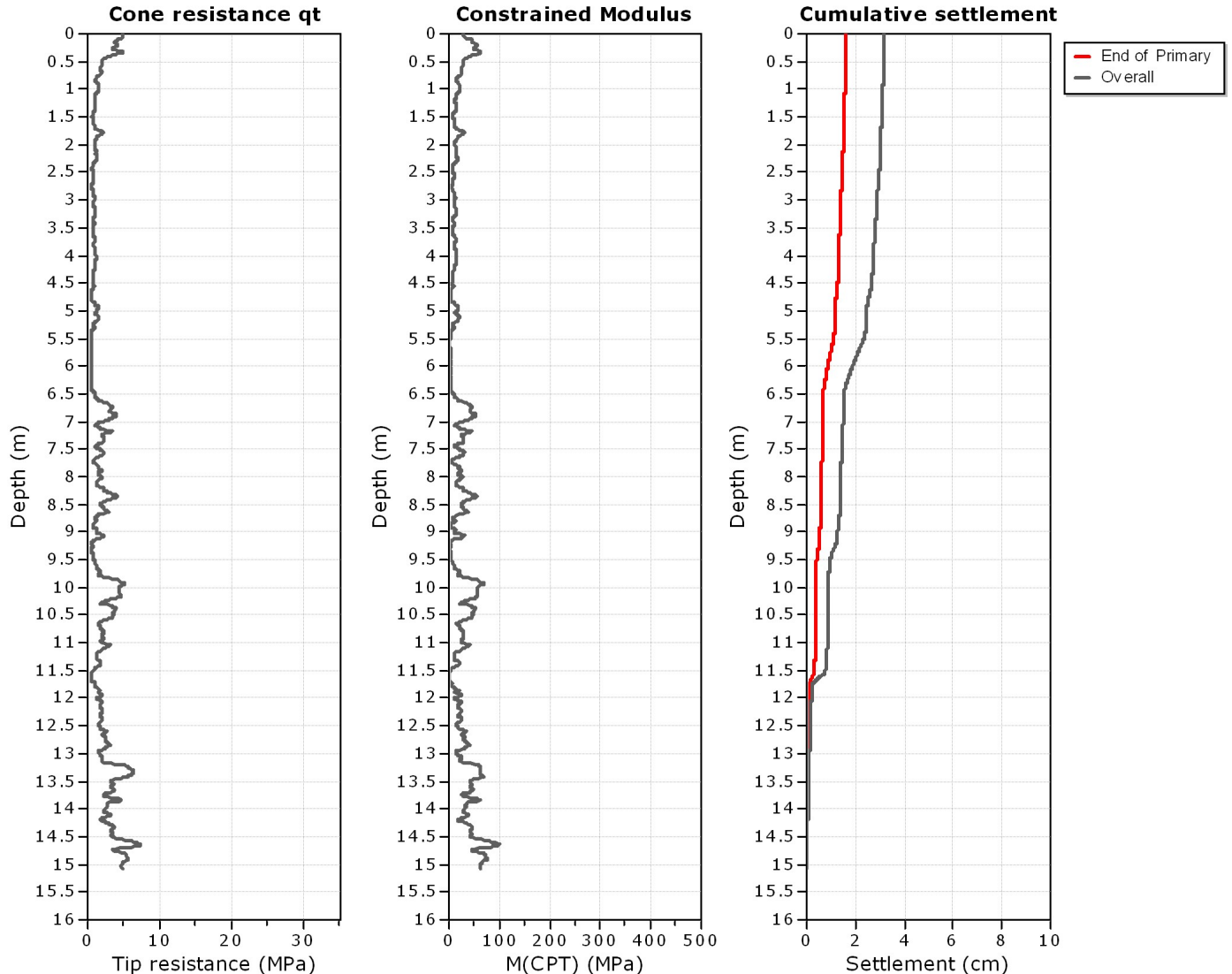
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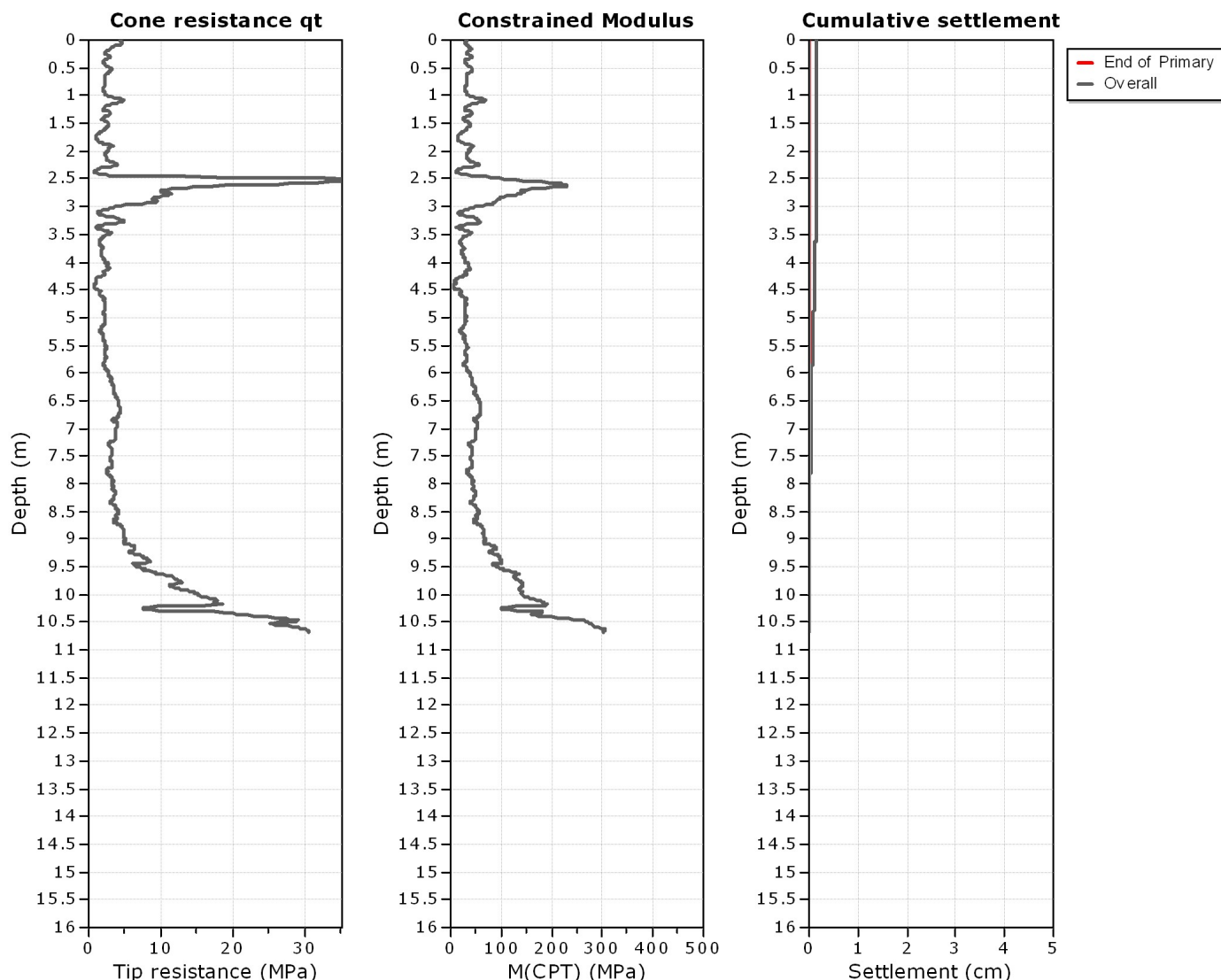
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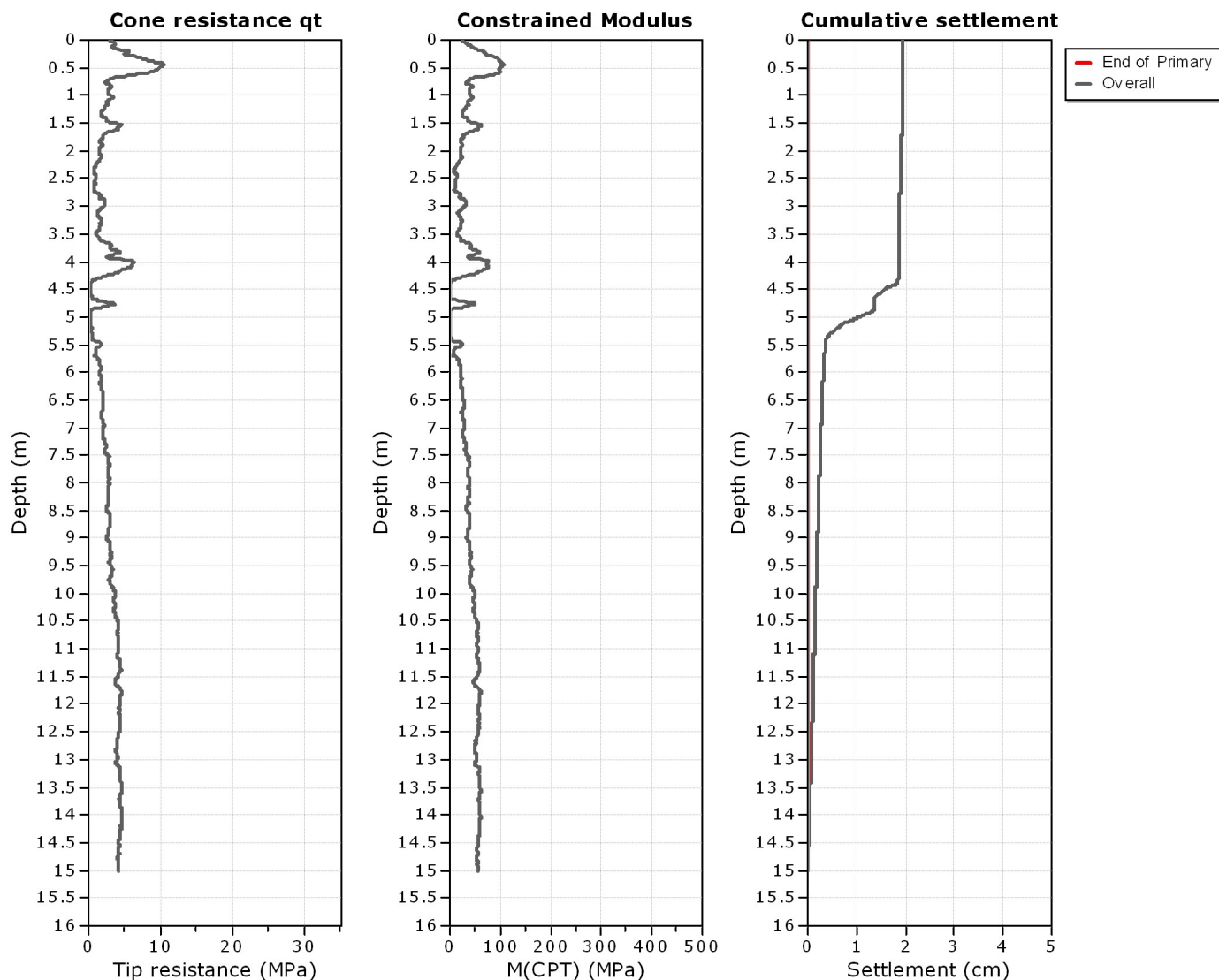
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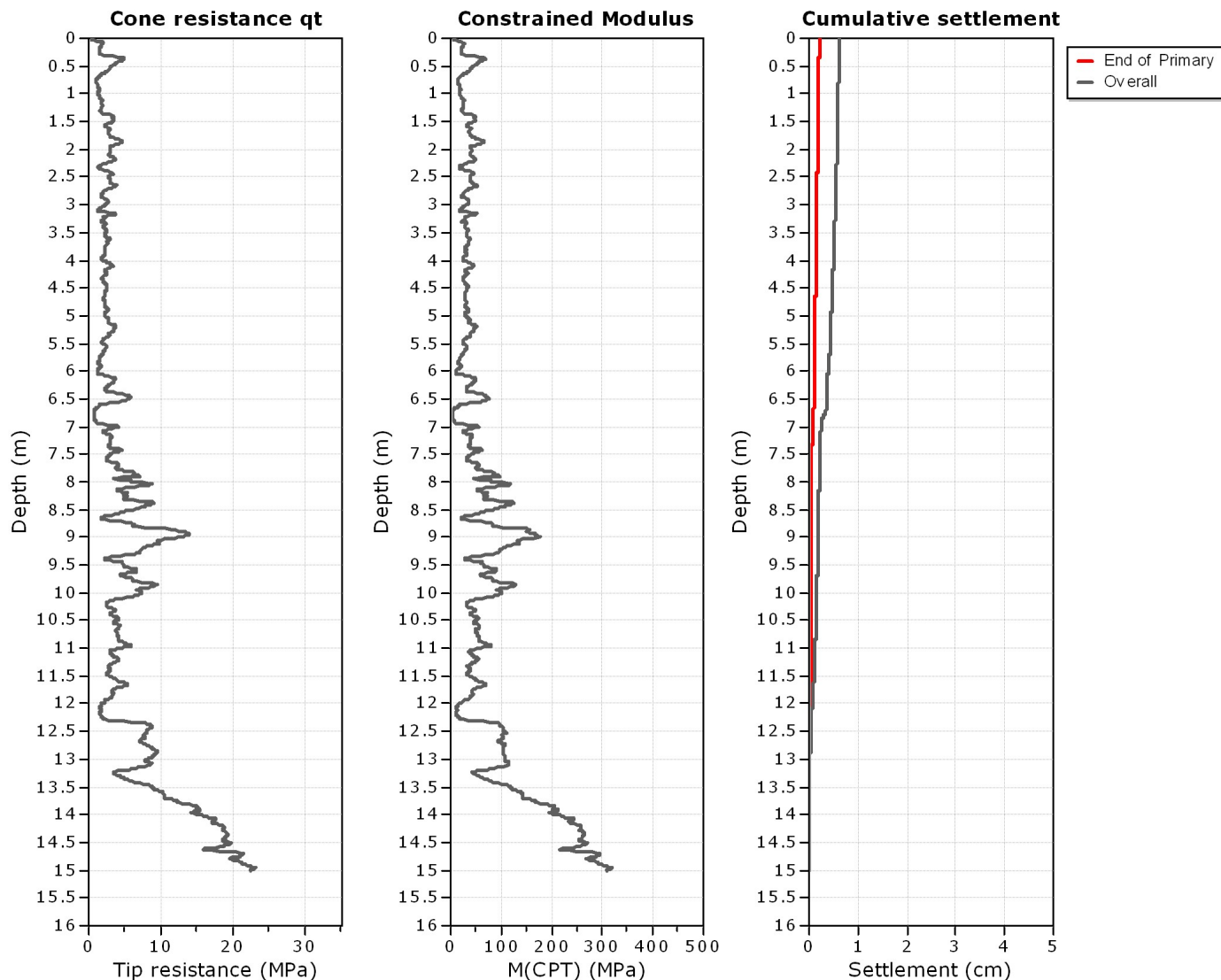
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**Settlements calculation according to theory of elasticity\***



**Calculation properties**

Footing type: Rectangular

Footing width: 30.00 (m)

L/B: 1.0

Footing pressure: 5.00 (kPa)

Embedment depth: 0.00 (m)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: Yes

Time period for primary consolidation: 1 months

Time period for second. settlements: 12 months

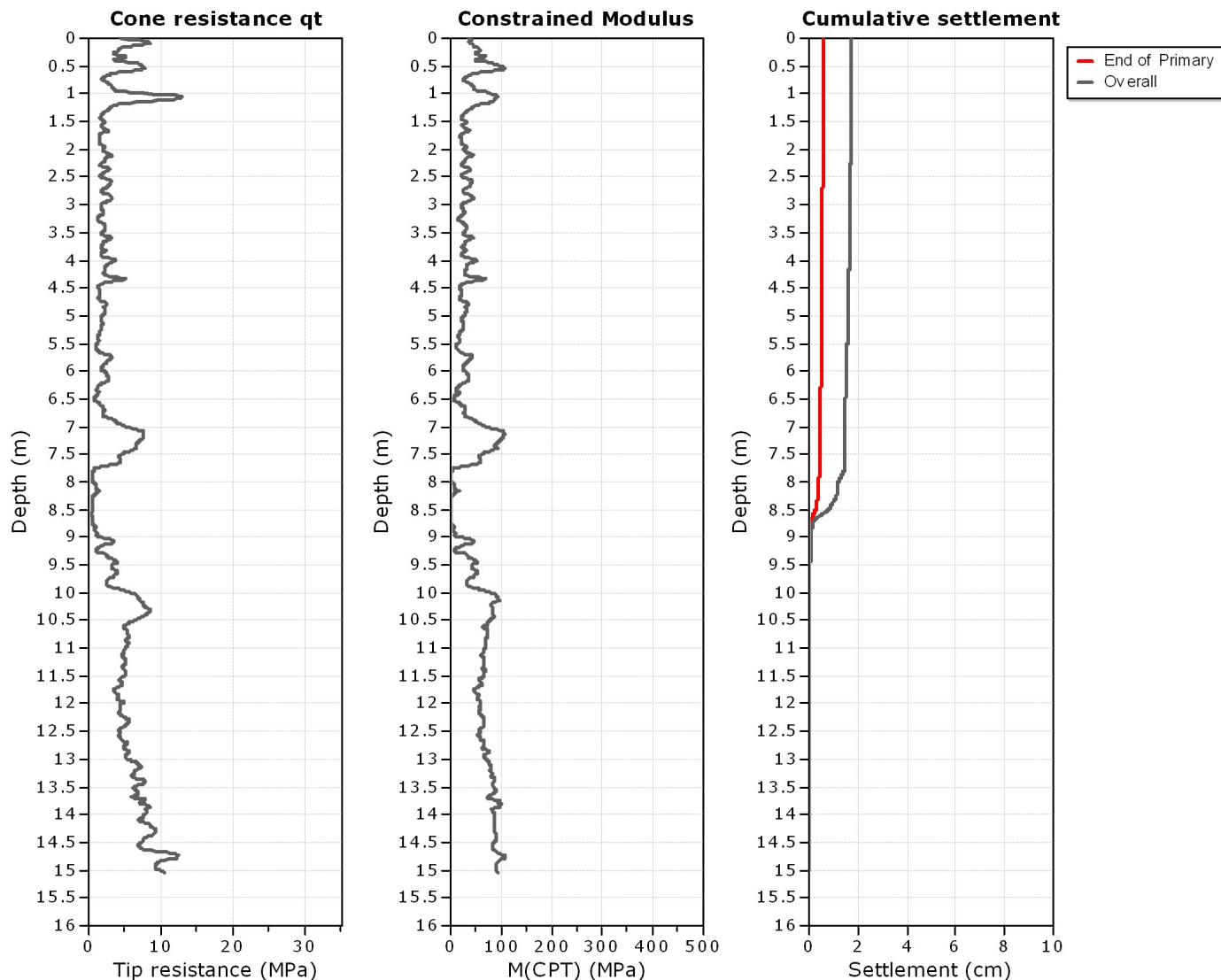
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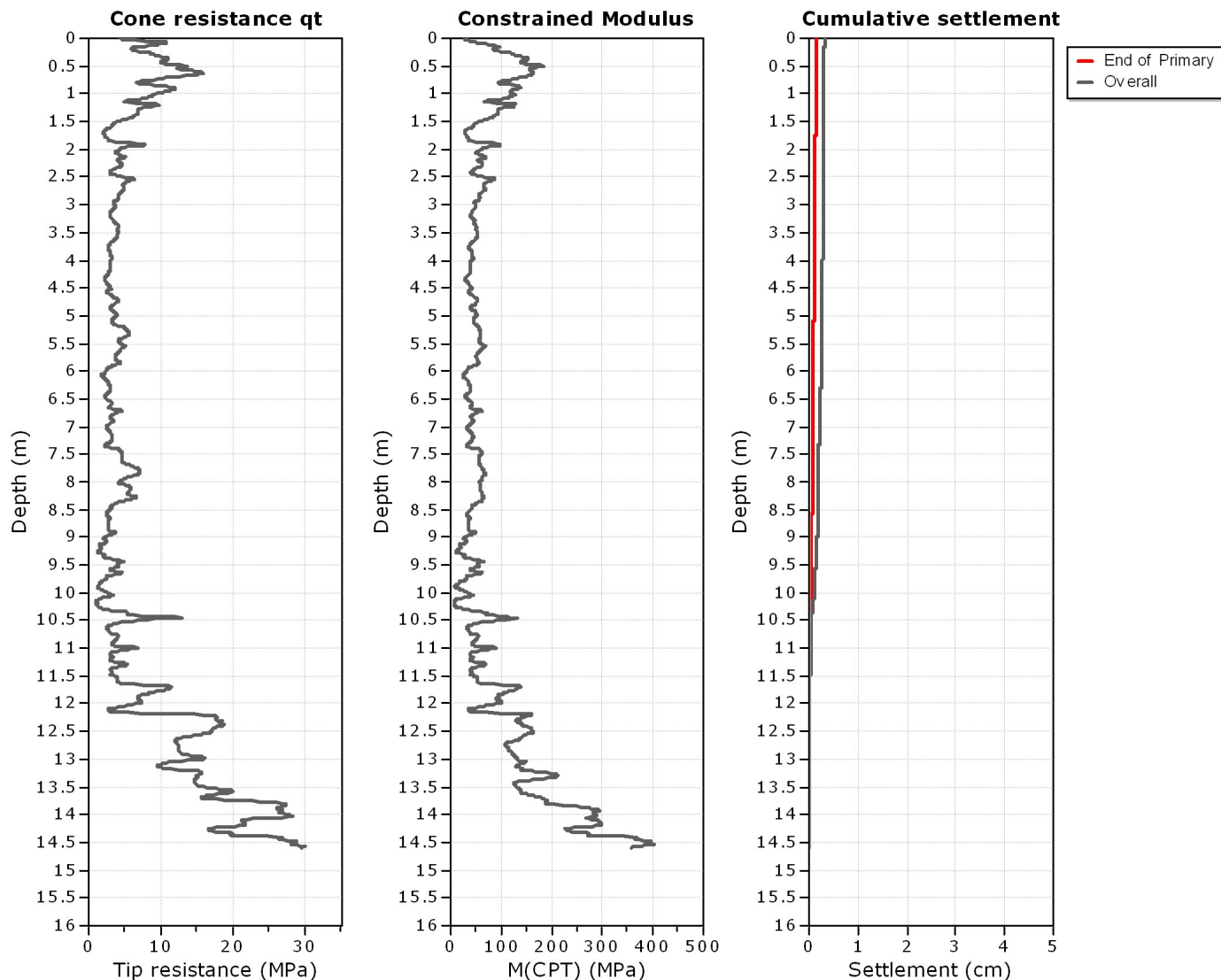
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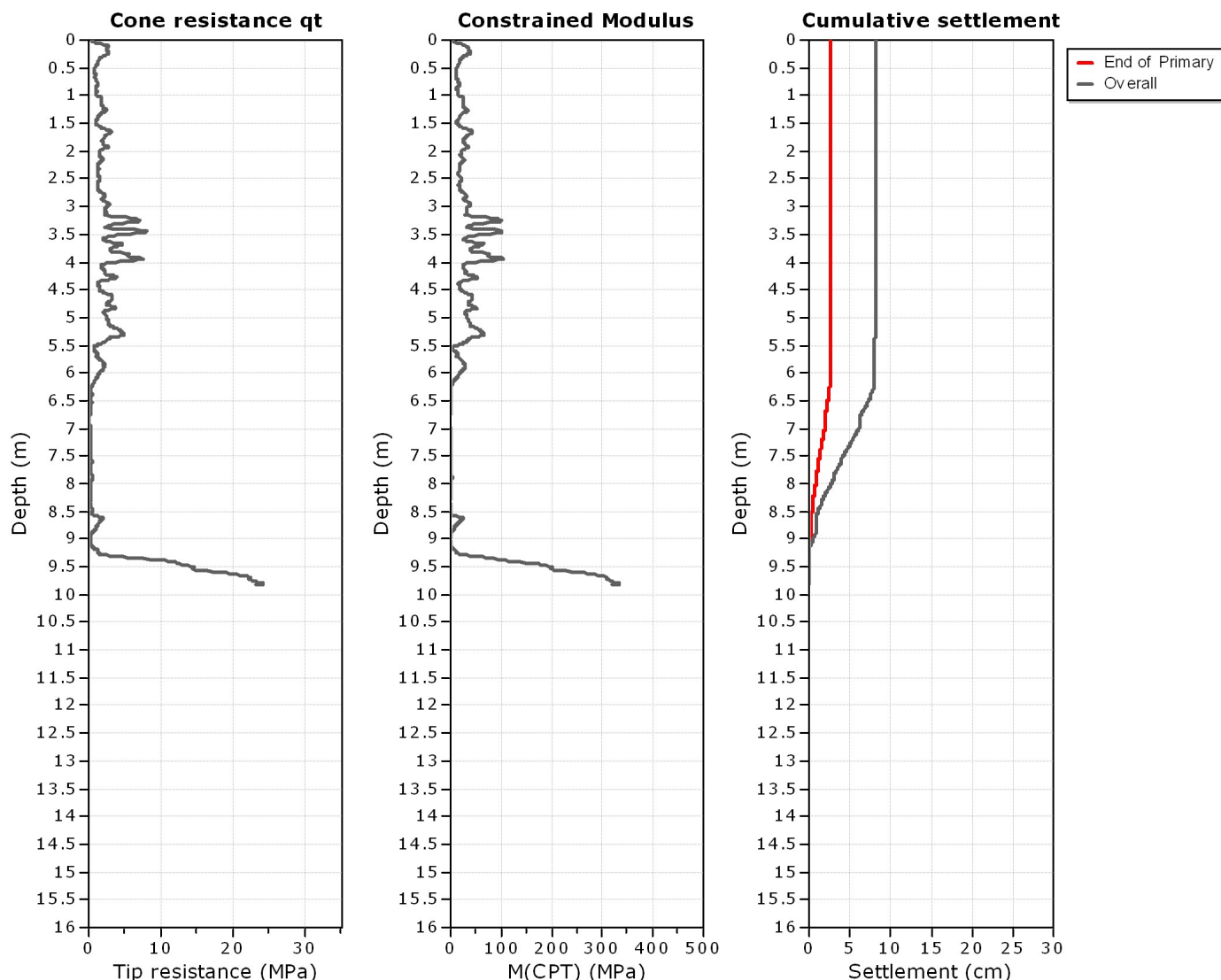
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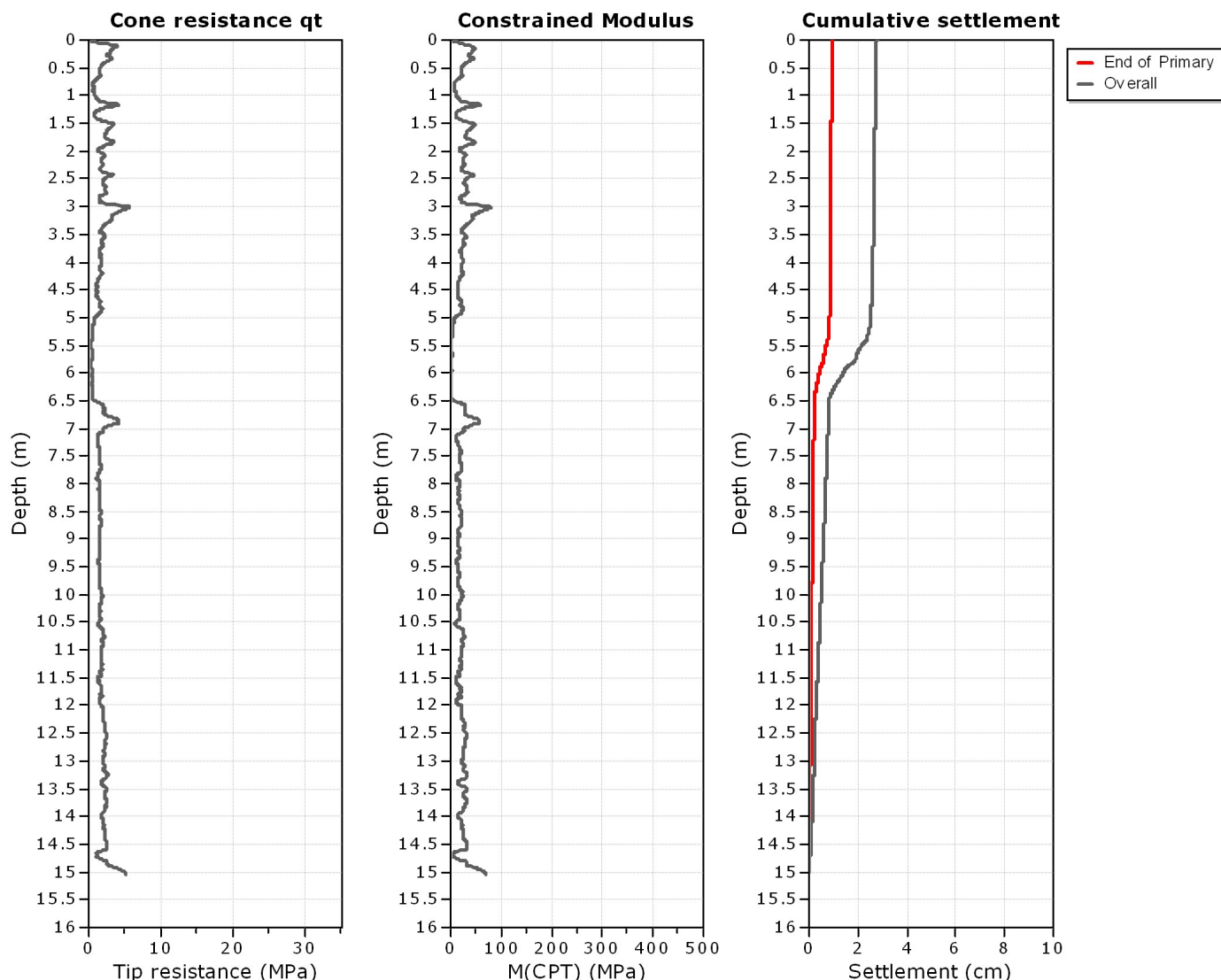
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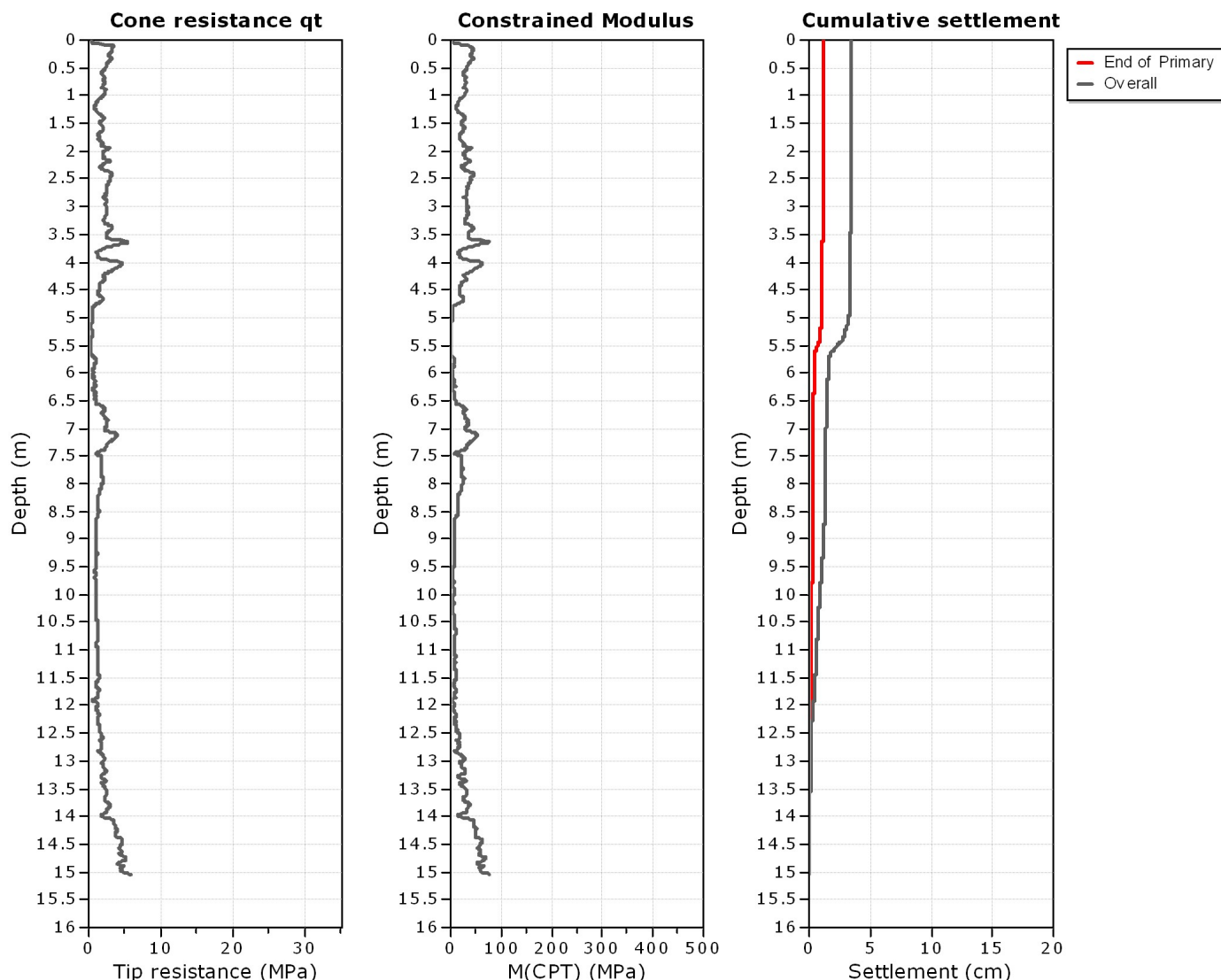
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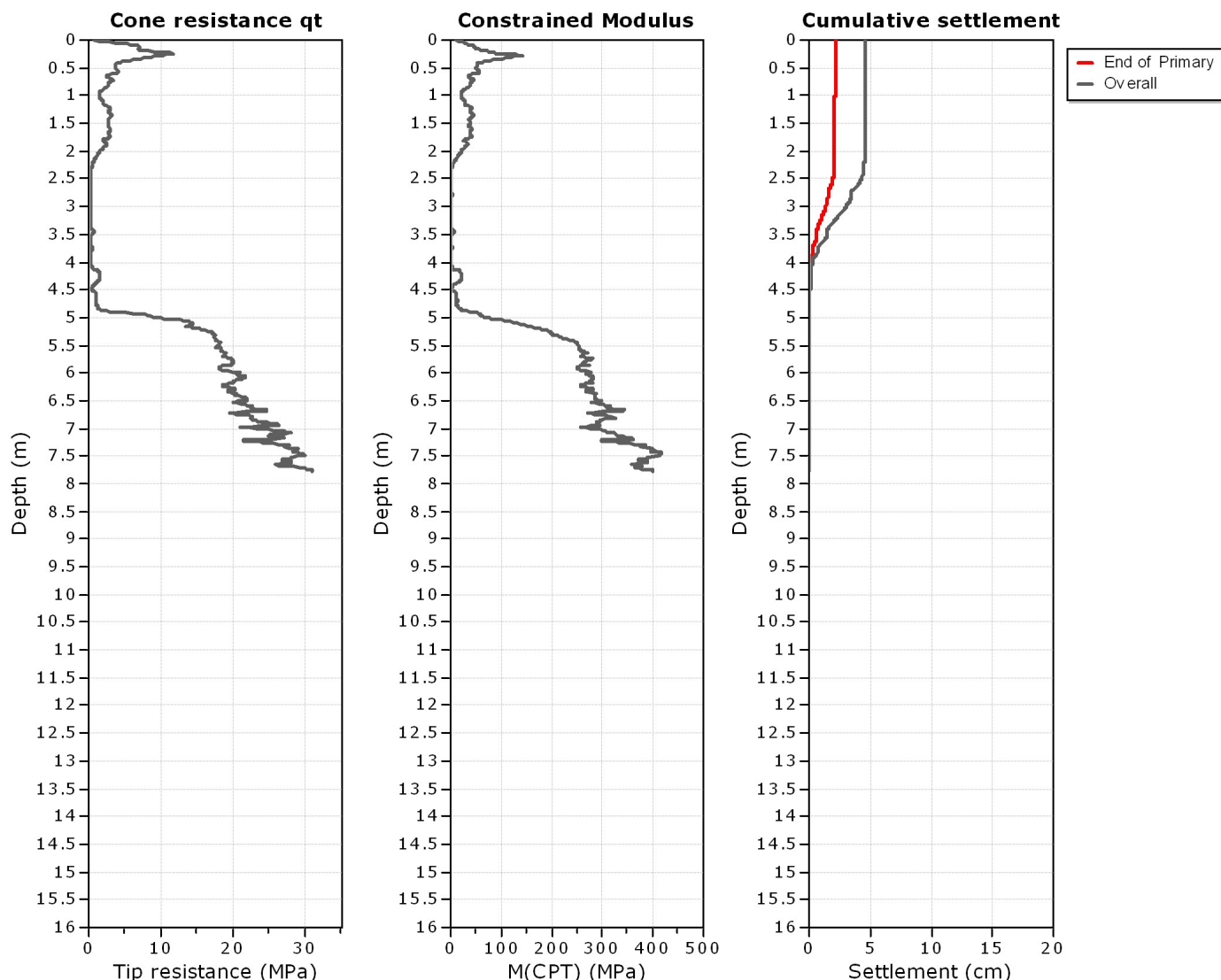
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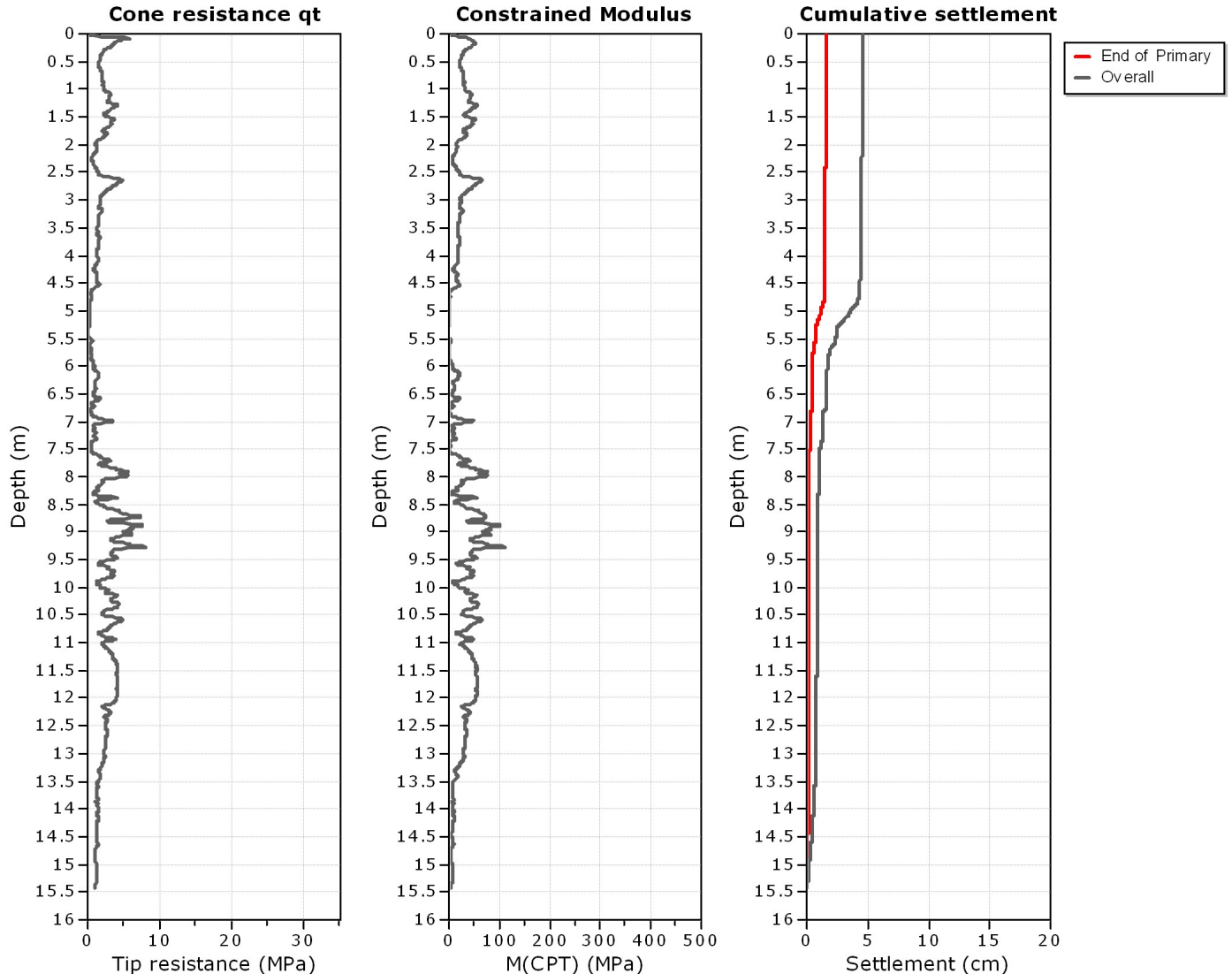
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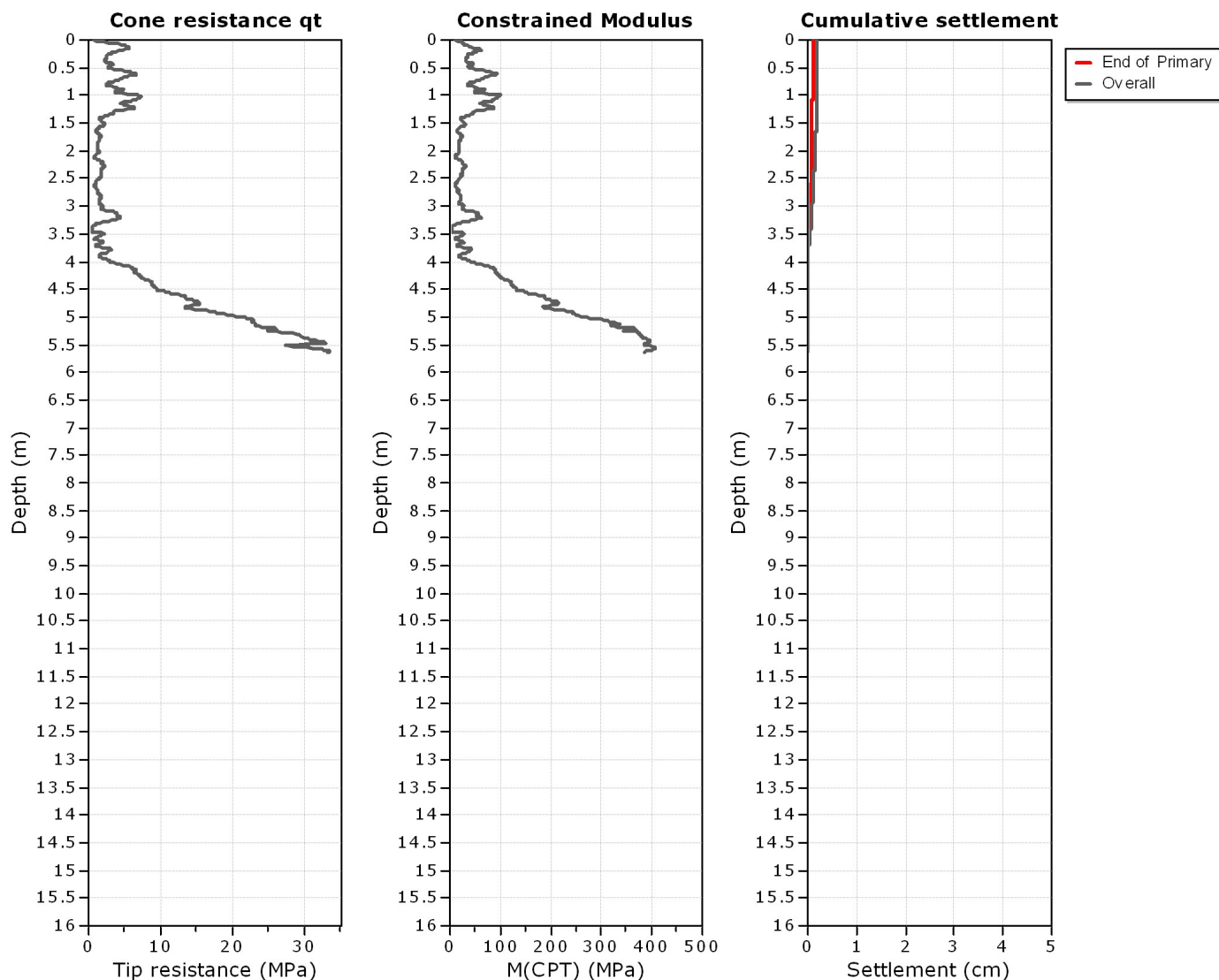
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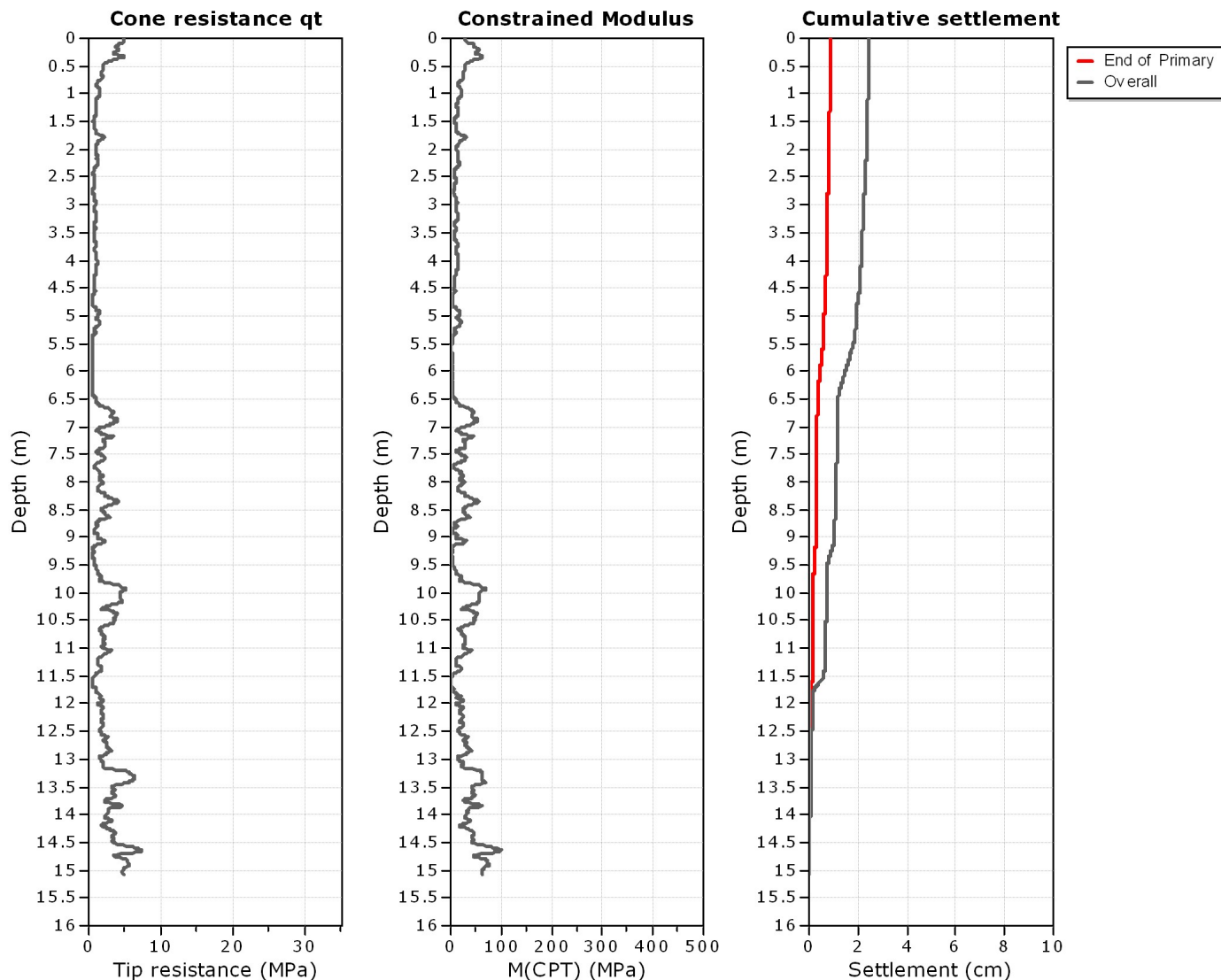
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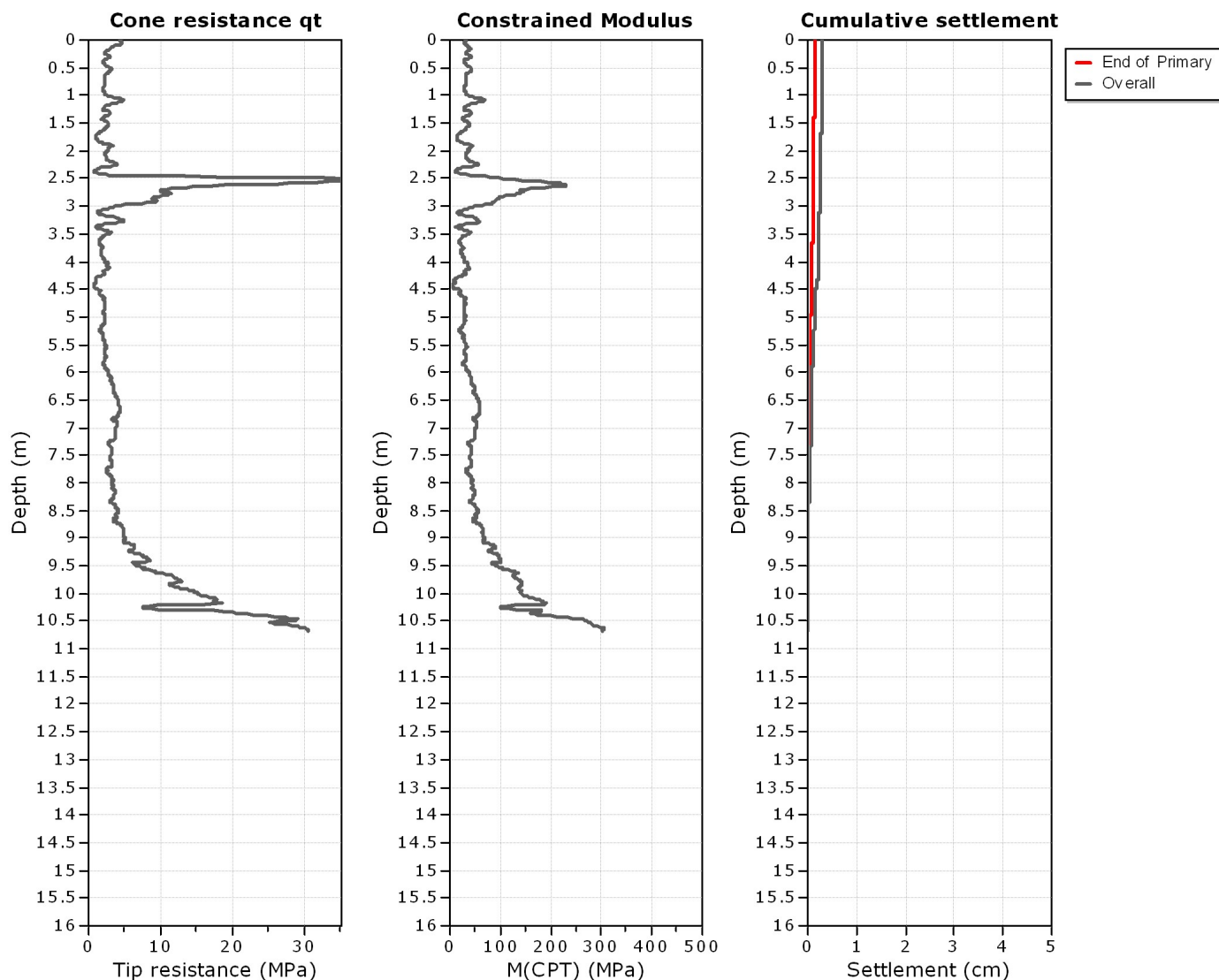
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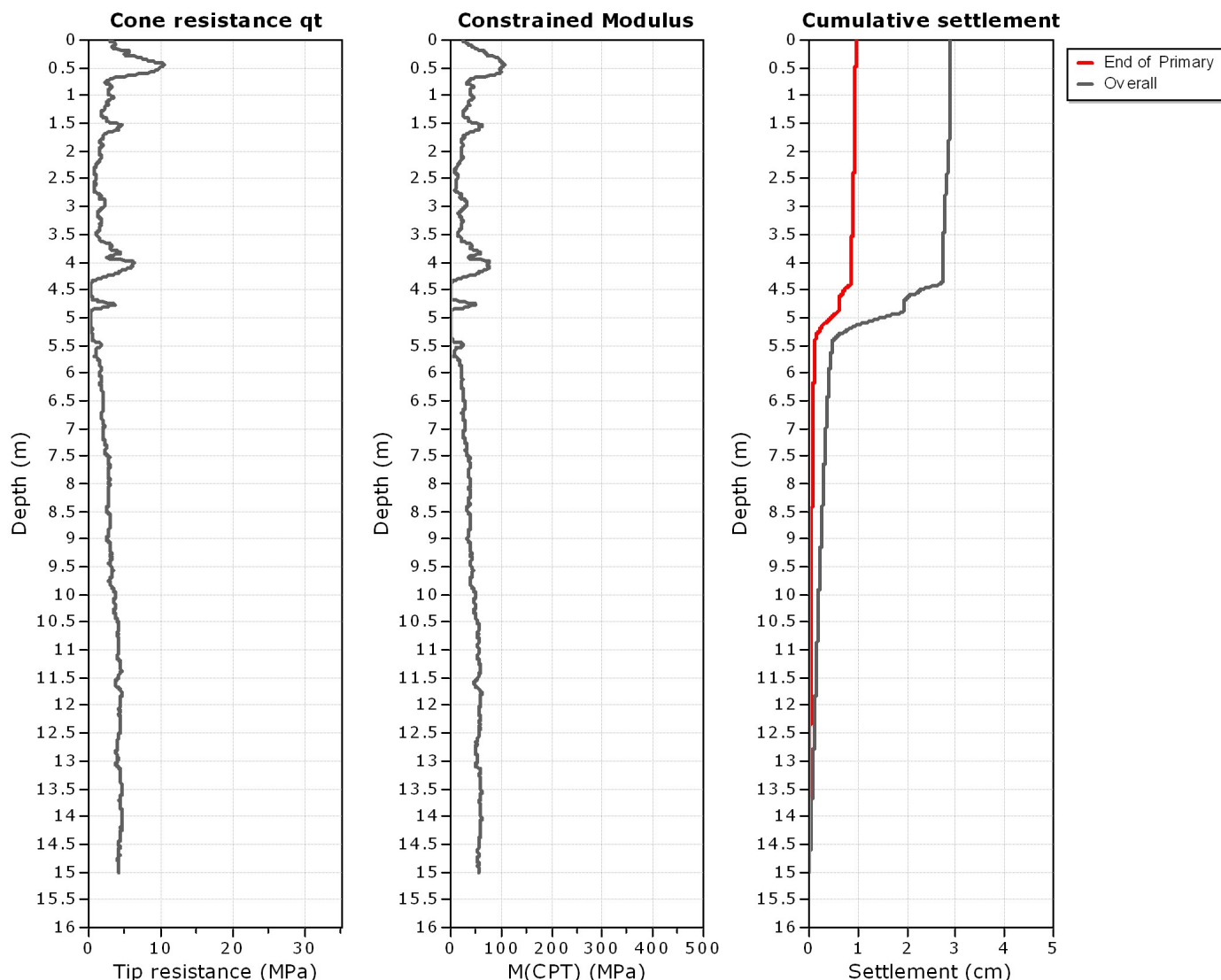
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## Dissipation Tests Results

### Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures ( $u$ ) with elapsed time ( $t$ ). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of ( $t$ ). The graphical technique suggested by Robertson and Campanella (1989), yields a value for  $t_{50}$ , which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction  $c_h$  was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position

r: piezocone radius

$I_r$ : stiffness index, equal to shear modulus G divided by the undrained strength of clay ( $S_u$ ).

$t_{50}$ : time corresponding to 50% consolidation

### Permeability estimates based on dissipation test

The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction ( $c_h$ ) which is influenced by a combination of the soil permeability ( $k_h$ ) and compressibility (M), as defined by the following:

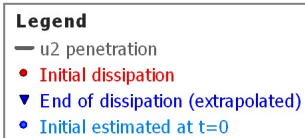
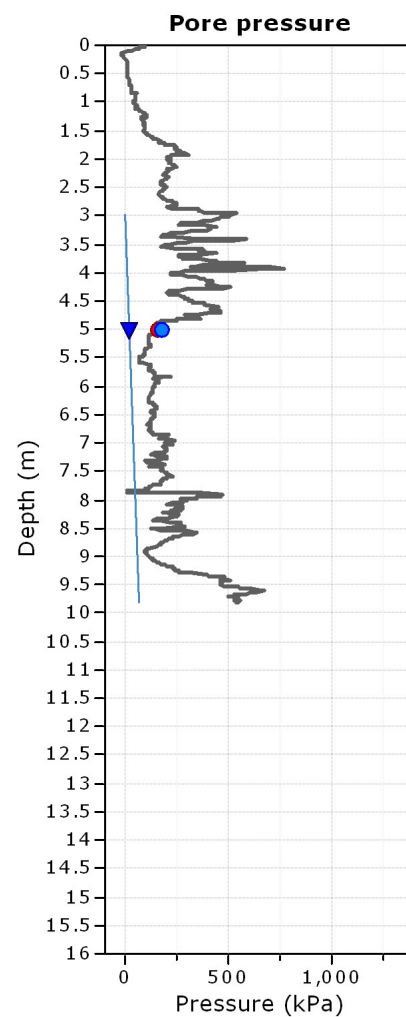
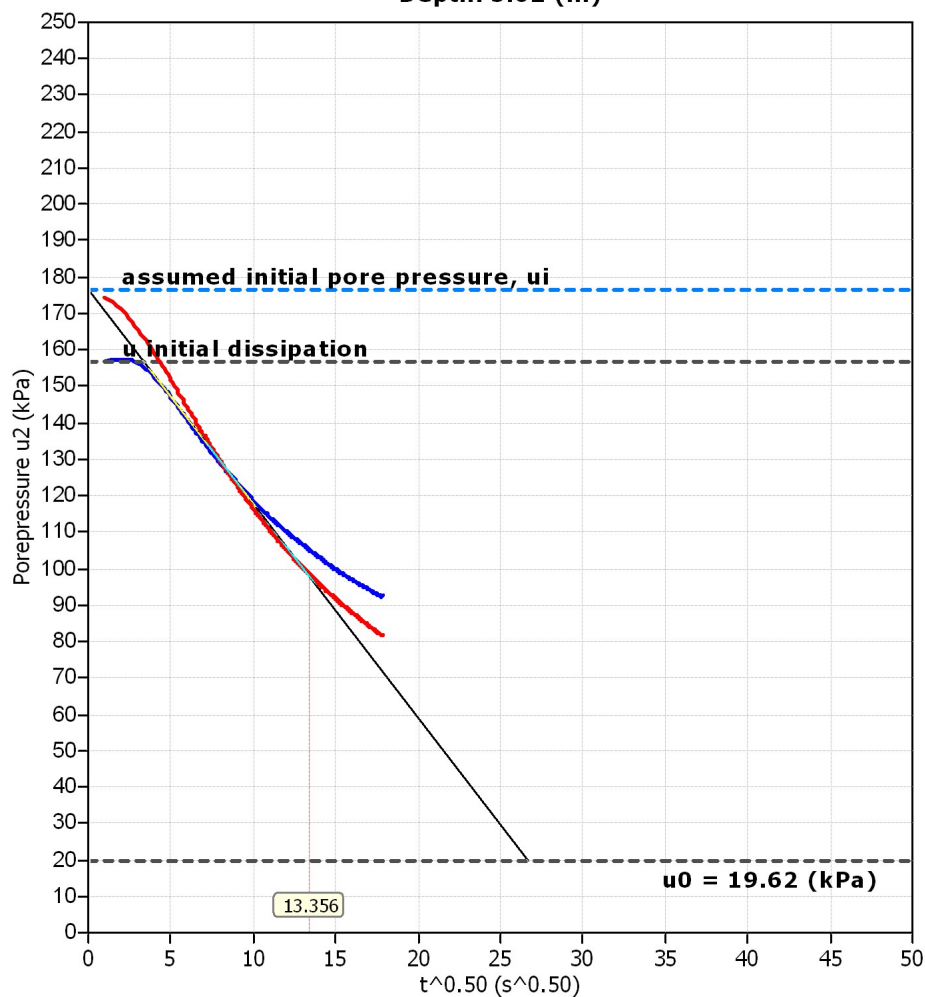
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and  $\gamma_w$  is the unit weight of water, in compatible units.

### Tabular results

| CPTU Borehole | Depth (m) | $(t_{50})^{0.50}$ | $t_{50}$ (s) | $t_{50}$ (years) | G/ $S_u$ | $c_h$ ( $m^2/s$ ) | $c_h$ ( $m^2/year$ ) | M (MPa) | $k_h$ (m/s) |
|---------------|-----------|-------------------|--------------|------------------|----------|-------------------|----------------------|---------|-------------|
| CPT-04        | 5.02      | 13.4              | 178          | 5.66E-006        | 512.97   | 9.86E-006         | 311                  | 32.34   | 2.99E-009   |

### Piezocone Dissipation Test: CPT-04 Depth: 5.02 (m)





**Coffey**  
96 Cameron Road, Tauranga  
3110  
New Zealand

**CPT: CPT-06**

Total depth: 15.04 m, Date: 28/11/2012  
Surface Elevation: 19.50 m  
Coords: lat 0° lon 0°  
Cone Type: 50 MPa Piezocone  
Cone Operator: Ground Investigation

**Project: GENZTAUC13086AE - THE LAKES STAGE 2 QRST EARTHWORKS**  
**Location: TAURANGA**

## Dissipation Tests Results

### Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures ( $u$ ) with elapsed time ( $t$ ). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

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The value of the coefficient of consolidation in the radial or horizontal direction  $c_h$  was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position

r: piezocone radius

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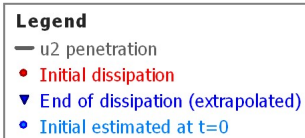
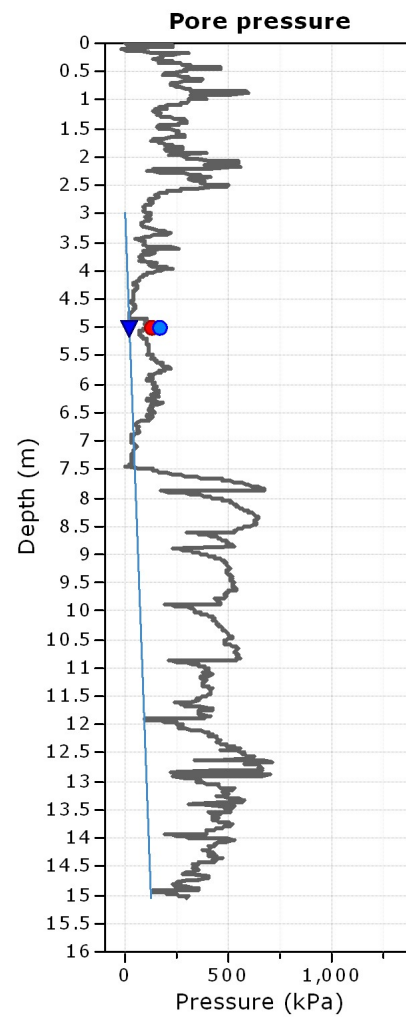
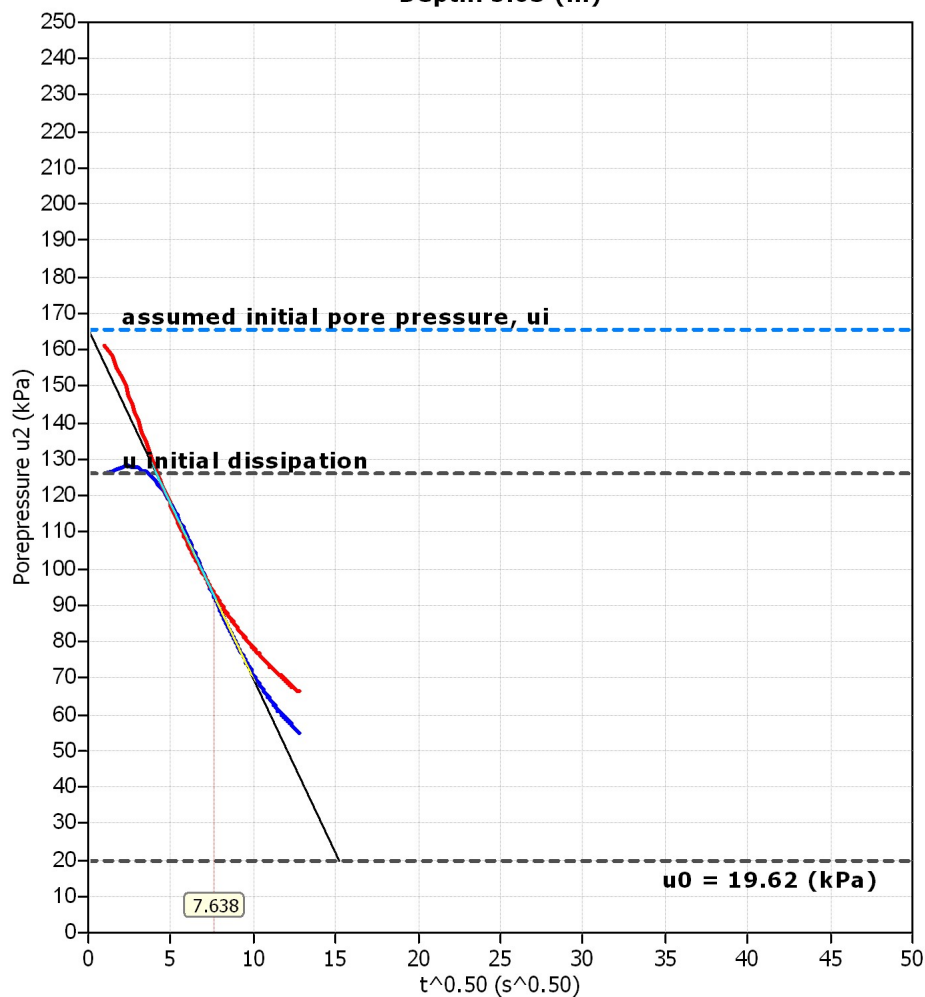
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and  $\gamma_w$  is the unit weight of water, in compatible units.

### Tabular results

| CPTU Borehole | Depth (m) | $(t_{50})^{0.50}$ | $t_{50}$ (s) | $t_{50}$ (years) | G/ $S_u$ | $c_h$ ( $m^2/s$ ) | $c_h$ ( $m^2/year$ ) | M (MPa) | $k_h$ (m/s) |
|---------------|-----------|-------------------|--------------|------------------|----------|-------------------|----------------------|---------|-------------|
| CPT-06        | 5.03      | 7.6               | 58           | 1.85E-006        | 1227.24  | 4.66E-005         | 1470                 | 2.31    | 1.98E-007   |

**Piezocene Dissipation Test: CPT-06**  
**Depth: 5.03 (m)**





## Dissipation Tests Results

### Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures ( $u$ ) with elapsed time ( $t$ ). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

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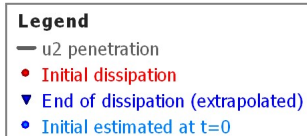
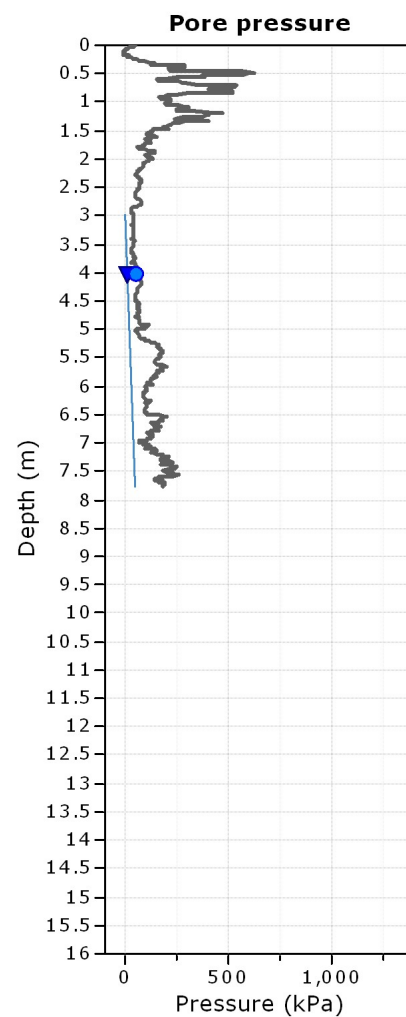
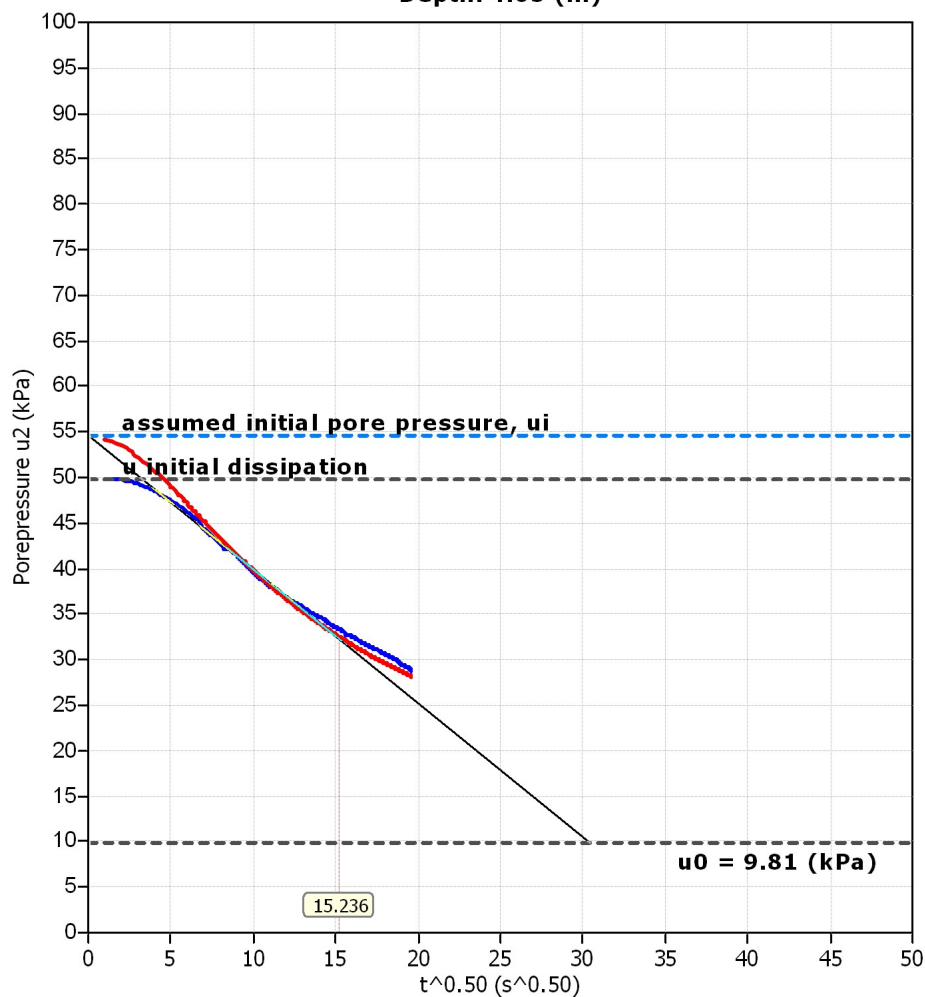
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### Tabular results

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|---------------|-----------|-------------------|--------------|------------------|----------|-------------------|----------------------|---------|-------------|
| CPT-07        | 4.05      | 15.2              | 232          | 7.36E-006        | 1413.20  | 1.26E-005         | 396                  | 0.84    | 1.47E-007   |

**Piezocene Dissipation Test: CPT-07**  
**Depth: 4.05 (m)**





## Dissipation Tests Results

### Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures (u) with elapsed time (t). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

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The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction ( $c_h$ ) which is influenced by a combination of the soil permeability ( $k_h$ ) and compressibility (M), as defined by the following:

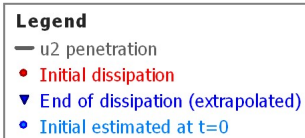
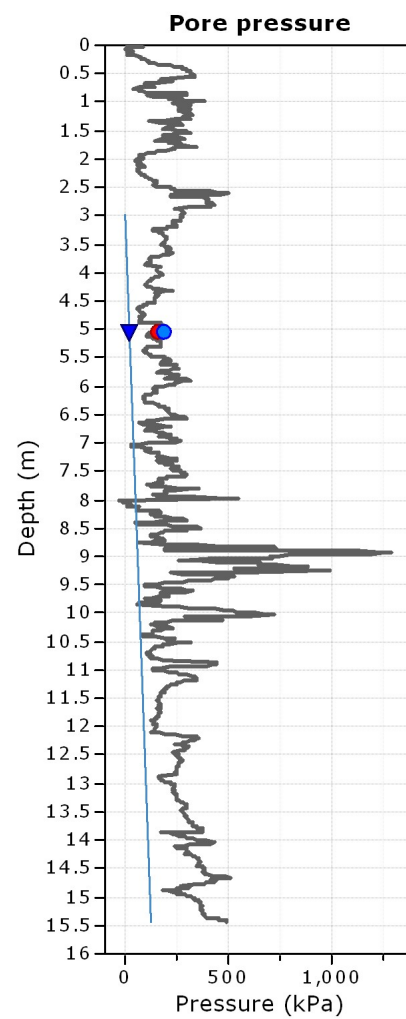
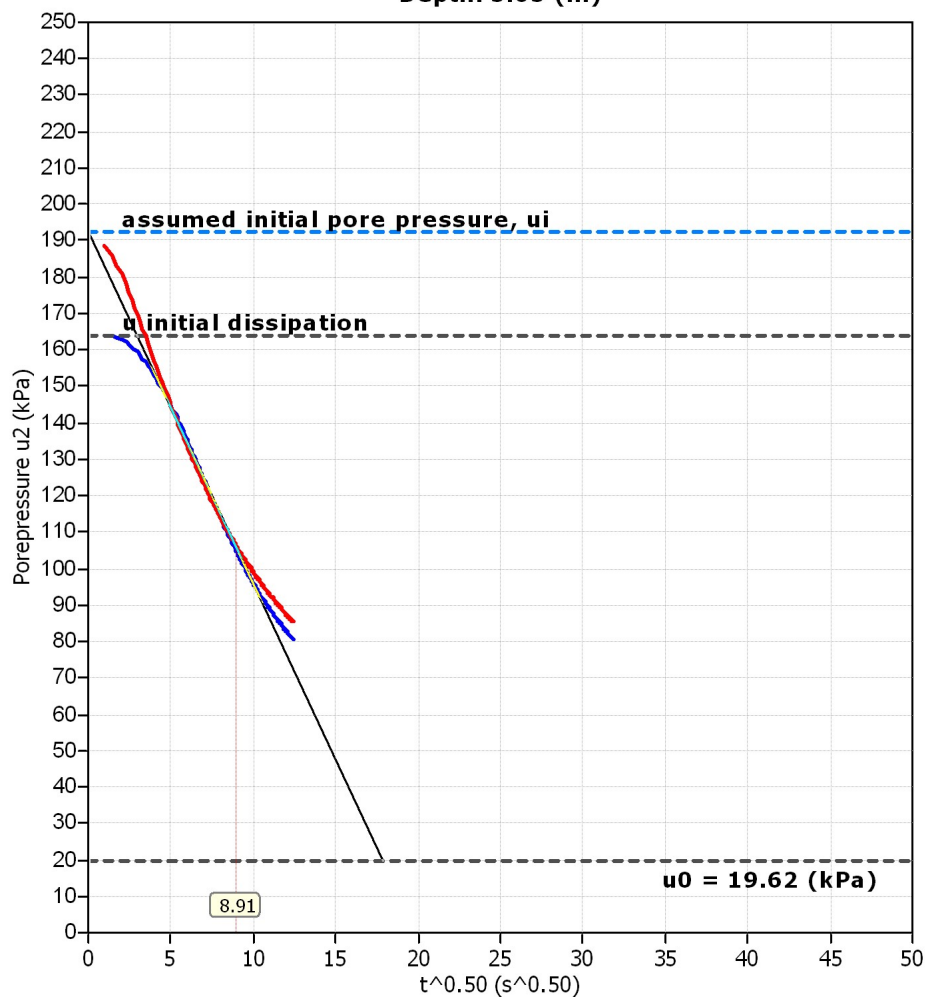
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and  $\gamma_w$  is the unit weight of water, in compatible units.

### Tabular results

| CPTU Borehole | Depth (m) | $(t_{50})^{0.50}$ | $t_{50}$ (s) | $t_{50}$ (years) | G/ $S_u$ | $c_h$ ( $m^2/s$ ) | $c_h$ ( $m^2/year$ ) | M (MPa) | $k_h$ (m/s) |
|---------------|-----------|-------------------|--------------|------------------|----------|-------------------|----------------------|---------|-------------|
| CPT-08        | 5.05      | 8.9               | 79           | 2.52E-006        | 2059.14  | 4.44E-005         | 1399                 | 0.37    | 1.17E-006   |

**Piezocene Dissipation Test: CPT-08**  
**Depth: 5.05 (m)**





## Dissipation Tests Results

### Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures ( $u$ ) with elapsed time ( $t$ ). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of ( $t$ ). The graphical technique suggested by Robertson and Campanella (1989), yields a value for  $t_{50}$ , which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction  $c_h$  was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position

r: piezocone radius

$I_r$ : stiffness index, equal to shear modulus G divided by the undrained strength of clay ( $S_u$ ).

$t_{50}$ : time corresponding to 50% consolidation

### Permeability estimates based on dissipation test

The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction ( $c_h$ ) which is influenced by a combination of the soil permeability ( $k_h$ ) and compressibility (M), as defined by the following:

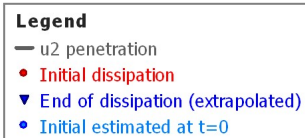
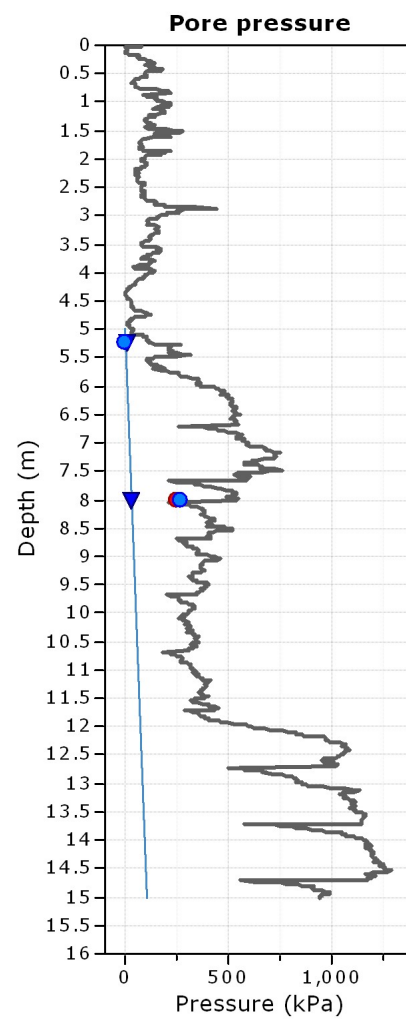
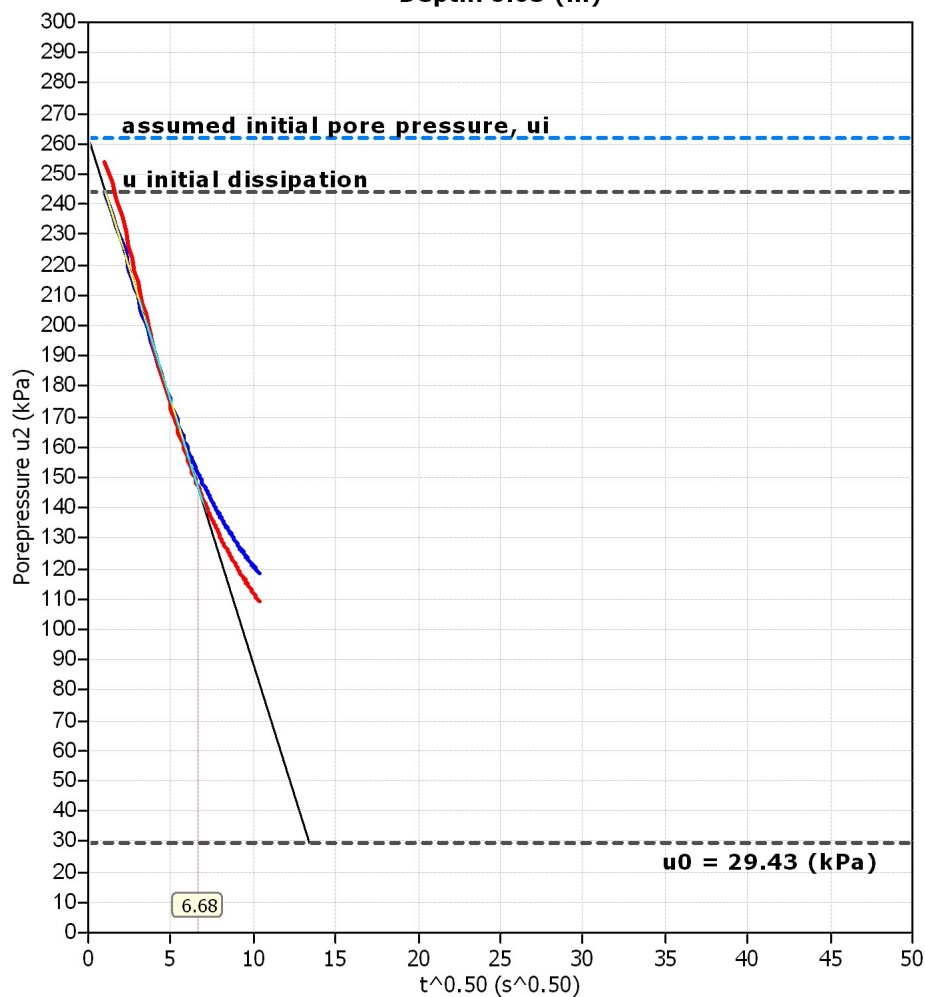
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and  $\gamma_w$  is the unit weight of water, in compatible units.

### Tabular results

| CPTU Borehole | Depth (m) | $(t_{50})^{0.50}$ | $t_{50}$ (s) | $t_{50}$ (years) | G/ $S_u$ | $c_h$ ( $m^2/s$ ) | $c_h$ ( $m^2/year$ ) | M (MPa) | $k_h$ (m/s) |
|---------------|-----------|-------------------|--------------|------------------|----------|-------------------|----------------------|---------|-------------|
| CPT-12        | 8.03      | 6.7               | 45           | 1.42E-006        | 526.76   | 3.99E-005         | 1259                 | 37.70   | 1.04E-008   |

**Piezocone Dissipation Test: CPT-12**  
**Depth: 8.03 (m)**



# Appendix G

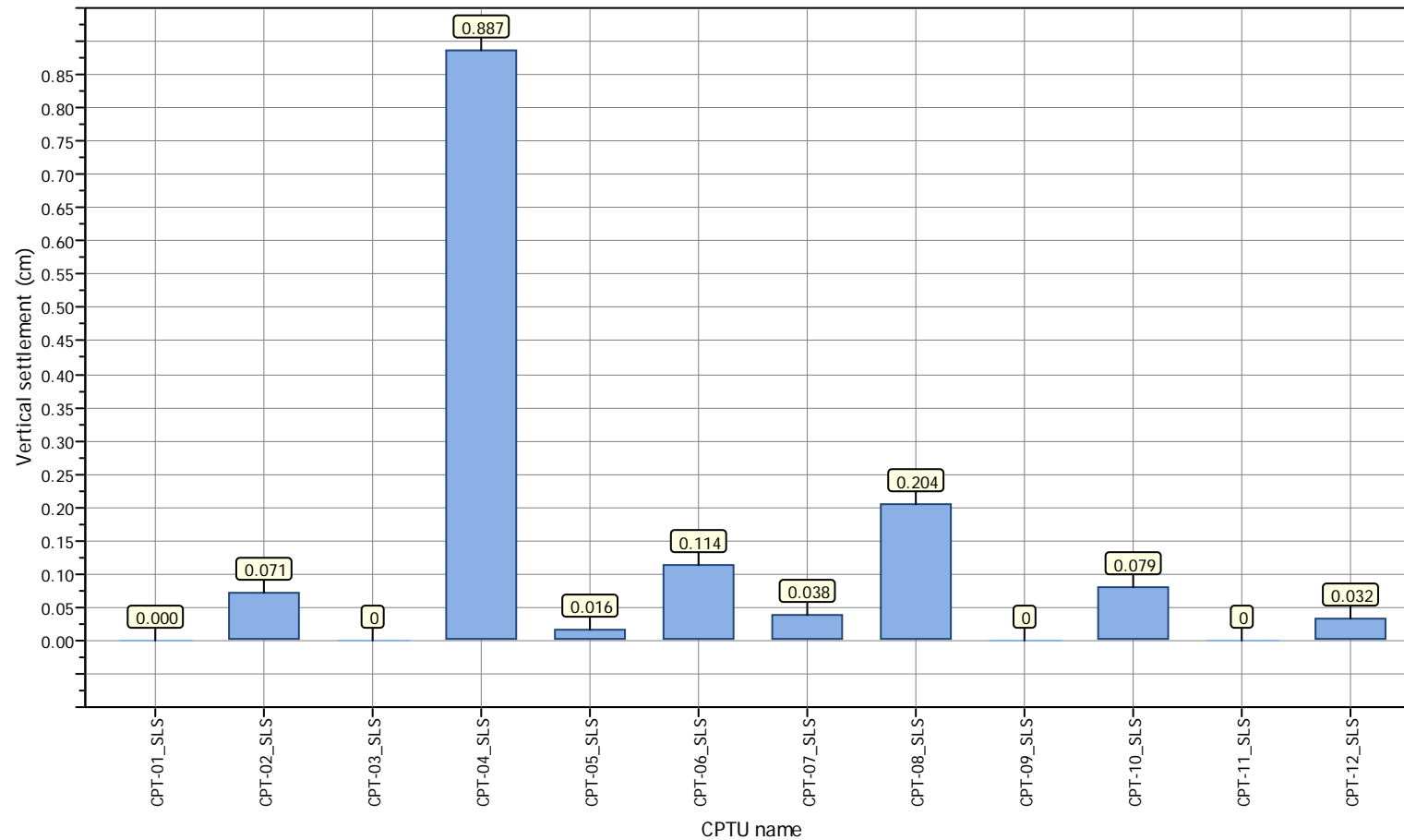
## **Liquefaction and Lateral Spread Analyses**



Project title : GENZTAUC13086AE - THE LAKES STAGE 2 QRST SLS EARTHQUAKE

Location : TAURANGA

### Overall vertical settlements report



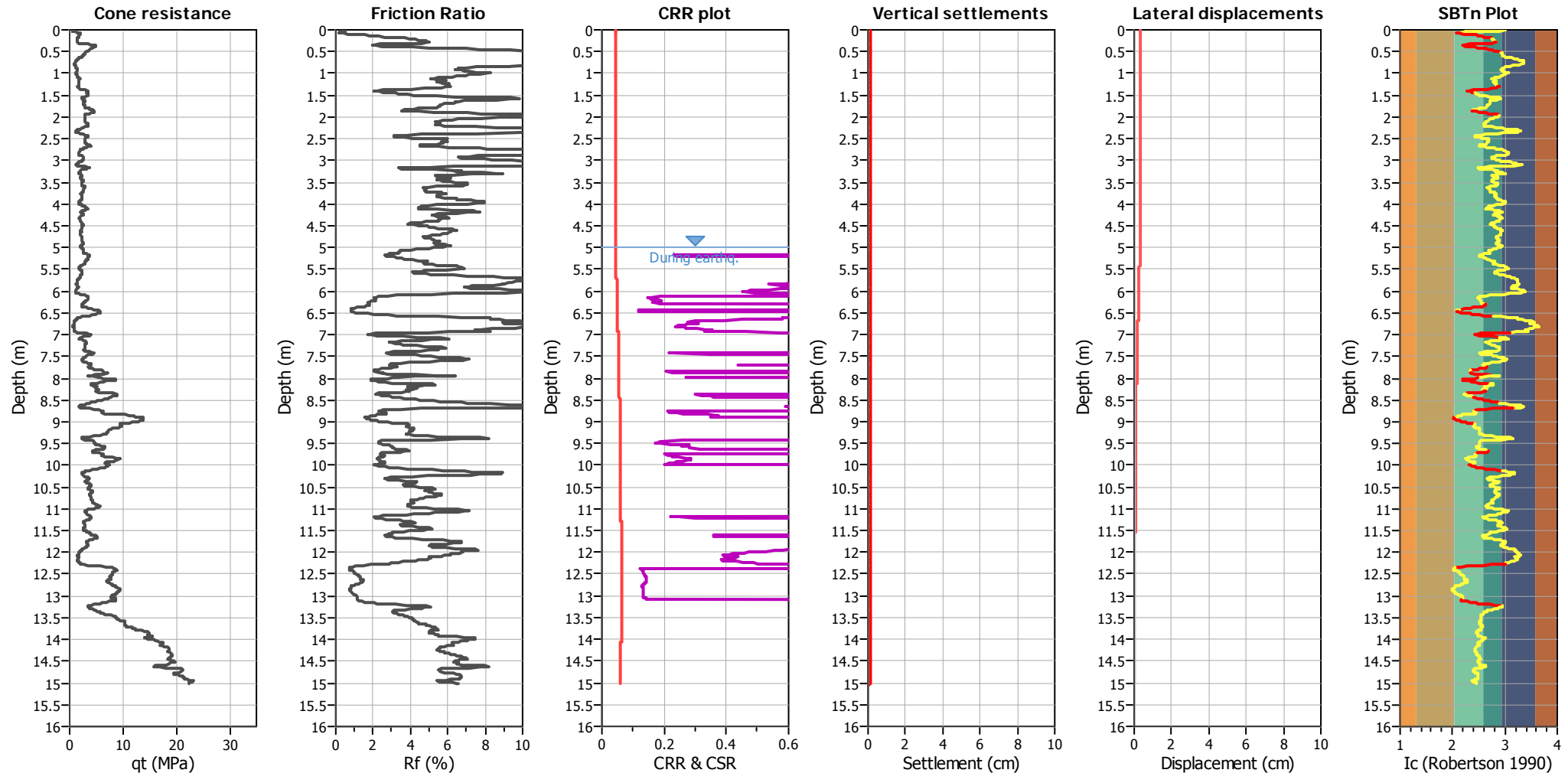


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New Zealand

Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-01\_SLS

Total depth: 15.02 m



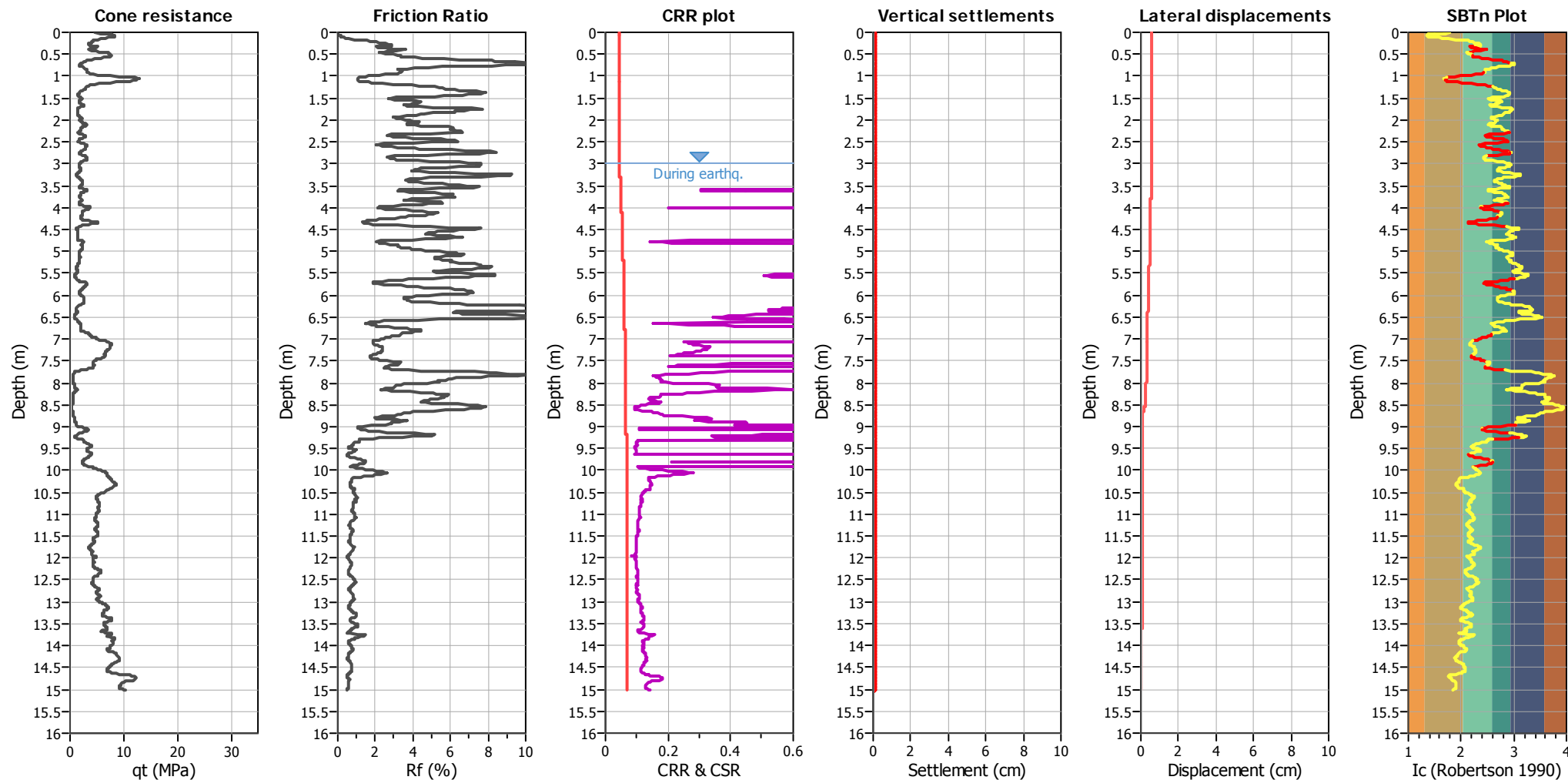
|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 5.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 5.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-02\_SLS  
Total depth: 15.03 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |

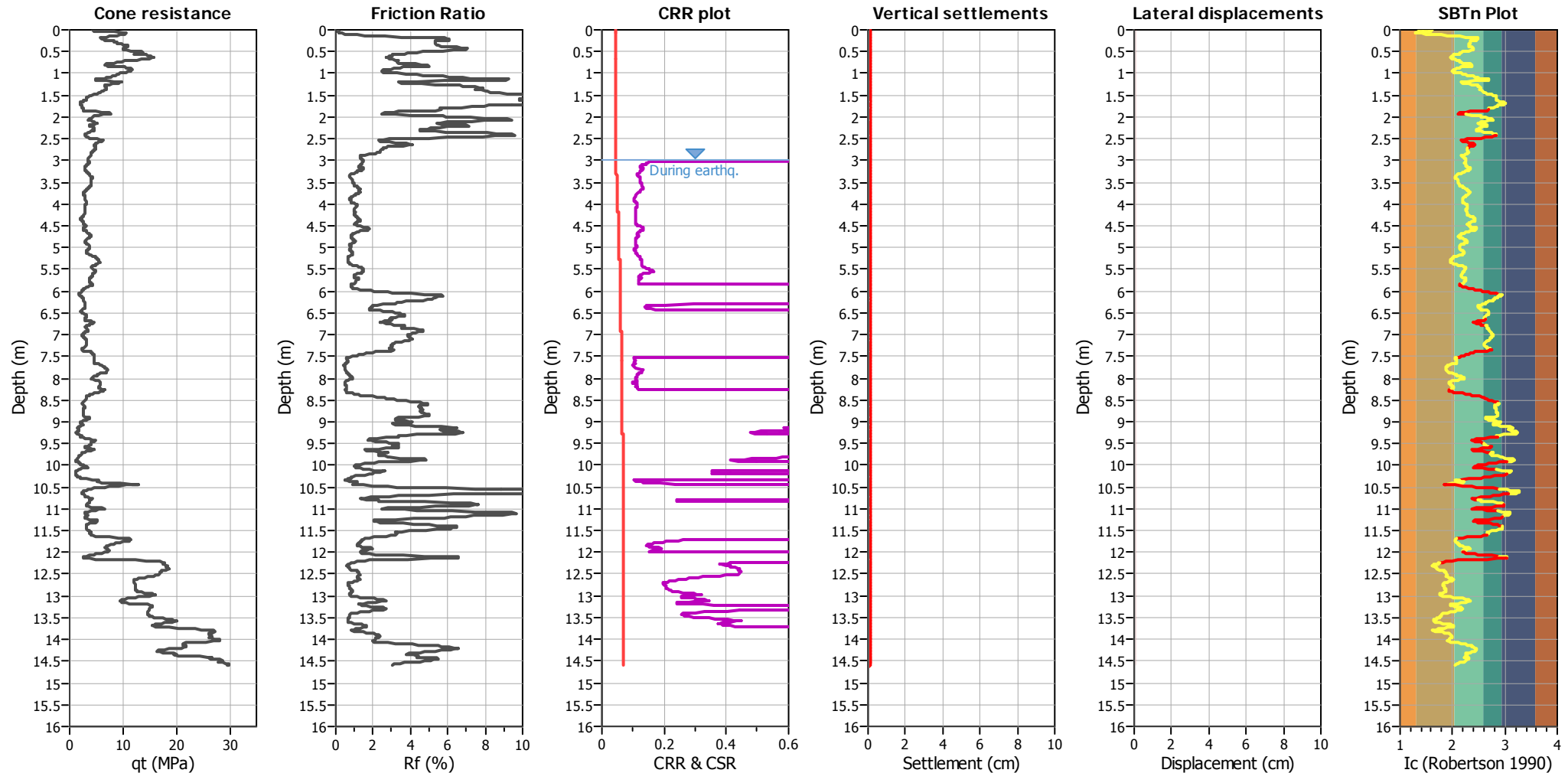


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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-03\_SLS

Total depth: 14.59 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



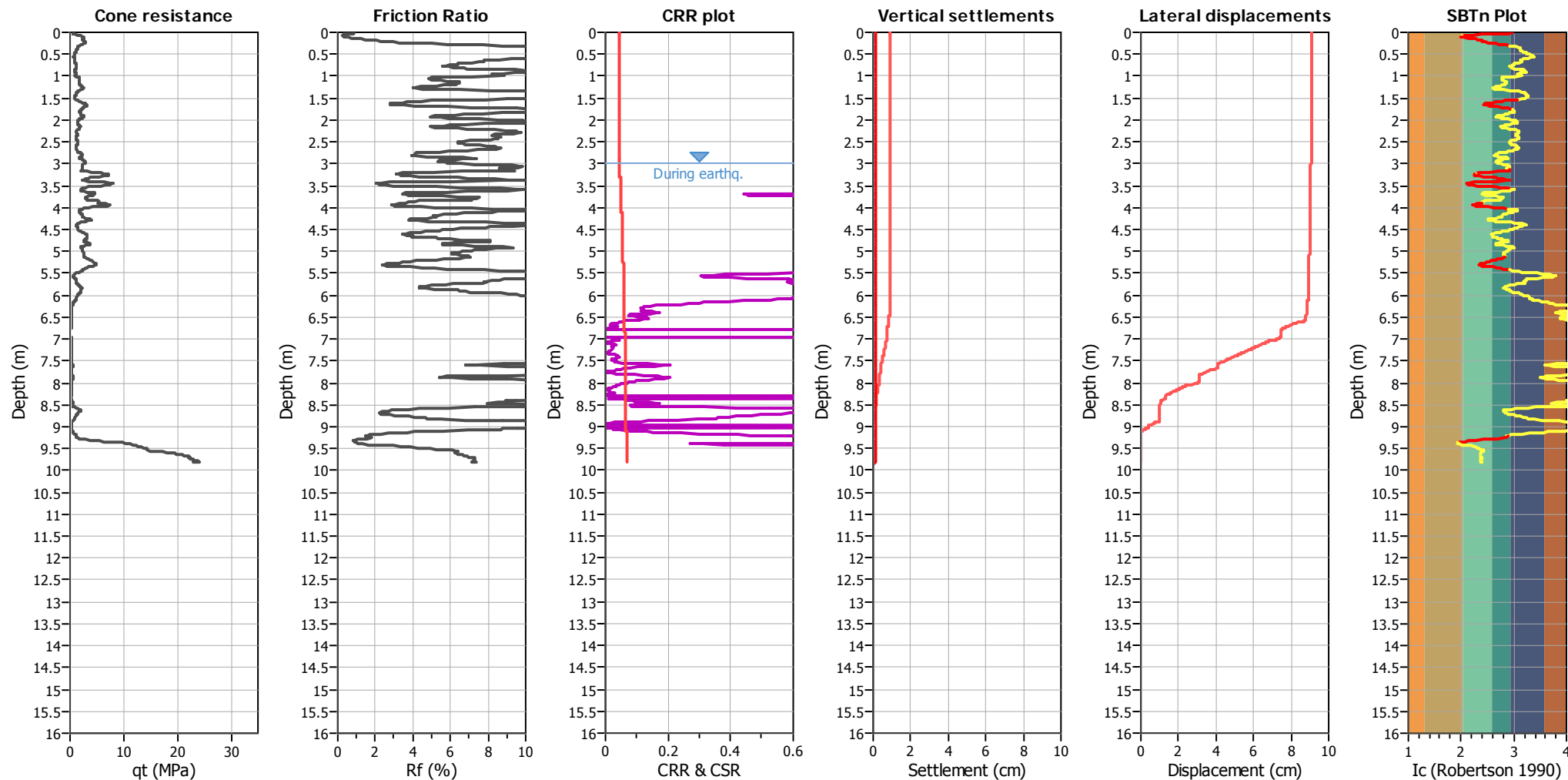
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE

Location: TAURANGA

CPT: CPT-04\_SLS

Total depth: 9.82 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



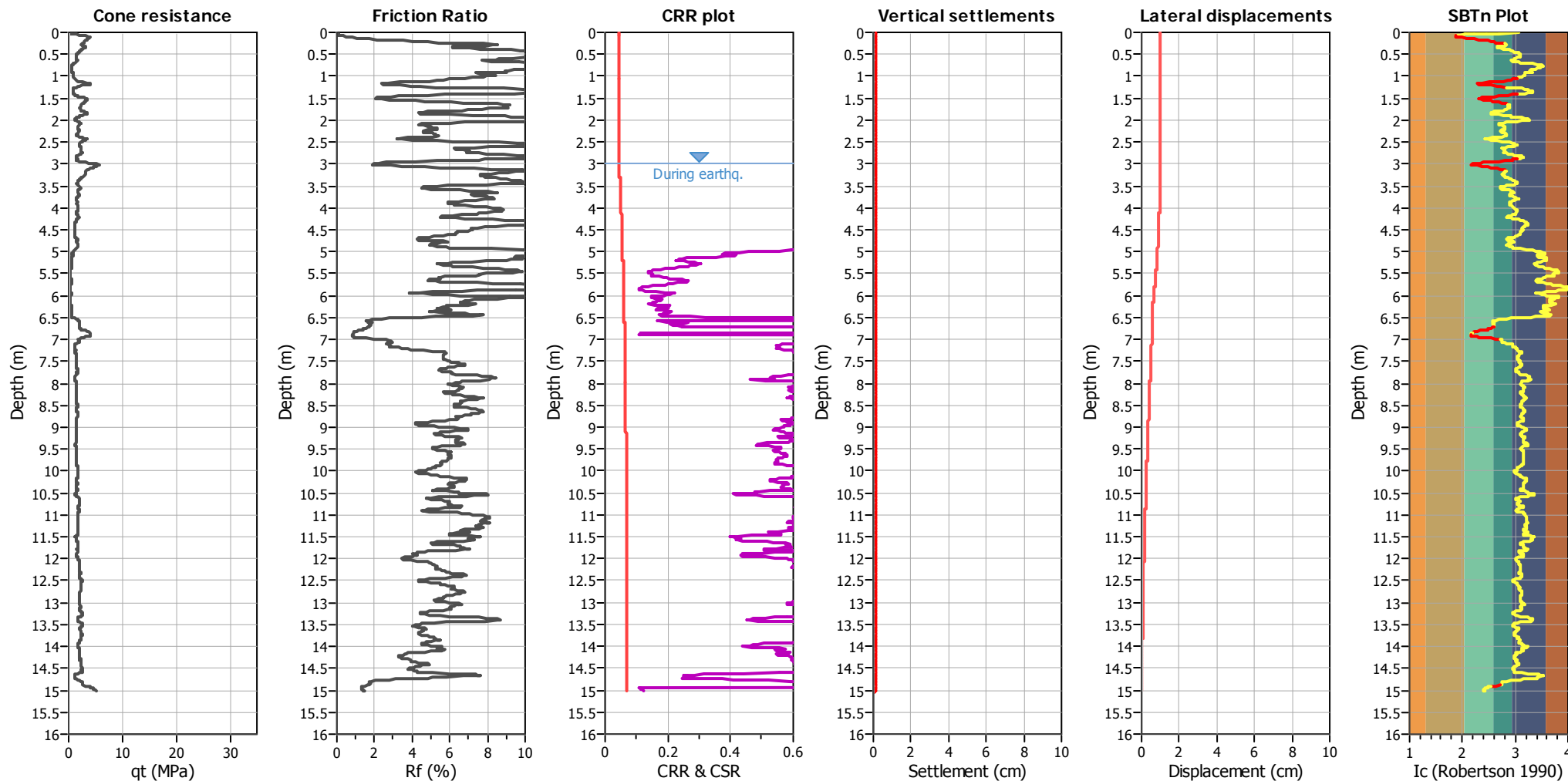
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE

Location: TAURANGA

CPT: CPT-05\_SLS

Total depth: 15.03 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



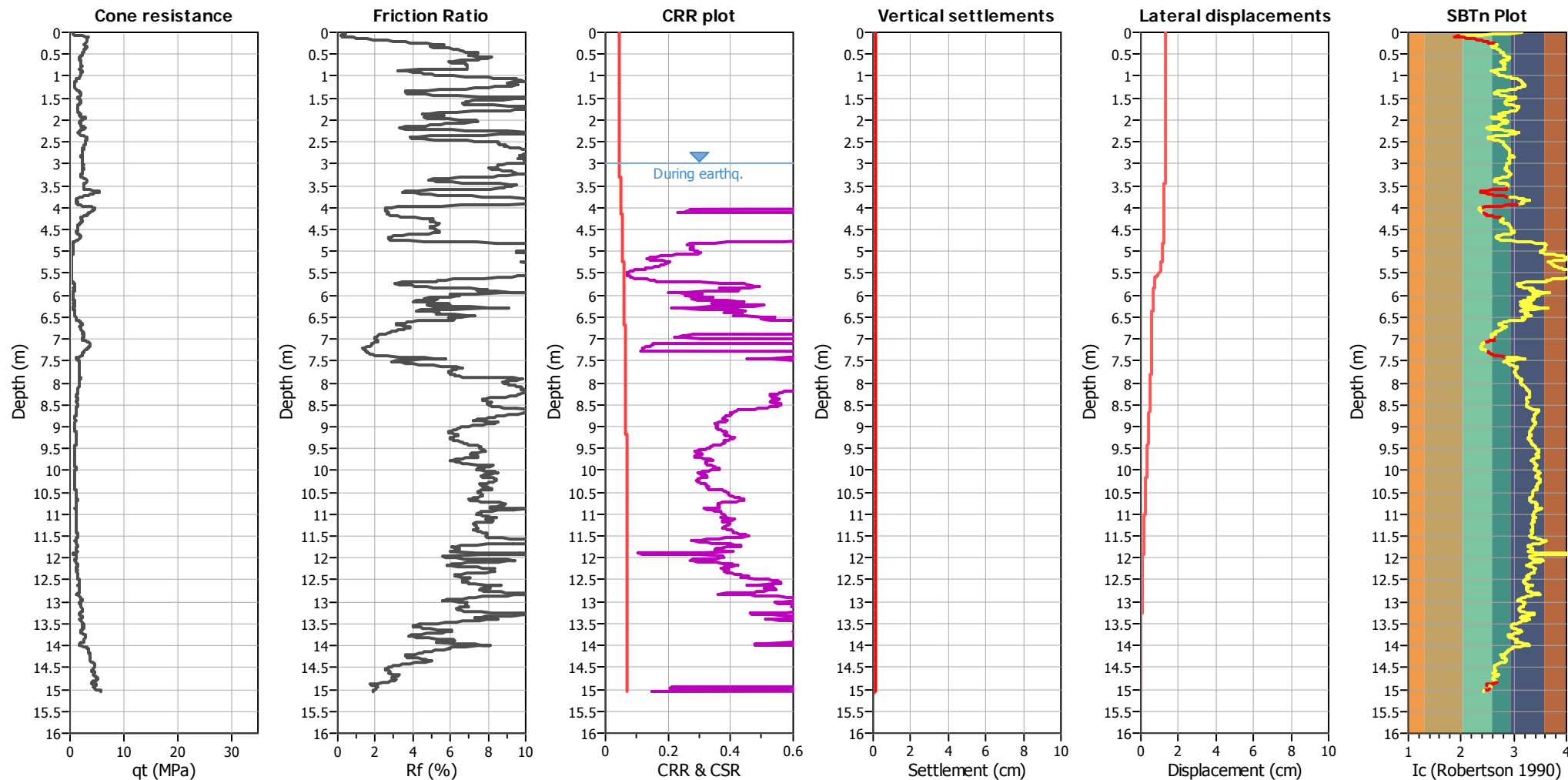
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New Zealand

Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE

Location: TAURANGA

CPT: CPT-06\_SLS

Total depth: 15.04 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |

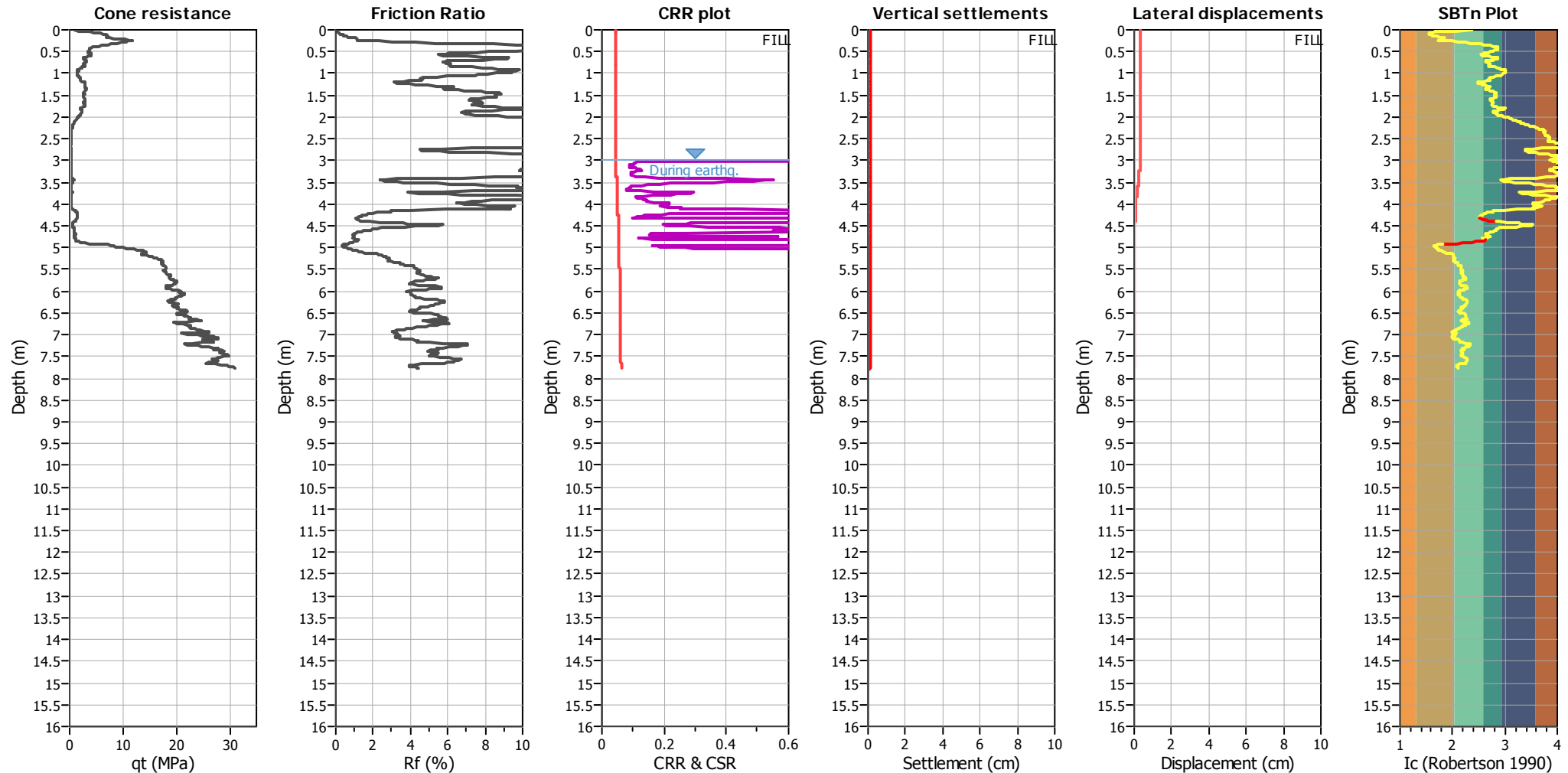


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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-07\_SLS

Total depth: 7.77 m



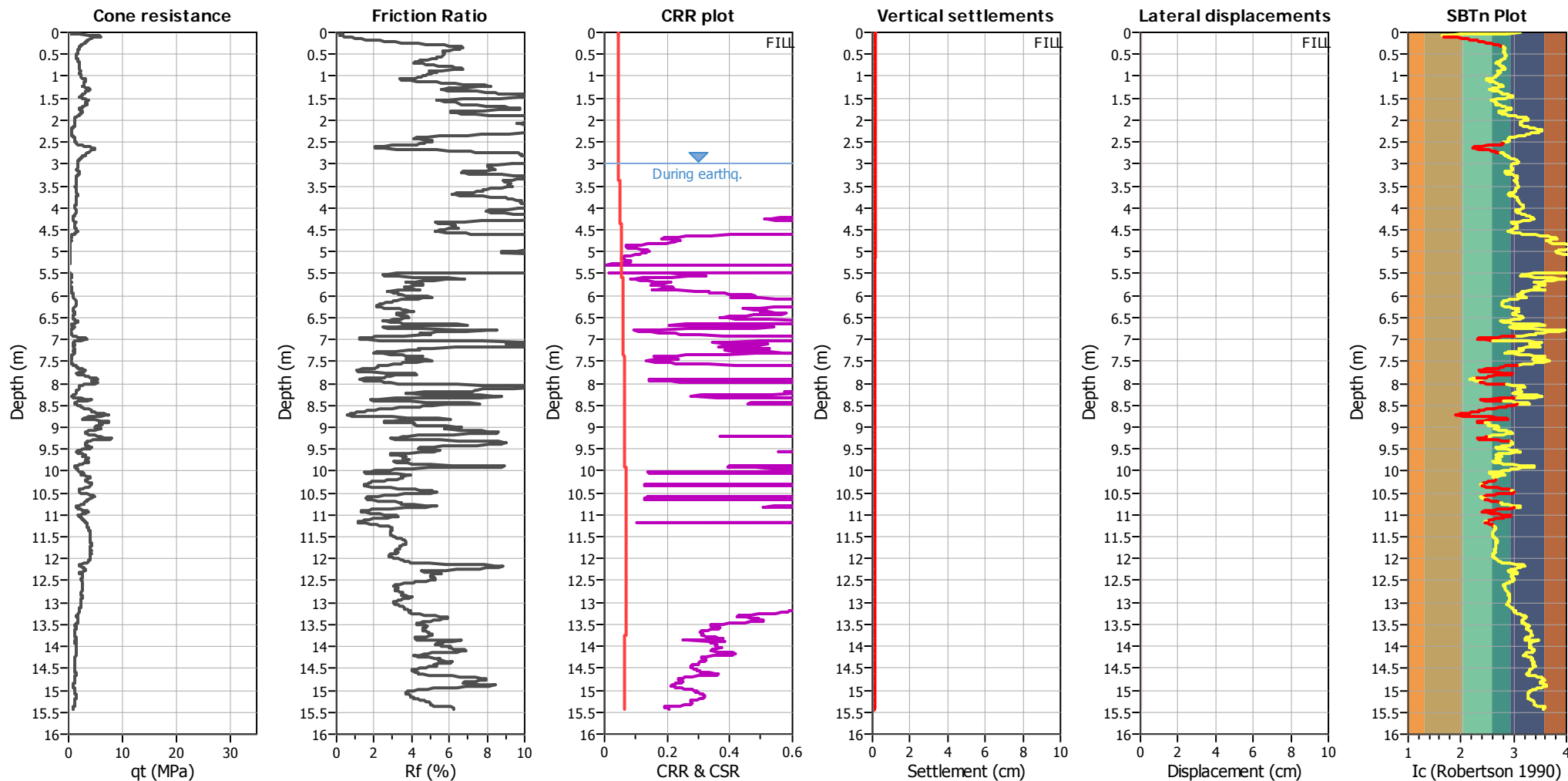
|                              |                   |                           |              |                         |                         |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-------------------------|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | Yes                     | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.50 m       | Fill height:            | 0.50 m                  | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | 17.00 kN/m <sup>3</sup> | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes                     | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes                     | MSF method:          | Method based |



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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-08\_SLS  
Total depth: 15.42 m



|                              |                   |                           |              |                         |                         |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-------------------------|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | Yes                     | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.50 m       | Fill height:            | 0.50 m                  | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | 17.00 kN/m <sup>3</sup> | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes                     | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes                     | MSF method:          | Method based |



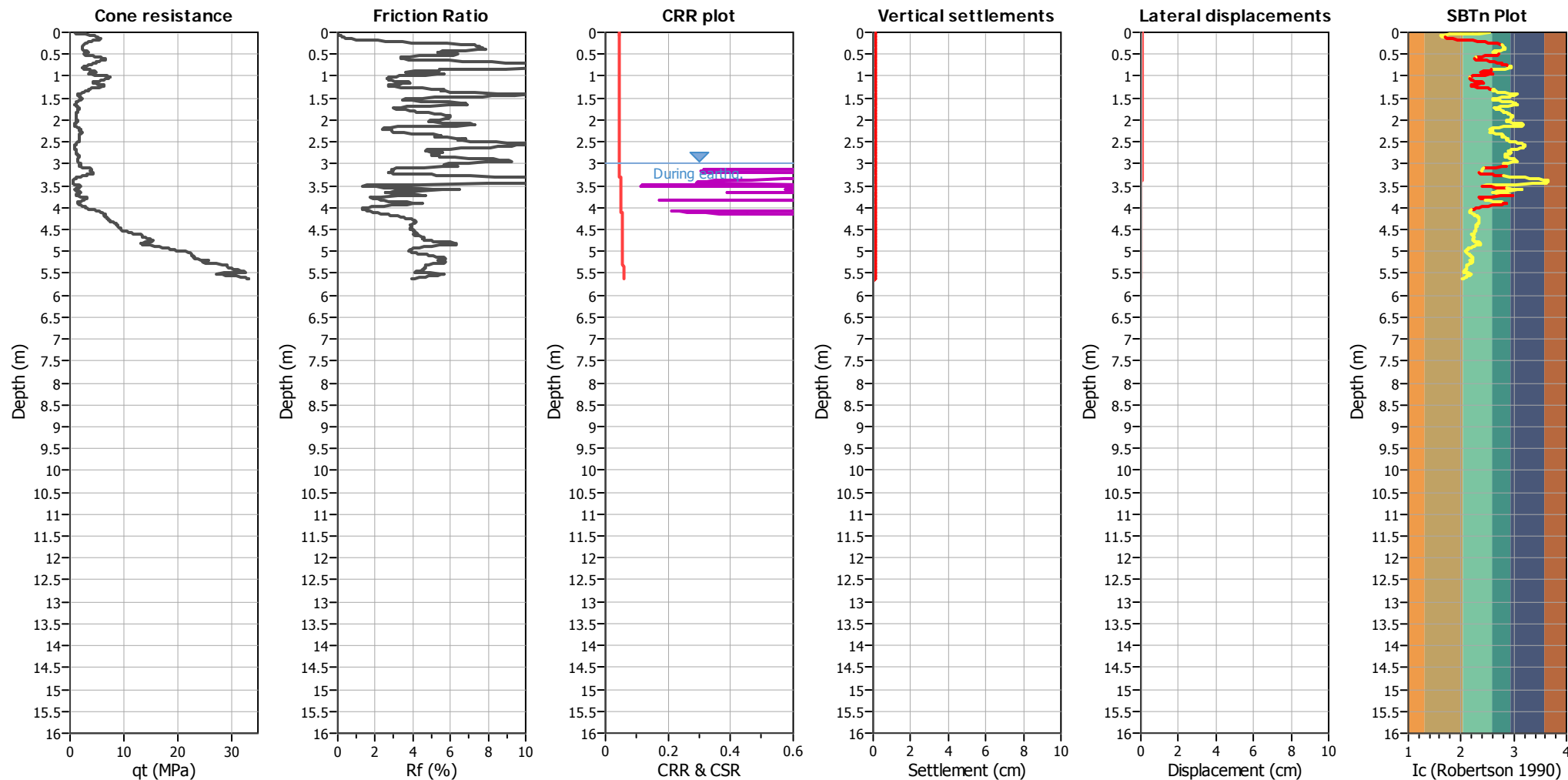
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96 Cameron Road, Tauranga  
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE

Location: TAURANGA

CPT: CPT-09\_SLS

Total depth: 5.64 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



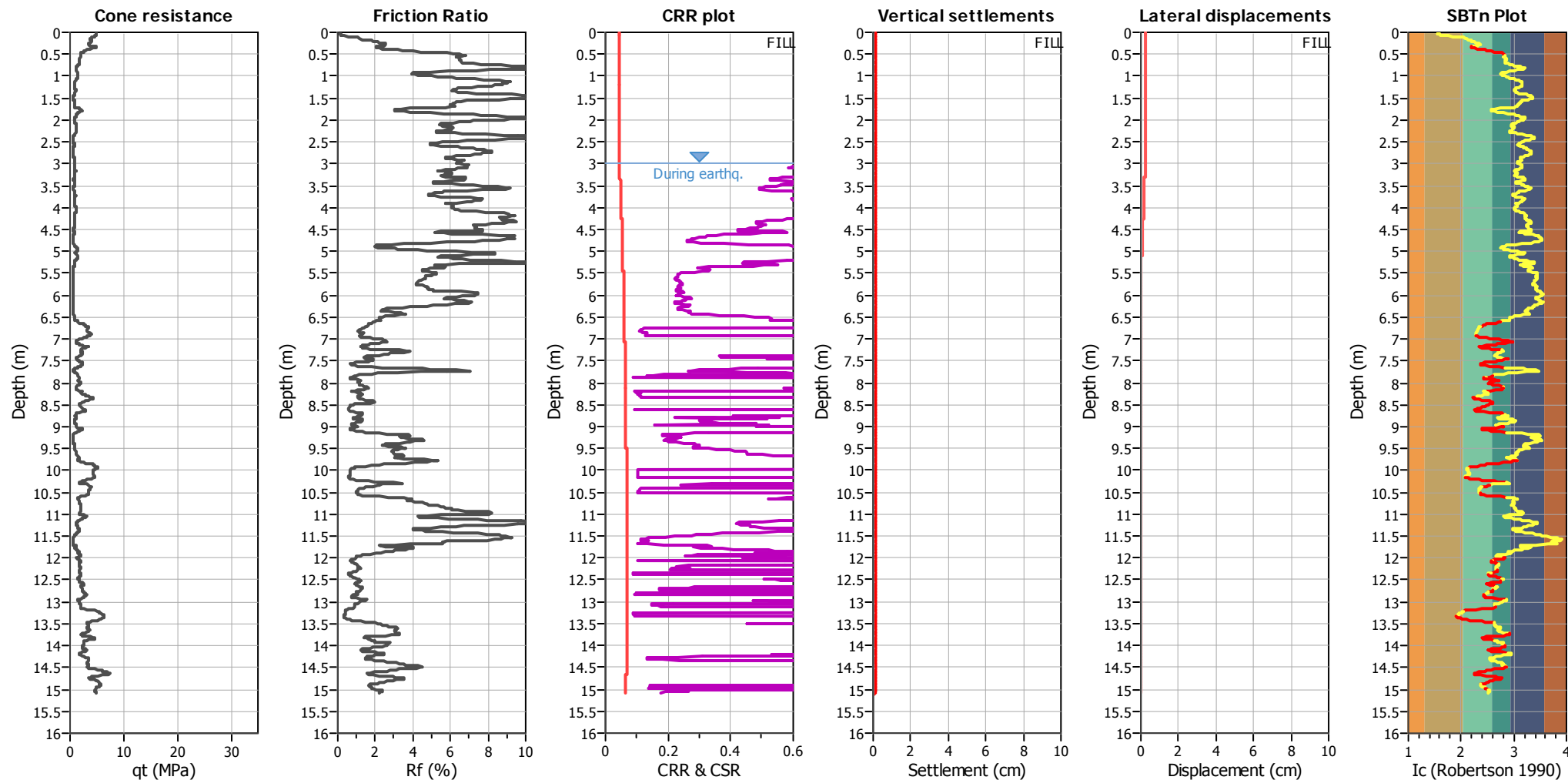
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3110  
New Zealand

Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE

Location: TAURANGA

CPT: CPT-10\_SLS

Total depth: 15.07 m



|                              |                   |                           |              |                         |                         |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-------------------------|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | Yes                     | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.50 m       | Fill height:            | 0.50 m                  | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | 17.00 kN/m <sup>3</sup> | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes                     | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes                     | MSF method:          | Method based |



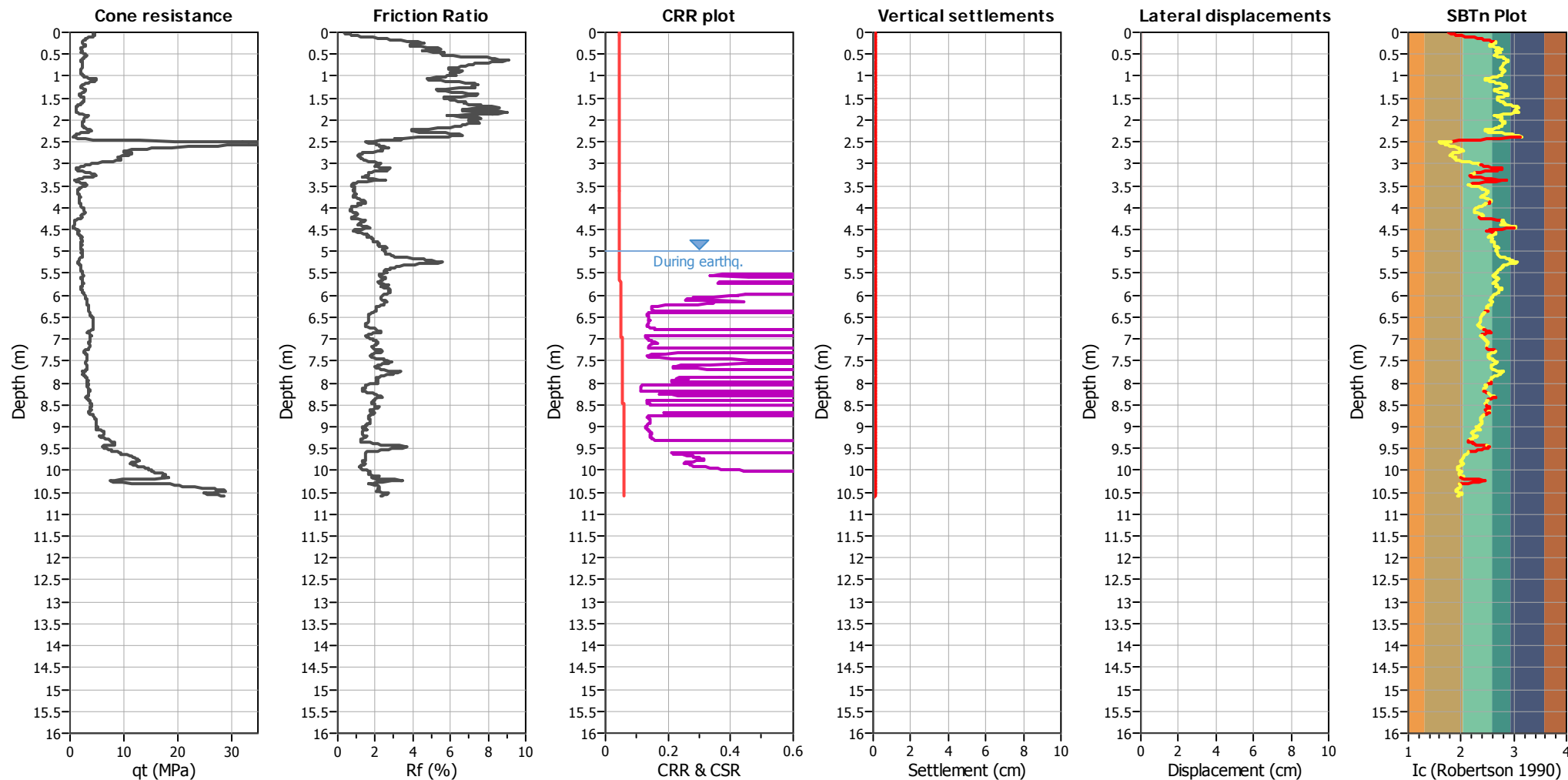
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE

Location: TAURANGA

CPT: CPT-11\_SLS

Total depth: 10.58 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 5.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 5.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |

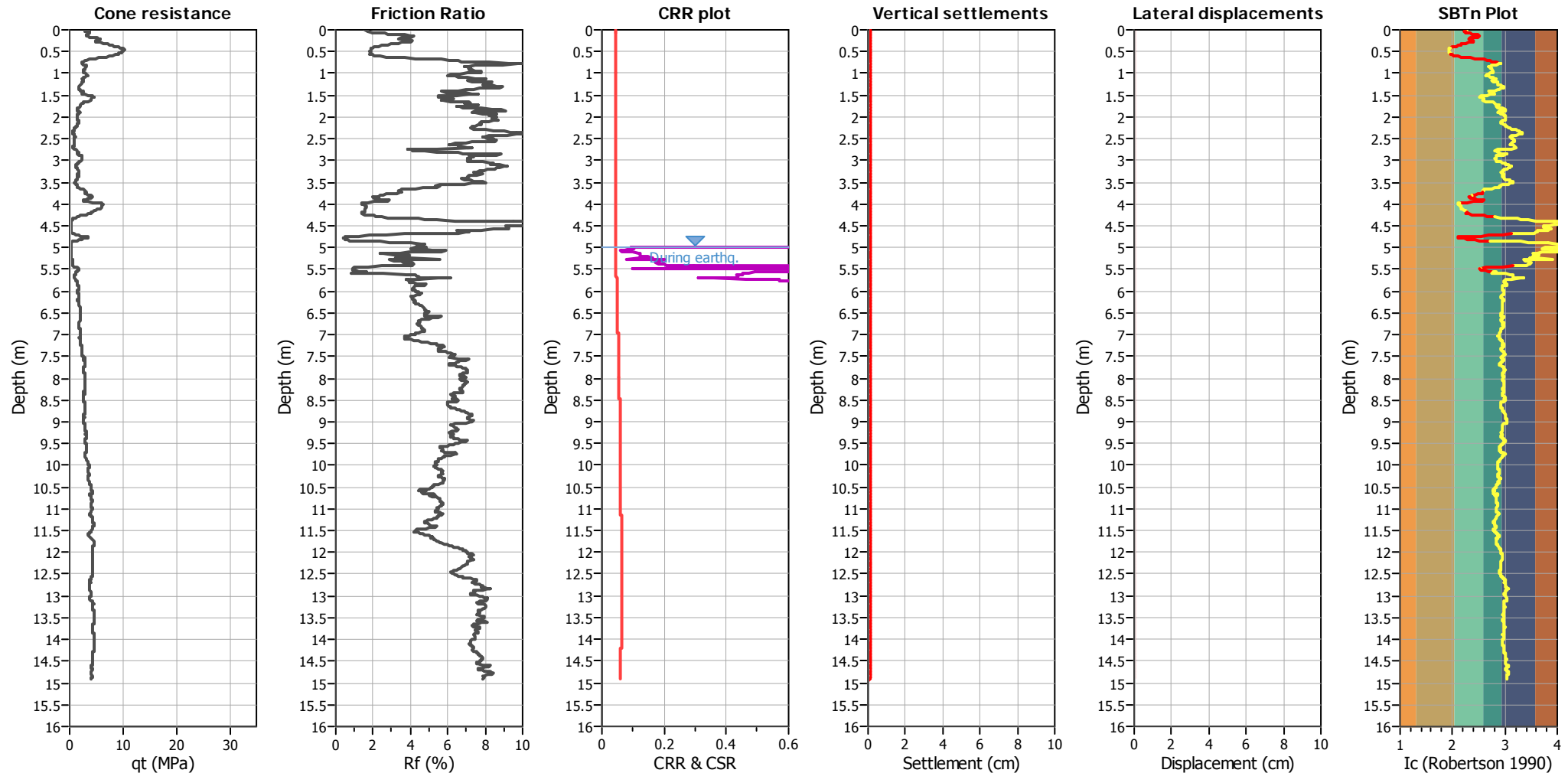


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96 Cameron Road, Tauranga  
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST SLS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-12\_SLS

Total depth: 14.90 m



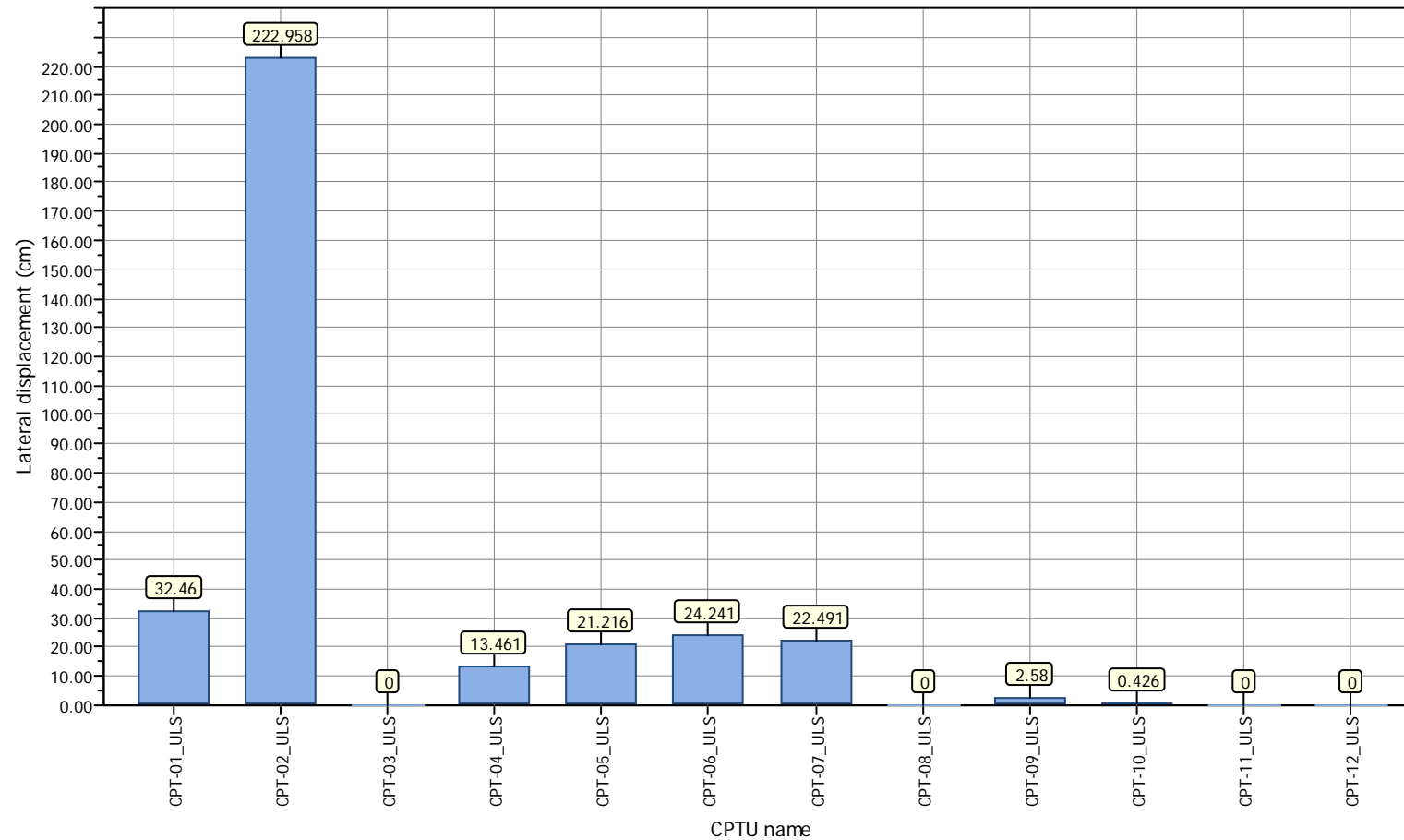
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|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 5.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 5.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.07              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



Project title : GENZTAUC13086AE - THE LAKES STAGE 2 QRST ULS EARTHQUAKE

Location : TAURANGA

### Overall lateral displacements report



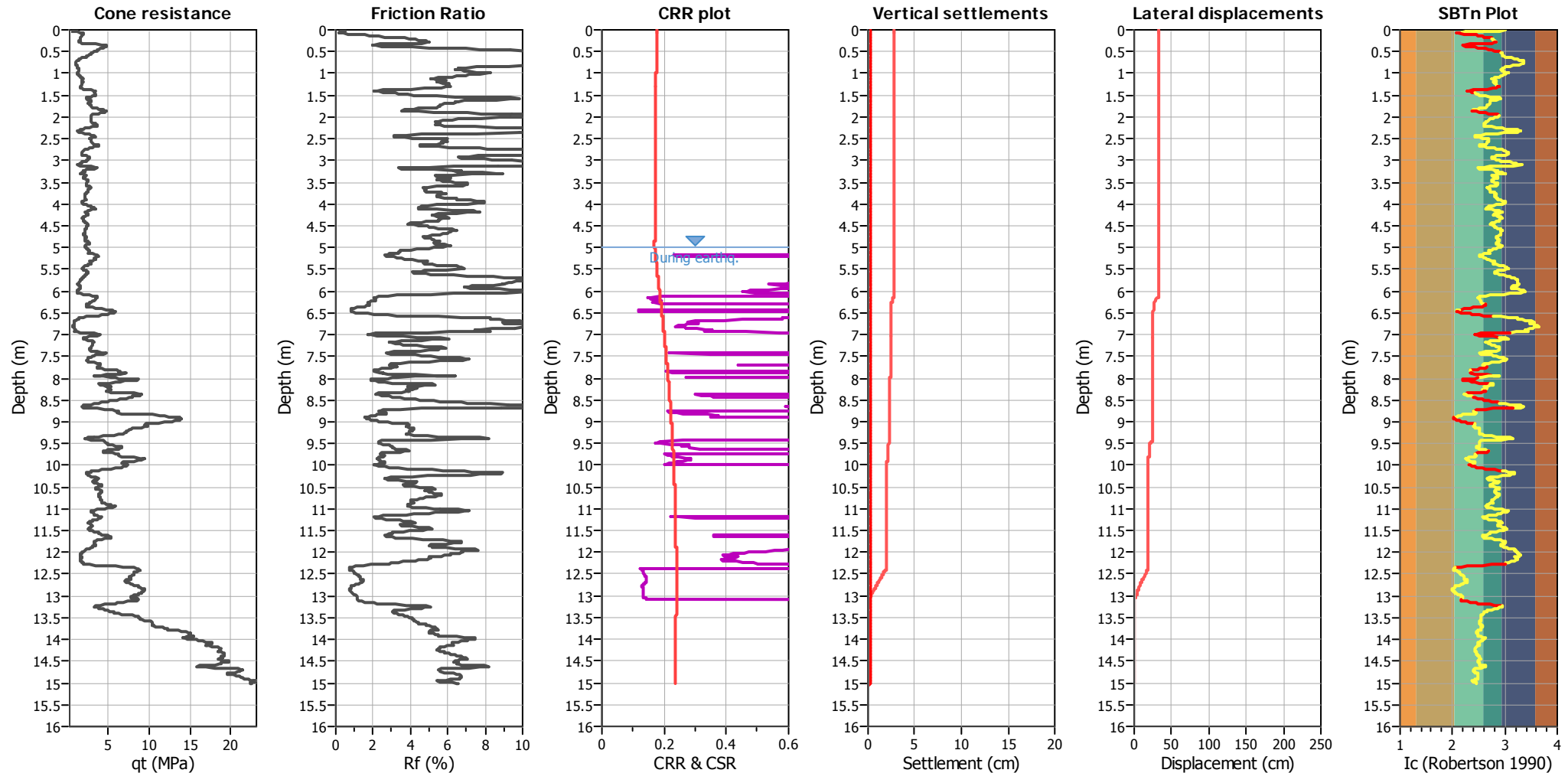


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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-01\_ULS

Total depth: 15.02 m



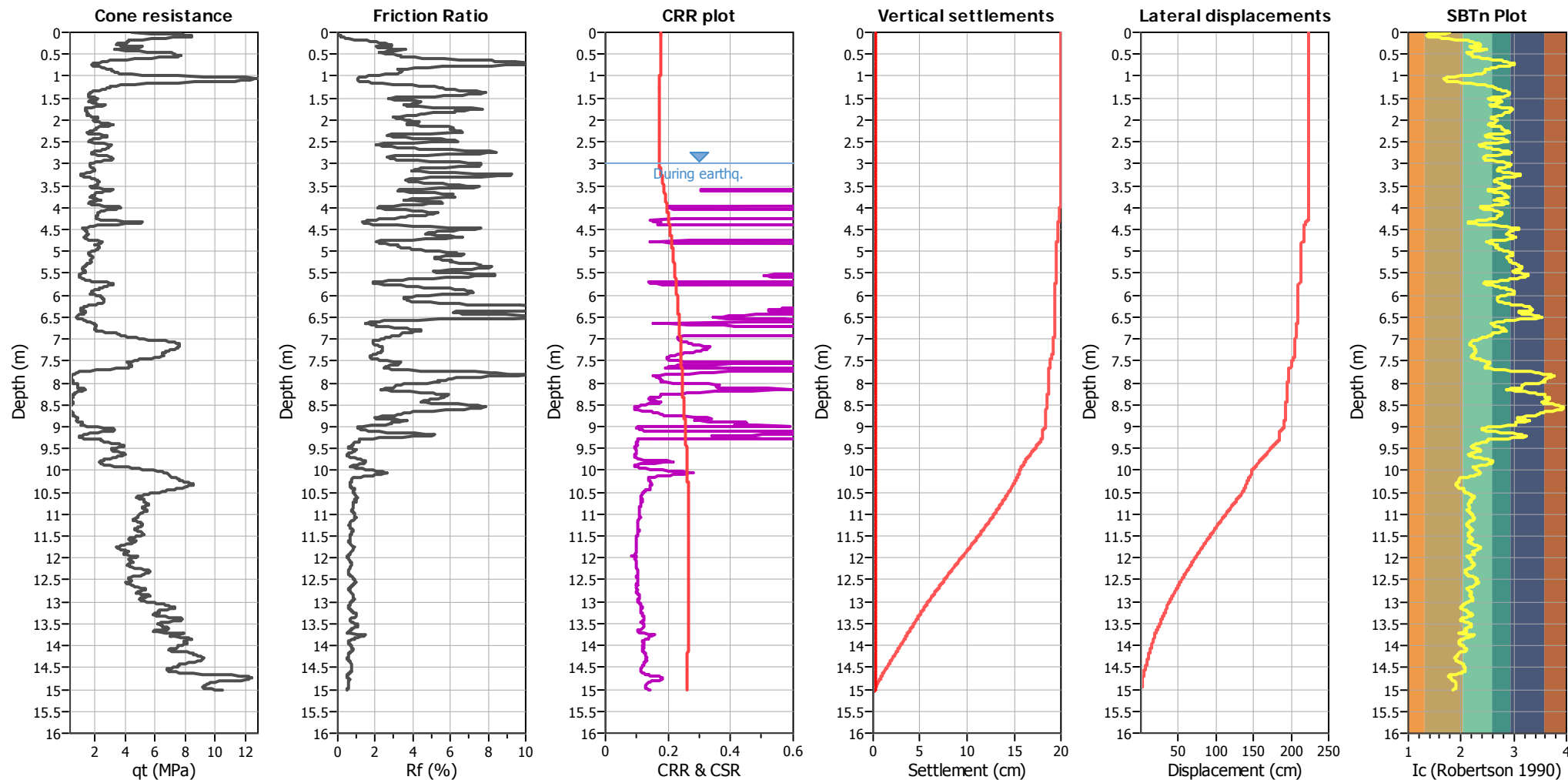
|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 5.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 5.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-02\_ULS  
Total depth: 15.03 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | No  | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



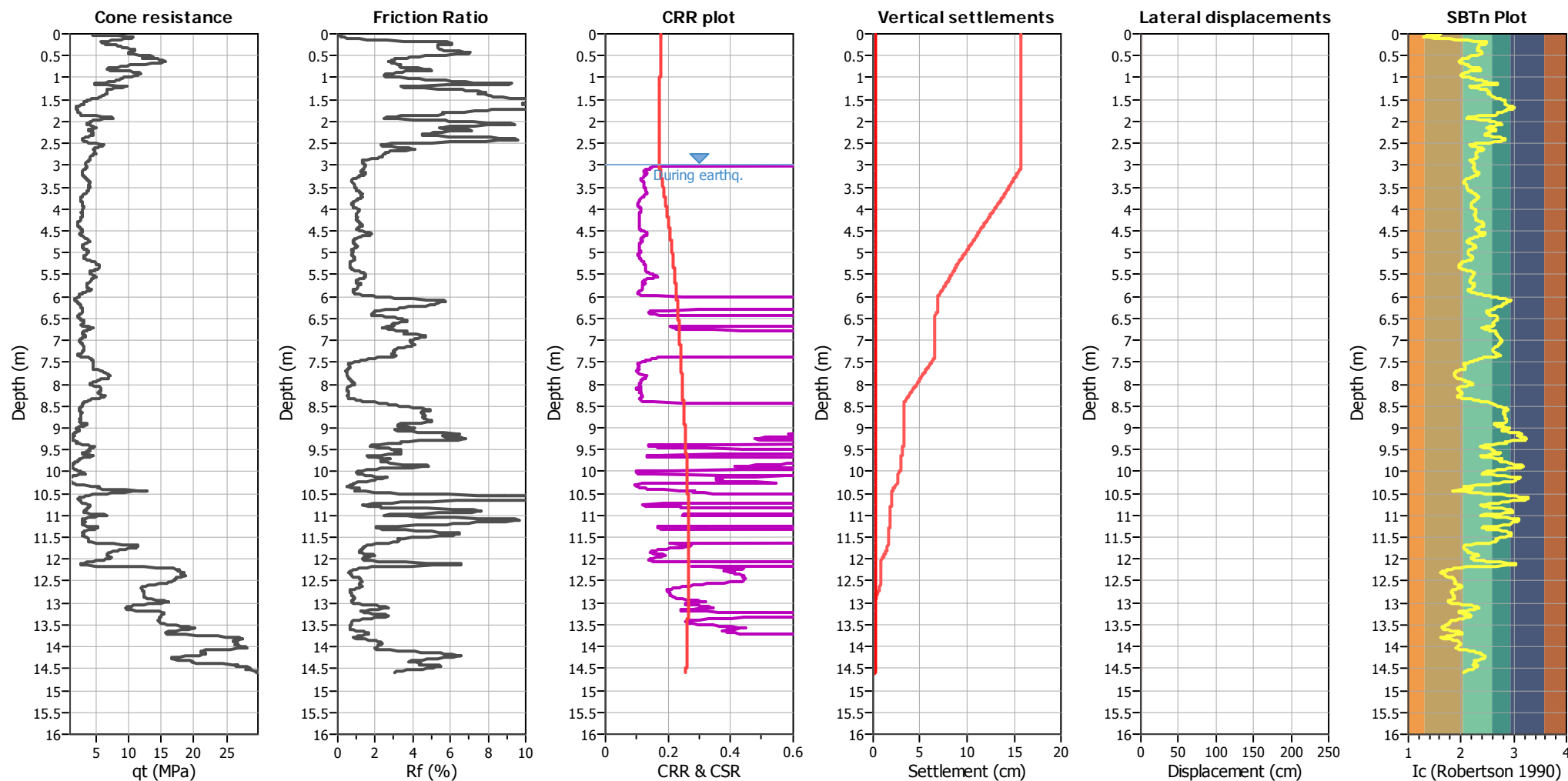
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New Zealand

Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE

Location: TAURANGA

CPT: CPT-03\_ULS

Total depth: 14.59 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | No  | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



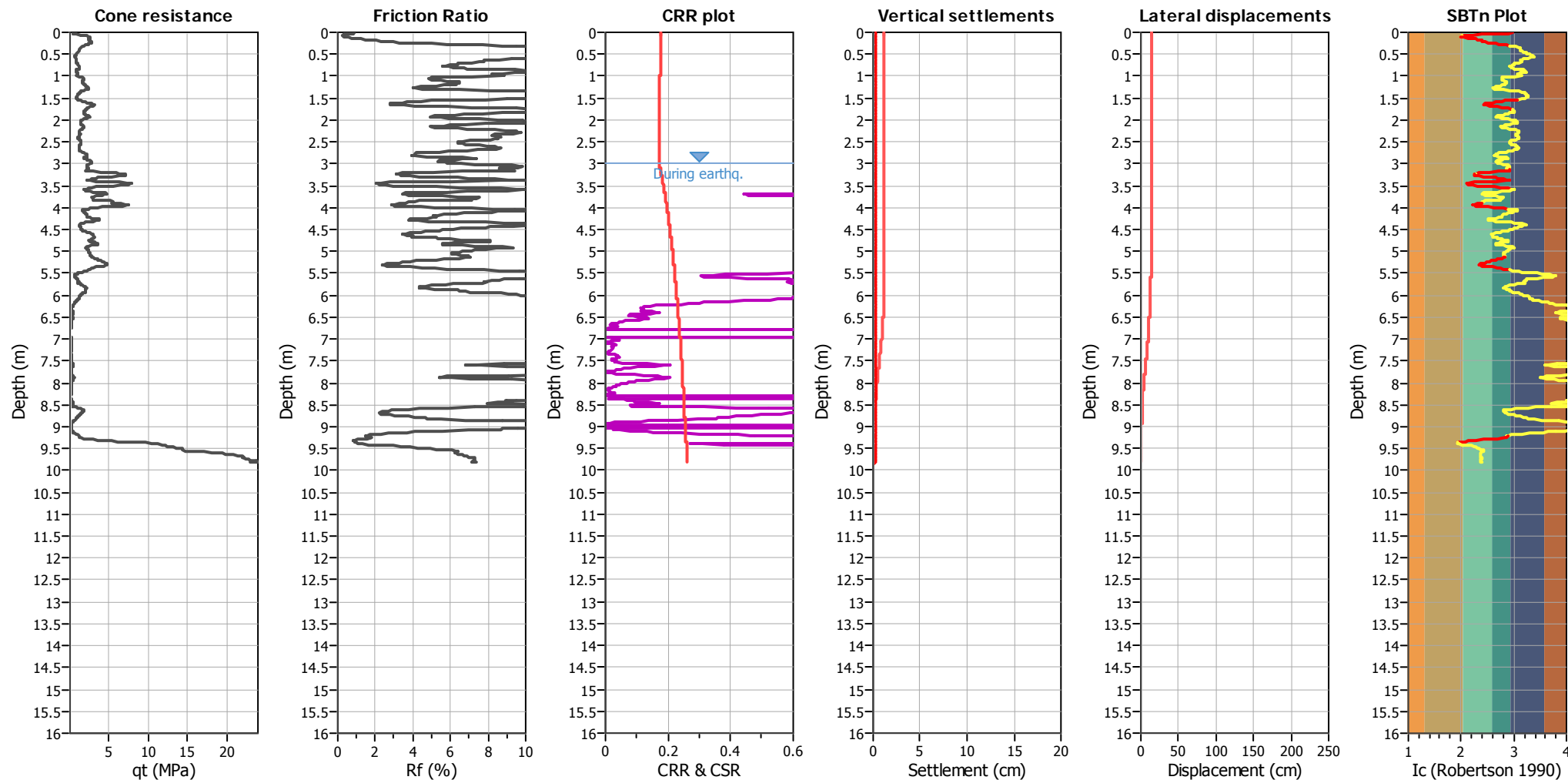
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE

Location: TAURANGA

CPT: CPT-04\_ULS

Total depth: 9.82 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |

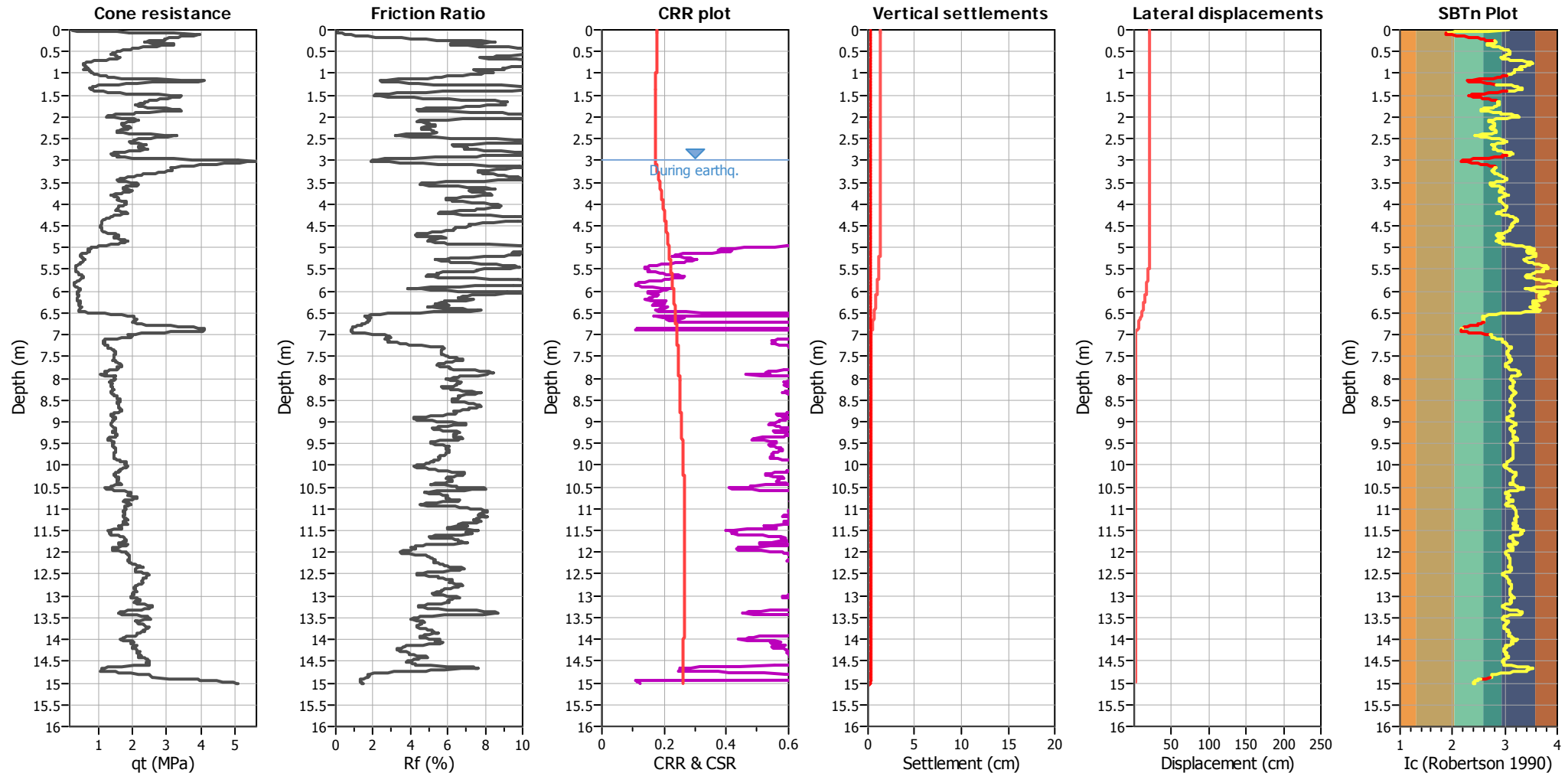


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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-05\_ULS

Total depth: 15.03 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



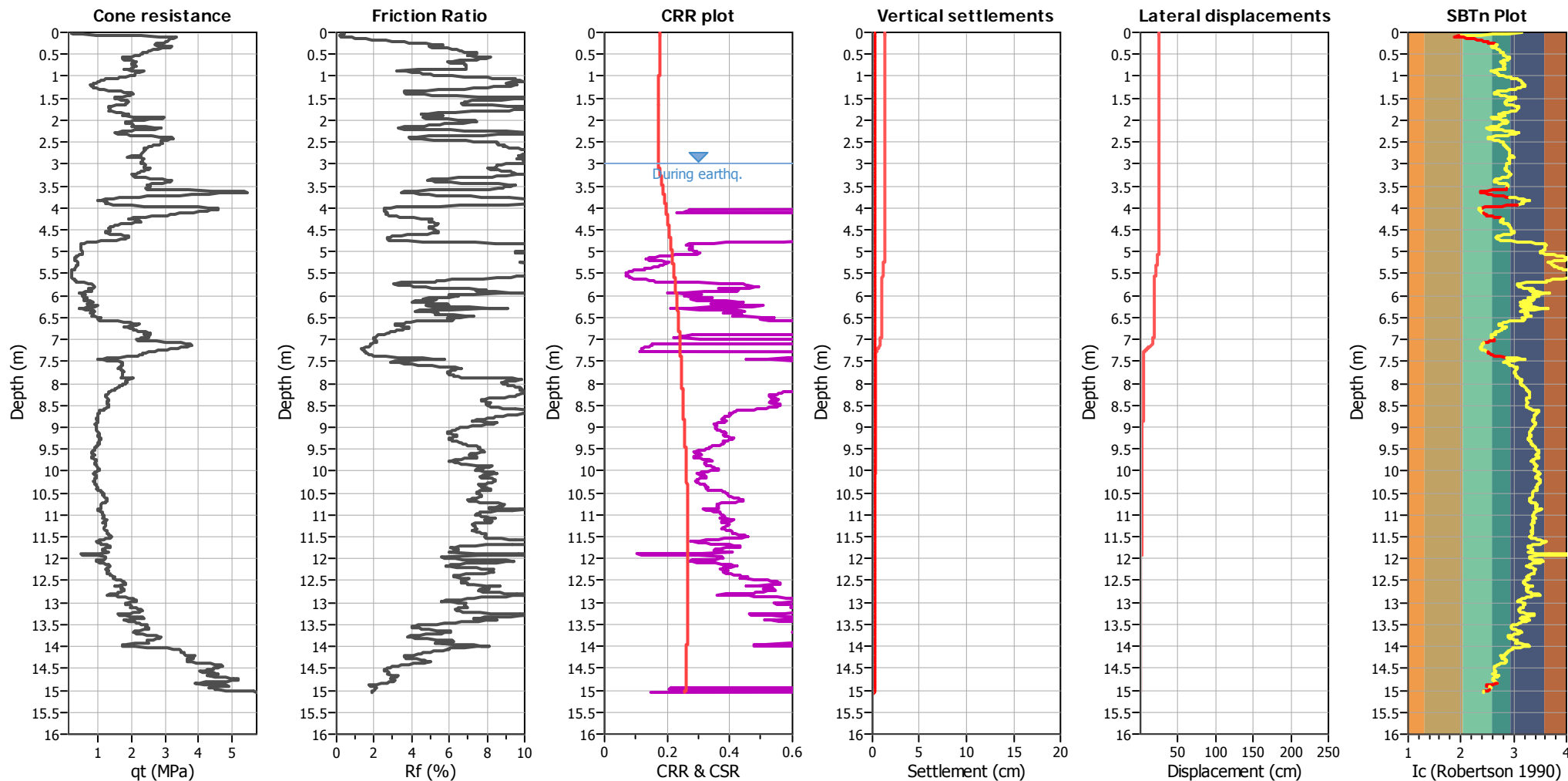
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE

Location: TAURANGA

CPT: CPT-06\_ULS

Total depth: 15.04 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |



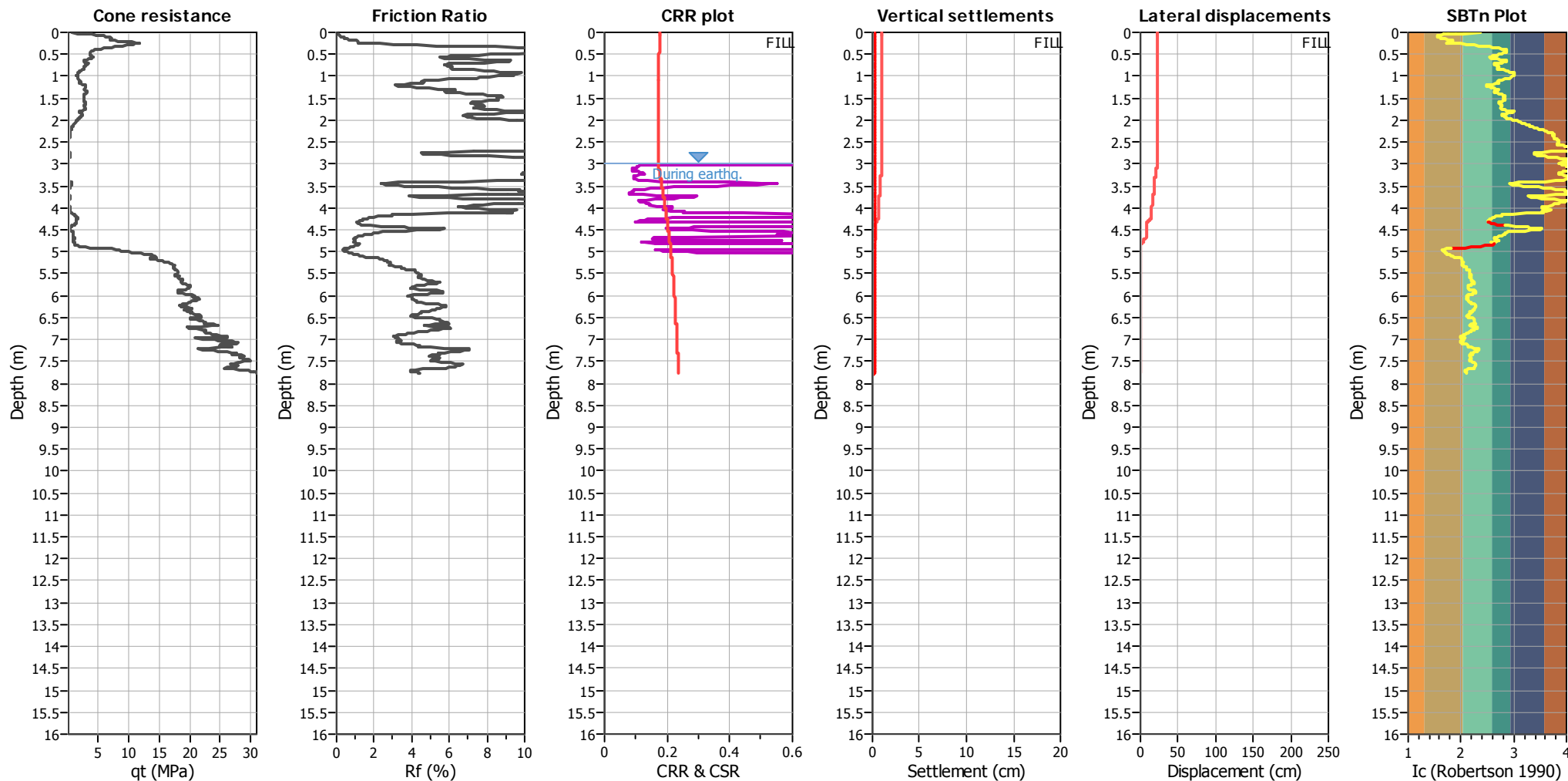
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE

Location: TAURANGA

CPT: CPT-07\_ULS

Total depth: 7.77 m



|                              |                   |                           |              |                         |                         |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-------------------------|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | Yes                     | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.50 m       | Fill height:            | 0.50 m                  | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | 17.00 kN/m <sup>3</sup> | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes                     | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes                     | MSF method:          | Method based |



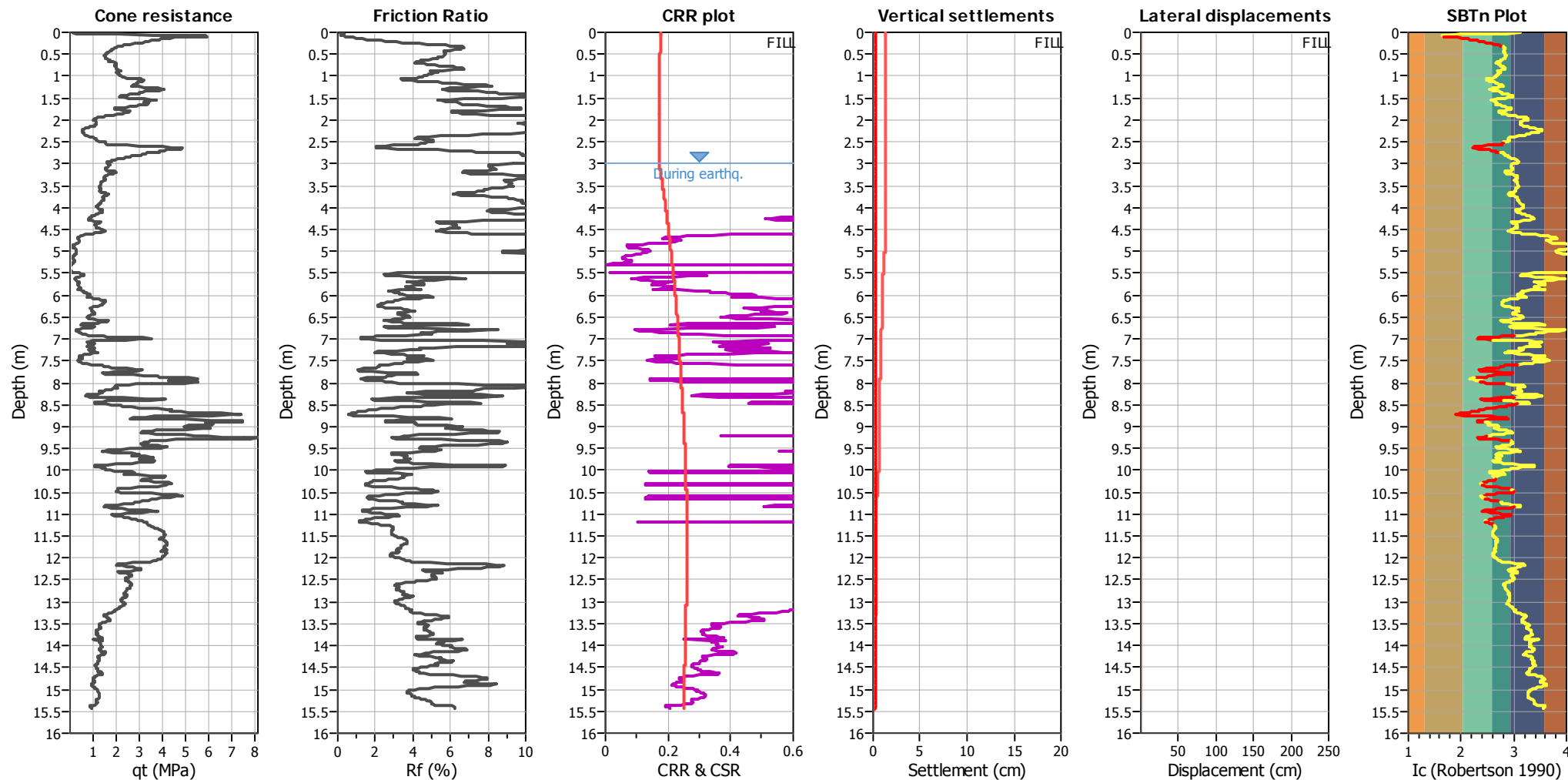
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE

Location: TAURANGA

CPT: CPT-08\_ULS

Total depth: 15.42 m



|                              |                   |                           |              |                         |                         |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-------------------------|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | Yes                     | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.50 m       | Fill height:            | 0.50 m                  | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | 17.00 kN/m <sup>3</sup> | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes                     | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_0$ applied:          | Yes                     | MSF method:          | Method based |



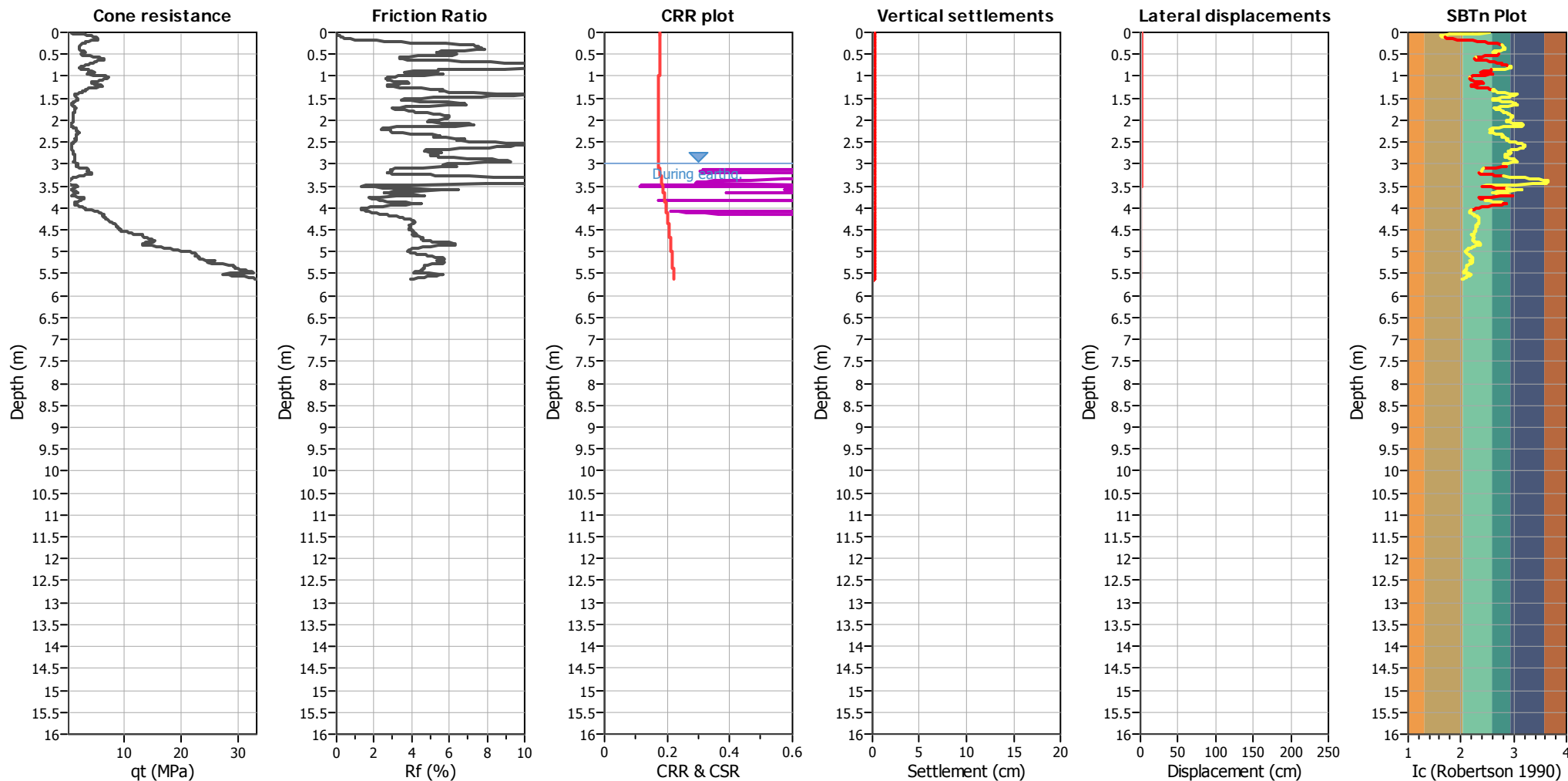
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE

Location: TAURANGA

CPT: CPT-09\_ULS

Total depth: 5.64 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |

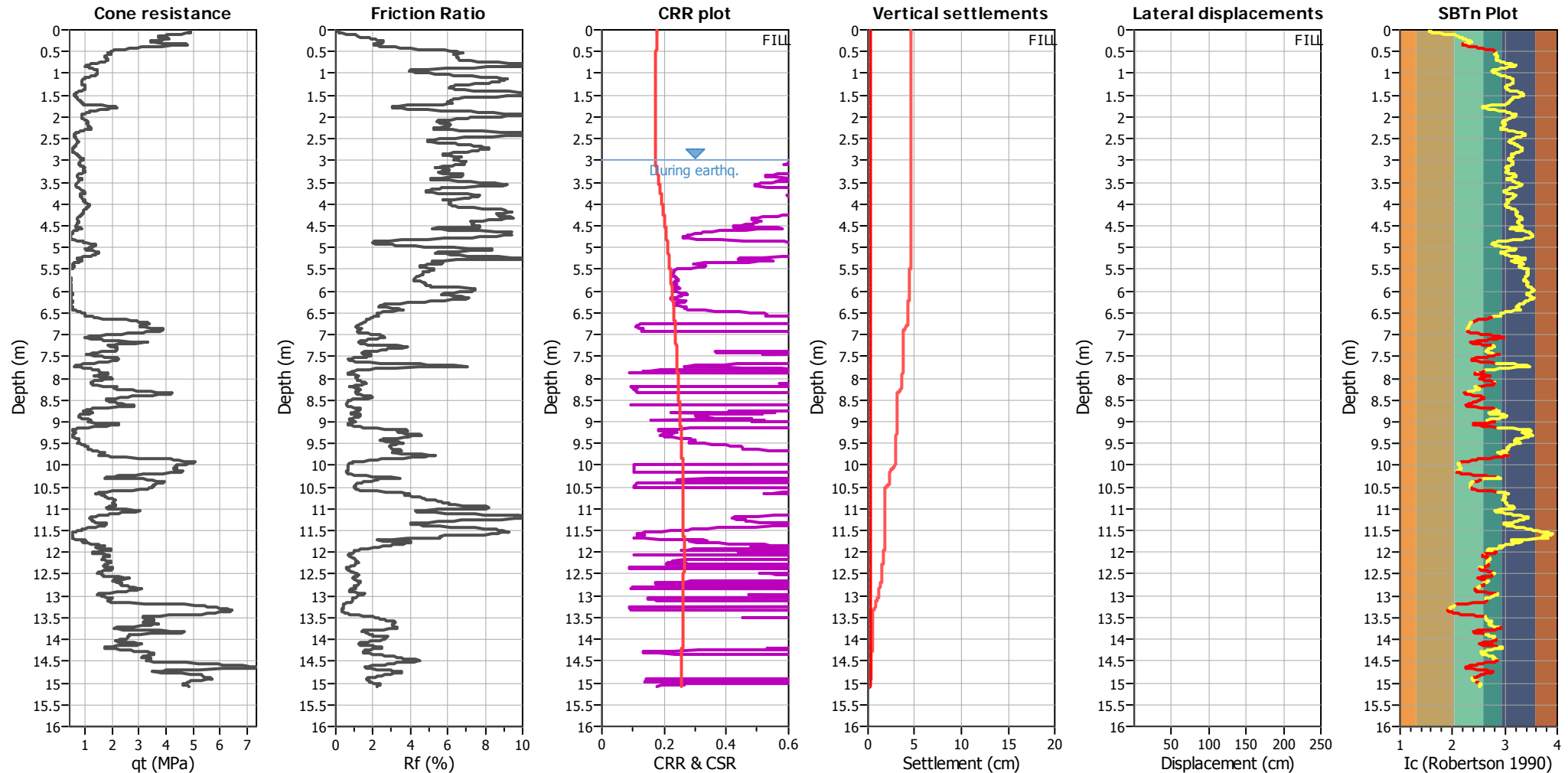


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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-10\_ULS

Total depth: 15.07 m



|                              |                   |                           |              |                         |                         |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-------------------------|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 3.00 m       | Use fill:               | Yes                     | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 3.50 m       | Fill height:            | 0.50 m                  | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | 17.00 kN/m <sup>3</sup> | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes                     | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes                     | MSF method:          | Method based |



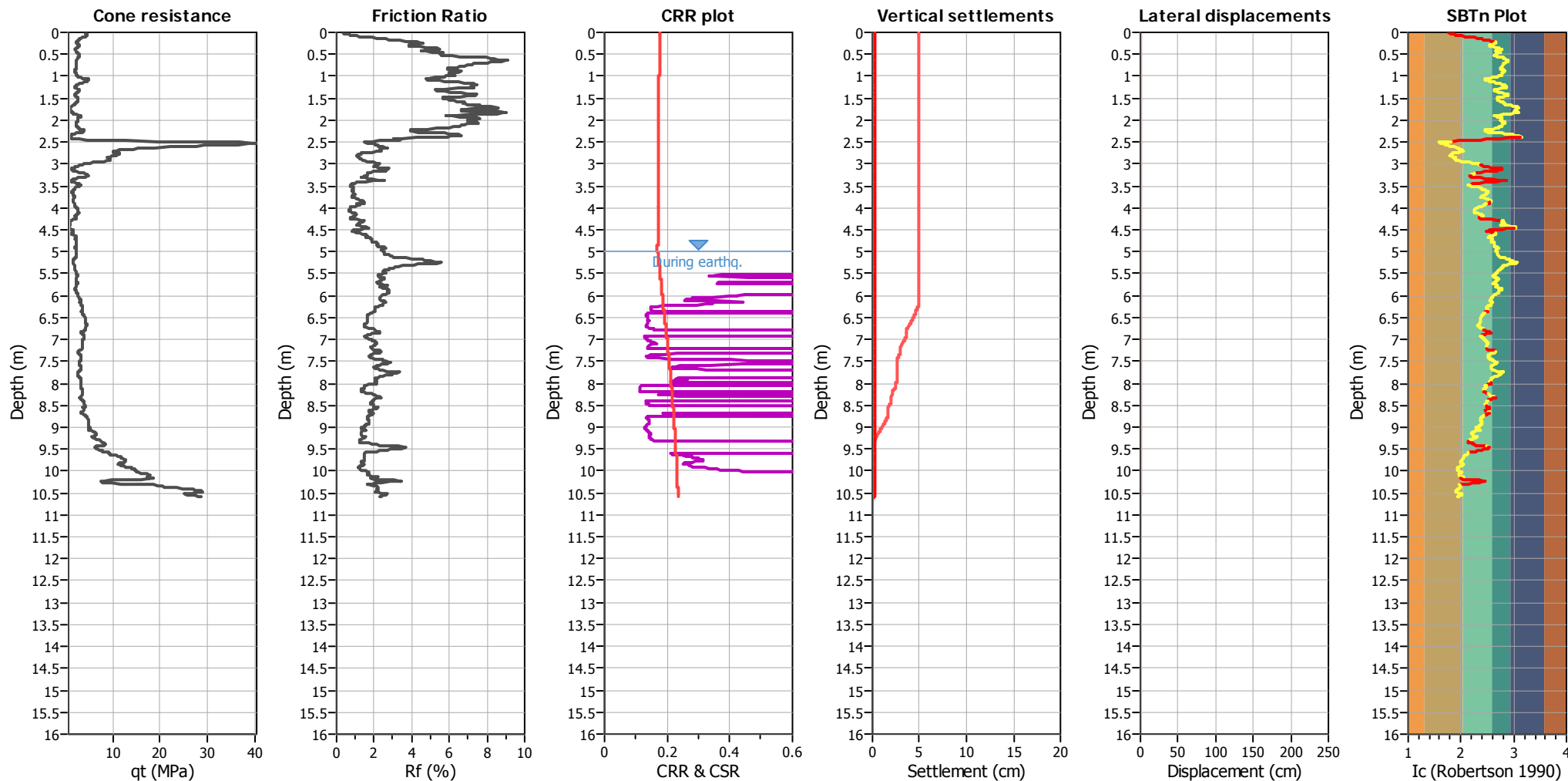
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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE

Location: TAURANGA

CPT: CPT-11\_ULS

Total depth: 10.58 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 5.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 5.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |

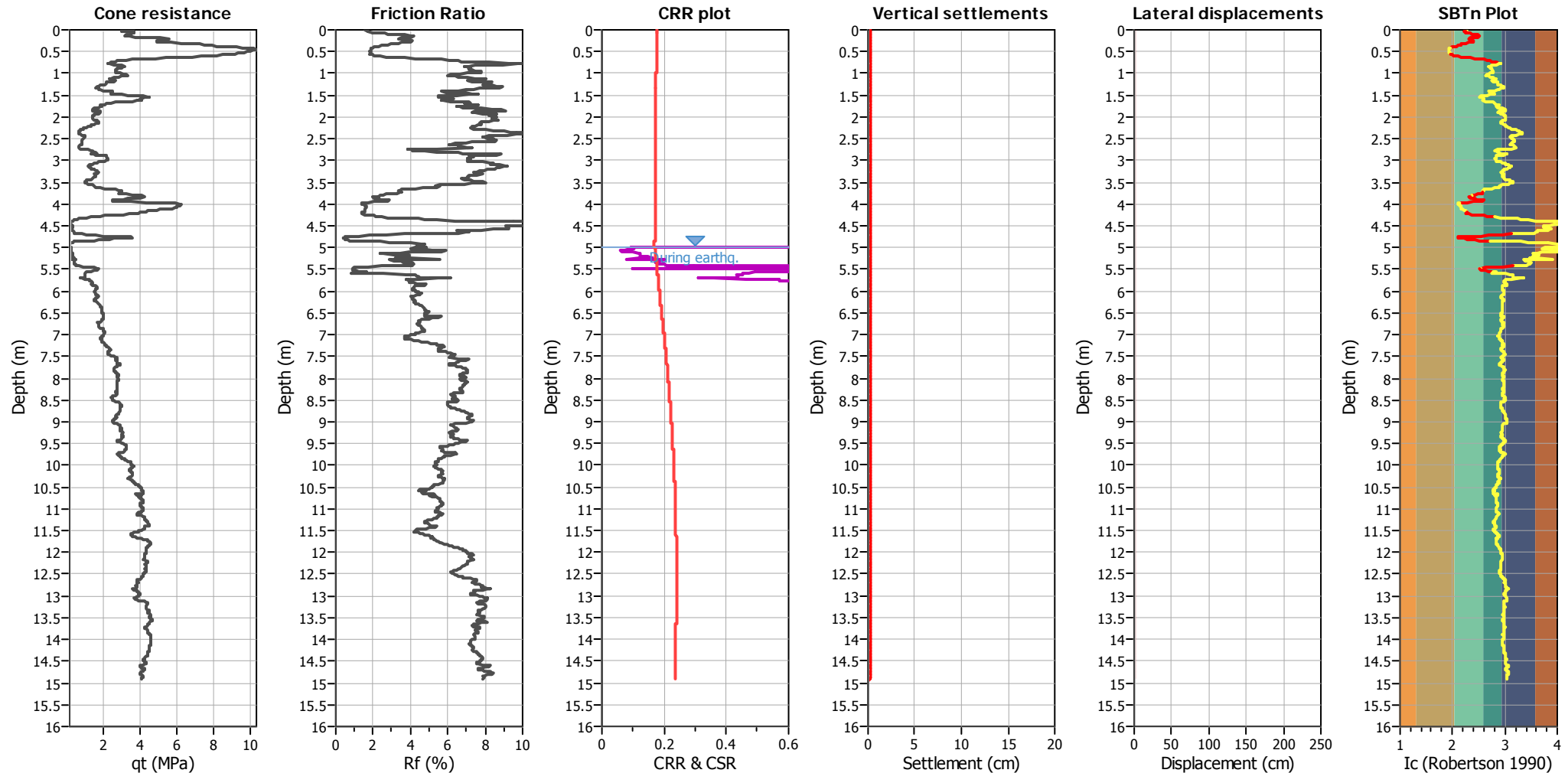


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Project: GENZTAUC13086AE - THE LAKES STAGE 2QRST ULS EARTHQUAKE  
Location: TAURANGA

CPT: CPT-12\_ULS

Total depth: 14.90 m



|                              |                   |                           |              |                         |     |                      |              |
|------------------------------|-------------------|---------------------------|--------------|-------------------------|-----|----------------------|--------------|
| Analysis method:             | Robertson (2009)  | G.W.T. (in-situ):         | 5.00 m       | Use fill:               | No  | Clay like behavior   |              |
| Fines correction method:     | Robertson (2009)  | G.W.T. (earthq.):         | 5.00 m       | Fill height:            | N/A | applied:             | All soils    |
| Points to test:              | Based on Ic value | Average results interval: | 3            | Fill weight:            | N/A | Limit depth applied: | No           |
| Earthquake magnitude $M_w$ : | 7.50              | Ic cut-off value:         | 2.60         | Trans. detect. applied: | Yes | Limit depth:         | N/A          |
| Peak ground acceleration:    | 0.27              | Unit weight calculation:  | Based on SBT | $K_\sigma$ applied:     | Yes | MSF method:          | Method based |