The Landing Stage 6

Earthworks Completion Report

WFH PROPERTIES LIMITED

One Tree Point

The Landing

Stage 6

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1. Limitations

This report and the stated or inferred professional opinions found within, relating to the suitability of the areas being ready for building development, shall not be construed as a guarantee.

This report and the inferred professional opinions found within does not remove the necessity for site-specific geotechnical investigation, normal inspection, and design of foundations for each lot, as would be made in natural ground and NZS3604 for standard residential building foundations.

2. Executive Summary

Cook Costello was engaged by WFH Properties Ltd, to provide technical advice for earthworks and be the geo-professional for the Landing Stage 6 subdivision at One Tree Point, Northland. Cook Costello designed earthwork cuts and placement of controlled sand engineered fill, in order to enable the construction of the building platforms within the proposed development.

A requirement of the consenting authority WDC (Whangarei District Council) is that a “Statement of Professional Opinion on Suitability of Land for Building Construction” (Statement of Suitability) is made by the geo-professional at the end of construction (prior to building developments). This process requires “WDC form EES-PO1” to be completed, and requires a geotechnical completion report. The completion report summarises the situation and is used to describe any departure from the standard foundation conditions expected by the building industry and outline any restrictions or recommendations if required. The purpose of this report is to provide the supporting details required for the Statement of Suitability.

The Statement of Professional Opinion on Suitability of Land for Building Construction - Form EES-PO1 has been attached to Appendix 6.

3. Introduction

Cook Costello was engaged by WFH Properties Ltd, to provide technical advice for earthworks and be the geo-professional for Stage 6 of the Landing subdivision at One Tree Point, Northland. Cook Costello designed earthwork cuts and placement of controlled sand engineered fill, in order to enable the construction of the building platforms within the proposed development.

Previous reports and geotechnical information at the site comprise of:

- Ormiston Associates Ltd. Geotechnical Report (dated September 2005).
- Cook Costello Earthworks Specification (dated October 2018).

This report is for the completion of the subdivision works in relation to the developed sections and covers the information required by the Whangarei District Council for preparing consent notices for the future property titles and provides geotechnical information to the future lot owners. It covers the requirements of the Whangarei District Council Engineering Standards (Issue 1, operative from 1 July 2010) for subdivision completion and is an addendum to the Form EES-PO1 certificate.

On completion of the works, the developer shall provide the following:

- Geotechnical reports and plans,
- All limitations on the development of the properties, including hazards, easement requirements, etc.

This report relates to the lots in Stages 6 of the subdivision only. The lot numbers for Stage 6 (as shown on the Scheme Plan appended to Appendix 1 covered by this report are:

Stage 6:

- 53 Residential Lots (Lots 320–332, 344–345, 348–349, 352–353, 356–357, 362–379 & 429–442)
- Roads 5, 8 & 9
- JOAL 708 & 710

The subdivision has been designed and constructed to satisfy Whangarei District Council Environmental and Engineering Standards 2010.

4. Site Description

The Landing subdivision is situated at One Tree Point, approximately 17 km southeast of Whangarei Central Business District. The subdivision consists of 9 stages, with Stages 1, 2, 3, 4, 5, and 6 completed. Stages 7, 8, and 9 are currently under construction. The scheme plan for Stage 6 can be seen in Appendix 1.

5. Geology

The property is regionally placed as part of the Marsden Point Barrier Spit, a broad peninsula, comprised of coastal SAND dunes, estuarine and alluvial sediments, that partly encloses Whangarei Harbour. These are considered young soils.

The spit has been built up by a prograding (seaward advancing) foreshore depositional process in the vicinity of the harbour entrance with sequences of aeolian-influenced coastal SAND dunes and alluvial and estuarine sediments.

The GNS Science online geology map defines the underlying geology of the site as comprised of Late Pleistocene stable dune deposits. Weakly cemented sand in fixed transverse dune ridges.

The soil type in the area is defined on NZMS290 Sheet Q06/07 Hukerenui - Whangarei (SOILS) as a combination of Ruakaka Loamy Peat, One Tree Point Peaty Sand, and Tangitiki Sandy Loam and Sand (imperfectly to poorly drained).

The rock type in the area is defined on NZMS290 Q06/07 Hukerenui - Whangarei (ROCK TYPES) as Sand: felspathic with some quartz, minor dark minerals and clay forming fixed dunes, minor swamp deposits; unconsolidated to very soft. Unweathered or weathered to brown-stained very soft clayey sand to depths of 5m.

6. Construction Methodology

The earthworks were carried out under Cook Costello as the supervising engineering consultant with Geocivil Ltd carrying out the physical testing. The general methodology consisted of a removal of organic material (peat and topsoil) stripped ground inspection, cut to fill, with fill being tested, and covering complete fill with organic topsoil peat.

A bulk earthworks plan showing the finished earthworks and contours is included in Appendix 2.

6.1. Earthworks

A bulk earthworks operation was carried out over the site to improve the drainage and contour of the Lots. Earthworks were also carried out to establish reasonable building platforms. Stage 6 of the Landing used the following methodology:

1. The topsoil and the peat were stripped off using motor scrapers and 50 ton Moxy dump trucks (Cat 725) with 20 – 30 ton excavators (Cat 320).
2. Cut to fill in the old sand dune complex using Sand fill was undertaken to bring the lots up to finished level.
3. Testing was undertaken to achieve a medium dense compacted sand with an allowable bearing capacity of greater than 100 kPa (Ultimate Bearing Capacity of 300kPa). This meets the requirements of the New Zealand Standard 4404 and the New Zealand Building Code.
4. Once the desired contours were achieved topsoil was spread from the temporary stockpile using Motor scrapers. This was track rolled with a D6 dozer and levelling bar.
5. Grassing of Stage 6 occurred very shortly after the top soiling process was completed.

6.2. Roading

A standard industrial/commercial roading operation was undertaken on Stage 6. The roading has been achieved using the following methodology:

1. Trim subgrade sand layer to level using Motor Scrapers and graders.
2. Check the subgrade CBR by Scala Penetrometer analysis.
3. Place lay and spread AP65 subbase layer using a Grader and 10 ton dynamic and static rollers to achieve optimum density.
4. Prepared Kerb lines using a grader and a 4 ton Dynapac roller.
5. Place, Laid, and formed slip form kerb and channels.
6. Backfilled kerb & channel using 12 Ton excavator.
7. Place lay and spread AP40 basecourse layer using a grader and 10 ton dynamic and static rollers to achieve optimum density, using a 9 ton PTR to tighten the top layer ready for sealing.

8. Check the compaction of the basecourse layer by Nuclear Densometer Readings and Benkelman Beam testing.
9. Sweep / clean the road of loose material and debris ready for seal.
10. Seal the street with waterproofing seal coat and single coat chip seal (grade 5) using automatic pressurised bitumen sprayer 6-wheel trucks with chip spreading boxes on to spread both the bitumen and chip over the surface evenly.
11. Apply asphaltic concrete over waterproofing layer using paving machine and rollers. Asphaltic concrete to be DG10 or AC10 (refer to paving plan) to comply with NZTA M/10 Specification.

7. Testing & Inspection Methodology

The relevant quality control testing for the bulk earthworks was undertaken by Cook Costello and Geocivil Ltd at the required intervals. Testing locations are appended in Appendix 3, results of the tests can be found in Appendix 4.

Supervision by the Engineers was required at key critical stages, and a series of hold points were identified and agreed with the Contractor.

Testing was carried out at the same time for both Stage 6 and 7 by Geocivil Ltd. The testing has been issued as one package by Geocivil and can be found in Appendix 4. However, this report only utilises the Stage 6 testing as shown on the site testing plans in Appendix 3.

7.1. Pre-earthworks Testing to Determine Design

A range of geotechnical testing has been completed within Stage 6 that has allowed the appropriate design of the earthworks that have now been carried out.

This testing included:

- Cone penetration testing (CPT) to determine subsoil strengths and depths.
- Test pits to determine depths to the consolidated sand (hardpan).

The locations of this testing is found on the *Pre-earthworks Site Testing Plan* in Appendix 3.

7.1.1. Cone Penetration Testing

6 CPT's were conducted across Stage 6 by Geocivil on the 11th May 2021. The CPTs enabled an understanding of the soil profile and strength across the stage. A summary of the results can be found in Table 1 below. CPT test locations can be found in Appendix 3 and detailed CPT logs can be found in Appendix 4.

Table 1: CPT testing completed before the earthworks

Test ID	Depth (m)	Groundwater Table (m)	Depth (m)	qc (MPa)[1]	Interpreted Soil Description
CPTH13	1.36 (anchor failure)	Not Encountered	0.0 – 1.41	10	SAND and Silty SAND
CPTJ11	0.9 (anchor failure)	Not Encountered	0.0 – 0.4	5	Silty SAND and sandy SILT
			0.4 – 0.9	20	SAND and Silty SAND
CPTK13	3.6 (anchor failure)	Not Encountered	0.0 – 0.6	2	CLAY & Silty CLAY
			0.6 – 1.8	7	SAND and Silty SAND
			1.8 – 3.6	4	SAND and Silty SAND
CPTL11	3.2 (anchor failure)	Not Encountered	0.0 – 0.3	2	CLAY & Silty CLAY
			0.3 – 1.1	10	SAND and Silty SAND

Test ID	Depth (m)	Groundwater Table (m)	Depth (m)	qc (MPa)[1]	Interpreted Soil Description
			1.1 – 2.7	5.8	SAND and Silty SAND
			2.7 – 3.2	9	SAND and Silty SAND
CPTM8	0.95 (anchor failure)	Not Encountered	0.0 – 0.7	1.7	CLAY & Silty CLAY
			0.7 – 0.95	4	Silty SAND and Sandy SILT
CPTN11	1.0 (anchor failure)	Not Encountered	0.0 – 0.6	2	Silty SAND and Sandy SILT
			0.6 – 1.0	12	SAND and Silty SAND

7.1.2. Test Pits

19 test pits were carried out by Geocivil on the 15th of April 2021 across Stage 6. The test pits enabled the depth to the consolidated sand (hardpan) to be determined across the Stage. Geocivil carried out the test pits using a 12-tonne excavator. A summary of the test pit results can be seen in Table 2 below. Test-pit locations can be found in Appendix 3 and detailed soil logs can be found in Appendix 4.

Table 2: Summary of the test pits carried out pre-earthworks by Geocivil

Test ID	Depth (m)	Groundwater Table (m)	Layer Depth (m)	Soil Description
H12	0.8	Not Encountered	0.0 – 0.2	Amorphous PEAT trace sand
			0.2 – 0.5	SAND trace silt
			0.5 – 0.8	Peaty SAND
H13	0.95	Not Encountered	0.0 – 0.5	Peaty TOPSOIL trace sand
			0.5 – 0.95	SAND trace silt
J11	0.65	Not Encountered	0.0 – 0.5	PEAT trace sand
			0.5 – 0.65	SAND minor peat
J12	0.7	Not Encountered	0.0 – 0.15	Sandy TOPSOIL
			0.15 – 0.5	Amorphous PEAT
			0.5 – 0.7	SAND
J13	0.75	Not Encountered	0.0 – 0.1	Sandy TOPSOIL

Test ID	Depth (m)	Groundwater Table (m)	Layer Depth (m)	Soil Description
			0.1 – 0.45	Amorphous PEAT
			0.45 – 0.75	SAND trace silt
J14	0.5	Not Encountered	0.0 – 0.25	Peaty TOPSOIL
			0.25 – 0.5	SAND trace silt
K12	0.9	Not Encountered	0.0 – 0.7	Amorphous PEAT trace sand
			0.7 – 0.9	SAND
K13	1.4	Not Encountered	0.0 – 0.5	Sandy TOPSOIL
			0.5 – 1.4	SAND minor silt
L09	0.85	Not Encountered	0.0 – 0.5	Amorphous PEAT minor sand
			0.5 – 0.85	SILT trace sand
L11	0.8	Not Encountered	0.0 – 0.3	Sandy TOPSOIL
			0.3 – 0.6	Amorphous PEAT some sand
			0.6 – 0.8	SAND trace silt
L12	1.2	Not Encountered	0.0 – 0.3	Sandy TOPSOIL
			0.3 – 0.8	Sandy SILT
			0.8 – 1.2	SAND some silt
M09	0.6	Not Encountered	0.0 – 0.2	Peaty TOPSOIL
			0.2 – 0.4	Silty SAND
			0.4 – 0.6	SAND some silt
M11	0.8	Not Encountered	0.0 – 0.2	Sandy TOPSOIL
			0.2 – 0.8	SAND minor silt
N08	0.65	Not Encountered	0.0 – 0.4	Amorphous PEAT trace sand/SILT trace sand
			0.4 – 0.65	Cemented SAND some silt

Test ID	Depth (m)	Groundwater Table (m)	Layer Depth (m)	Soil Description
N09	0.55	Not Encountered	0.0 – 0.4	TOPSOIL/ Amorphous PEAT
			0.4 – 0.65	SAND some silt
N11	0.9	Not Encountered	0.0 – 0.2	Sandy TOPSOIL
			0.2 – 0.7	Peaty SAND
			0.7 – 0.9	SAND trace silt
P08	0.8	Not Encountered	0.0 – 0.5	Amorphous PEAT
			0.5 – 0.8	Cemented silty SAND
P09	0.9	Not Encountered	0.0 – 0.6	Sandy TOPSOIL/ Amorphous PEAT
			0.6 – 0.9	SAND some silt
Q10	1.5	Not Encountered	0.0 – 0.8	Sandy TOPSOIL / Silty SAND some peat
			0.8 – 1.5	SAND minor silt

7.2. Fill Testing

The Cook Costello Earthworks Specification (dated October 2018) initially suggested testing consisting of Light Weight Deflectometer (LWD), Scala Penetrometers (DCP), and Nuclear Densometers (NDM).

However, as observed during the compaction of the material in the other stages, it was discovered that there was a delay of approximately 4 – 5 weeks between compaction and achieving the desired compaction results. This is due to pore-pressure build-up in the compacted fill material caused by the compaction process. The delay between testing and receiving results was unacceptable in terms of constructability.

As a result, it was decided to test the fill material using Static Plate Load Tests (PLT) where fill to undercut levels were deeper than 1.5m. This allowed the testing to be conducted at the finished level, speeding up the construction process. DCPs, NDMs, and LWDs were conducted at the finished level after the excess pore pressure was allowed to dissipate where fill depth to undercut was less than 1.5m depth.

The frequency of testing has been set up to be not less than:

- 1 test per layer or 200 mm thickness per material type per 2500 m^2; or
- 1 test per 500 m^3 distributed reasonably evenly throughout full depth and area; or
- 3 tests per visit; whichever requires the most tests.

As a result, the following testing has been carried out on the sand FILL areas:

- No. 19 Plate Load Tests
- No. 5 CPTs
- Approximately 100 Scalas and LWDs distributed across Stages 6 and 7 were carried out at the same time.

Locations of testing on the fill areas are shown on Drawing SK010 and SK011 appended to Appendix 3.

It is to be noted that the 300kPa ultimate bearing capacity has been calculated according to DIN 18134:2012-04 at 5mm vertical settlement (DIN 18134:2012-04: German Standard Soil Testing procedures and testing equipment – Plate load test, English translation of DIN 18134:2012-04).

7.3. Undercut Testing

The Cook Costello Earthworks Specification (dated October 2018) suggested testing consisting of Light Weight Deflectometer (LWD) and Scala Penetrometers (DCP). Prior to fill placement, the area was stripped of vegetation and topsoil and inspected by Cook Costello and Geocivil Ltd. Site testing with DCPs was conducted to identify areas and depths that required further undercutting. Undercutting terminates on the consolidated sand layers (i.e. hard pan) and/or at the bottom of the peat or sandy peat layer.

Enabling works, undercut, and benching to competent material were inspected and approved by the supervising Engineer prior to filling.
Approximately 50 Scala penetrometer tests were carried out to assess the suitability of the undercut areas.
Locations of testing on the undercut areas are shown in Drawing SK010 and SK011 appended to Appendix 3. The testing package for Stages 6 & 7 as issued by Geocivil is appended in Appendix 4.

7.4. Laboratory Testing

Laboratory testing was undertaken during construction to determine the following characteristics for the sand fill and for enabling site testing procedures. Laboratory testing is attached to Appendix 4. An exhaustive list of laboratory testing is reported below:

- Determination of the Dry density/water content relationship – New Zealand Standard Compaction - NZS 4402: 1986 Test 4.1.1
- Determination of the particle size distribution-Dry sieving method - NZS 4407:2015 Test 3.8.2
- Determination of the Dry density/water content relationship – New Zealand Heavy Compaction - NZS 4402: 1986 Test 4.1.2
- Determination of pH levels from Piezometers

8. Foundation Design

8.1. Ultimate Bearing Capacity

Investigations have been carried out by or under the supervision of Geocivil Ltd or Cook Costello. The locations of tests are shown in Appendix 3. Test results are shown in Appendix 4.

In accordance with the Whangarei District Council Environmental Engineering Standards dated 2010 clause 2.7 The Councils Report on Completion of Construction undertook testing as the excavation or filling was carried out. The following testing was undertaken to support the statement of professional opinion as to the compliance of the filled/cut ground to the specification and the suitability of the land for Building Construction. (WDC Form EES-PO1). The testing undertaken in our view provides sufficient information to allow identification of any specific design requirements that necessitate the building foundation design to deviate from NZS 3604 and NZS 4229 and design parameters for detailed design of the foundations (such as bearing capacity, suitable founding depth etc).

The testing approach has been to test and demonstrate that the bearing capacity requirements of NZS3604 and NZS 4229 have been met or exceed the requirements of the definition of “Good Ground” where the tests were undertaken. It is assumed that the extent of testing represents that 300kPa ultimate bearing capacity is exceeded over the entire building platform even though not every piece of that ground/soil has been tested.

The existing depth of peat/peaty sand was determined by the pre-earthworks testing as summarised in Section 7.1 of this report. The Geotechnical Investigation Report carried out by Ormiston Associated Ltd for the residential subdivision (ref. # 1600/2114, dated September 2005) was also referred too. This included 51 CPTs, 25 Flight Augers, and 4 test pits which were carried out across all stages in 2005. Due to the ongoing long-term settlement and shrinkage properties of the peat and organic soils, it was decided to remove this material as part of the bulk earthworks operations.

Scala Penetrometer and Plate Load testing were carried out to identify the compaction and ultimate bearing capacity of the sand fill layers. Scala Penetrometers were used to determine ultimate bearing capacity in cut areas. The bearing capacity results are summarised in Table 3. The provided ultimate bearing capacity of 300kPa is available below any topsoil that has been spread on site after the completion of the earthworks. It is to be noted that between 100 – 300 mm of topsoil has been spread throughout the site with an average of 200 mm.

Table 3: Bearing capacity summary for Stage 4 & Stage 5 of The Landing Subdivision.

Area	Depth (mbgl)	Ultimate Static Bearing Capacity (kPa)	Dependable Static Bearing Capacity (kPa)
Stage 6 (All lots)	0.1 – 0.5	300	150

The Statement of Professional Opinion on Suitability of Land for Building Construction - Form EES-PO1 is included in Appendix 6.

8.2. Static Settlements

Foundation design should limit the probable maximum differential settlement over a horizontal distance of 6 m to no more than 25 mm under serviceability limit state load combinations of AS/NZS 1170 Part 0 unless the structure is specifically designed to prevent damage under a greater settlement.

8.3. Subsoil Class

Generally, across the entire site, the soils are consistent with site subsoil classification Class C – Shallow Soil sites as per NZS1170.5, based on estimated shear velocity (Vs) values from the CPTs presented within Ormiston Associated Ltd (ref. # 1600/2114, dated September 2005) and the calculated natural period of the site was less than 0.6 seconds.

8.4. Liquefaction Potential

A liquefaction analysis has been carried out utilising the CPT investigations across both Stage 6 & 7. Five CPT investigations were conducted in Stage 6 and 3 were conducted in Stage 7. The location of this testing can be found in Appendix 3. Detailed test logs can be found in Appendix 4.

8.4.1. Previous Liquefaction Analysis

As stated in the Geotechnical Investigation Report carried out by Ormiston Associated Ltd (ref. # 1600/2114, dated September 2005) the site presents a low risk for the development of liquefaction during an earthquake. The investigations at the property presented in the Ormiston Geotechnical report, in particular the CPT tests, indicate that the site is underlain by upper dense sands (qc varying from 8MPa to 20MPa) overlying a layer of loose to medium dense sands.

Groundwater was not encountered during any of our geotechnical testings. However, from CPTs conducted across the Stages as reported in the Ormiston Associated Ltd (ref. # 1600/2114, dated September 2005) groundwater has been encountered, varying between 4.5m and 5.3m. Liquefaction does not occur above the groundwater table and this relatively deep groundwater decreases the potential of liquefaction within the shallow layers that have been cut up to the consolidated sands (hardpan) or filled using compacted sands.

In the sand-filled areas, where the unsuitable materials have been removed, sand fill has been compacted, increasing the relative density of the sands. Subsequently, further CPTs testing has been carried out to assess the liquefaction potential of the compacted sand fill.

8.4.2. CPT Investigations

Geocivil Ltd conducted eight CPTs to a 20 m target depth on 23 December 2021 where the sand fill depths were more significant within Stages 6 and 7. It is to be noted that between 100 – 300 mm of topsoil has been spread throughout the site. All the test results show Dense / Very Dense Sand below the topsoil with a cone resistance qc between 4 and 22 MPa.

The CPT investigations carried out within Stage 6 are summarised in Table 4. CPT test locations are shown in Appendix 3. Detailed testing results are shown in Appendix 4.

Table 4: CPT Investigation results.

Test ID	Depth (m)	Groundwater Table (m)	Depth (m)	qc (MPa)[1]	Interpreted Soil Description
CPT01 (Stage 7)	2.1 (anchor failure)	Not Encountered	0.0 – 0.7	12	SAND & Silty SAND
			0.7 – 2.1	22	SAND
CPT02 (Stage 6)	1.1 (anchor failure)	Not Encountered	0.0 – 0.2	2	SAND & Silty SAND
			0.2 – 0.95	14	SAND & Silty SAND
			0.95 – 1.1	7.5	SAND & Silty SAND
CPT03 (Stage 6)	1.8 (anchor failure)	Not encountered	0.0 – 1.3	8.5	SAND & Silty SAND
			1.3 – 1.8	20	SAND
CPT04 (Stage 7)	22 (anchor failure)	Hole collapse at 2.5 m	0.0 – 3.0	8.5	SAND & Silty SAND
			3.0 – 5.2	12.3	SAND & Silty SAND
			5.2 – 9.7	8.3	SAND & Silty SAND
			9.7 – 14.5	5	SAND & Silty SAND
			14.5 - 21	6.2	Silty SAND & Sandy SILT
			21 – 22	15	Silty SAND & Sandy SILT
CPT05 (Stage 6)	20.7 (anchor failure)	Hole collapse at 2.9 m	0.0 – 1.0	7.5	SAND & Silty SAND
			1.0 – 5.0	14.5	SAND & Silty SAND
			5.0 – 7.8	10	SAND & Silty SAND
			7.8 – 13.7	7	SAND & Silty SAND
			13.7 – 18.8	4.3	Silty SAND & Sandy SILT
			18.8 – 20.7	8.2	Silty SAND & Sandy SILT
CPT06 (Stage 6)	3.1 (anchor failure)	Not encountered	0.0 – 0.7	7	SAND & Silty SAND
			0.7 – 1.9	4.3	SAND & Silty SAND
			1.9 – 2.5	10.7	SAND & Silty SAND
			2.5 – 3.1	17.8	SAND
CPT07 (Stage 6)	1.2 (anchor failure)	Not encountered	0.0 – 0.2	5	SAND & Silty SAND
			0.2 – 1.2	12	SAND & Silty SAND
CPT08 (Stage 7)	3.4 (anchor failure)	Not encountered	0.0 – 1.0	13.3	SAND & Silty SAND
			1.0 – 2.1	20.1	SAND
			2.1 – 2.9	7.1	SAND & Silty SAND

Test ID	Depth (m)	Groundwater Table (m)	Depth (m)	qc (MPa)[1]	Interpreted Soil Description
			2.9 – 3.4	22.1	SAND & Silty SAND

1. Cone tip resistance

8.4.3. Peak Ground Acceleration

According to NZS 1170.5:2004, Importance Level 2 buildings are required to be designed to resist earthquake shaking with an annual probability of exceedance of 1/500 (i.e. a 500-year return period). This is the ultimate limit state (ULS) design seismic loading. Structures are expected to retain their structural integrity during the ULS earthquake, and not collapse or endanger life.

Peak horizontal ground accelerations (PGA) have been calculated in accordance with MBIE/NZGS Module 1 (2016) using the following formula:

$\text{PGA} = C_{0,1000}\ R\ f\ g\ /\ 1.3$

$C_{0,1000}$ = 0.13 for Whangarei (NZTA Bridge Manual Commentary (2018) Table C6)

R = 1.0 for a 500-year return period event (NZS 1170.5)

f = 1.33 for Class C

Thus, the PGA = 0.13 x 1.0 x 1.33 g / 1.3 = 0.13 g for ULS.

The seismic parameters are summarised in Table 5.

Table 5: Seismic parameters.

Importance Level	Limit State	Peak Ground Acceleration, PGA or C(T)	Effective Magnitude, M_w
2	ULS[1]	0.13	5.8
2	SLS[2]	0.03	5.8

1. Ultimate Limit State
2. Serviceability Limit State

8.4.4. Method of Analysis

CPT results have been analysed using CLiq software to assess the potential soil liquefaction and settlement. Boulanger & Idriss (2014) was used to evaluate the liquefaction potential (triggering) of the soil strata at the site, the method proposed by Zhang et al. (2002) was used for settlement calculations.

Liquefaction analysis results are attached in Appendix 5.

The assessment of liquefaction has been undertaken under ultimate limit state design (ULS) criteria and serviceability limit state design (SLS) criteria. The serviceability limit state is the point where a structure can no longer be used for its intended purpose but would still be structurally sound. The tolerances for serviceability depend on the intended use of the structure and can vary significantly (Section 2 of NZS 1170.5:2004).

A groundwater level of 3.0 mbgl was conservatively considered during earthquake events for the liquefaction analysis which is the shallowest recorded value within the Geotechnical Investigation Report carried out by Ormiston Associated Ltd.

8.4.5. Liquefaction Severity Number (LSN)

The Liquefaction Severity Number (LSN) is a method developed by Van Ballegooy et al (2013) which provides an estimate of liquefaction damage manifesting at the ground surface. The LSN parameter refines the calculated settlement by including a depth weighting function and can be used to differentiate the most severely damaged land from the least affected land. Table 6 provides the LSN ranges and associated damage classifications.

Table 6: LSN Ranges and damage classifications

LSN Range	Damage Classification
0 – 10	Little to No expression of liquefaction
10 – 20	Minor expression of liquefaction
20 – 30	Moderate expression of liquefaction
30 – 40	Moderate to severe expression of liquefaction
40 – 50	Major expression of liquefaction
50+	Severe damage

8.4.6. Ultimate Limit State

A PGA value of 0.13 g and an earthquake magnitude (M_w) of 5.8 have been used for liquefaction analysis in accordance with NZGS Module 1 and the NZTA Bridge Manual guidelines.

8.4.6.1. Liquefaction Severity Number

The LSN for the ULS design case was 1.2 in CPT05 and 0.9 in CPT04. The rest of the CPT did not indicate any expression of liquefaction. This indicates *Little to no expression of liquefaction* according to Table 6. Refer to Figure 1 below.

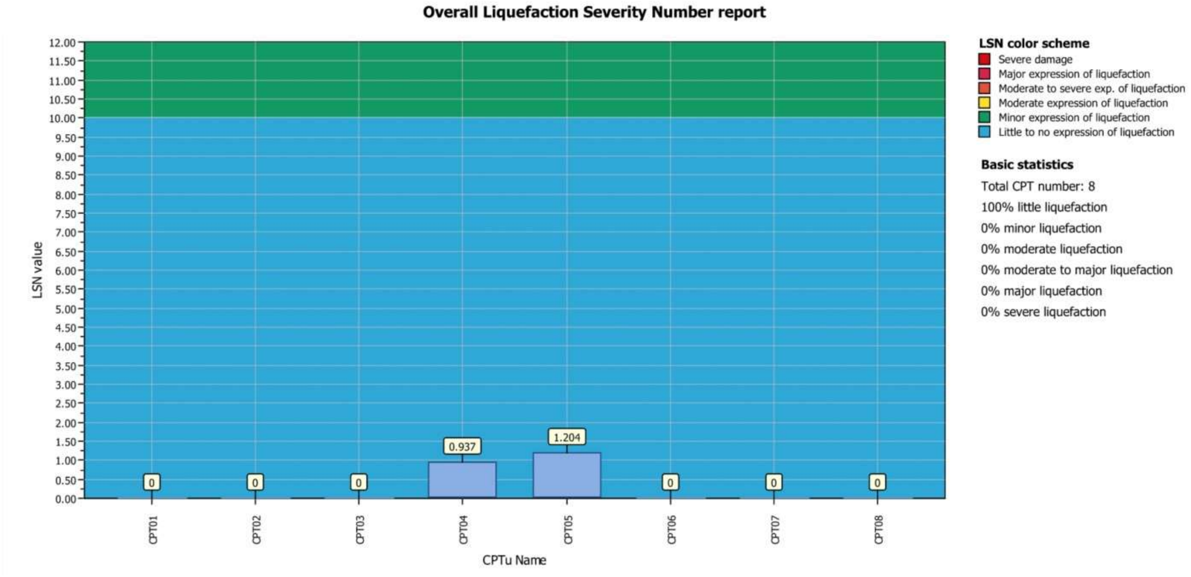


Figure 1: LSN results summary (ULS).

8.4.6.2. Liquefaction Induced Subsidence

Up to 28 mm of settlement has been noted under the ULS design earthquake parameters for CPT04 and 22 mm of settlement for CPT05. All other CPTs showed nil settlement. Refer to the liquefaction results attached in Appendix 5.

8.4.6.3. Lateral Displacement

Lateral displacement is not considered to be an issue on-site due to the presence of relatively flat ground.

8.4.7. Serviceability Limit State

A PGA value of 0.03 g and an earthquake magnitude (Mw) of 5.8 have been used for liquefaction analysis for the SLS case in accordance with NZGS Module 1 and the NZTA Bridge Manual guidelines.

8.4.7.1. Liquefaction Severity Number

The LSN for the SLS design case was nil. This indicates *Little to no expression of liquefaction* according to Table 6. Refer to Figure 2 below.

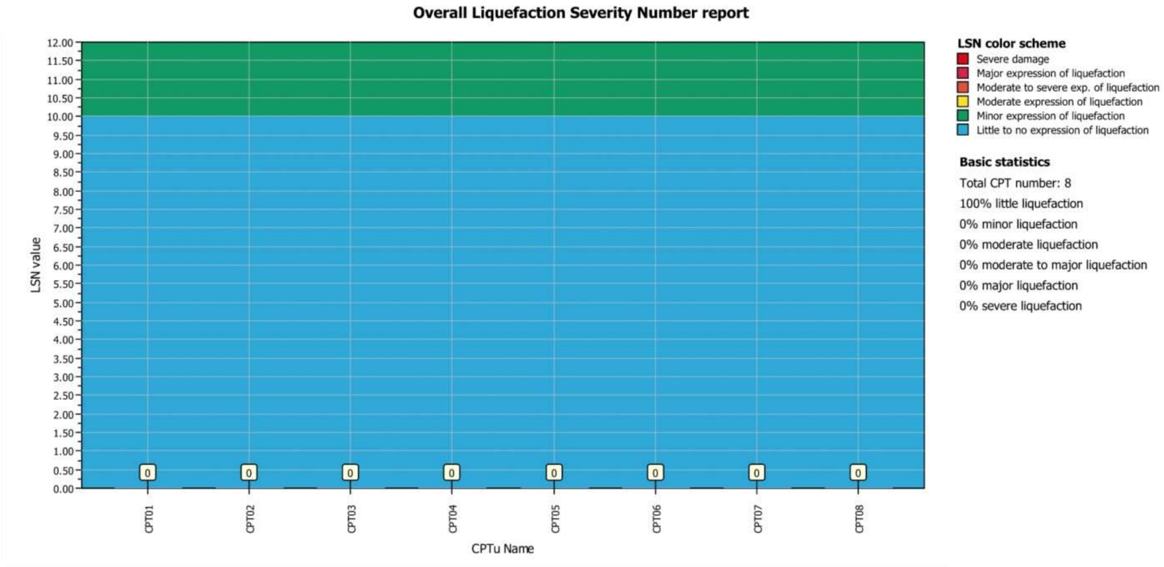


Figure 2: LSN results summary (SLS).

8.4.7.2. Liquefaction Induced Subsidence

No settlement has been noted under the SLS design earthquake parameter. Refer to the liquefaction results attached in Appendix 5.

8.4.8. Liquefaction Summary

The liquefaction assessment has been carried out across Stages 6 & 7 as one package. Liquefaction potential is considered to be low. Little to no expression of liquefaction is expected within Stages 6 & 7 subdivision. Liquefaction analysis results are attached in Appendix 5. Up to 28 mm of settlements could be expected under the ULS earthquake case. No settlement is expected during the SLS. This is within the tolerance of the building code that is 25 mm over 6 m according to Clause B1/VM1 for static settlements.

8.5. Acid Sulphate Risk

8.5.1. Acid Sulphate Testing Discussion

The Landing Stage 6 subdivision is mapped on the Whangarei District Council Map to be in the Acid Sulphate Risk Area. Acid Sulphate Soil Field PH Tests have been conducted on-site following the Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1, Section H, published by Department of Natural Resources, Mines and Energy, Indooroopilly, Queensland, Australia, June 2004. This Australian guide applies to soils below an RL of 5.0m.

Given the vicinity of Stage 3, no further testing was carried out for Stage 6. Outcomes of further testing would not have changed the conservative approach to the mitigation measures for the foundation design recommended in Sections 8.5.2 and 8.5.3.

Field pH (pH_F) recording has been undertaken on-site at the invert level (Test B) of proposed infrastructures (i.e. stormwater and sewer pipes) and 1 m above the invert level (Test A) in 10 different locations. Field testing is appended to Appendix 4.

For both Test A and Test B cases, a field pH peroxide test (pH_{OX}) was performed on each of the 10 samples adding 30% of H_2O_2 (Hydrogen peroxide) to the 10 samples taken from the field in order to determine soil pH following complete oxidation.

After the reaction, the rate of the reaction indicates the level of sulfides present. The reaction is characterised by heat and gas evolution. A soil containing very little sulfides only rates an 'X' (Slight Reaction) however a soil containing high levels of sulfides is likely to rate an 'XXXX' (Very Vigorous Reaction). All the soil reactions of the pH_{OX} tests undertaken by Geocivil are characterised by an "X", therefore soils are likely to contain very few sulfides. Also, according to the ASS Sampling & Analysis Guidelines, 1998, a pH_{OX} value at least one unit below field pH_F indicates the potential presence of acid sulphate soils. The greater the difference between the two measurements, the more indicative the value is of a PASS (Potential Acid Sulphate Soils). The lower the final pH_{OX} value is, the better the indication of a positive result. The lab testing generally shows a pH_{OX} value less than one unit below field pH, therefore the presence of acid sulphate soils could be little. Another qualitative indication of little sulphides is that If the measured $pH_{OX} < 3$. The more the pH_{OX} drops below 3, the more positive the presence of sulfides is. There is one pH_{OX} value recorded below 3.

These results are consistent with local observations of good quality concrete that had been in the ground for a long time and has been excavated and shows no sulphate acid damage.

However, the PH_F and pH_{OX} values are comprised between 2.92 and 5.22. According to NZS 3101:Part 1:2006 Section 3.4.3.2, an acidity represented by a PH of 5.0 to 5.5 may be considered as a practical limit of tolerance of high-quality concrete in contact with any acids. For pH lower than 5.0, the environment shall be assessed as exposure classification U. As per Section 3.8, NZS 3101, Exposure Classification U represents an exposure environment not specified in Table 3.1 of NZS 3101 for which the degree of severity should be assessed by the designer. Concrete in members subject to exposure classification U shall be specified to ensure durability under the particular exposure environment and for the chosen design life. Protective coatings may be taken into account in the assessment of concrete requirements.

Alternatively, as reported in the Acid Sulphate Soil Planning Policy Basic Guide prepared for WDC by Opus International Consultants, Australian Standard AS 2159 – 2009 Section 6 is relevant when designing concrete and steel structures to withstand corrosive environments. This standard refers to piles, however, the knowledge can be transferred to other structures.

8.5.2. Mitigation measures for Shallow Foundations

Given the acid sulphate soil risk and low pH values recorded on site, it is recommended to install a waterproof membrane underneath any shallow foundations, the membrane should be extended up to the edge of the foundations. If the above recommendations are followed, the concrete exposure class can be A1 according to NZS3101. A typical detail is shown in Figure 3 showing the damp-proof membrane for a typical foundation detail.

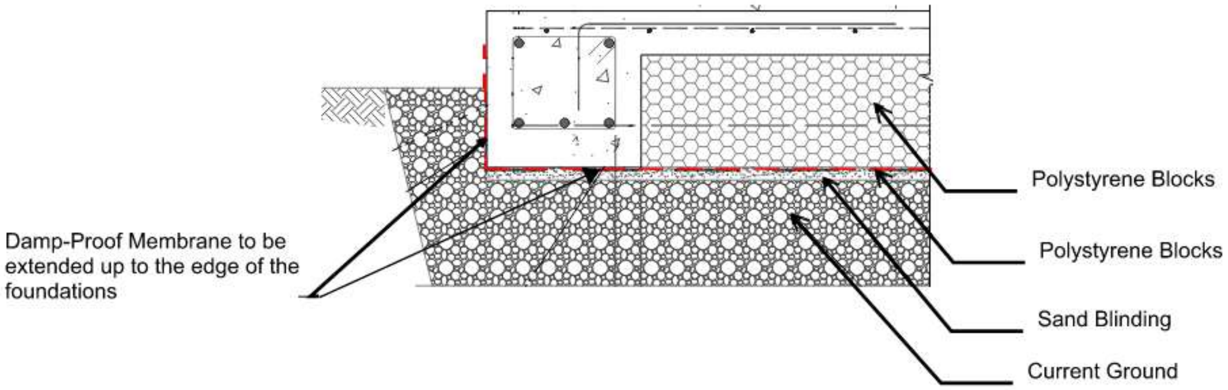


Figure 3: Damp-Proof Membrane Detail

8.5.3. Mitigation measure for Deep Foundations

8.5.3.1. Concrete

In case of deep concrete foundations were used on-site, it is recommended to refer to the Australian Standard AS 2159 – 2009 Section 6 when designing concrete and steel structures to withstand corrosive environments.

The exposure classification of concrete is *Very Severe* according to Table 6.4.2 (C) of AS 2159 – 2009, considering a pH of less than 4 and soil Conditions A (high permeability soils). It is recommended to refer to Table 6.4.3 of AS 2159 – 2009 to select the minimum strength of concrete and concrete cover relevant for the *Very Severe* Exposure Classification and design life.

8.5.3.2. Steel

If steel elements are used in the ground (i.e. driven H-steel piles, etc.), it Is recommended to adopt the Severe Exposure Classification shown in Table 6.5.2 (C) of AS 2159 – 2009, considering a pH less than 3 and soil Conditions A (high permeability soils).

A uniform corrosion allowance of 0.04-0.1 mm/year should be adopted during the design of any underground steel structure.

8.5.3.3. Timber

No precautions are required to be taken for timber piles. Timber is not susceptible to acidic corrosion.

8.6. Proposed Building Foundations

The test results indicate that the sites (once the peat/topsoil layer is removed) are suitable for standard foundations for buildings.

If a shallow concrete strip footing or concrete slab on grade is to be used, any organic soil such as peat and topsoil in the building footprint is to be excavated and replaced with an engineered hard fill layer of compacted aggregate in accordance with NZS 4431 or AS 3798:2007.

The Sandy material across all lots in Stage 6 is consistent with a Class A site as defined by AS 2870:2011 indicating little to no ground movement from moisture changes is expected.

This means that the finished ground within the lots is suitable for the erection of buildings on “Good Ground” in terms of NZS 3604:2011 (Timber Framed Buildings) & NZS 4229:2013 (Concrete Masonry Buildings Not Requiring Specific Engineering Design) and related documents providing that:

- A standard check of excavated foundations is carried out at the time of construction.
- Buildings subject to heavy loads or vibrations will require specific design.
- Buildings not meeting the criteria for NZS3604:2011 and NZS4229:2013 will require specific design.

This report and the inferred professional opinions found within do not remove the necessity for normal inspection and design of foundations, as would be made in natural ground.

Site-specific testing should be carried out within the each lot within the proposed building footprint and should be selected to give adequate information about the soil over the entire plan area of the proposed building.

There shall be a minimum of four test sites for a building up to 200 m^2, with at least one additional test site for each additional 100 m^2 plan area of building as recommended by NZS3604.

9. Conclusions

Cook Costello was engaged by WFH Properties Ltd, to provide technical advice for earthworks and be the geo-professional for the Landing Stage 6 subdivision at One Tree Point, Northland. Cook Costello designed earthwork cuts and placement of controlled sand engineered fill, in order to enable the construction of the building platforms within the proposed development.

All lots have been subject to bulk earthworks to provide sites suitable for standard foundations for typical residential buildings. Any heavy structures or heavy industry users will require specific design and further investigations. A layer of topsoil was spread over the lots to ensure moisture is retained and grass will grow to prevent wind-blown erosion.

Based on our investigations we make the following conclusions and recommendations:

- The test results indicate that the sites (once the peat/topsoil layer is removed) are suitable for standard foundations for buildings.
- An ultimate bearing capacity of 300kPa is available from approximately 0.1 – 0.5 m across Stage 6, below any peat/topsoil that has been spread on site after the completion of the earthworks.
- Between 100 – 300 mm of topsoil has been spread throughout the site with an average of 200 mm.
- The site is consistent with Subsoil Class C – Shallow Soil sites as per NZS1170.5.
- Liquefaction potential is low. Little to no expression of liquefaction is expected within Stage 6 and Stage 7 subdivisions.
- Up to 20 mm of settlements could be expected under the ULS earthquake case that are within the tolerance of the building code that is 25 mm over 6 m according to Clause B1/VM4 for static settlements.
- Foundation design should limit the probable maximum differential settlement over a horizontal distance of 6 m to no more than 25 mm under serviceability limit state load combinations of AS/NZS 1170 Part 0 unless the structure is specifically designed to prevent damage under a greater settlement.
- The Landing Stage 6 subdivision is mapped on the Whangarei District Council Map to be in the Acid Sulphate Risk Area that is a well-known hazard in the area and well addressed with standard construction measures (i.e. waterproof membrane for shallow foundations).

  Acid Sulphate Soil Field PH Tests have been conducted. Results of lab testing suggest that soils are likely to contain very little sulfides.

  - However, the PH_F and pH_{OX} values are comprised of between 2.92 and 5.22. According to NZS 3101:Part 1:2006 Section 3.4.3.2, an acidity represented by a PH of 5.0 to 5.5 may be considered as a practical limit of tolerance of high-quality concrete in contact with any acids.

  - For pH lower than 5.0, the environment shall be assessed as exposure classification U as per NZS 3101.
  - Alternatively, as reported in the Acid Sulphate Soil Planning Policy Basic Guide prepared for WDC by Opus International Consultants, Australian Standard AS 2159 – 2009 Section 6 is relevant when designing concrete and steel structures to withstand corrosive environments.
  - It is recommended to install a waterproof membrane underneath any shallow foundations, the membrane should be extended up to the edge of the foundations to mitigate the presence of a corrosive environment. If the above recommendations are followed, the concrete exposure class can be A1 according to NZS3101.
  - In case of deep concrete foundations were used on-site, it is recommended to refer to the Australian Standard AS 2159 – 2009 Section 6 when designing concrete and steel structures to withstand corrosive environments. The exposure classification of concrete is *Very Severe* according to Table 6.4.2 (C) of AS 2159 – 2009, considering a pH less than 4 and soil Conditions A (high permeability soils). It is recommended to refer to Table 6.4.3 of AS 2159 – 2009 to select the minimum strength of concrete and concrete cover relevant for the *Very Severe* Exposure Classification and design life.
  - If steel elements are used in the ground (i.e. driven H-steel piles, etc.), it Is recommended to adopt the Severe Exposure Classification shown in Table 6.5.2 (C) of AS 2159 – 2009, considering a pH less than 3 and soil Conditions A (high permeability soils). A uniform corrosion allowance of 0.04-0.1 mm/year should be adopted during the design of any underground steel structure.
  - No precautions are required to be taken for timber piles. Timber is not susceptible to corrosion by acid.

- If a shallow concrete strip footing or concrete slab on grade is to be used, any organic soil such as peat and topsoil in the building footprint is to be excavated and replaced with an engineered hard fill layer of compacted aggregate in accordance with NZS 4431 or AS 3798:2007.
- The Sandy material for all lots in Stage 6 is consistent with a Class A site as defined by AS 2870:2011 indicating little to no ground movement from moisture changes is expected.
- The finished ground within the lots is suitable for the erection of buildings on “Good Ground” in terms of NZS 3604:2011 (Timber Framed Buildings) & NZS 4229:2013 (Concrete Masonry Buildings Not Requiring Specific Engineering Design) and related documents providing that:
  - A standard check of excavated foundations is carried out at the time of construction.
  - Buildings subject to heavy loads or vibrations will require specific design.
  - Buildings not meeting the criteria for NZS3604:2011 and NZS4229:2013 will require specific design.

- This report and the inferred professional opinions found within do not remove the necessity for site-specific geotechnical investigation, normal inspection, and design of foundations, as would be made in natural ground.

10. Limitations

This report has been prepared for the benefit of WFH Properties Limited as our client with respect to a geotechnical completion report for Stage 6 of The Landing Subdivision, One Tree Point. It shall not be relied upon for any other purpose. The reliance by other parties on the information or opinions contained in this report shall, without our prior review and agreement in writing, be at such parties' sole risk.

Opinions and judgments expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions. Where opinions or judgments are to be relied on they should be independently verified with appropriate legal advice. Any recommendations, opinions, or guidance provided by Cook Costello in this report are limited to technical engineering requirements and are not made under the Financial Advisers Act 2008.

Recommendations and opinions in this report are based on data from testing undertaken on site. The nature and continuity of subsoil conditions away from the tests are inferred and it must be appreciated that actual conditions could vary considerably from the assumed model.

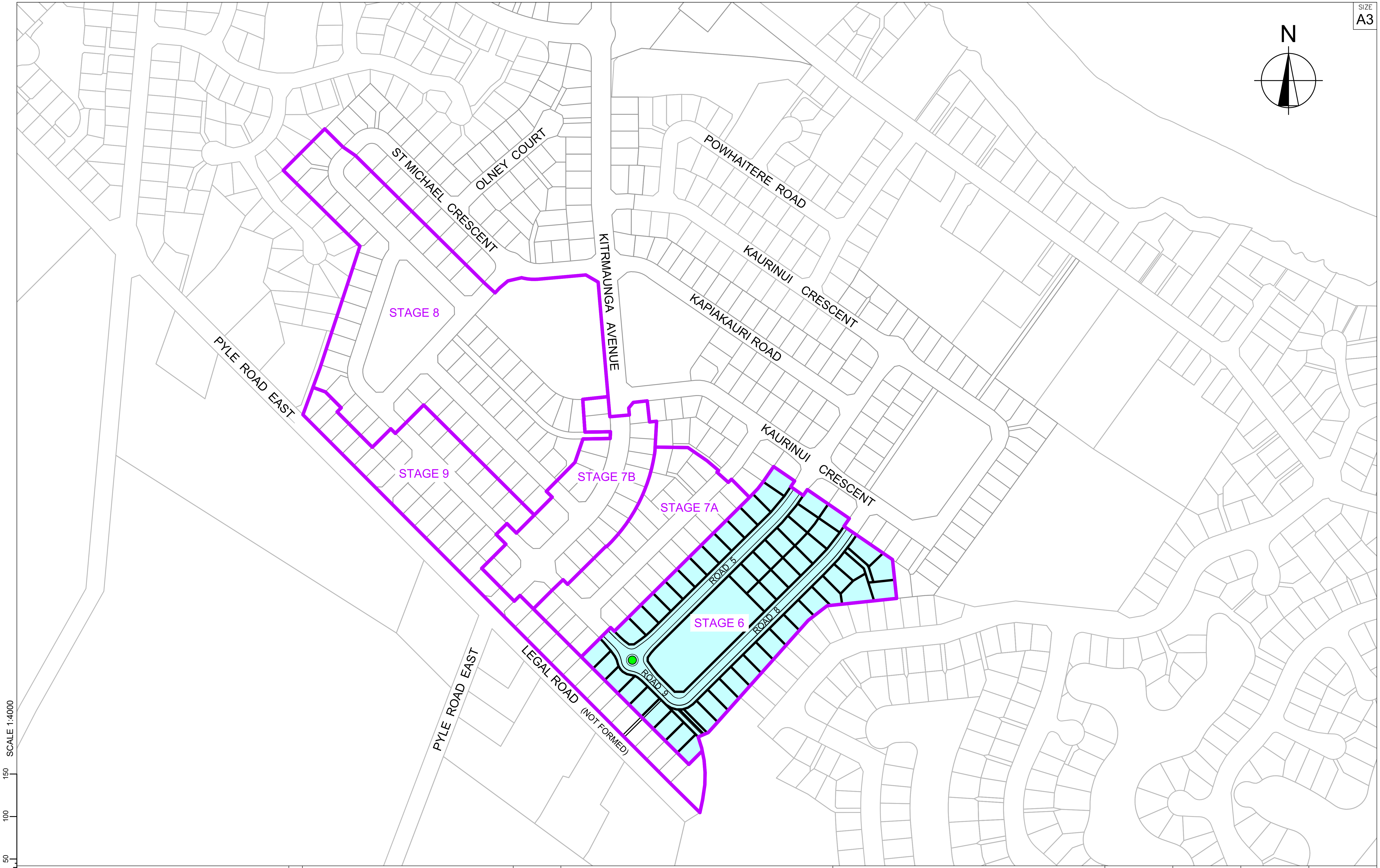
During excavation and construction, the site should be examined by a Cook Costello Engineer or Engineering Geologist to judge whether the exposed subsoils are compatible with the inferred conditions on which the report has been based. It is possible that the nature of the exposed subsoil may require further investigation and modification of the design based on this report. In any event, it is essential that the firm is notified if there is any variation in subsoil conditions from those described in the report as it may affect the design parameters recommended in the report.

Cook Costello has performed the services for this project in accordance with the standard agreement for consulting services and current professional standards for environmental site assessment. No guarantees are either expressed or implied.

There is no investigation that is thorough enough to preclude the presence of materials at the site which presently, or in the future, may be considered hazardous. Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable now may in the future become subject to different regulatory standards which cause them to become unacceptable and require further remediation for this site to be suitable for the existing or proposed land use activities.

This report is generally appropriate for engineering use for five years, however, it should be considered that future seismic events may change soil parameters and as a result, a new assessment of the site may be necessitated. Local changes in groundwater tables may also necessitate a reassessment of the site. It is recommended that if an interpretive report is more than two years old, or the proposed building that the report originally applied to have changed significantly, (e.g., layout, height, weight of building materials, foundation loads, etc.) and/or design loadings have changed (e.g., design PGA levels), then the report is reviewed by the geotechnical engineer for current applicability.

Appendix 1 – Scheme Plan



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REV.	REVISION DETAILS	DRAWN	APP.
C			
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A	IST ISSUE	30-08-21 KH	PC

PROJECT DETAILS

WFH PROPERTIES LIMITED
THE LANDING - STAGE 6
ONE TREE POINT
RUAKAKA

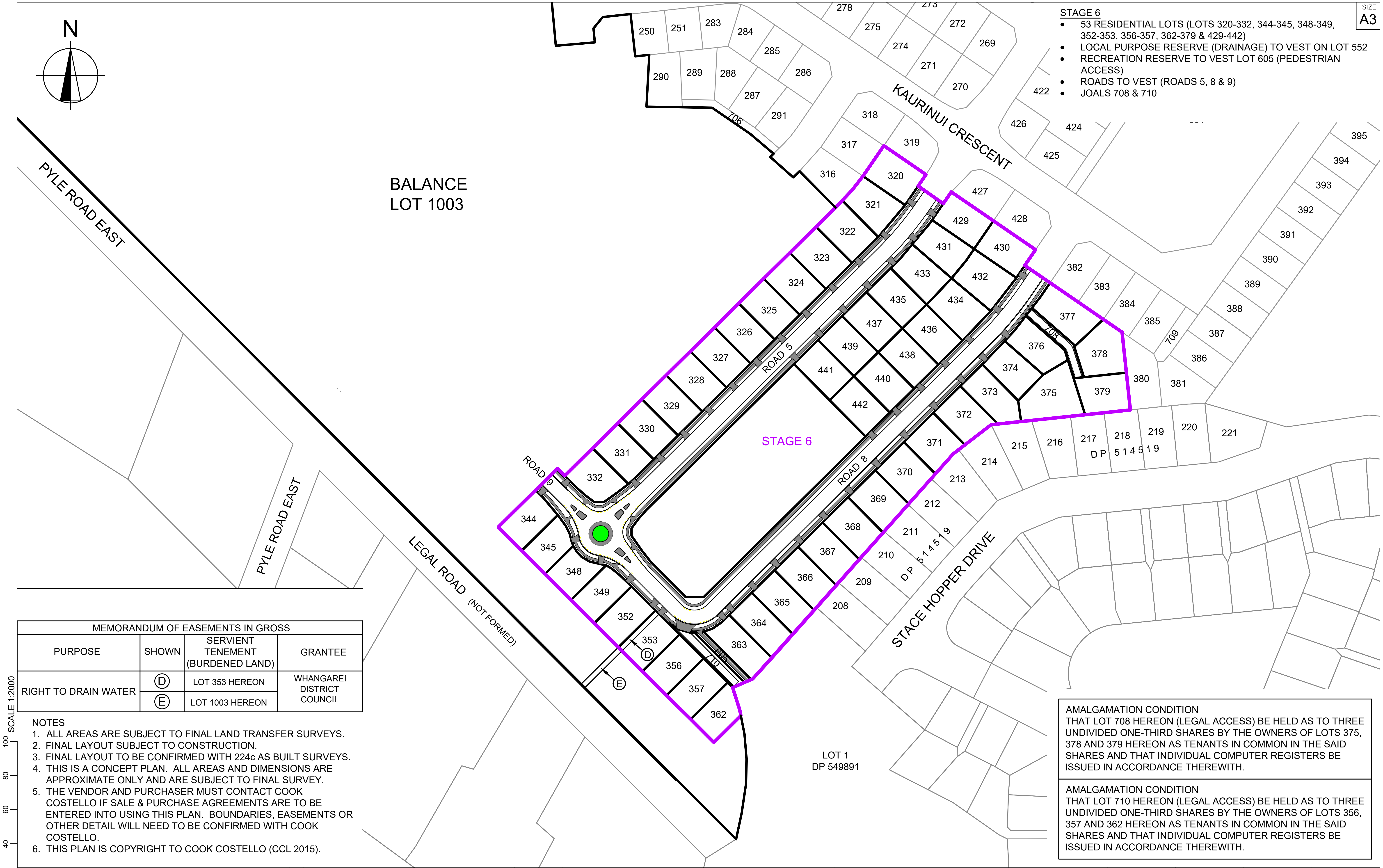
TITLE

SCHEME PLAN - STAGE 6 OVERVIEW
PROPOSED SUBDIVISION OF
LOT 1002 (STAGE 5)
SHEET 1 OF 4

DATE CREATED: 30/08/2021
DRAWN: K HANSARD
DESIGNED: R BROOKES
APPROVED: P COOK
CCL REF NO: 14333-006
SCALE: 1:4000 @ A3
STATUS: FOR APPROVAL
DWG NUMBER: SCH01
REVISION: A

0 50 100 150 SCALE 1:4000

DATE PLOTTED: Thursday, 10 March 2022 12:24:33 pm FILE PATH: C:\12dS\data\COOKCOSTELLO-12\14333-006-The Landing Stage 6 & 7_550\05 CAD\DWGS\Other\14333-006-SCH01-Scheme Stage 6.dwg



STAGE 6

- 53 RESIDENTIAL LOTS (LOTS 320-332, 344-345, 348-349, 352-353, 356-357, 362-379 & 429-442)
- LOCAL PURPOSE RESERVE (DRAINAGE) TO VEST ON LOT 552
- RECREATION RESERVE TO VEST LOT 605 (PEDESTRIAN ACCESS)
- ROADS TO VEST (ROADS 5, 8 & 9)
- JOALS 708 & 710

SIZE
A3

MEMORANDUM OF EASEMENTS IN GROSS

PURPOSE	SHOWN	SERVIENT TENEMENT (BURDENED LAND)	GRANTEE
RIGHT TO DRAIN WATER	Ⓓ	LOT 353 HEREON	WHANGAREI DISTRICT COUNCIL
	Ⓔ	LOT 1003 HEREON	

NOTES

1. ALL AREAS ARE SUBJECT TO FINAL LAND TRANSFER SURVEYS.
2. FINAL LAYOUT SUBJECT TO CONSTRUCTION.
3. FINAL LAYOUT TO BE CONFIRMED WITH 224c AS BUILT SURVEYS.
4. THIS IS A CONCEPT PLAN. ALL AREAS AND DIMENSIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO FINAL SURVEY.
5. THE VENDOR AND PURCHASER MUST CONTACT COOK COSTELLO IF SALE & PURCHASE AGREEMENTS ARE TO BE ENTERED INTO USING THIS PLAN. BOUNDARIES, EASEMENTS OR OTHER DETAIL WILL NEED TO BE CONFIRMED WITH COOK COSTELLO.
6. THIS PLAN IS COPYRIGHT TO COOK COSTELLO (CCL 2015).

AMALGAMATION CONDITION
THAT LOT 708 HEREON (LEGAL ACCESS) BE HELD AS TO THREE UNDIVIDED ONE-THIRD SHARES BY THE OWNERS OF LOTS 375, 378 AND 379 HEREON AS TENANTS IN COMMON IN THE SAID SHARES AND THAT INDIVIDUAL COMPUTER REGISTERS BE ISSUED IN ACCORDANCE THEREWITH.

AMALGAMATION CONDITION
THAT LOT 710 HEREON (LEGAL ACCESS) BE HELD AS TO THREE UNDIVIDED ONE-THIRD SHARES BY THE OWNERS OF LOTS 356, 357 AND 362 HEREON AS TENANTS IN COMMON IN THE SAID SHARES AND THAT INDIVIDUAL COMPUTER REGISTERS BE ISSUED IN ACCORDANCE THEREWITH.

SCALE 1:2000
0 20 40 60 80 100

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A	IST ISSUE	30-08-21 KH	PC

PROJECT DETAILS
WFH PROPERTIES LIMITED
THE LANDING - STAGE 6
ONE TREE POINT
RUAKAKA

TITLE
SCHEME PLAN - STAGE 6
PROPOSED SUBDIVISION OF
LOT 1002 (STAGE 5)
SHEET 2 OF 4

DATE CREATED	DRAWN	DESIGNED	APPROVED
30/08/2021	K HANSARD	R BROOKES	P COOK

CCL REF NO	SCALE	STATUS
14333-006	1:2000 @ A3	FOR APPROVAL

DWG NUMBER	REVISION
SCH02	A

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AMALGAMATION CONDITION
THAT LOT 708 HEREON (LEGAL ACCESS) BE HELD AS TO THREE UNDIVIDED ONE-THIRD SHARES BY THE OWNERS OF LOTS 375, 378 AND 379 HEREON AS TENANTS IN COMMON IN THE SAID SHARES AND THAT INDIVIDUAL COMPUTER REGISTERS BE ISSUED IN ACCORDANCE THEREWITH.

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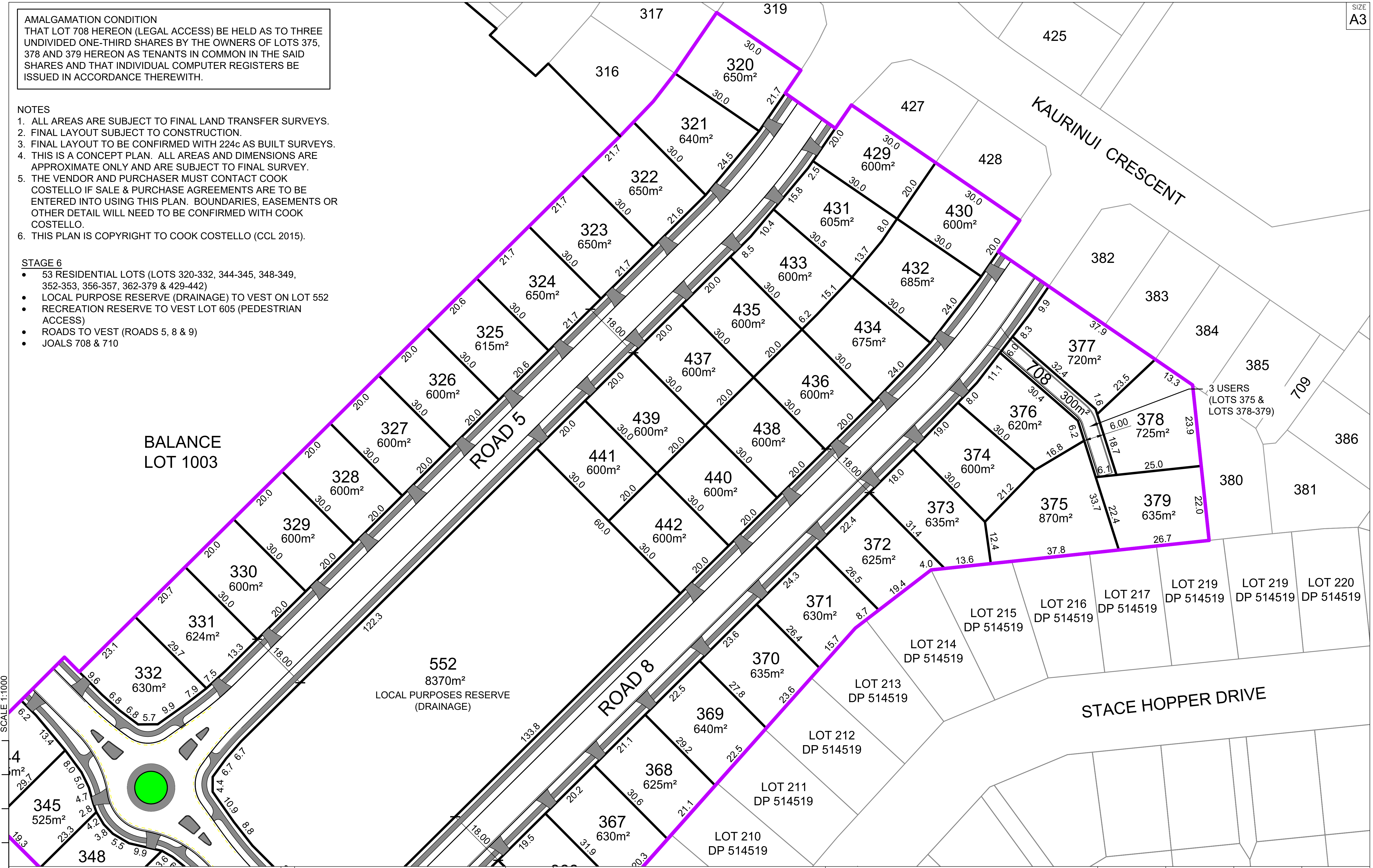
- ROADS TO VEST (ROADS 5, 8 & 9)
- JOALS 708 & 710



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B			
A	IST ISSUE	30-08-21 KH	PC

PROJECT DETAILS
WFH PROPERTIES LIMITED
THE LANDING - STAGE 6
ONE TREE POINT
RUAKAKA

TITLE
SCHEME PLAN - STAGE 6
PROPOSED SUBDIVISION OF
LOT 1002 (STAGE 5)
SHEET 3 OF 4

DATE CREATED	DRAWN	DESIGNED	APPROVED
30/08/2021	K HANSARD	R BROOKES	P COOK

CCL REF NO	SCALE	STATUS
14333-006	1:1000 @ A3	FOR APPROVAL

DWG NUMBER	REVISION
SCH03	A

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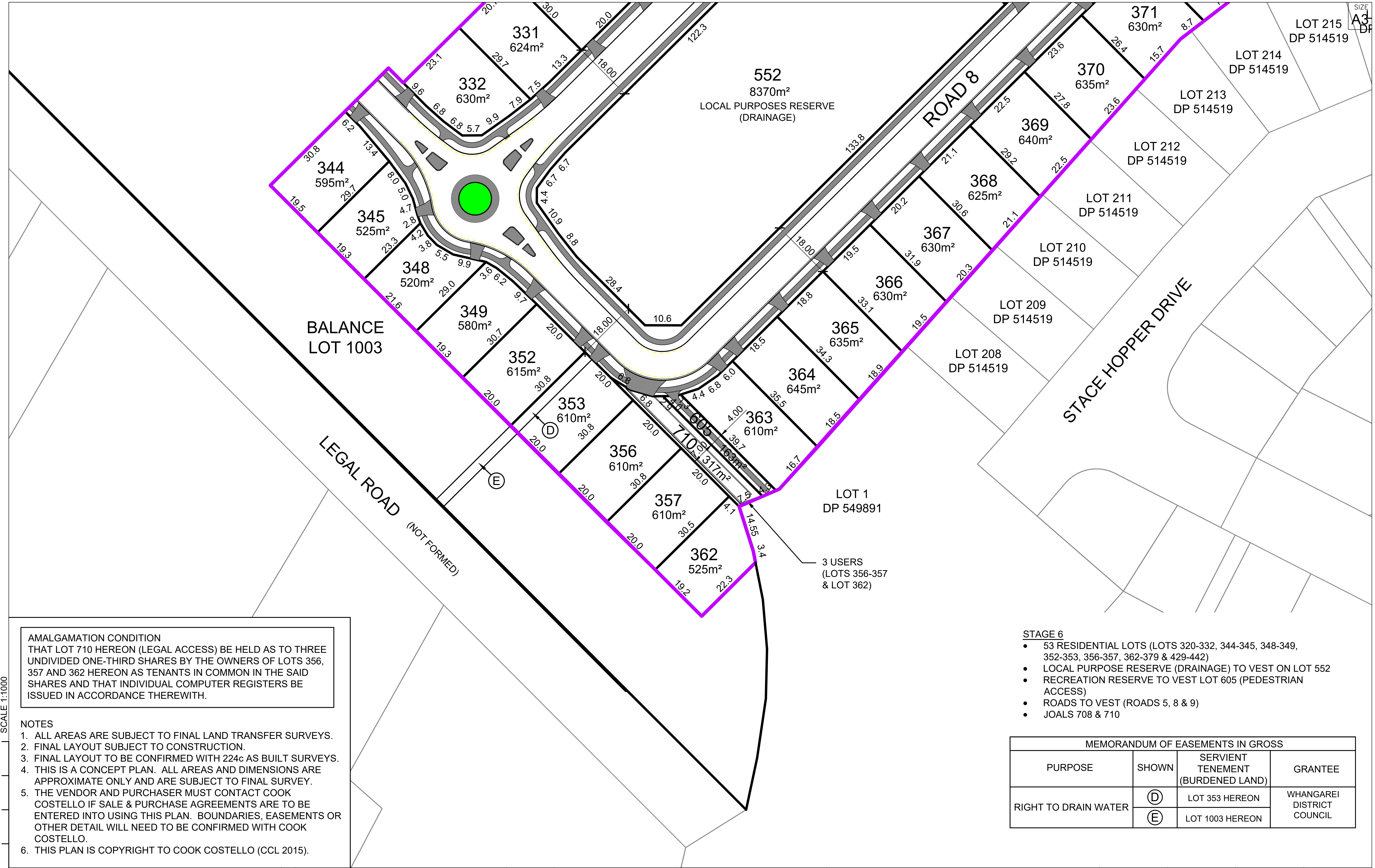

AMALGAMATION CONDITION
THAT LOT 710 HEREON (LEGAL ACCESS) BE HELD AS TO THREE UNDIVIDED ONE-THIRD SHARES BY THE OWNERS OF LOTS 356, 357 AND 362 HEREON AS TENANTS IN COMMON IN THE SAID SHARES AND THAT INDIVIDUAL COMPUTER REGISTERS BE ISSUED IN ACCORDANCE THEREWITH.

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- RECREATION RESERVE TO VEST LOT 605 (PEDESTRIAN ACCESS)
- ROADS TO VEST (ROADS 5, 8 & 9)
- JOALS 708 & 710

MEMORANDUM OF EASEMENTS IN GROSS

PURPOSE	SHOWN	SERVIENT TENEMENT (BURDENED LAND)	GRANTEE
RIGHT TO DRAIN WATER	Ⓓ	LOT 353 HEREON	WHANGAREI DISTRICT COUNCIL
	Ⓔ	LOT 1003 HEREON	

SCALE 1:1000

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PROJECT DETAILS
WFH PROPERTIES LIMITED
THE LANDING - STAGE 6
ONE TREE POINT
RUAKAKA

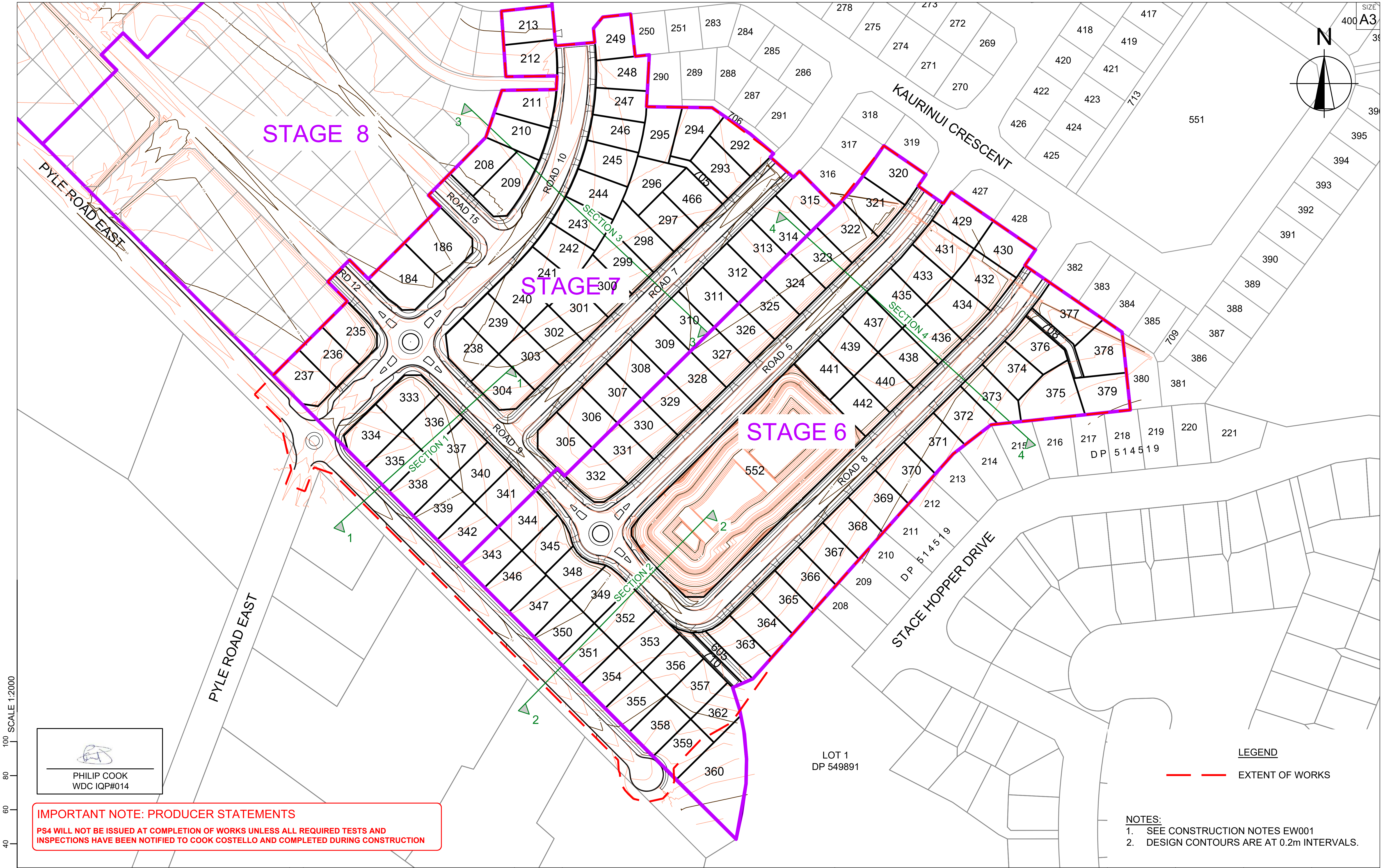
TITLE
SCHEME PLAN - STAGE 6
PROPOSED SUBDIVISION OF
LOT 1002 (STAGE 5)
SHEET 4 OF 4

DATE CREATED	DRAWN	DESIGNED	APPROVED
30/08/2021	K HANSARD	R BROOKES	P COOK

CCL REF NO: 14333-006
SCALE: 1:1000 @ A3
STATUS: FOR APPROVAL
DWG NUMBER: SCH04
REVISION: A
SIZE: A3

DATE PLOTTED: Thursday, March 10, 2022 03:23:47 FILE PATH: c:\12dS\temp\12dSynergy\12dSynergyServerService\3560\70311b52-f168-4921-8052-1c8a20d985c8\14333-006-SCH01-Scheme Stage 6.dwg

Appendix 2 – Finished Contours Plan



PHILIP COOK
WDC IQP#014

IMPORTANT NOTE: PRODUCER STATEMENTS

PS4 WILL NOT BE ISSUED AT COMPLETION OF WORKS UNLESS ALL REQUIRED TESTS AND INSPECTIONS HAVE BEEN NOTIFIED TO COOK COSTELLO AND COMPLETED DURING CONSTRUCTION

LEGEND

— — EXTENT OF WORKS

NOTES:
1. SEE CONSTRUCTION NOTES EW001
2. DESIGN CONTOURS ARE AT 0.2m INTERVALS.

SIZE A3

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A	IST ISSUE	28-05-21	KH	PC

PROJECT DETAILS
WFH PROPERTIES LIMITED
THE LANDING - STAGES 6 & 7
ONE TREE POINT
RUAKAKA

TITLE
FINISHED LEVELS PLAN

DATE CREATED	DRAWN	DESIGNED	APPROVED
28/05/2021	K HANSARD	R BROOKES	P COOK
CCL REF NO	SCALE		STATUS
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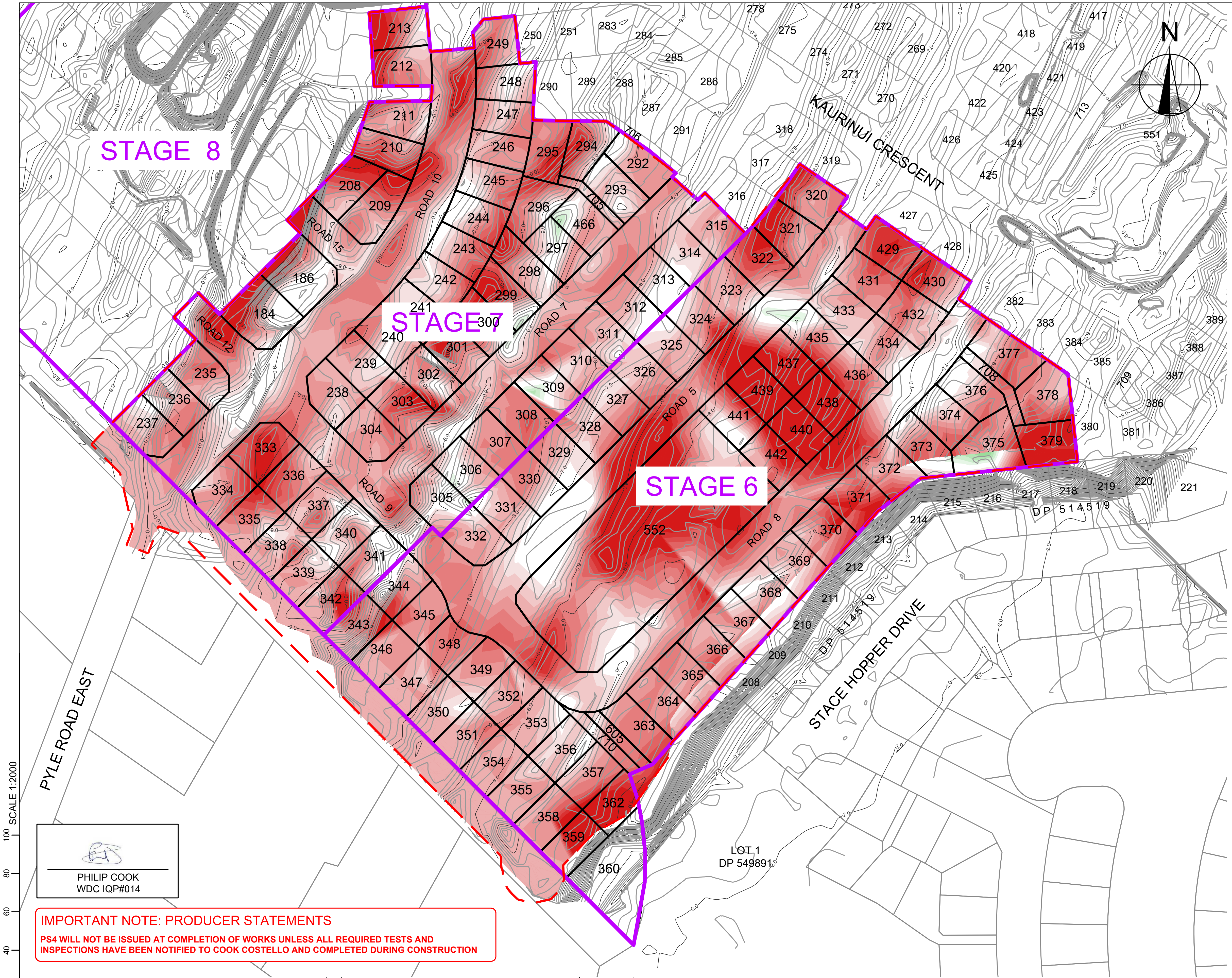
DWG NUMBER			REVISION
EW400			A

SCALE 1:2000

DATE PLOTTED: Saturday, May 29, 2021 02:08:36 FILE PATH: c:\12dS\temp\12dSynergy\12dSynergyServerService\3216\49ff312d-89be-4a33-b5d9-ded62382b8f2\14333-006 EW400 Finished Levels.dwg



PHILIP COOK
WDC IQP#014

IMPORTANT NOTE: PRODUCER STATEMENTS

PS4 WILL NOT BE ISSUED AT COMPLETION OF WORKS UNLESS ALL REQUIRED TESTS AND INSPECTIONS HAVE BEEN NOTIFIED TO COOK COSTELLO AND COMPLETED DURING CONSTRUCTION

SIZE
A3

NOTES:
1. SEE CONSTRUCTION NOTES EW001
2. EXISTING CONTOURS ARE AT 0.2m INTERVALS

DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-6.0	to	-1.8	m	🟥
-1.8	to	-1.6	m	🟥
-1.6	to	-1.4	m	🟥
-1.4	to	-1.2	m	🟥
-1.2	to	-1.0	m	🟥
-1.0	to	-0.8	m	🟥
-0.8	to	-0.6	m	🟥
-0.6	to	-0.4	m	🟥
-0.4	to	-0.2	m	🟥
-0.2	to	0.0	m	
0.0	to	0.2	m	
0.2	to	0.4	m	🟩
0.4	to	0.6	m	🟩
0.6	to	0.8	m	🟩
0.8	to	1.0	m	🟩
1.0	to	1.2	m	🟩
1.2	to	1.4	m	🟩
1.4	to	1.6	m	🟩
1.6	to	1.8	m	🟩
1.8	to	2.0	m	🟩
2.0	to	5.0	m	🟩

LEGEND

— — EXTENT OF WORKS

QUANTITIES:
TOPSOIL STRIP AREA = 116,753m²
TOTAL TOPSOIL STRIP 200mm THICK = 23,350m³
TOTAL PEAT STRIP = 110,600m³
TOTAL FILL = 272m³

VOLUMES BASED ON COMPARISON BETWEEN EXISTING TOPO DATA AND ASSUMED TOP OF SAND LAYER.

NOTES:
1. THE TOP OF SAND SURFACE HAS BEEN INFERRED BASED ON GEOTECHNICAL TESTING AND WILL NEED TO BE CONFIRMED ON SITE DURING EXCAVATION.
2. VOLUME ABOVE IS BASED ON SOLID MEASURE. IT IS RECOMMENDED THAT FURTHER ADJUSTMENTS BE MADE TO THE VOLUMES MENTIONED ABOVE TO ALLOW FOR ITEMS SUCH AS BULKING FACTORS AND PAVEMENT BOXING.
3. ALL 1 IN 1 BATTERS TO HAVE A TEMPORARY SAFETY FENCE ERECTED AT TOP OF BATTER OR OTHER APPROVED SAFETY MANAGEMENT PLAN.

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REV.	REVISION DETAILS	DRAWN	APP.
C			
B			
A	IST ISSUE	28-05-21 KH	PC

PROJECT DETAILS
WFH PROPERTIES LIMITED
THE LANDING - STAGES 6 & 7
ONE TREE POINT
RUAKAKA

TITLE
PEAT STRIP PLAN

DATE CREATED	DRAWN	DESIGNED	APPROVED
28/05/2021	K HANSARD	R BROOKES	P COOK

CCL REF NO	SCALE	STATUS
14333-006	1:2000 @ A3	FOR APPROVAL

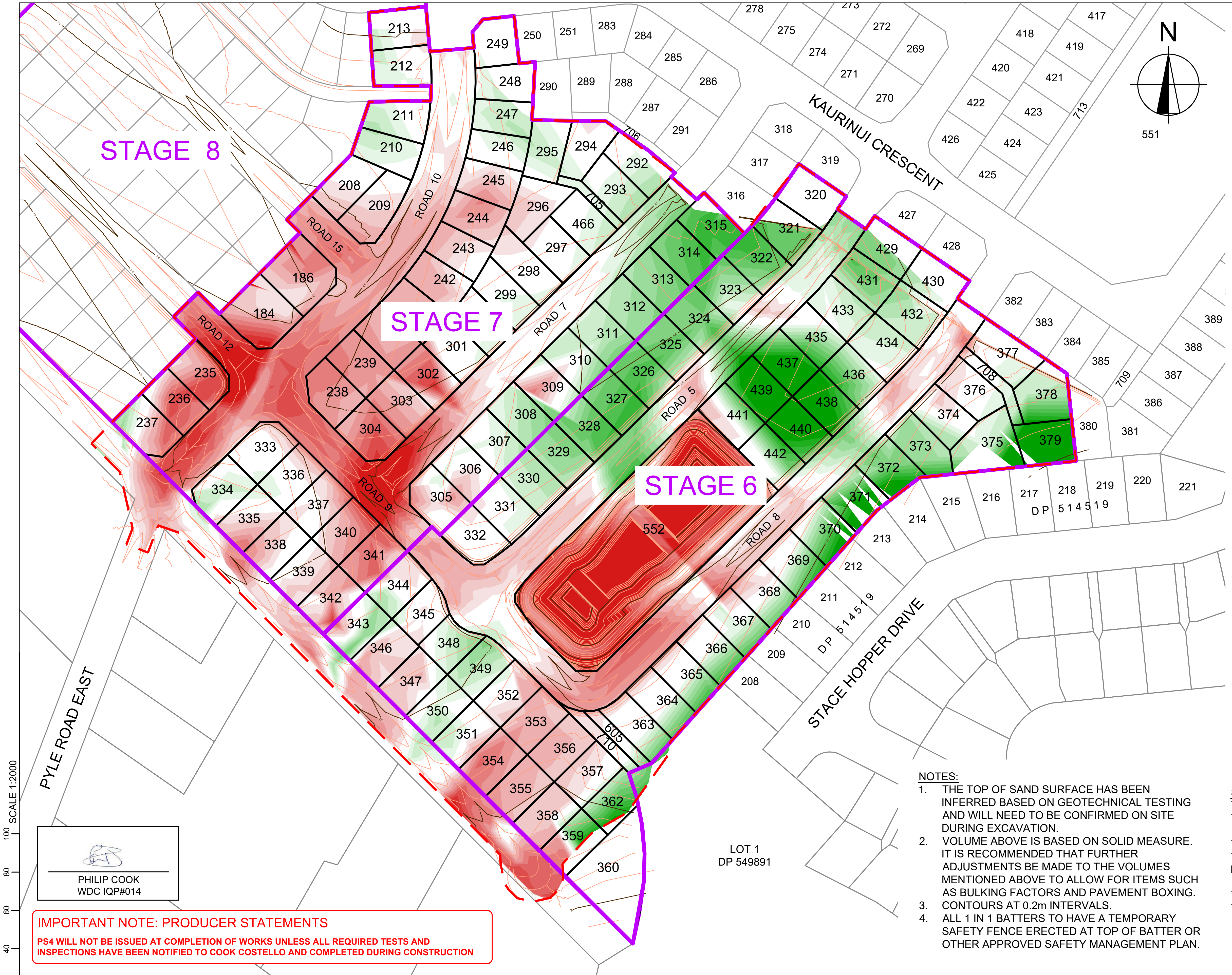
DWG NUMBER	REVISION
EW500	A

0 20 40 60 80 100 SCALE 1:2000

DATE PLOTTED: Saturday, May 29, 2021 02:08:41 FILE PATH: c:\12dS\temp\12dSynergy\12dSynergyServerService\3216\49ff312d-89be-4a33-b5d9-ded62382b8f2\14333-006 EW500 Peat Strip.dwg

NOTES:
1. SEE CONSTRUCTION NOTES EW001
2. DESIGN CONTOURS ARE AT 0.2m INTERVALS.

SIZE
A3



DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-6.0	to	-1.8	m	🟥
-1.8	to	-1.6	m	🟥
-1.6	to	-1.4	m	🟥
-1.4	to	-1.2	m	🟥
-1.2	to	-1.0	m	🟥
-1.0	to	-0.8	m	🟥
-0.8	to	-0.6	m	🟥
-0.6	to	-0.4	m	🟥
-0.4	to	-0.2	m	🟥
-0.2	to	0.0	m	
0.0	to	0.2	m	
0.2	to	0.4	m	🟩
0.4	to	0.6	m	🟩
0.6	to	0.8	m	🟩
0.8	to	1.0	m	🟩
1.0	to	1.2	m	🟩
1.2	to	1.4	m	🟩
1.4	to	1.6	m	🟩
1.6	to	1.8	m	🟩
1.8	to	2.0	m	🟩
2.0	to	5.0	m	🟩

LEGEND

EXTENT OF WORKS

NOTES:
1. THE TOP OF SAND SURFACE HAS BEEN INFERRED BASED ON GEOTECHNICAL TESTING AND WILL NEED TO BE CONFIRMED ON SITE DURING EXCAVATION.
2. VOLUME ABOVE IS BASED ON SOLID MEASURE. IT IS RECOMMENDED THAT FURTHER ADJUSTMENTS BE MADE TO THE VOLUMES MENTIONED ABOVE TO ALLOW FOR ITEMS SUCH AS BULKING FACTORS AND PAVEMENT BOXING.
3. CONTOURS AT 0.2m INTERVALS.
4. ALL 1 IN 1 BATTERS TO HAVE A TEMPORARY SAFETY FENCE ERECTED AT TOP OF BATTER OR OTHER APPROVED SAFETY MANAGEMENT PLAN.

SAND BULK EARTHWORKS QUANTITIES:
TOTAL EARTHWORKS AREA = 116,753m²
TOP SOIL RESPREAD = 0.2m X 116,753 = 23,350m³

TOTAL SAND CUT = 52,740m³
TOTAL SAND FILL = 35,728m³
BALANCE = 17,012m³ (EXCESS SAND)

VOLUMES BASED ON COMPARISON BETWEEN ASSUMED TOP OF SAND TO DESIGN SUBGRADE.

PHILIP COOK
WDC IQP#014

IMPORTANT NOTE: PRODUCER STATEMENTS

PS4 WILL NOT BE ISSUED AT COMPLETION OF WORKS UNLESS ALL REQUIRED TESTS AND INSPECTIONS HAVE BEEN NOTIFIED TO COOK COSTELLO AND COMPLETED DURING CONSTRUCTION

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REV.	REVISION DETAILS	DRAWN	APP.
C			
B			
A	IST ISSUE 28-05-21	KH	PC

PROJECT DETAILS
WFH PROPERTIES LIMITED
THE LANDING - STAGES 6 & 7
ONE TREE POINT
RUAKAKA

TITLE
SAND BULK EARTHWORKS PLAN

DATE CREATED	DRAWN	DESIGNED	APPROVED
28/05/2021	K HANSARD	R BROOKES	P COOK

CCL REF NO	SCALE	STATUS
14333-006	1:2000 @ A3	FOR APPROVAL

DWG NUMBER	REVISION
EW600	A

SCALE 1:2000

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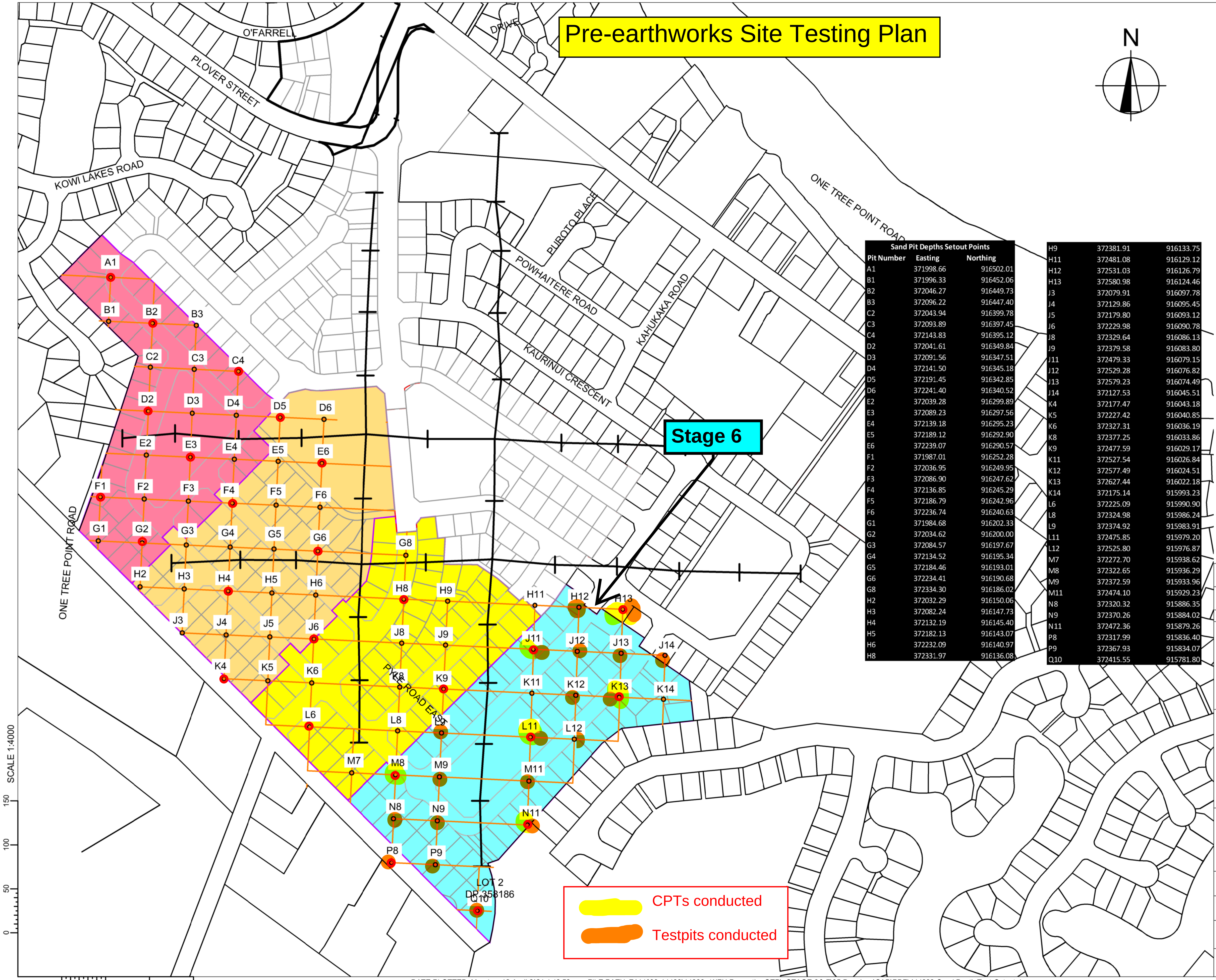
Appendix 3 – Site Testing Locations

Pre-earthworks Site Testing Plan



Sand Pit Depths Setout Points		
Pit Number	Easting	Northing
A1	371998.66	916502.01
B1	371996.33	916452.06
B2	372046.27	916449.73
B3	372096.22	916447.40
C2	372043.94	916399.78
C3	372093.89	916397.45
C4	372143.83	916395.12
D2	372041.61	916349.84
D3	372091.56	916347.51
D4	372141.50	916345.18
D5	372191.45	916342.85
D6	372241.40	916340.52
E2	372039.28	916299.89
E3	372089.23	916297.56
E4	372139.18	916295.23
E5	372189.12	916292.90
E6	372239.07	916290.57
F1	371987.01	916252.28
F2	372036.95	916249.95
F3	372086.90	916247.62
F4	372136.85	916245.29
F5	372186.79	916242.96
F6	372236.74	916240.63
G1	371984.68	916202.33
G2	372034.62	916200.00
G3	372084.57	916197.67
G4	372134.52	916195.34
G5	372184.46	916193.01
G6	372234.41	916190.68
G8	372334.30	916186.02
H2	372032.29	916150.06
H3	372082.24	916147.73
H4	372132.19	916145.40
H5	372182.13	916143.07
H6	372232.09	916140.97
H8	372331.97	916136.08
H9	372381.91	916133.75
H11	372481.08	916129.12
H12	372531.03	916126.79
H13	372580.98	916124.46
J3	372079.91	916097.78
J4	372129.86	916095.45
J5	372179.80	916093.12
J6	372229.98	916090.78
J8	372329.64	916086.13
J9	372379.58	916083.80
J11	372479.33	916079.15
J12	372529.28	916076.82
J13	372579.23	916074.49
J14	372127.53	916045.51
K4	372177.47	916043.18
K5	372227.42	916040.85
K6	372327.31	916036.19
K8	372377.25	916033.86
K9	372477.59	916029.17
K11	372527.54	916026.84
K12	372577.49	916024.51
K13	372627.44	916022.18
K14	372175.14	915993.23
L6	372225.09	915990.90
L8	372324.98	915986.24
L9	372374.92	915983.91
L11	372475.85	915979.20
L12	372525.80	915976.87
M7	372272.70	915938.62
M8	372322.65	915936.29
M9	372372.59	915933.96
M11	372474.10	915929.23
N8	372320.32	915886.35
N9	372370.26	915884.02
N11	372472.36	915879.26
P8	372317.99	915836.40
P9	372367.93	915834.07
Q10	372415.55	915781.80

○ = Test pit replaced by CPT

CPT = CONE PENETRATION TEST
FA = FLIGHT AUGER
TOS = TOP OF SAND

REV.	REVISION DETAILS	DRAWN	APP.
B			
A	1ST ISSUE	08-04-21 KAH	GMcG

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PROJECT DETAILS

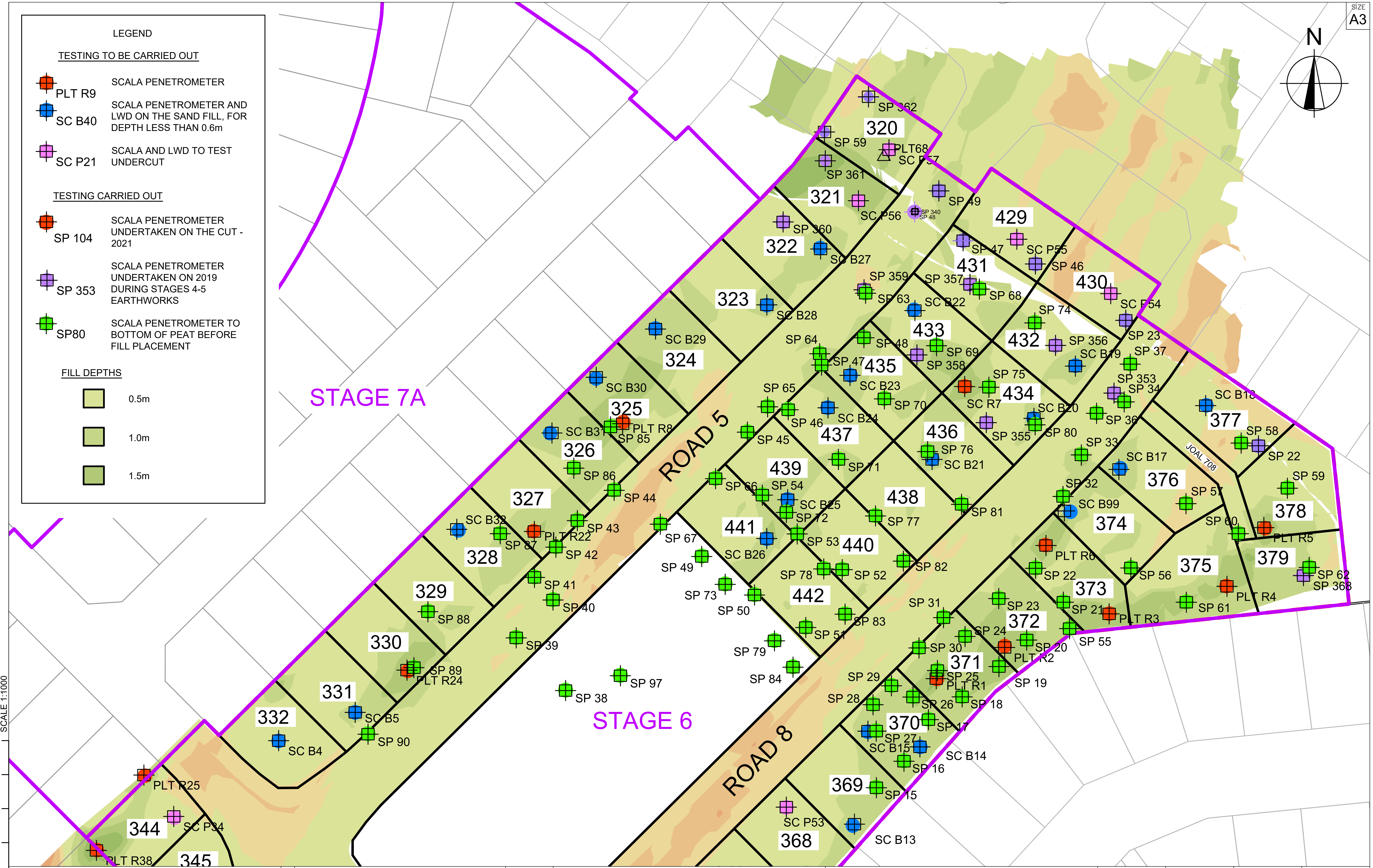
TITLE
SAND DEPTH TEST PITS

DATE CREATED: 08-04-2021
CCL REF NO: 14333
DRAWN: R BROOKES
DESIGNED: R BROOKES
APPROVED: G McGREGOR
SCALE: 1:4000 @ A3
STATUS: PRELIMINARY
DWG NUMBER: SK01
REVISION: A

SCALE 1:4000

DATE PLOTTED: Monday, 12 April 2021 4:48:58 pm FILE PATH: Z:\14000-14499\14333 - WFH Properties OTP_STAGE 6 & 7\05 Drawings\CAD\PDF's\14333 Sand Depth Test Setout.dwg

DO NOT REPRODUCE WITHOUT WRITTEN AUTHORITY



LEGEND

TESTING TO BE CARRIED OUT

🟥 PLT R9	SCALA PENETROMETER
🟦 SC B40	SCALA PENETROMETER AND LWD ON THE SAND FILL, FOR DEPTH LESS THAN 0.6m
🟪 SC P21	SCALA AND LWD TO TEST UNDERCUT

TESTING CARRIED OUT

🟥 SP 104	SCALA PENETROMETER UNDERTAKEN ON THE CUT - 2021
🟪 SP 353	SCALA PENETROMETER UNDERTAKEN ON 2019 DURING STAGES 4-5 EARTHWORKS
🟩 SP80	SCALA PENETROMETER TO BOTTOM OF PEAT BEFORE FILL PLACEMENT

FILL DEPTHS

🟨	0.5m
🟩	1.0m
🟩	1.5m

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REV.	REVISION DETAILS	DRAWN	APP.
C			
B			
A	1st ISSUE 09-03-22	KH	PC

PROJECT DETAILS

WFH PROPERTIES LIMITED
THE LANDING - STAGE 6
ONE TREE POINT
RUAKAKA

TITLE

STAGE 6
FILL TESTING
SHEET 1

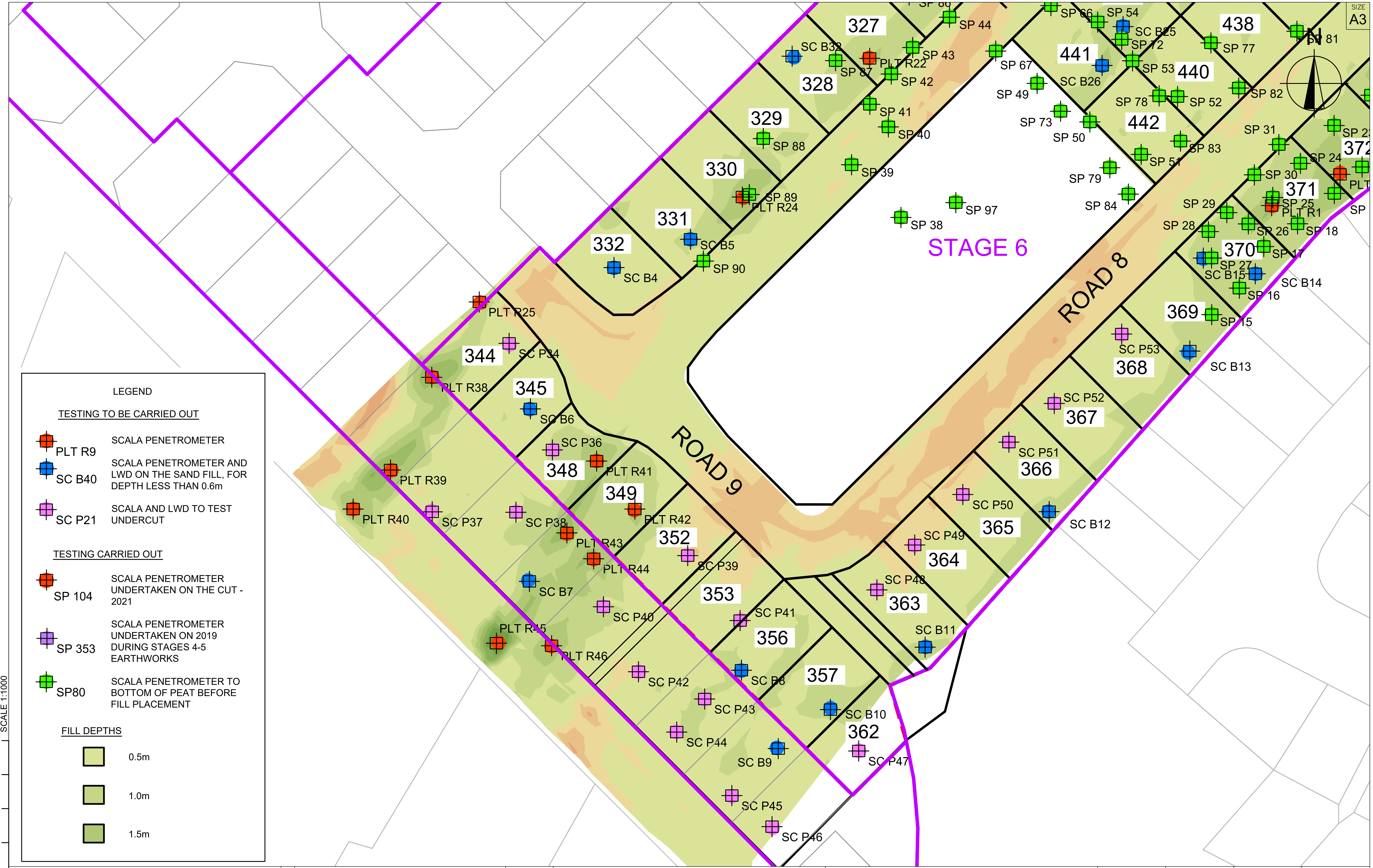
DATE CREATED	DRAWN	DESIGNED	APPROVED
09/03/2022	K HANSARD	R BROOKES	P COOK

CCL REF NO	SCALE	STATUS
14333-006	1:1000 @ A3	DRAFT

DWG NUMBER	REVISION
SK010	A

0 10 20 30 40 50 SCALE 1:1000

DATE PLOTTED: Thursday, 12 May 2022 8:56:50 am FILE PATH: C:\12dS\data\COOKCOSTELLO-12\14333-006-The Landing Stage 6 & 7_550\05 CAD\DWGS\Other\14333-006-Fill Testing Plan Stage 6.dwg



LEGEND

TESTING TO BE CARRIED OUT

🟥 PLT R9 — SCALA PENETROMETER

🟦 SC B40 — SCALA PENETROMETER AND LWD ON THE SAND FILL, FOR DEPTH LESS THAN 0.6m

🟪 SC P21 — SCALA AND LWD TO TEST UNDERCUT

TESTING CARRIED OUT

🟥 SP 104 — SCALA PENETROMETER UNDERTAKEN ON THE CUT - 2021

🟪 SP 353 — SCALA PENETROMETER UNDERTAKEN ON 2019 DURING STAGES 4-5 EARTHWORKS

🟩 SP80 — SCALA PENETROMETER TO BOTTOM OF PEAT BEFORE FILL PLACEMENT

FILL DEPTHS

🟨 0.5m

🟩 1.0m

🟩 1.5m

SCALE 1:1000
0 10 20 30 40 50

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REV.	REVISION DETAILS	DRAWN	APP.
C			
B			
A	1st ISSUE 09-03-22	KH	PC

PROJECT DETAILS
WFH PROPERTIES LIMITED
THE LANDING - STAGE 6
ONE TREE POINT
RUAKAKA

TITLE
STAGE 6
FILL TESTING
SHEET 2

DATE CREATED	DRAWN	DESIGNED	APPROVED
09/03/2022	K HANSARD	R BROOKES	P COOK

CCL REF NO: 14333-006
SCALE: 1:1500 @ A3
STATUS: DRAFT
DWG NUMBER: SK011
REVISION: A

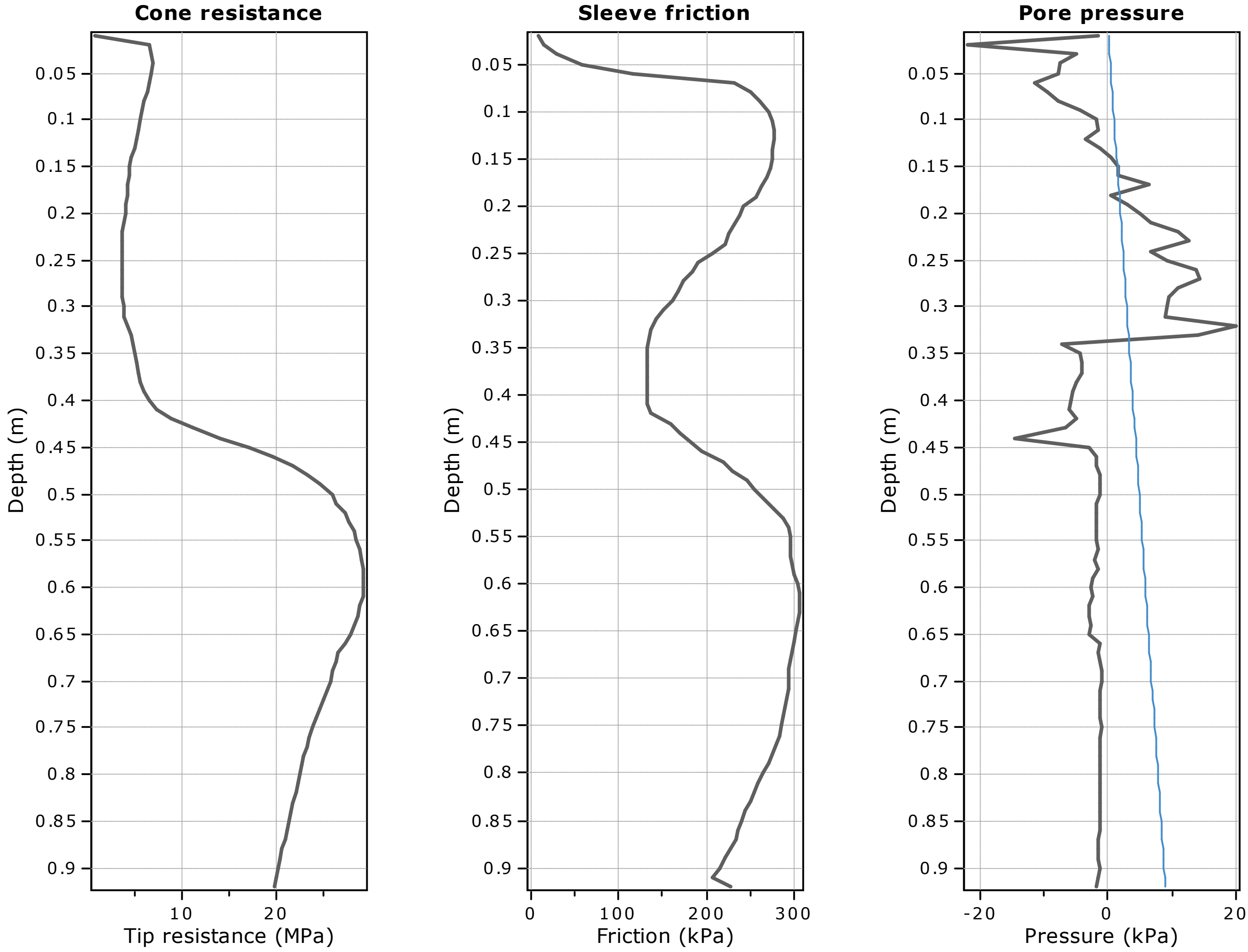
0 10 20 30 40 50 SCALE 1:1000

DATE PLOTTED: Thursday, 12 May 2022 8:57:36 am FILE PATH: C:\12dS\data\COOKCOSTELLO-12\14333-006-The Landing Stage 6 & 7_550\05 CAD\DWGS\Other\14333-006-Fill Testing Plan Stage 6.dwg

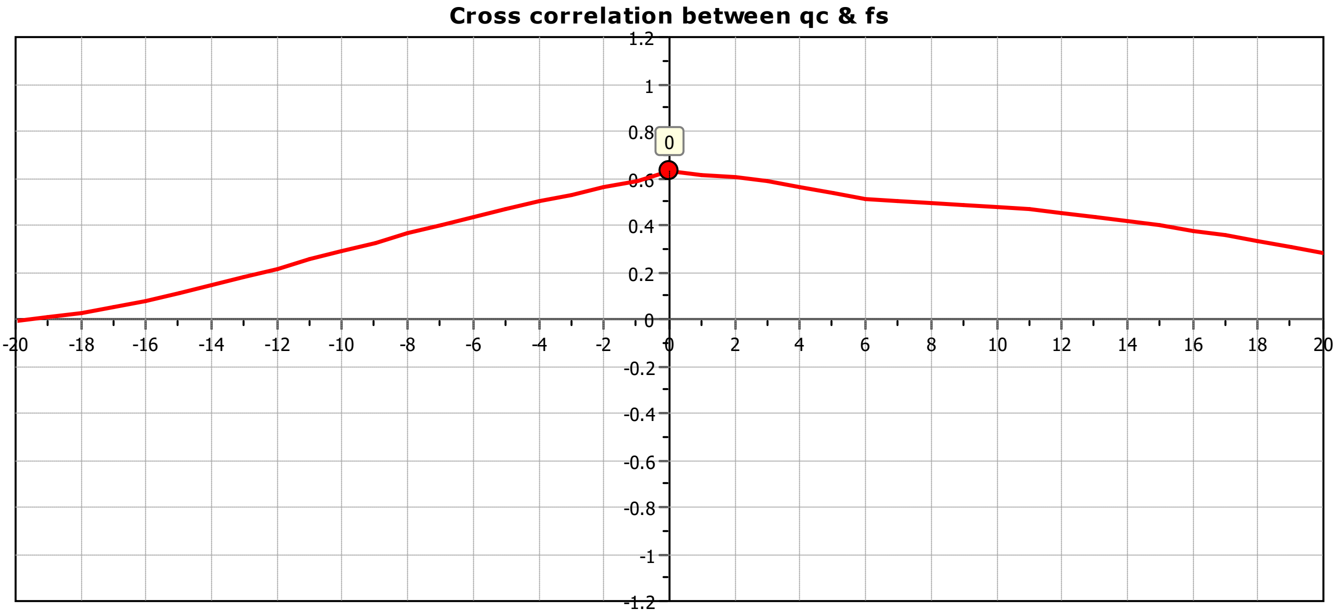
Appendix 4 – Site Testing Results

CPT: CPTJ11
Total depth: 0.92 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



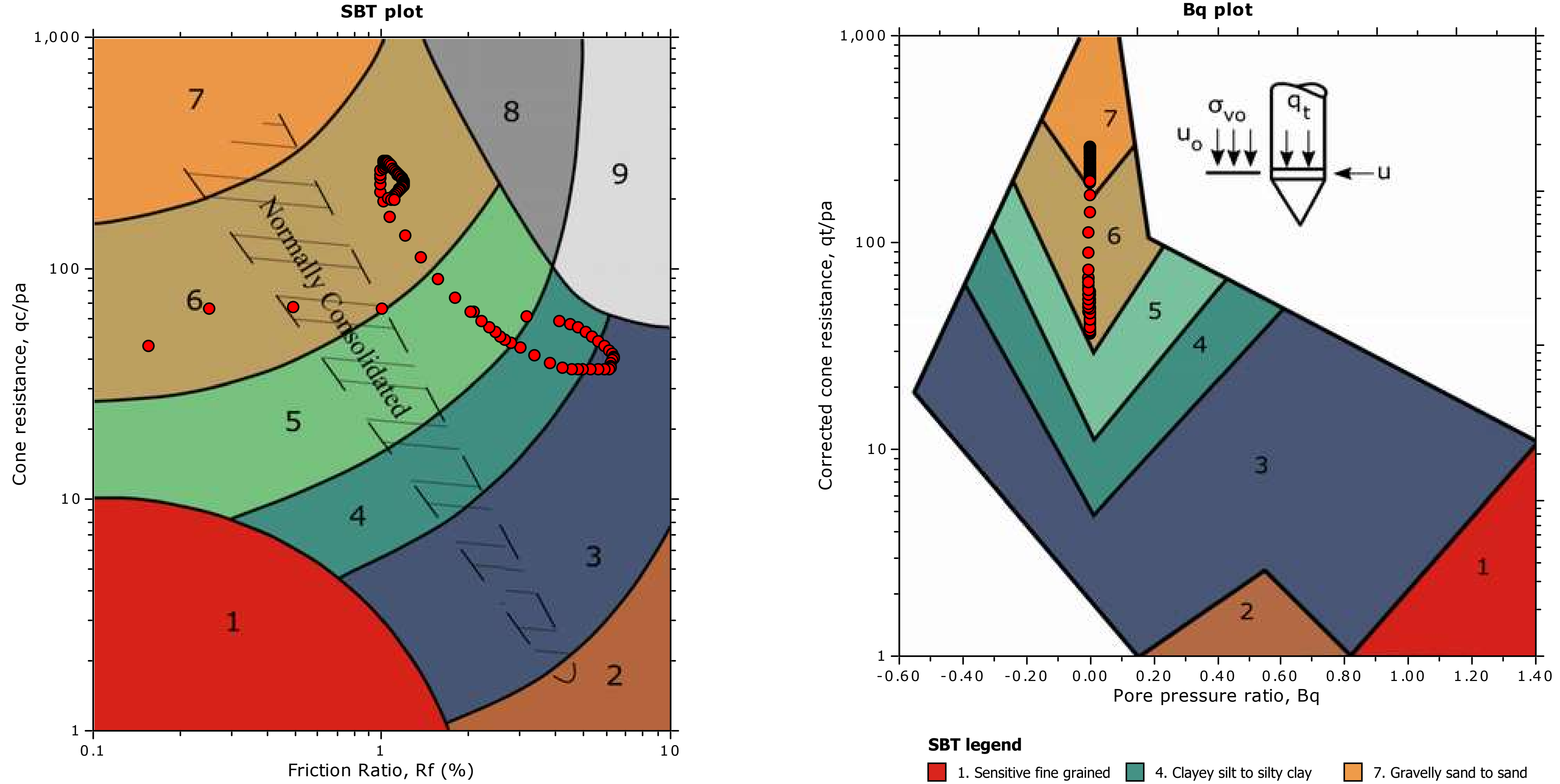
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



CPT: CPTJ11
Total depth: 0.92 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**

SBT - Bq plots



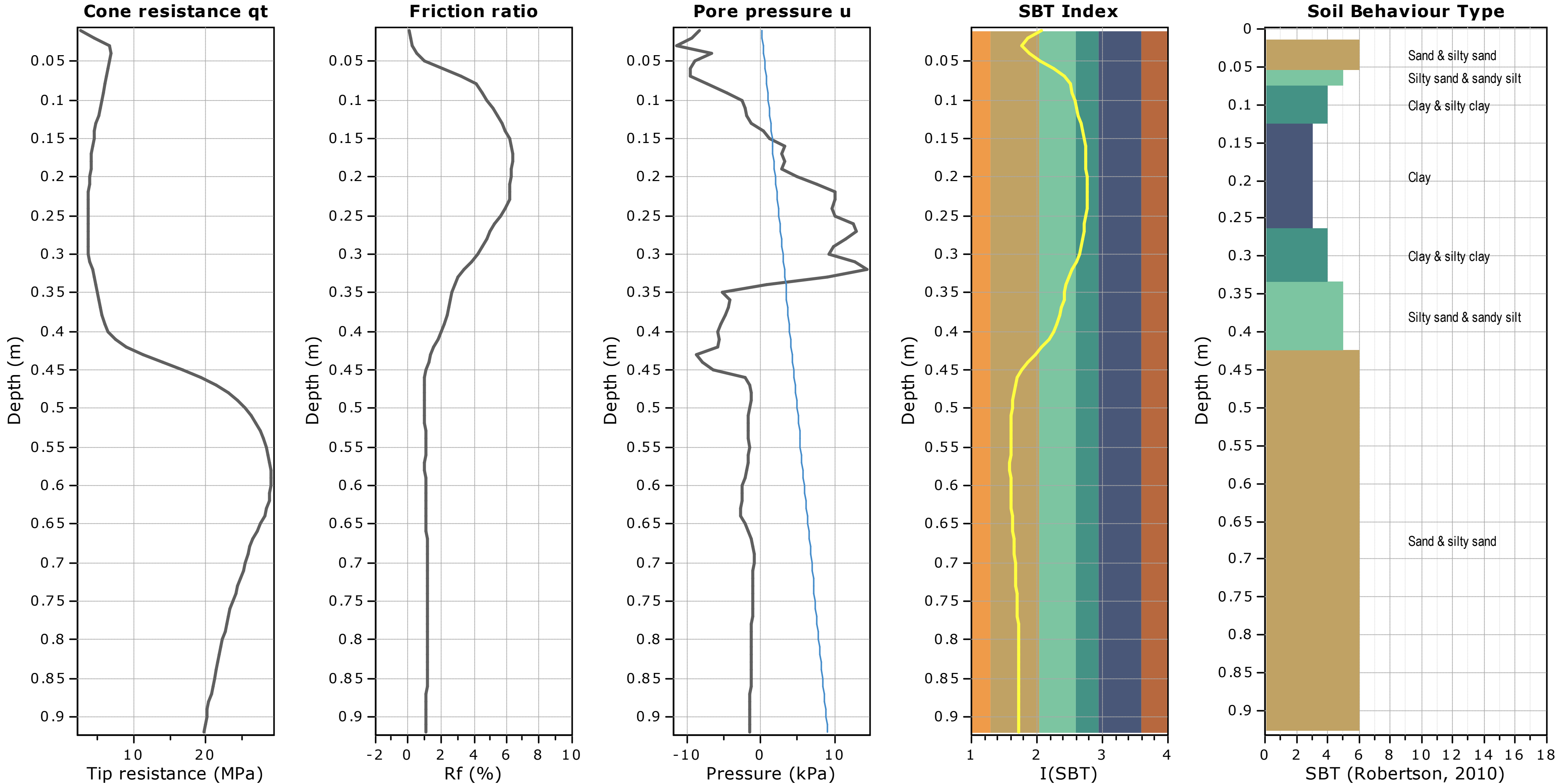
SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟨 6. Clean sand to silty sand
🟧 7. Gravelly sand to sand
⬜ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

Cook Costello
Geotechnical Engineers

CPT: CPTJ11
Total depth: 0.92 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



SBT legend

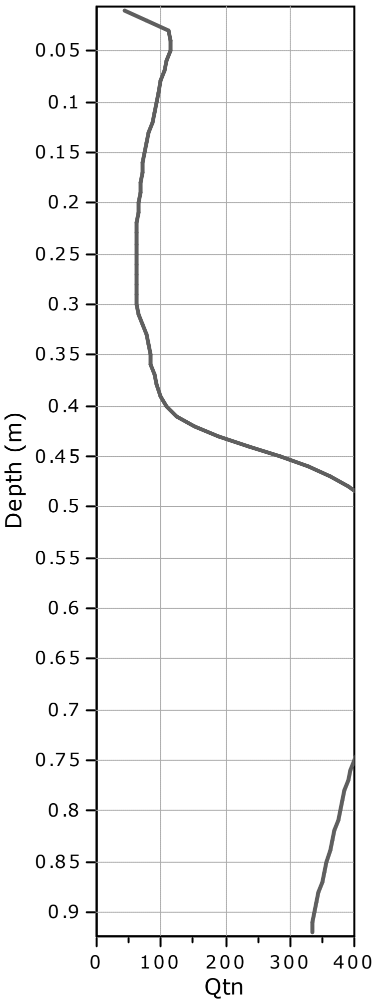
- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬜ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

Cook Costello
Geotechnical Engineers

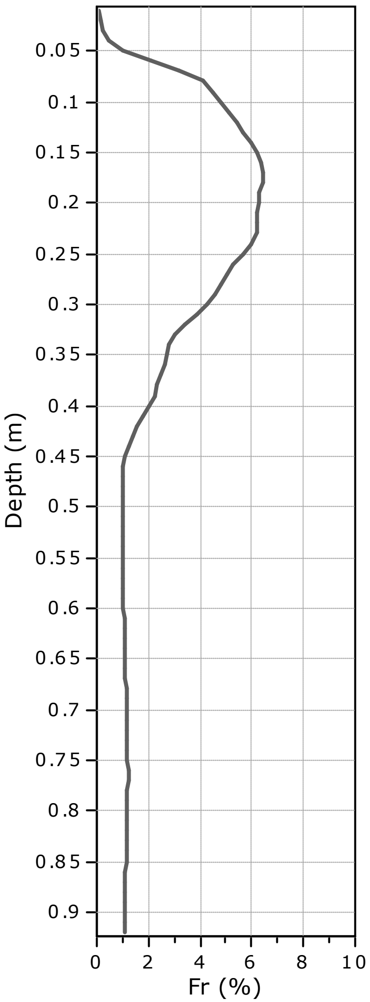
CPT: CPTJ11
Total depth: 0.92 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**

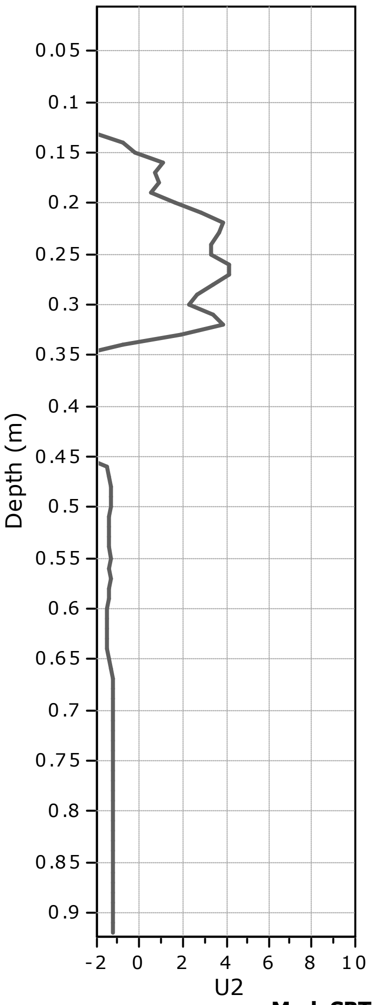
Norm. cone resistance



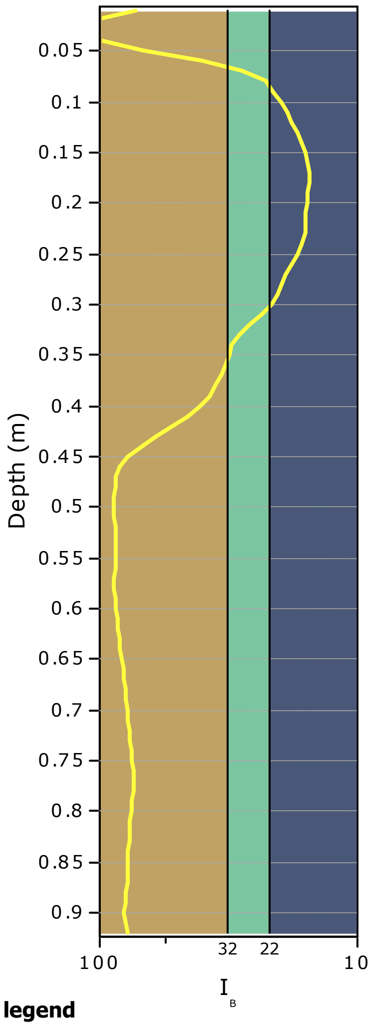
Norm. friction ratio



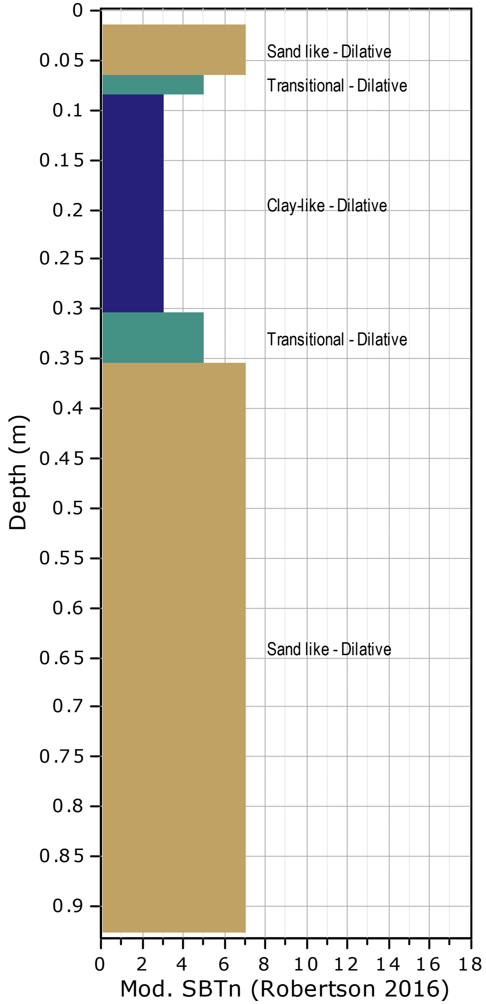
Norm. Pore Pressure



Mod. SBTn I(B)



Mod. Norm. SBTn

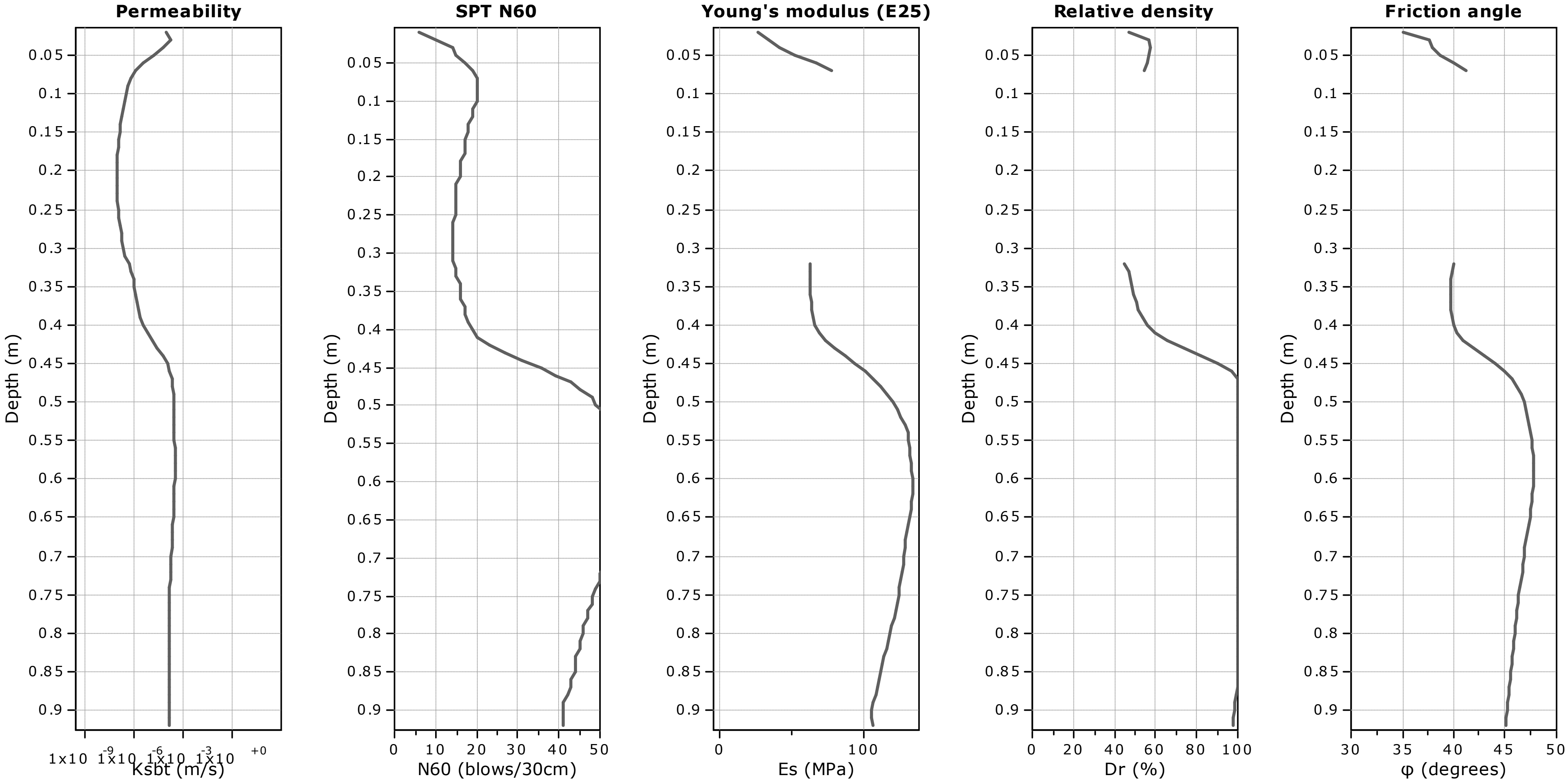


Mod. SBTn legend

🟥 1. CCS: ClayLike - Contractive, Sensitive
🟦 2. CC: Clay-like - Contractive
🟦 3. CD: Clay-Like: Dilative
🟩 4. TC: Transitional - Contractive
🟩 5. TD: Transitional - Dilative
🟧 6. SC: Sand-like - Contractive
🟫 7. SD: Sand-like - Dilative

CPT: CPTJ11
Total depth: 0.92 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters

Permeability: Based on SBT_n

SPT N_{60}: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0

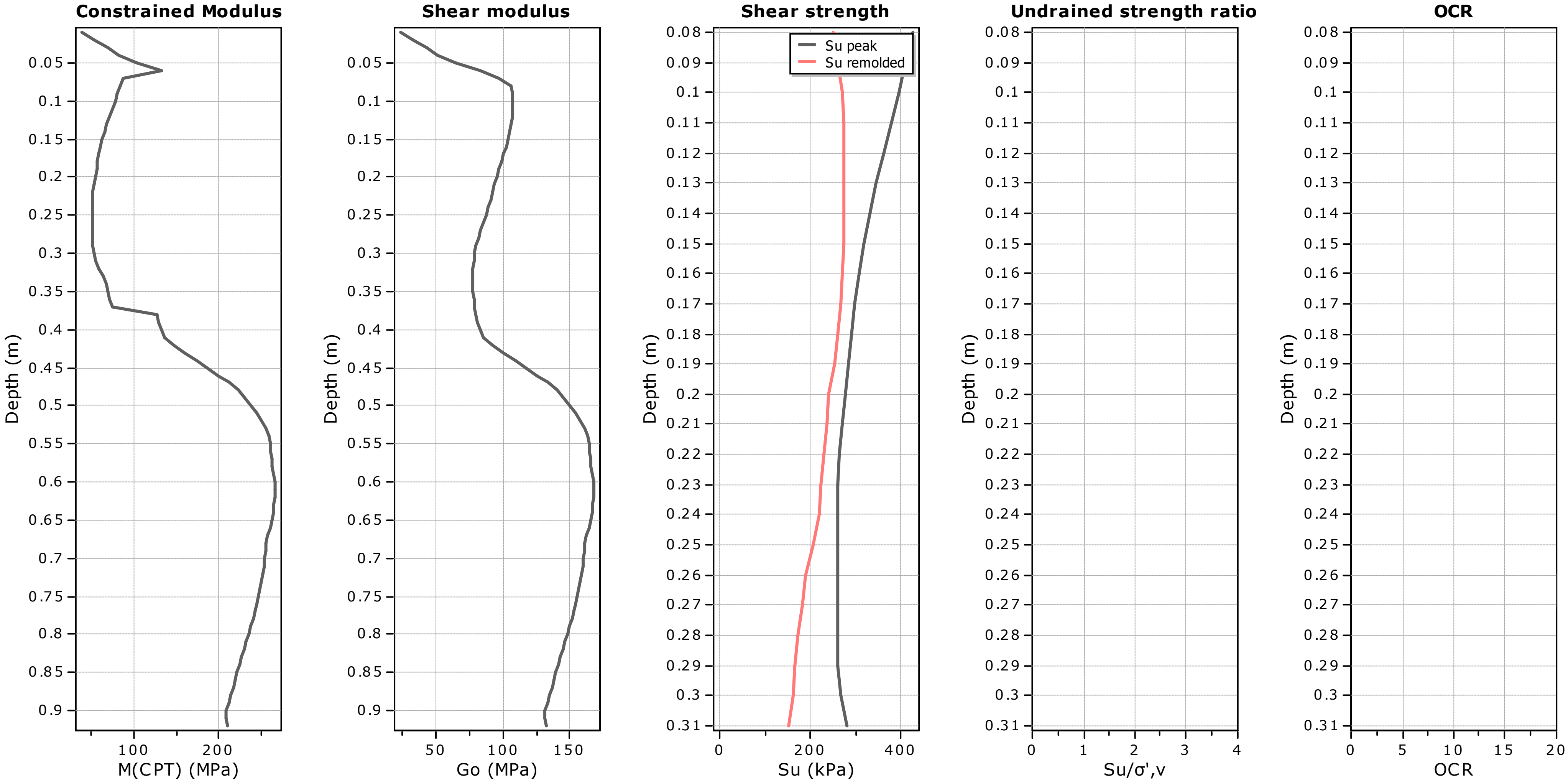
Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data

Cook Costello
Geotechnical Engineers

CPT: CPTJ11
Total depth: 0.92 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters

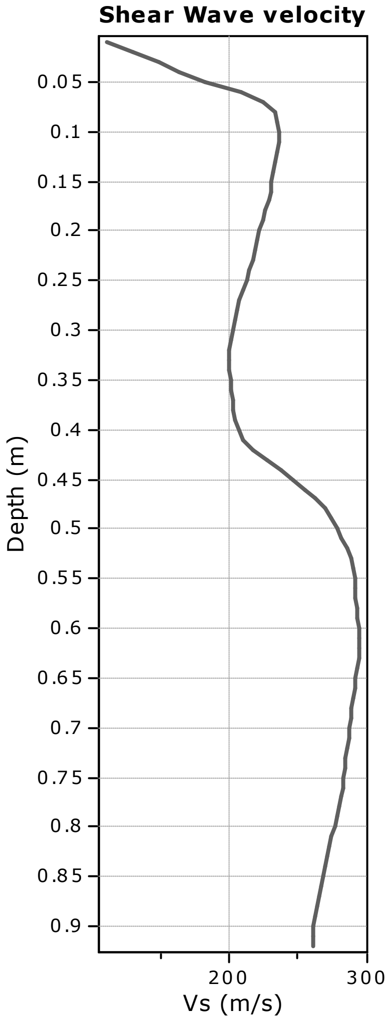
Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

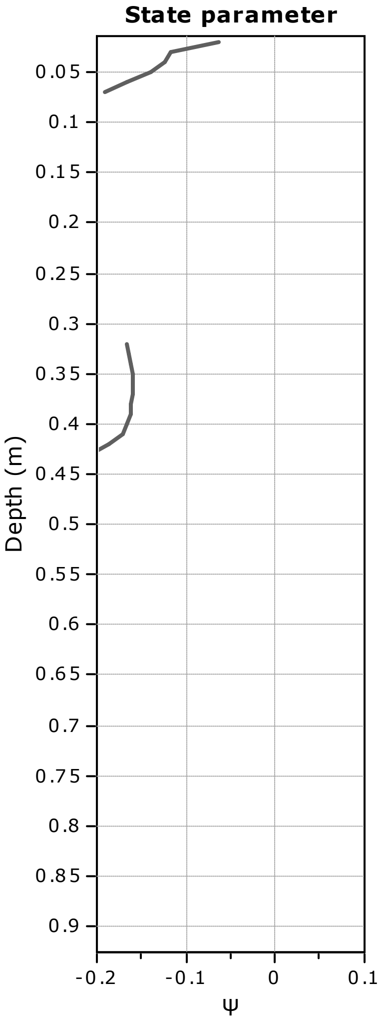
OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

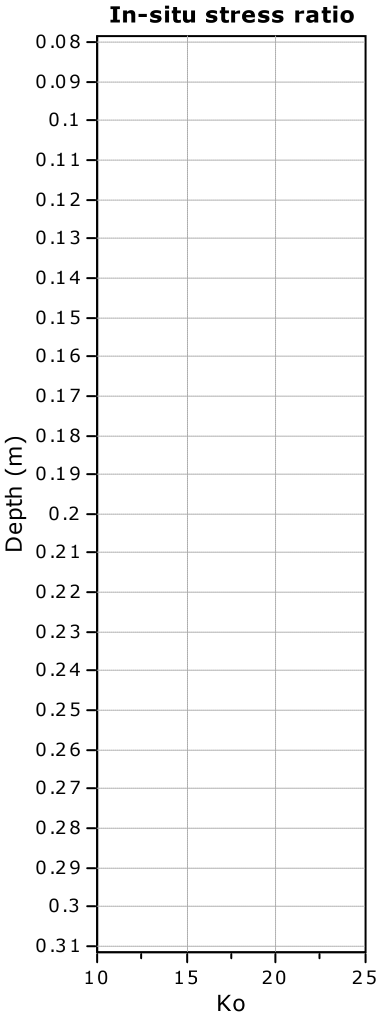
Cook Costello
Geotechnical Engineers

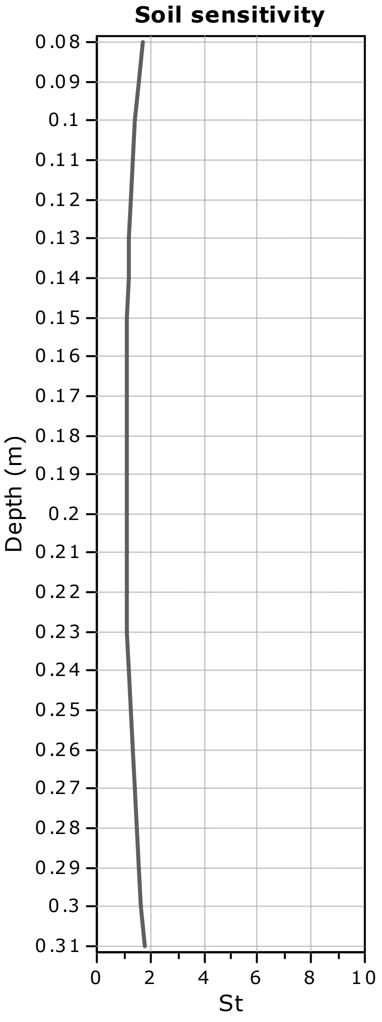
CPT: CPTJ11
Total depth: 0.92 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

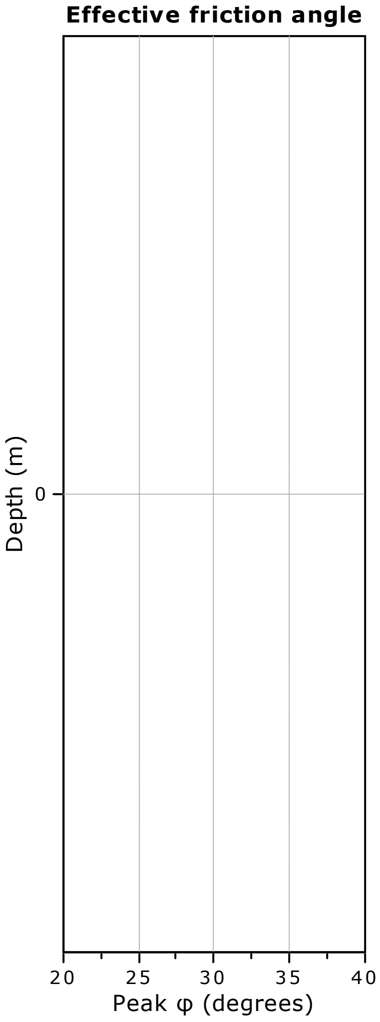
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**


Shear Wave velocity


State parameter

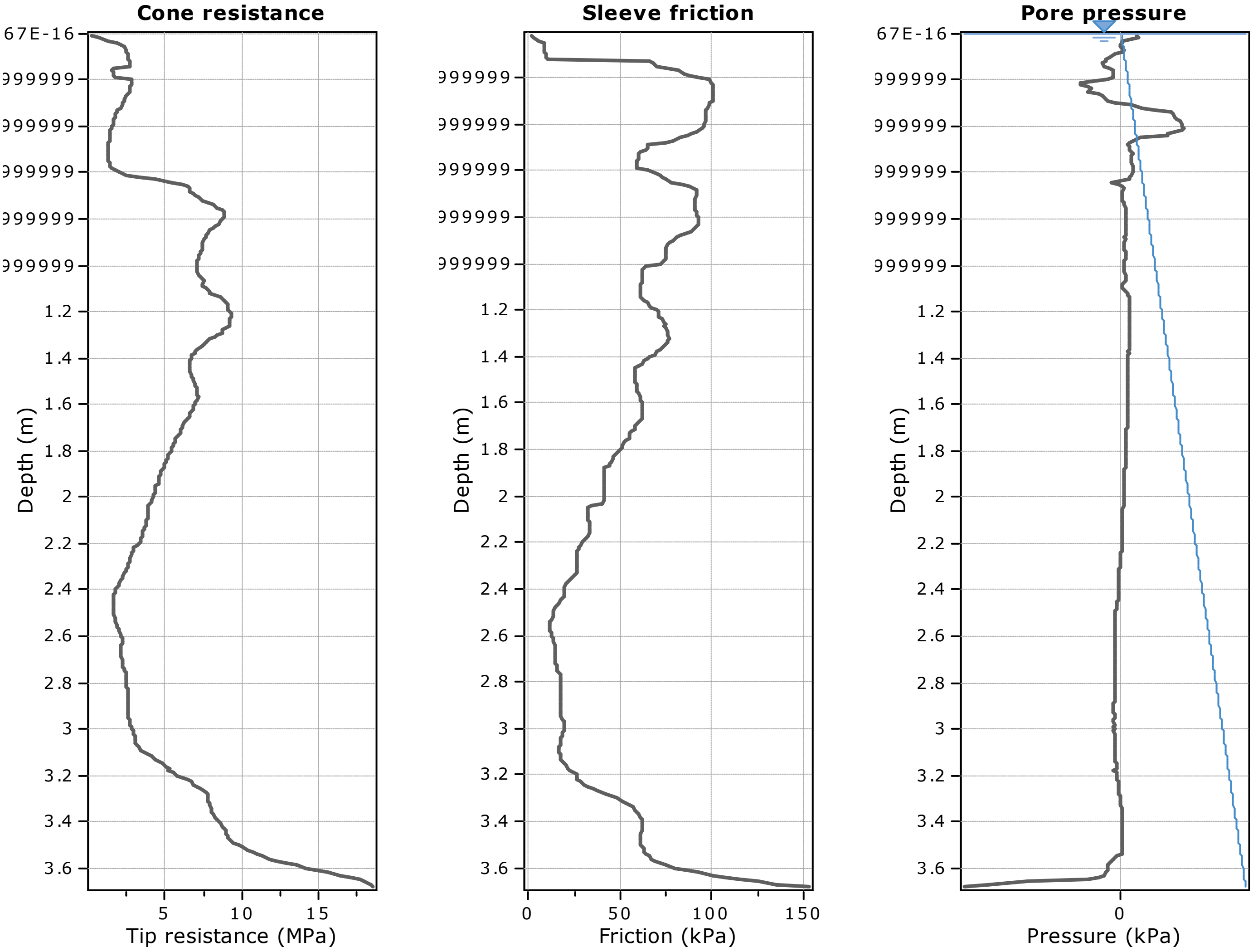

In-situ stress ratio


Soil sensitivity

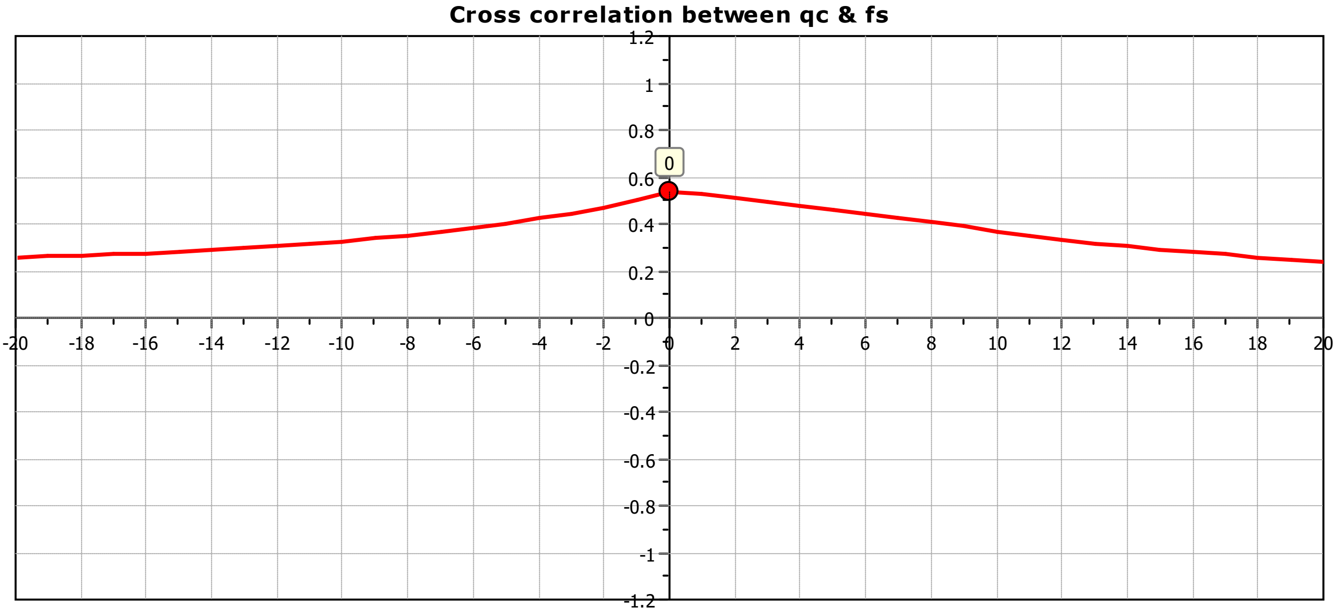

Effective friction angle

Calculation parameters

Soil Sensitivity factor, N_S: 7.00
—●— User defined estimation data



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

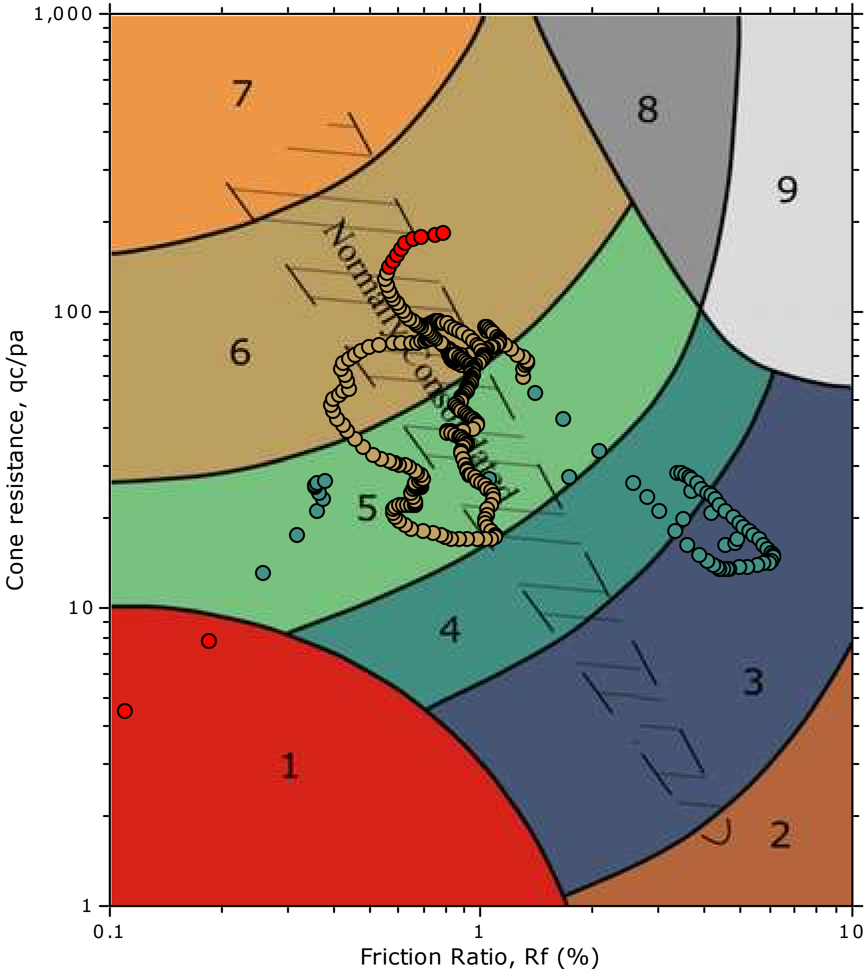


CPT: CPTk13
Total depth: 3.68 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

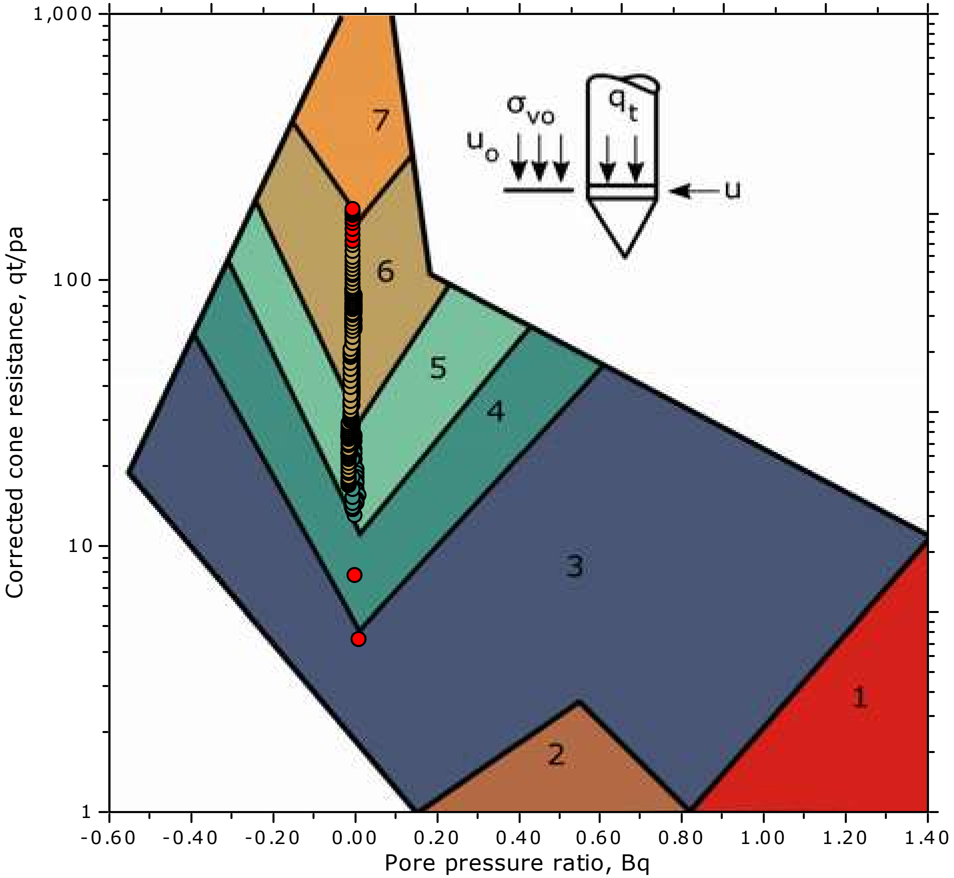
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**

SBT - Bq plots

SBT plot



Bq plot



SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟨 6. Clean sand to silty sand
- 🟧 7. Gravelly sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

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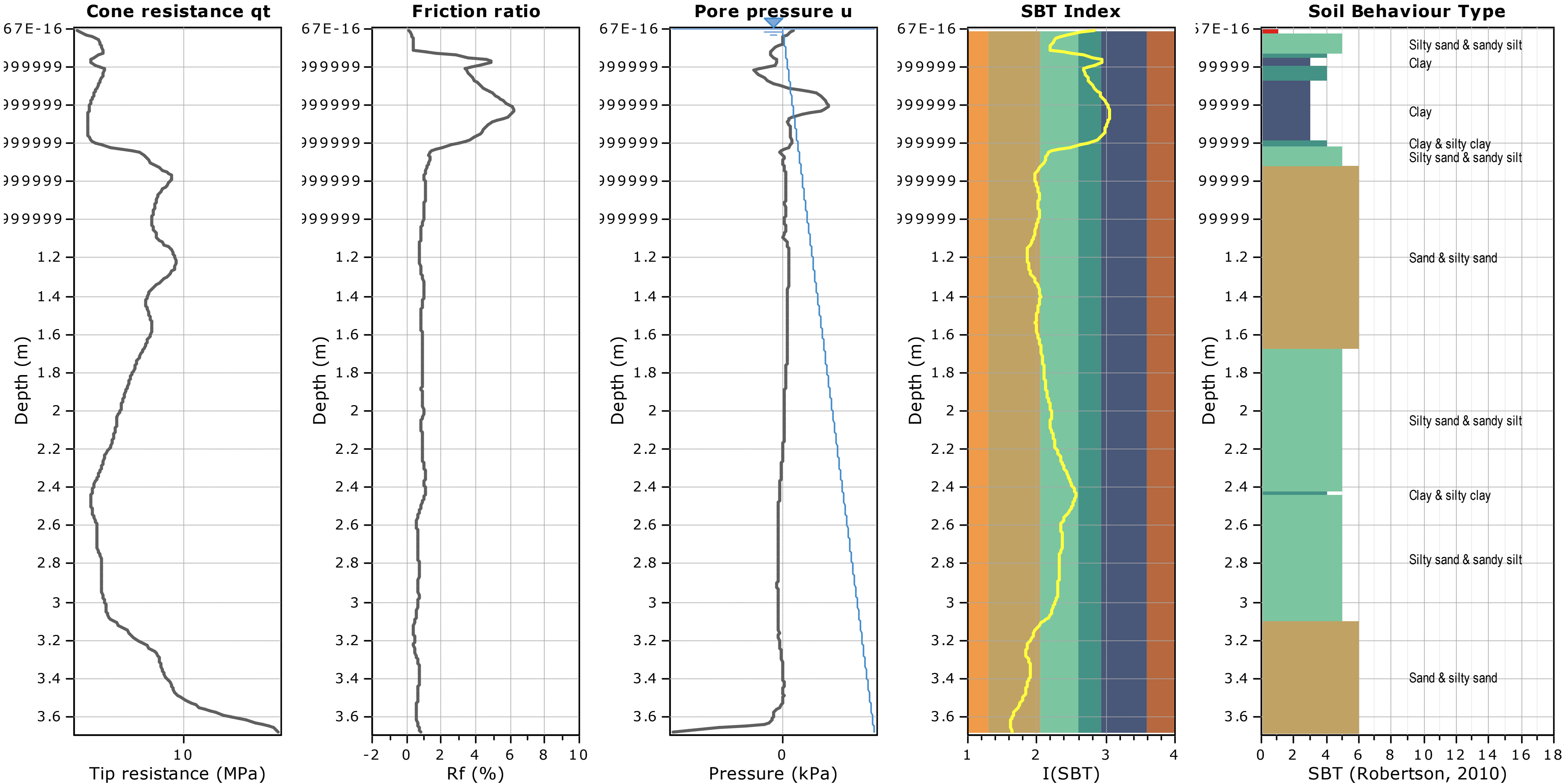
CPT: CPTk13
Total depth: 3.68 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟨 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

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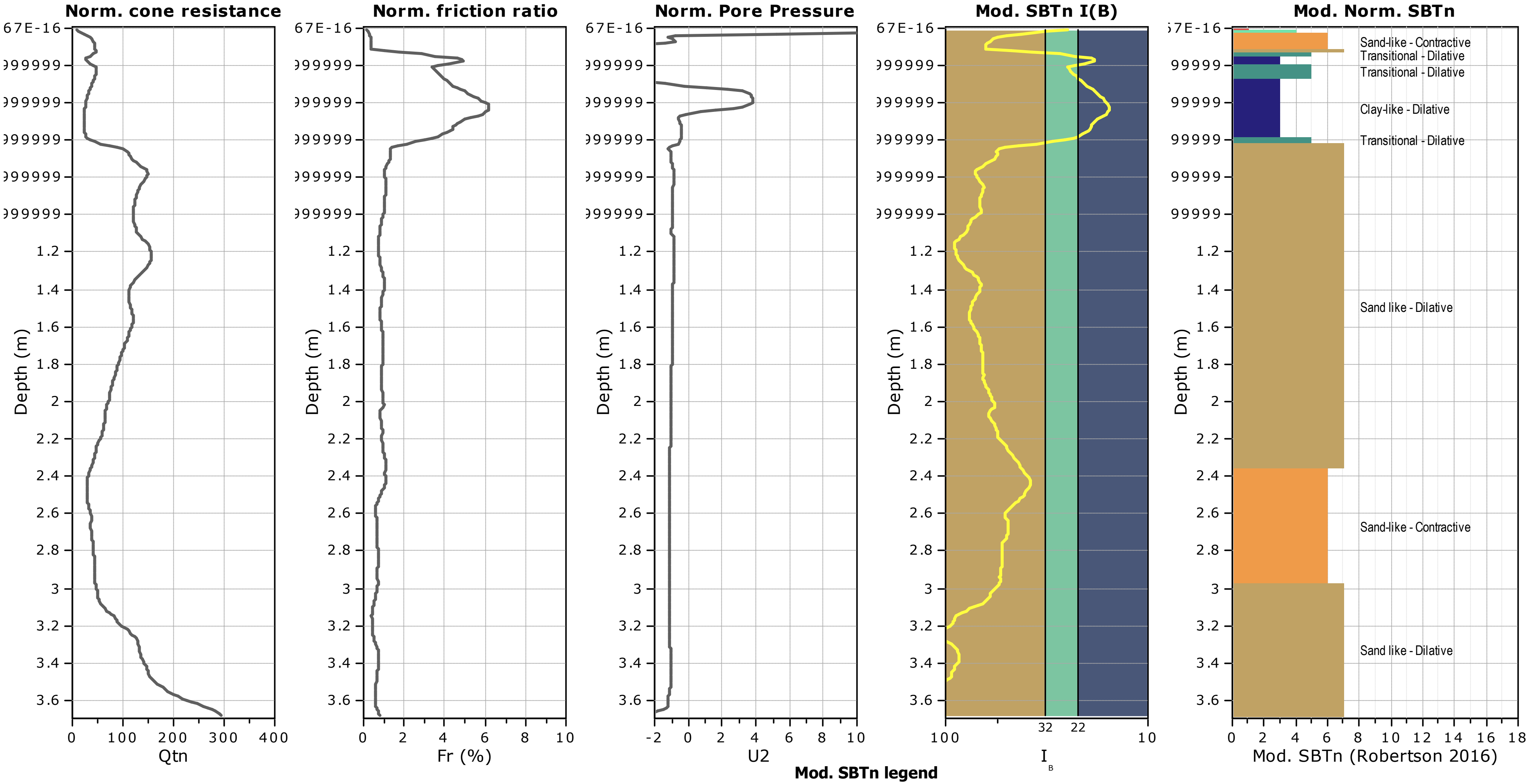
CPT: CPTk13
Total depth: 3.68 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Mod. SBTn legend

- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- 🟦 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative

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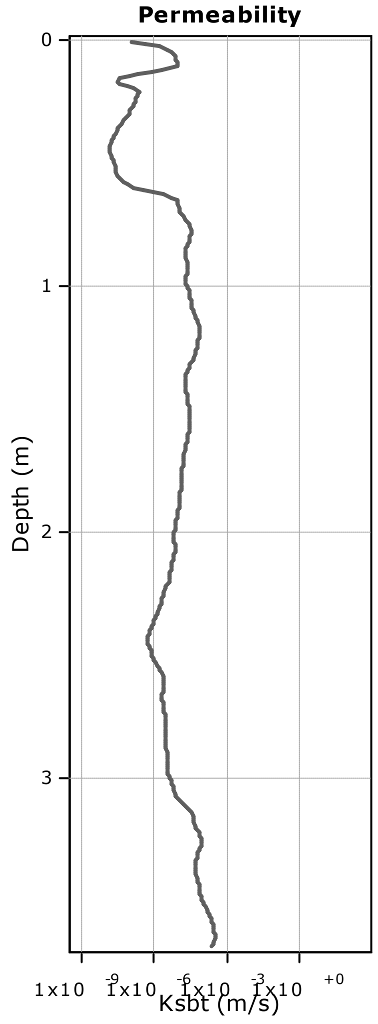
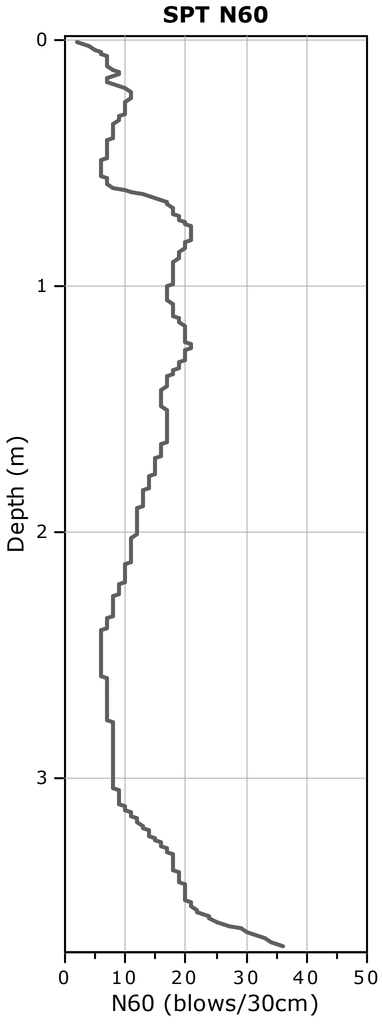
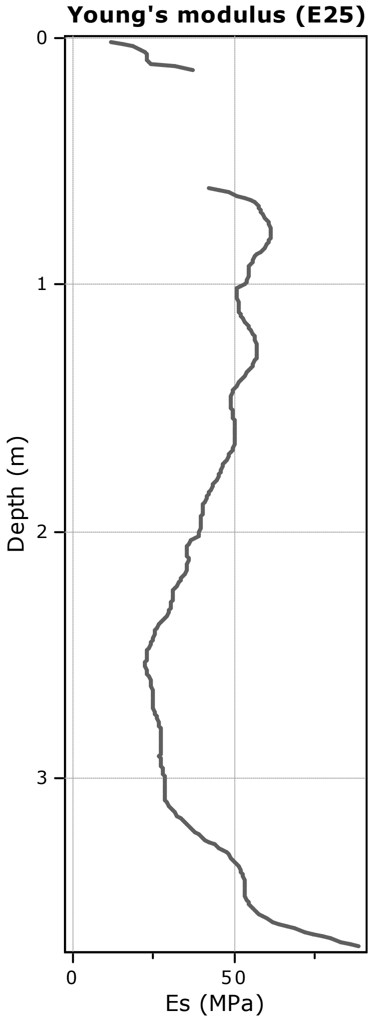
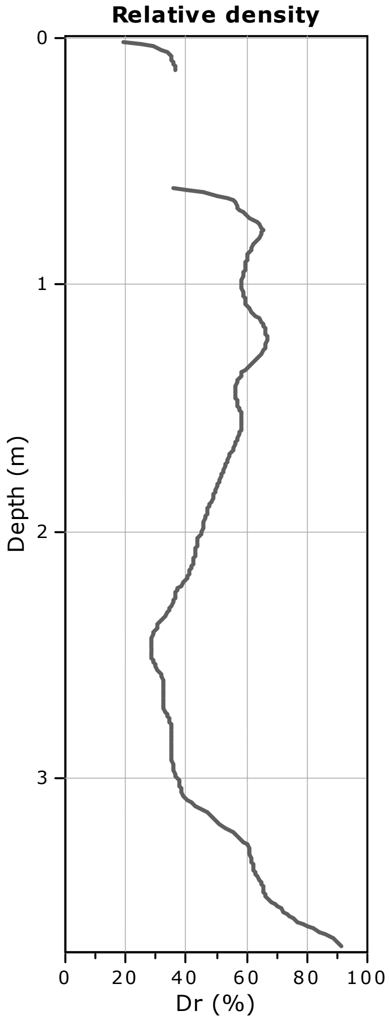
CPT: CPTk13
Total depth: 3.68 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

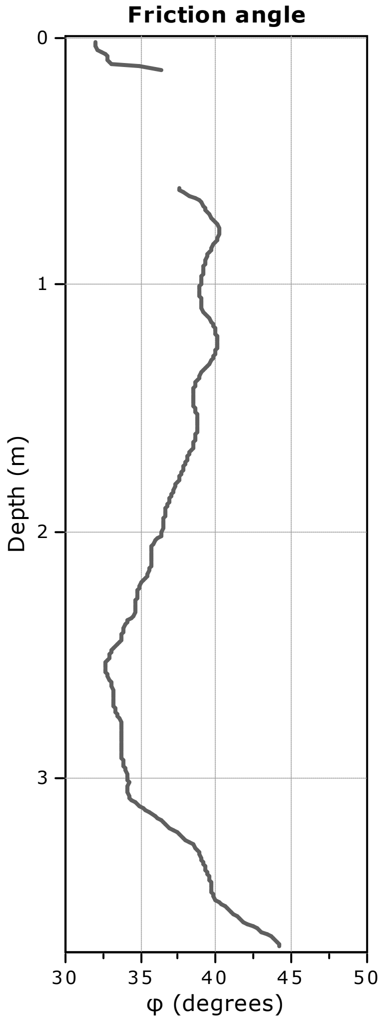
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**









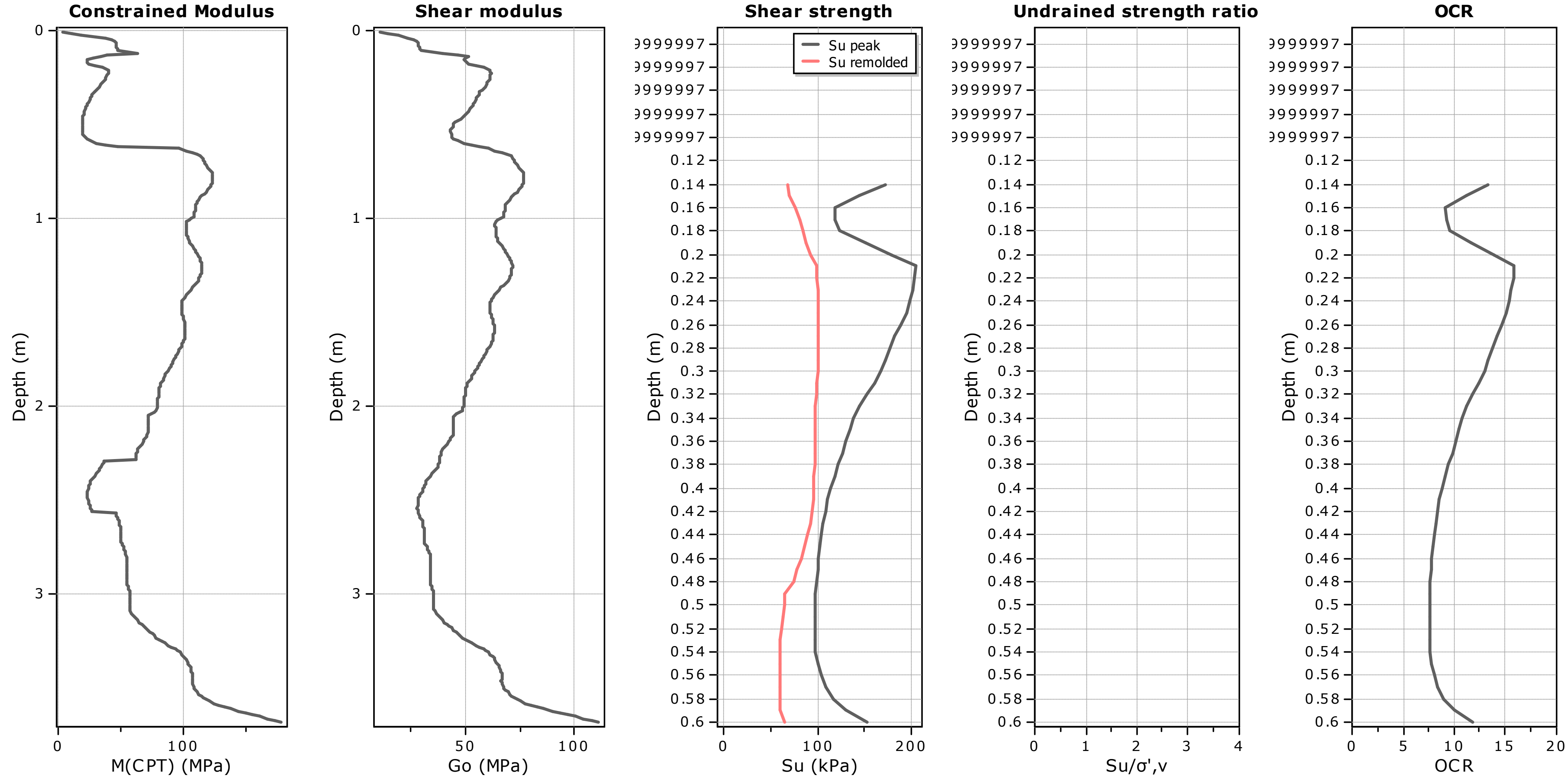


Calculation parameters
Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
—●— User defined estimation data

CPT: CPTk13
Total depth: 3.68 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

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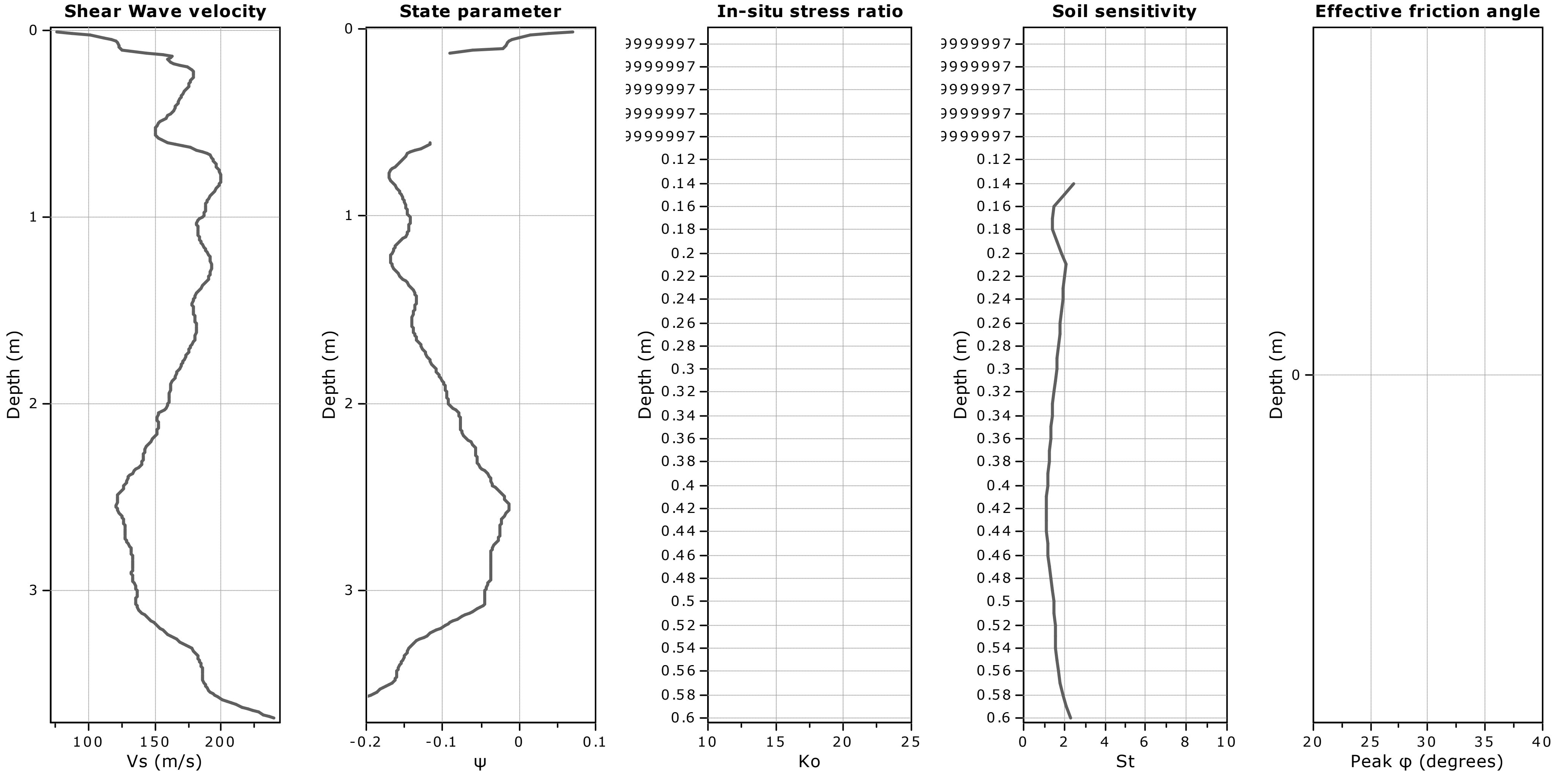
CPT: CPTk13
Total depth: 3.68 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**

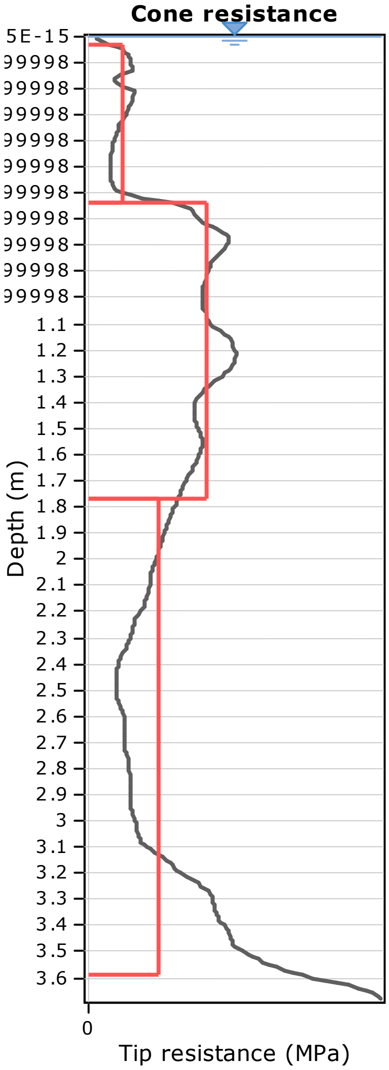


Calculation parameters

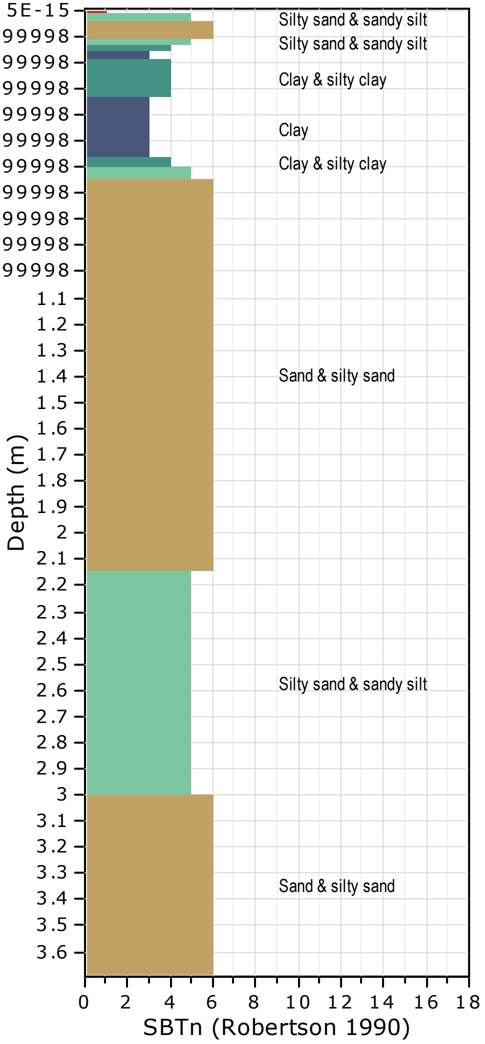
Soil Sensitivity factor, N_S: 7.00

—●— User defined estimation data

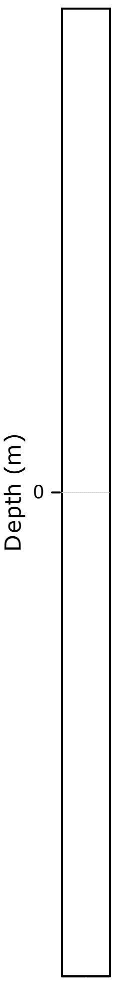
Cone resistance



Norm. Soil Behaviour Type



Typical Geotech. Section



Tabular results

.:: Layer No: 1 ::.

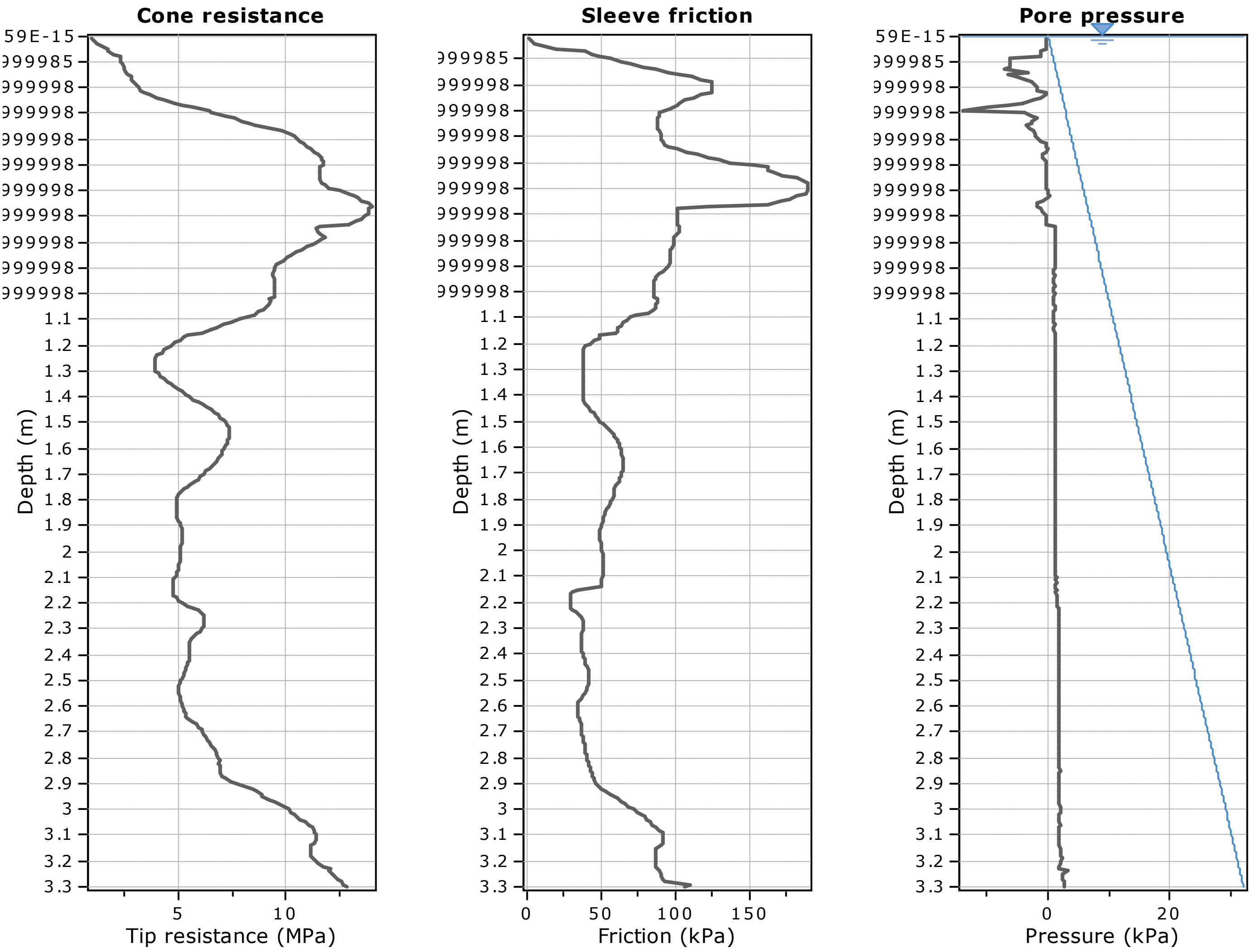
Code: Layer_1 **Start depth:** 0.03 (m), **End depth:** 0.64 (m)

Description: Clay & silty clay

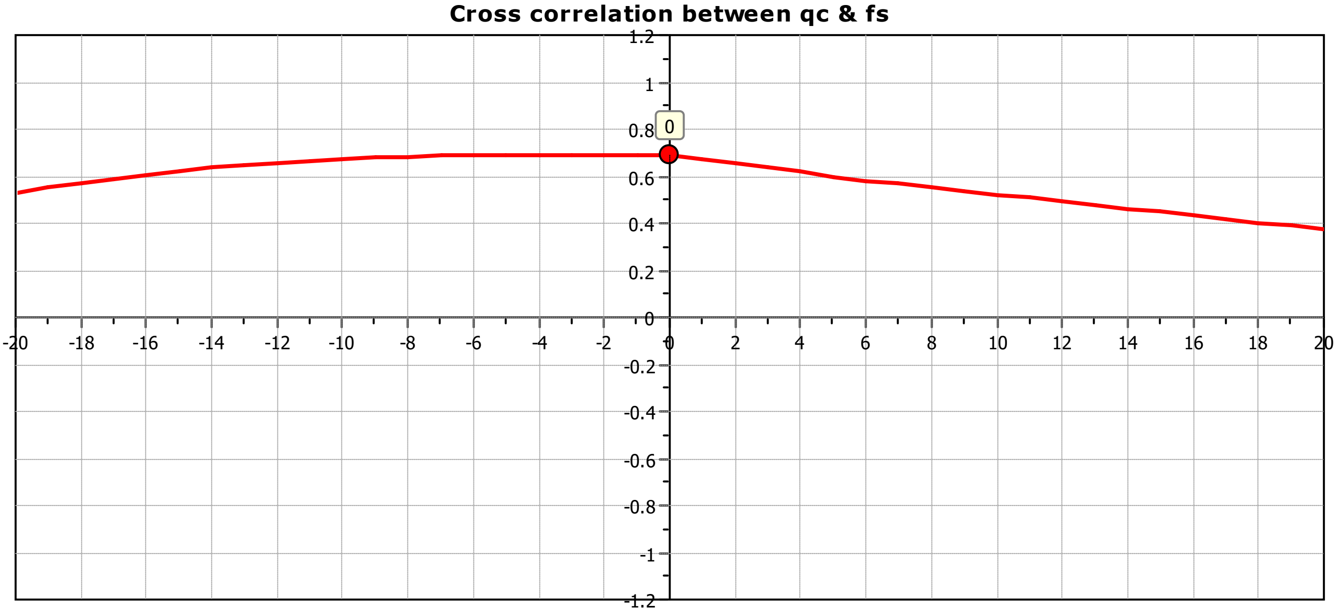
Basic results	**Estimation results**	
Total cone resistance: 2.12 ±0.74 MPa	Permeability: 1.13E-06 ±2.39E-06 m/s	Constrained Mod.: 32.37 ±15.92 MPa
Sleeve friction: 71.11 ±31.19 kPa	N_{60}: 8.08 ±1.97 blows	Go: 49.03 ±10.94 MPa
Ic: 2.58 ±0.29	Es: 0.00 ±0.00 MPa	Su: 135.33 ±35.15 kPa
SBT_n: 4	Dr (%): 0.00 ±0.00	Su ratio: 2.27 ±0.59
SBTn description: Clay & silty clay	φ (degrees): 0.00 ±0.00 °	O.C.R.: 10.49 ±2.72
	Unit weight: 19.00 ±0.00 kN/m³	

CPT: CPTL11
Total depth: 3.30 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

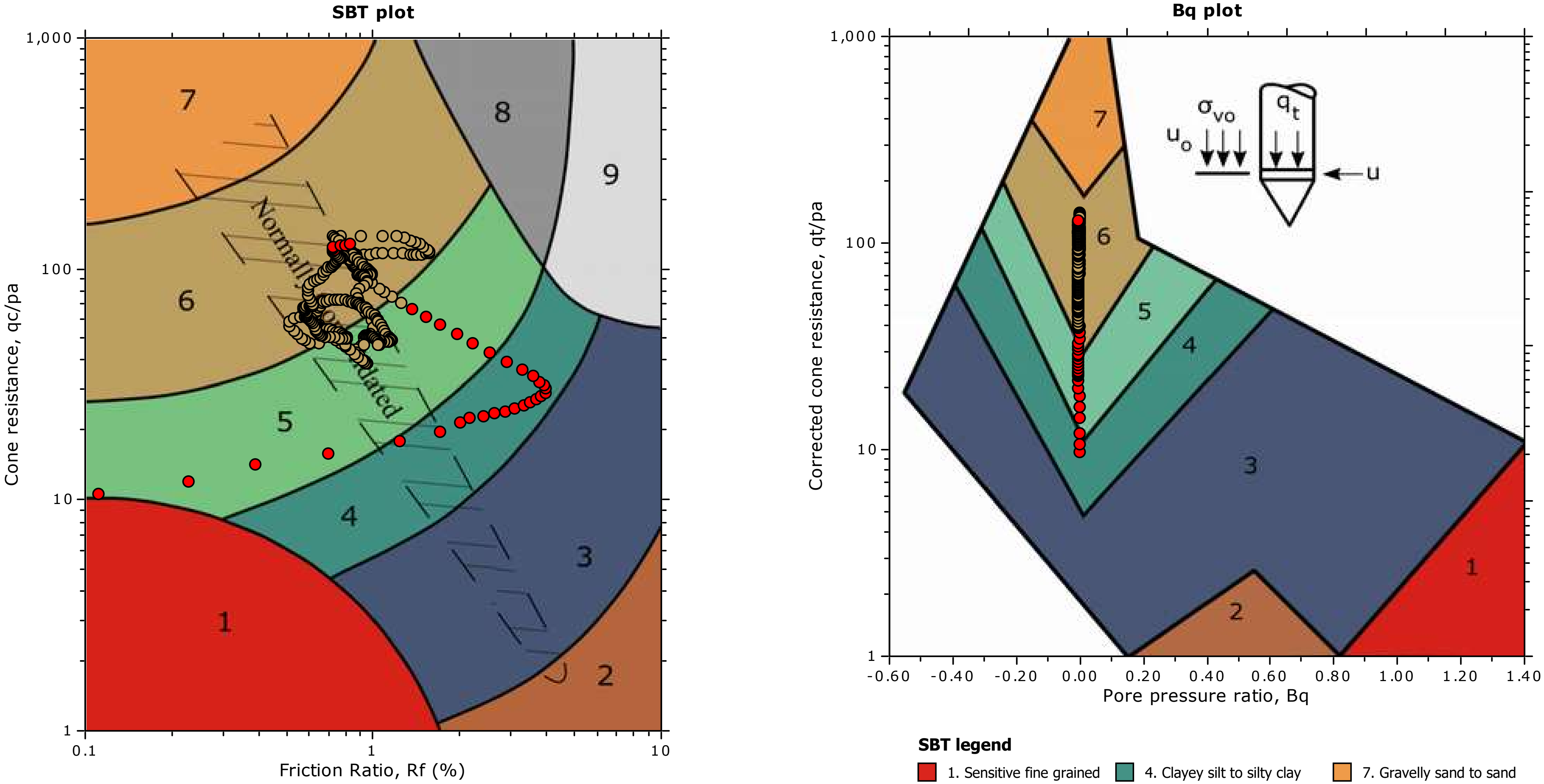
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



SBT - Bq plots



SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty clay	🟧 7. Gravelly sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬛ 8. Very stiff sand to clayey sand
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

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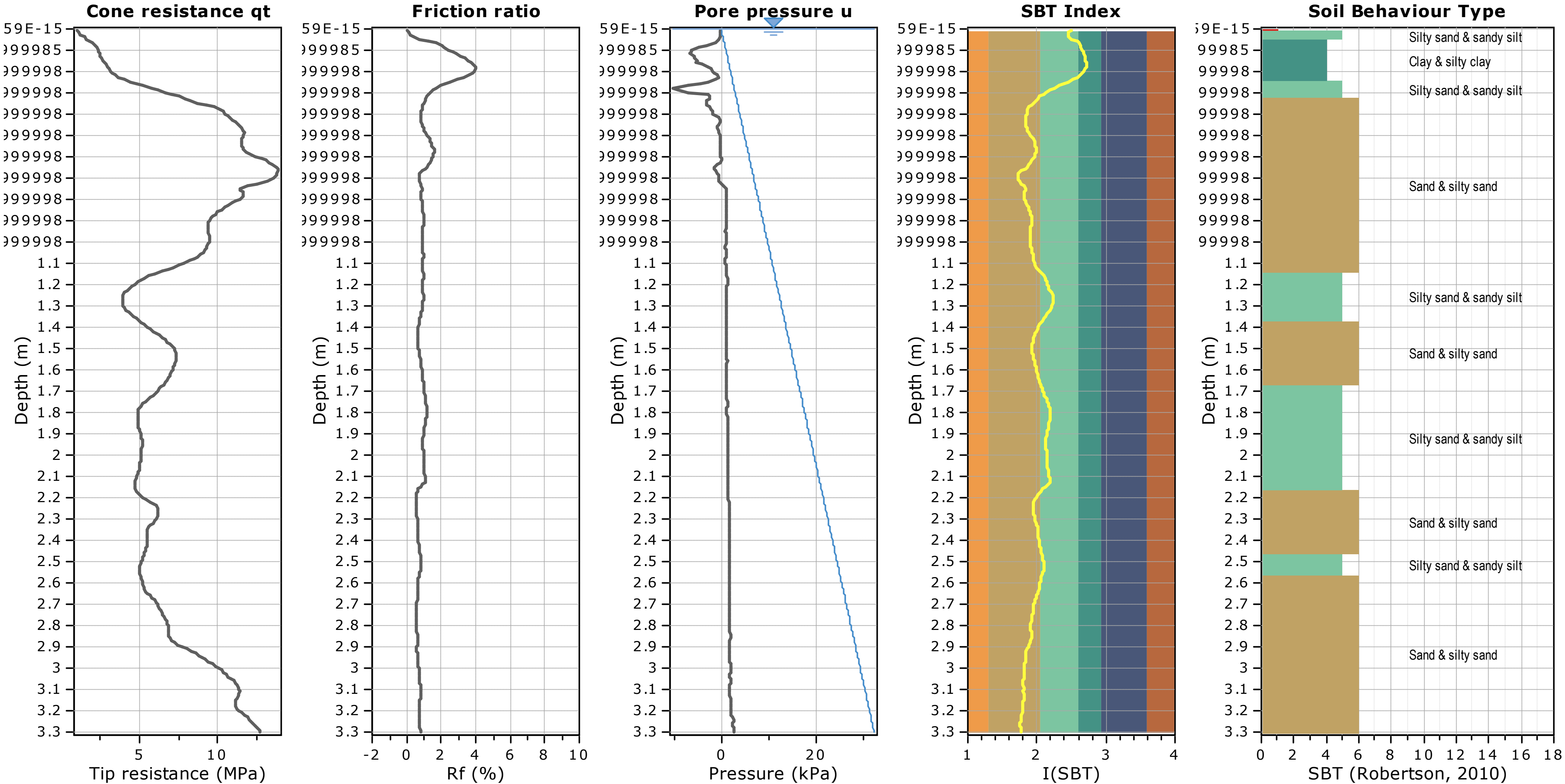
CPT: CPTL11
Total depth: 3.30 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty clay	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬜ 8. Very stiff sand to clayey sand
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

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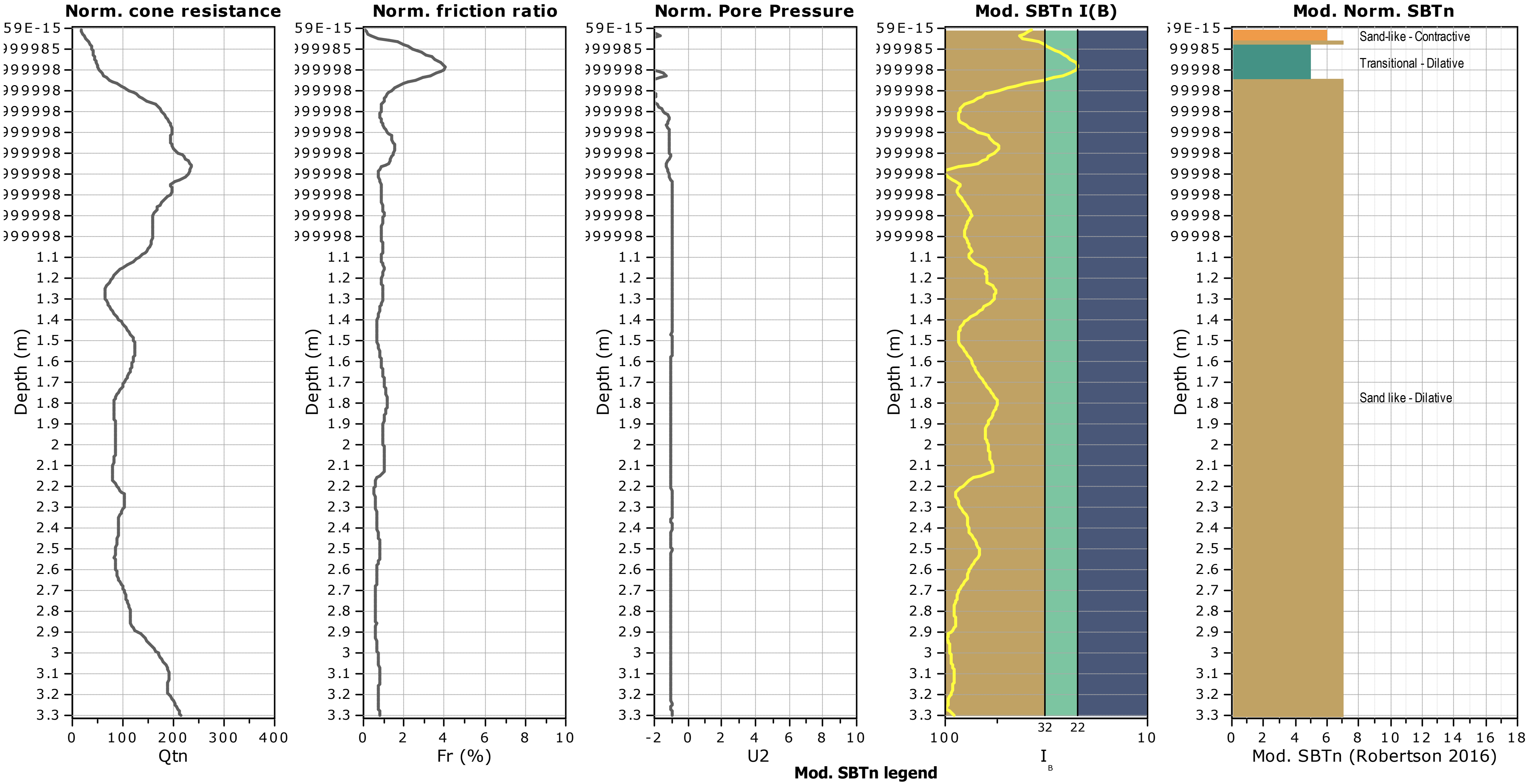
CPT: CPTL11
Total depth: 3.30 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Mod. SBTn legend

- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- 🟦 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative

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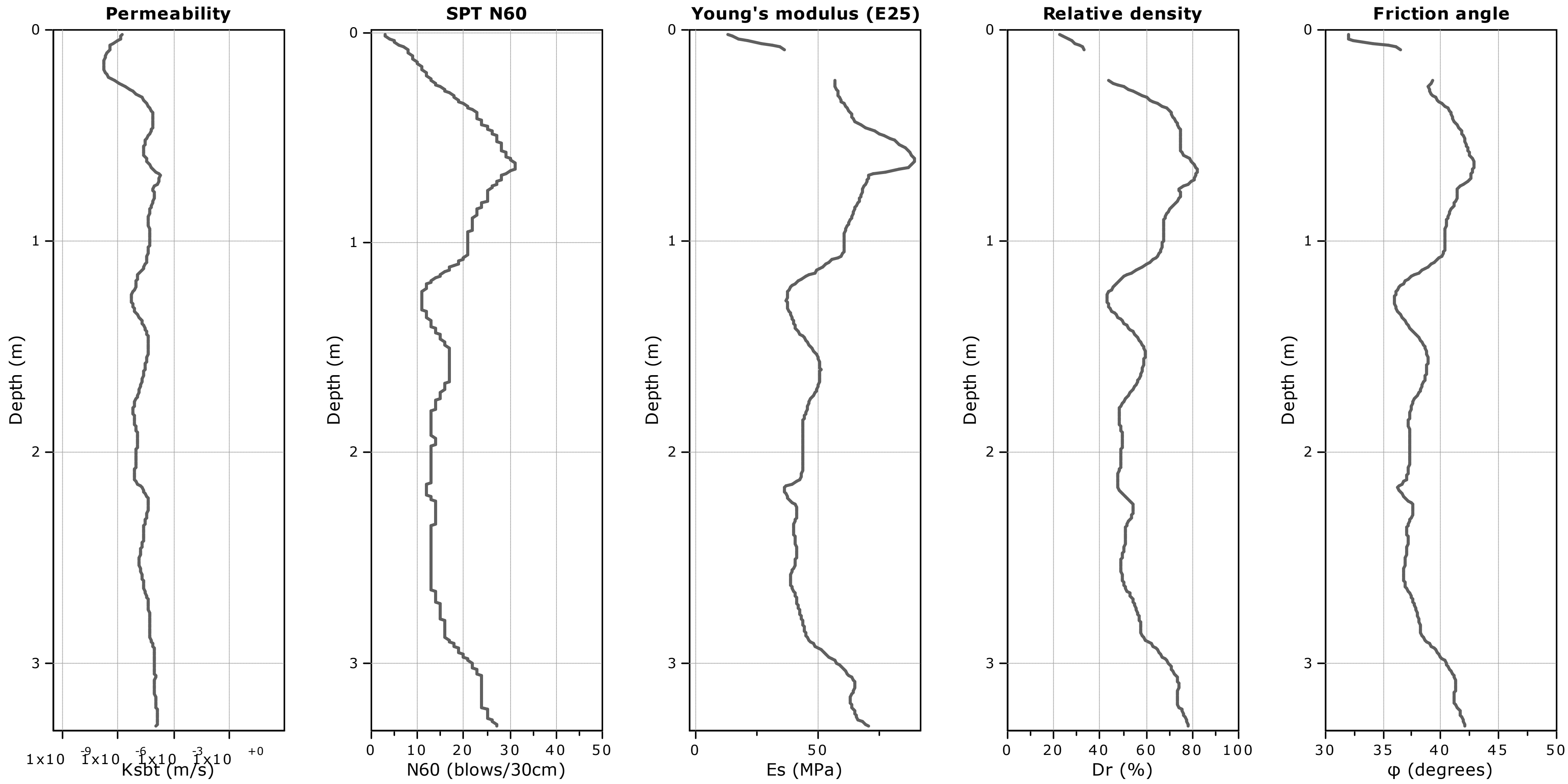
CPT: CPTL11
Total depth: 3.30 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

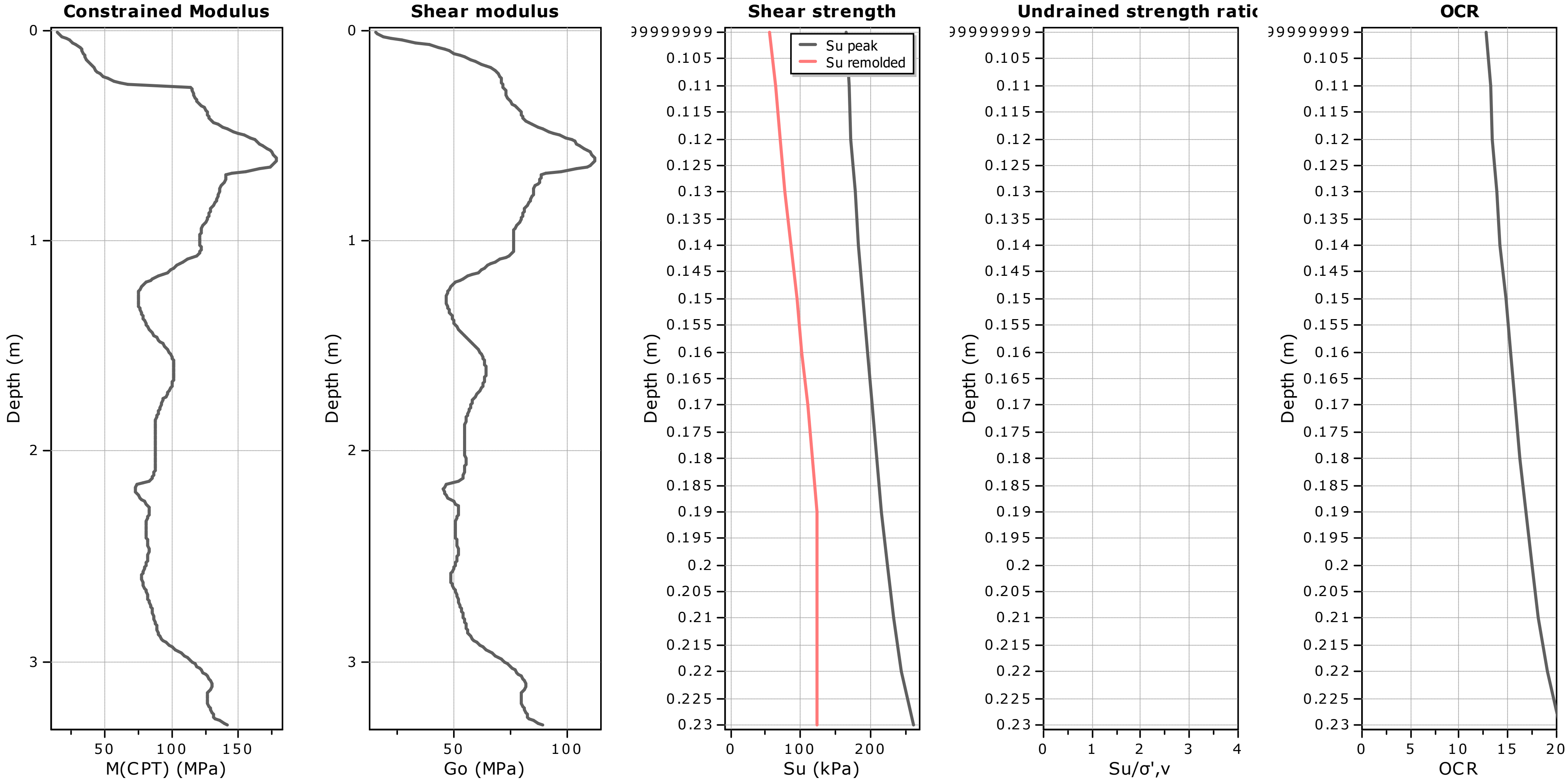
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters
Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)
Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
—●— User defined estimation data

CPT: CPTL11
Total depth: 3.30 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

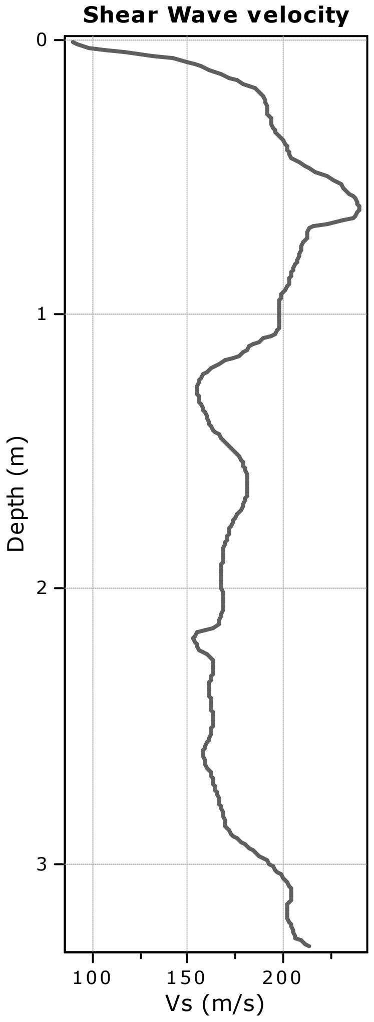
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**

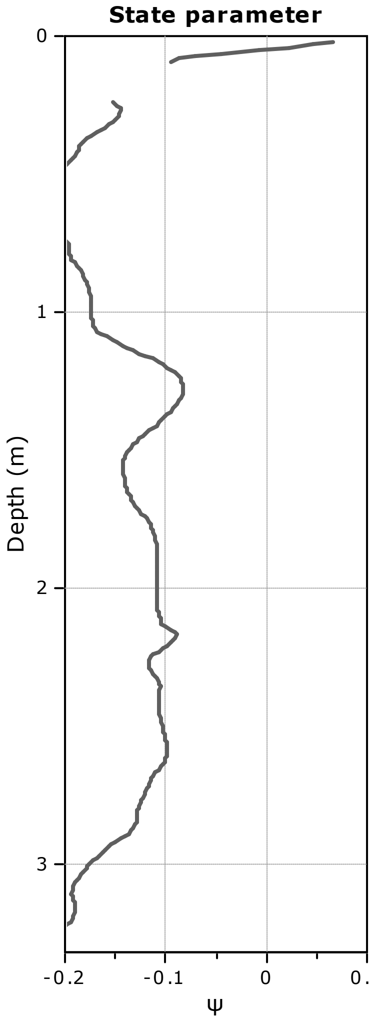


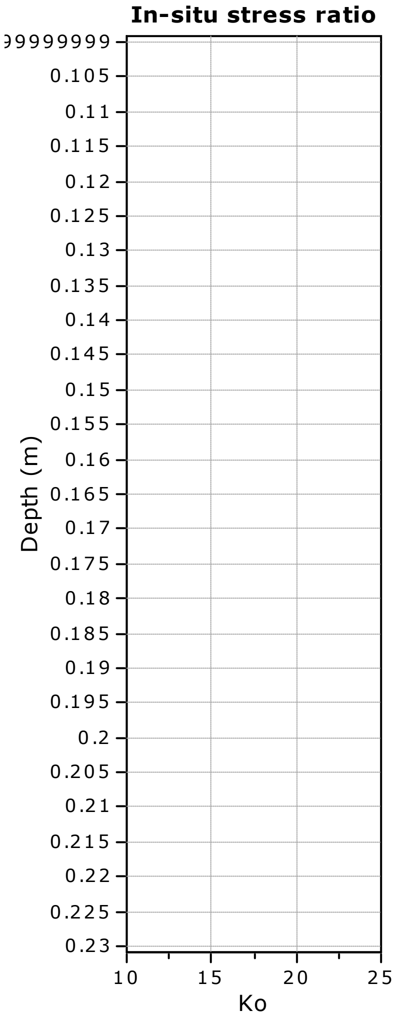
Calculation parameters
Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

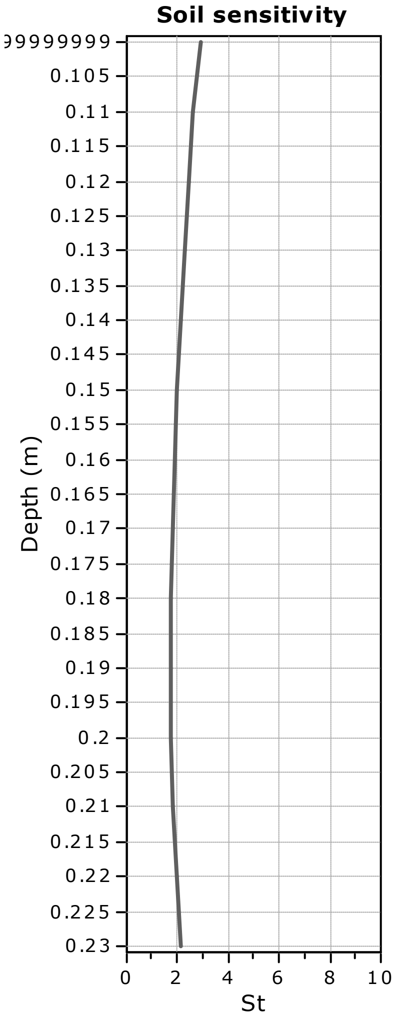
OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

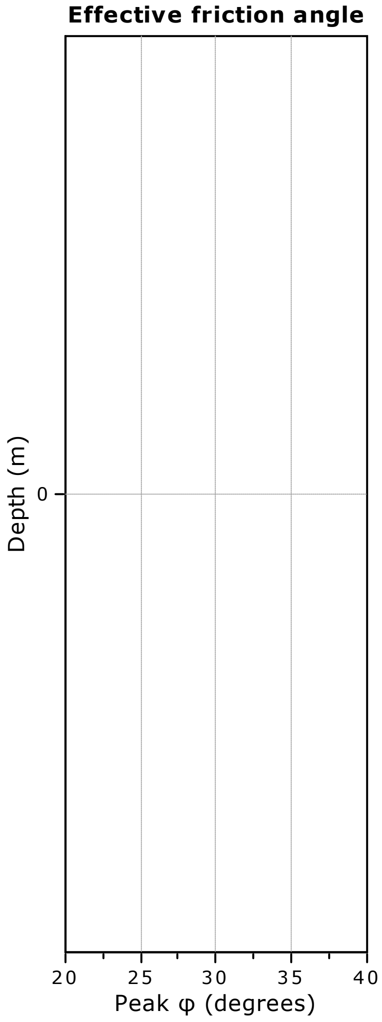
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**


Shear Wave velocity


State parameter


In-situ stress ratio

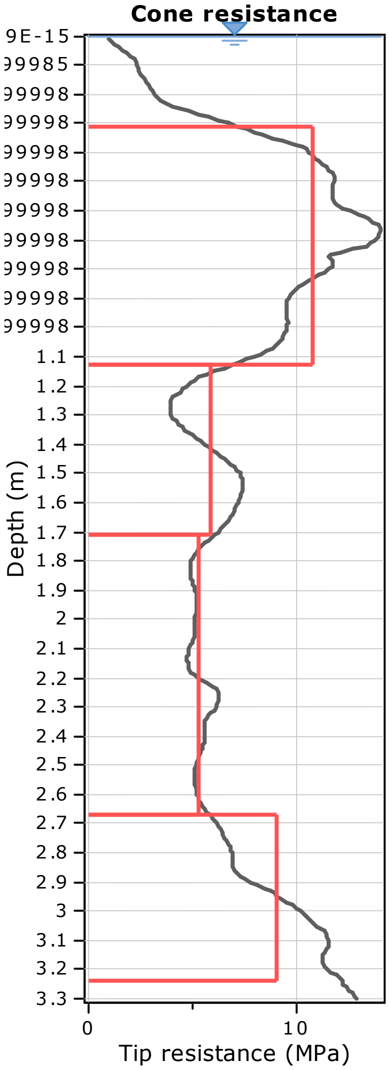

Soil sensitivity


Effective friction angle

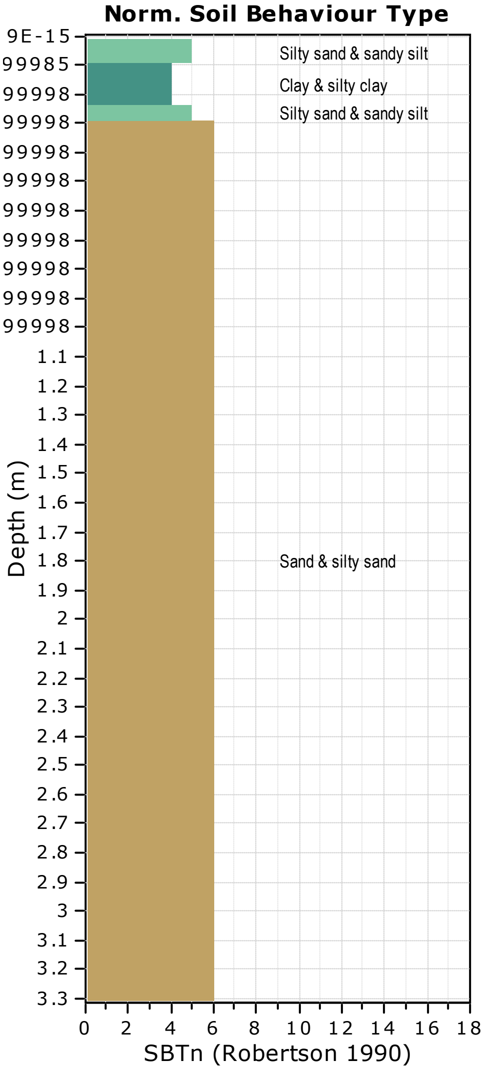
Calculation parameters

Soil Sensitivity factor, N_S: 7.00

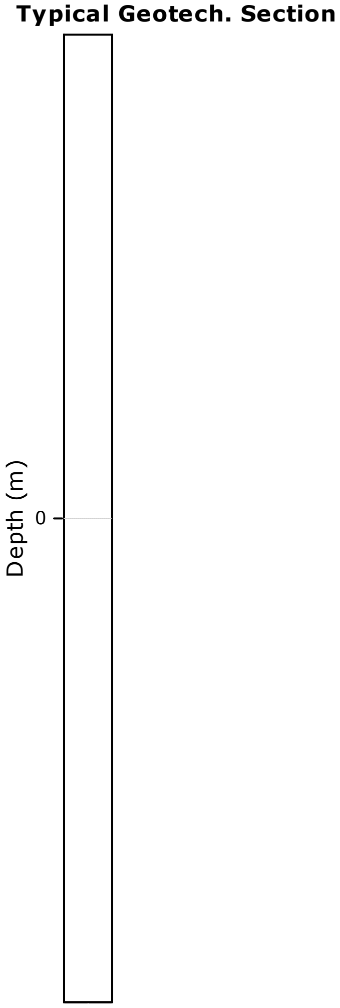
● User defined estimation data



Cone resistance



Norm. Soil Behaviour Type



Typical Geotech. Section

Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.31 (m), **End depth:** 1.13 (m)

Description: Sand & silty sand

Basic results

Total cone resistance: 10.70 ±1.80 MPa

Sleeve friction: 109.00 ±34.98 kPa

Ic: 1.73 ±0.08

SBT_n: 6

SBTn description: Sand & silty sand

Estimation results

Permeability: 5.82E-05 ±3.45E-05 m/s

N_{60}: 24.05 ±3.63 blows

Es: 68.05 ±10.05 MPa

Dr (%): 71.32 ±6.10

φ (degrees): 41.12 ±1.07 °

Unit weight: 19.00 ±0.00 kN/m³

Constrained Mod.: 136.11 ±20.10 MPa

Go: 85.29 ±12.60 MPa

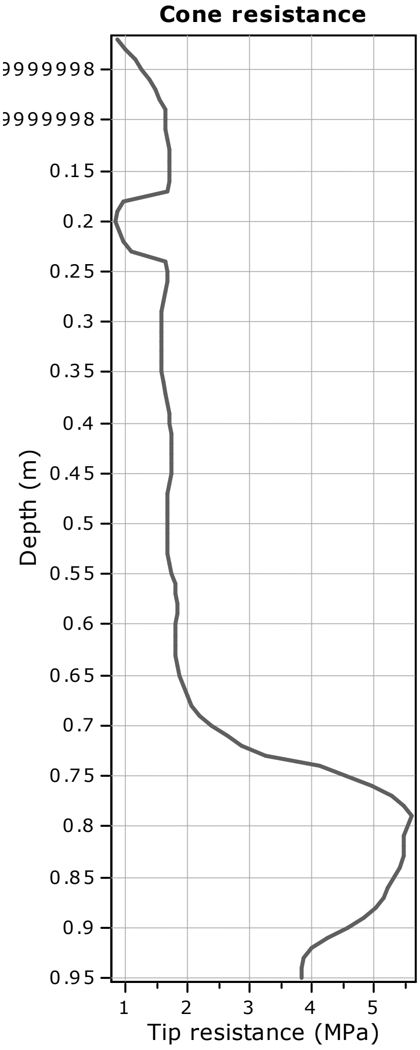
Su: 0.00 ±0.00 kPa

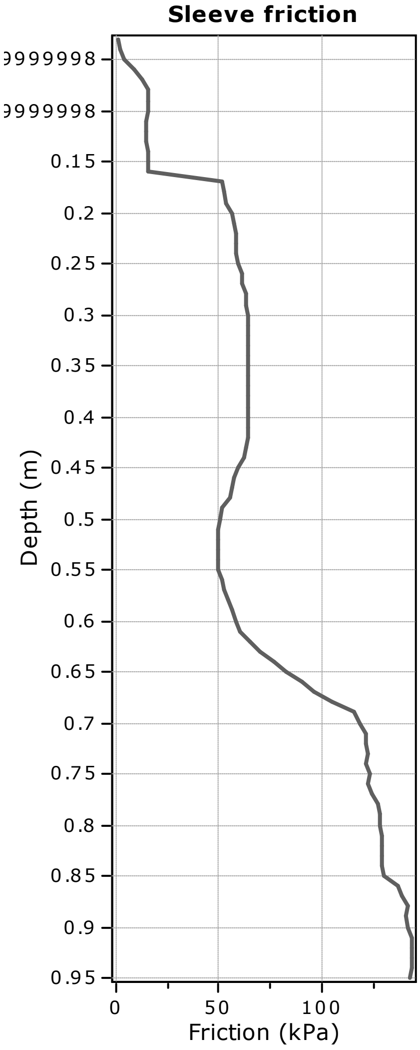
Su ratio: 0.00 ±0.00

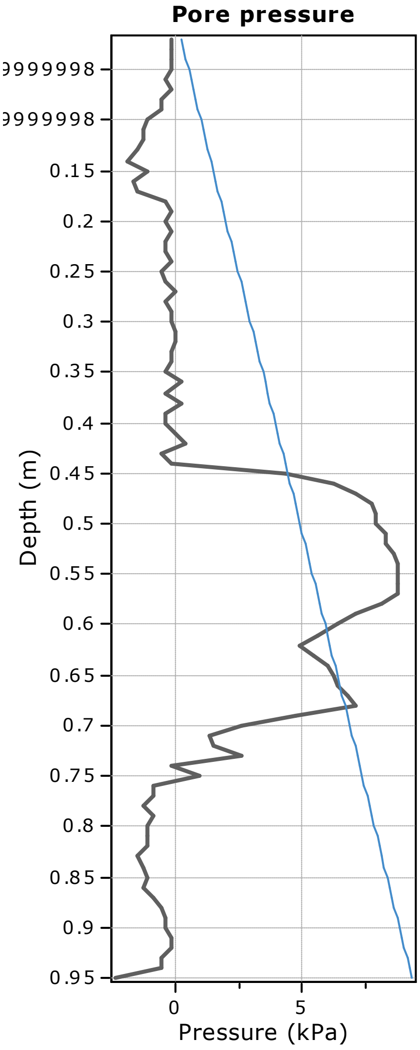
O.C.R.: 0.00 ±0.00

CPT: CPTM8
Total depth: 0.95 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

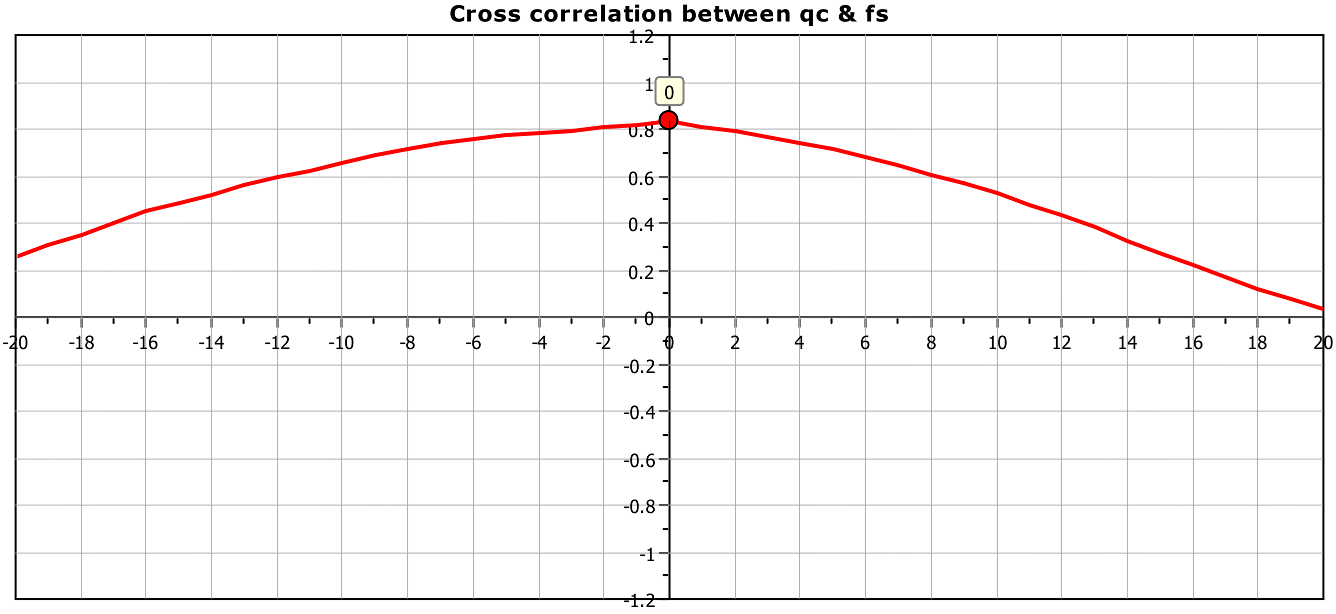
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**





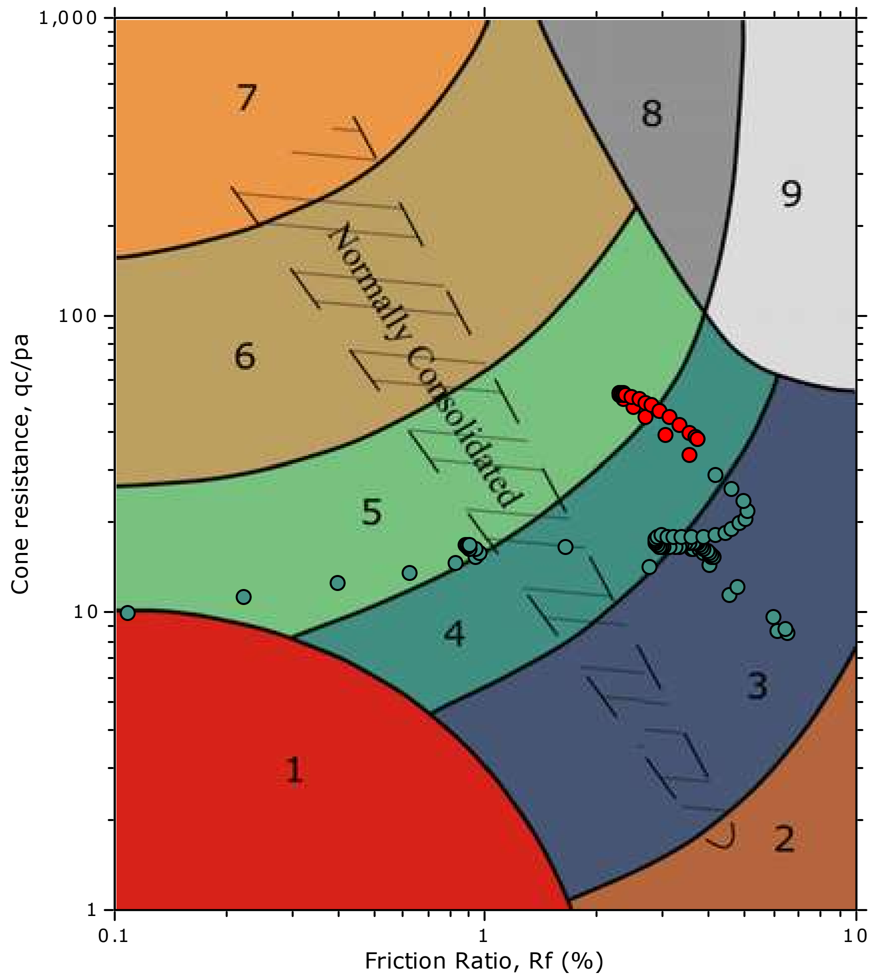


The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

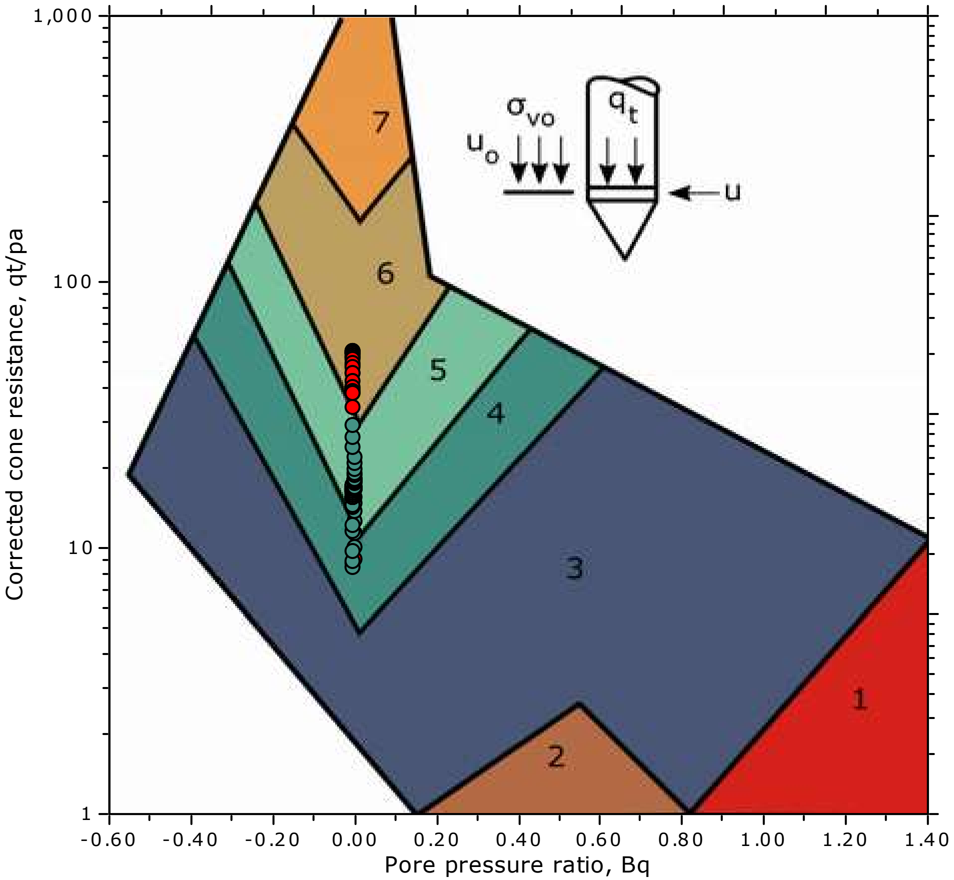


SBT - Bq plots

SBT plot



Bq plot



SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravelly sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

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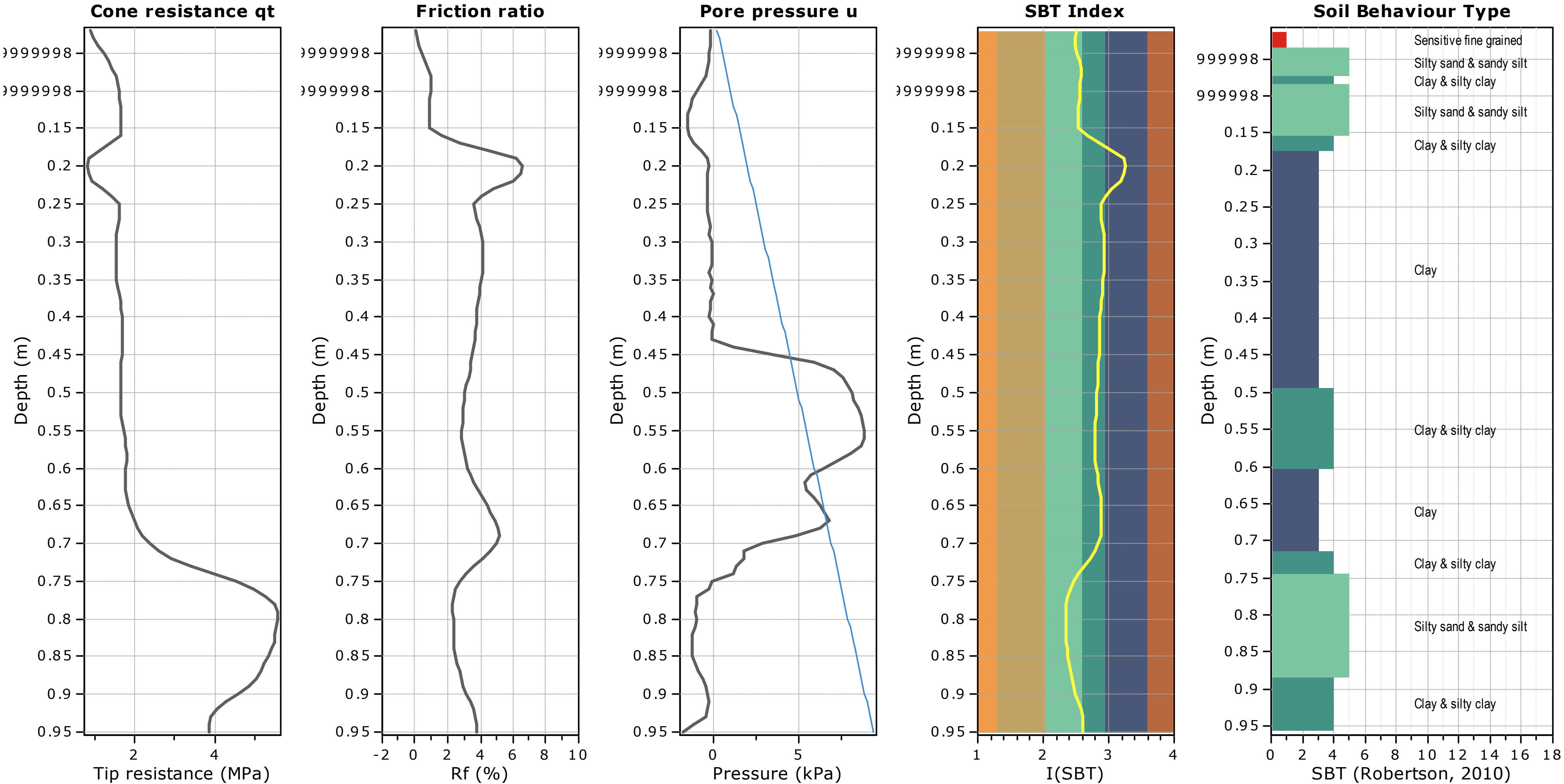
CPT: CPTM8
Total depth: 0.95 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



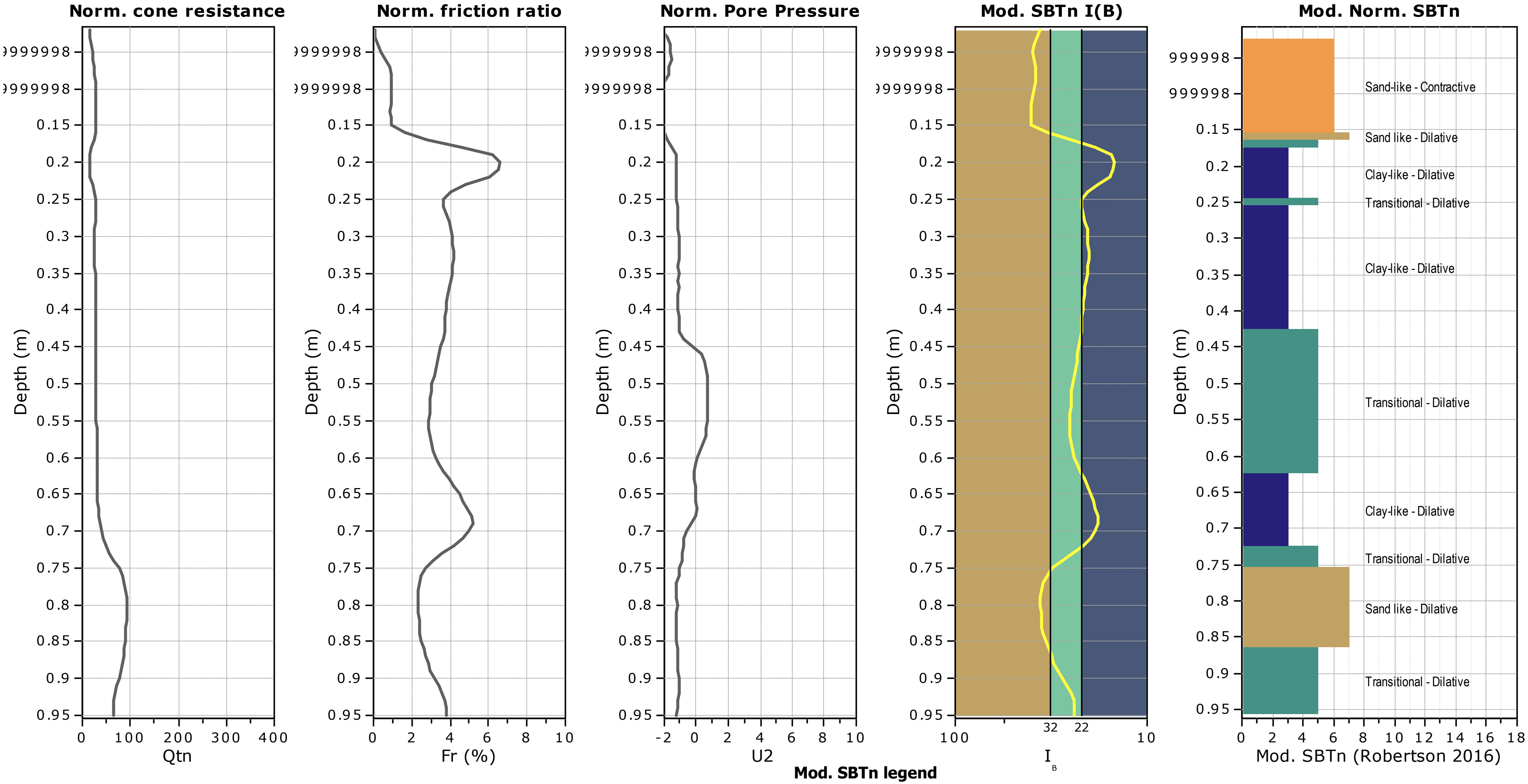
SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟨 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

Cook Costello
Geotechnical Engineers

CPT: CPTM8
Total depth: 0.95 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



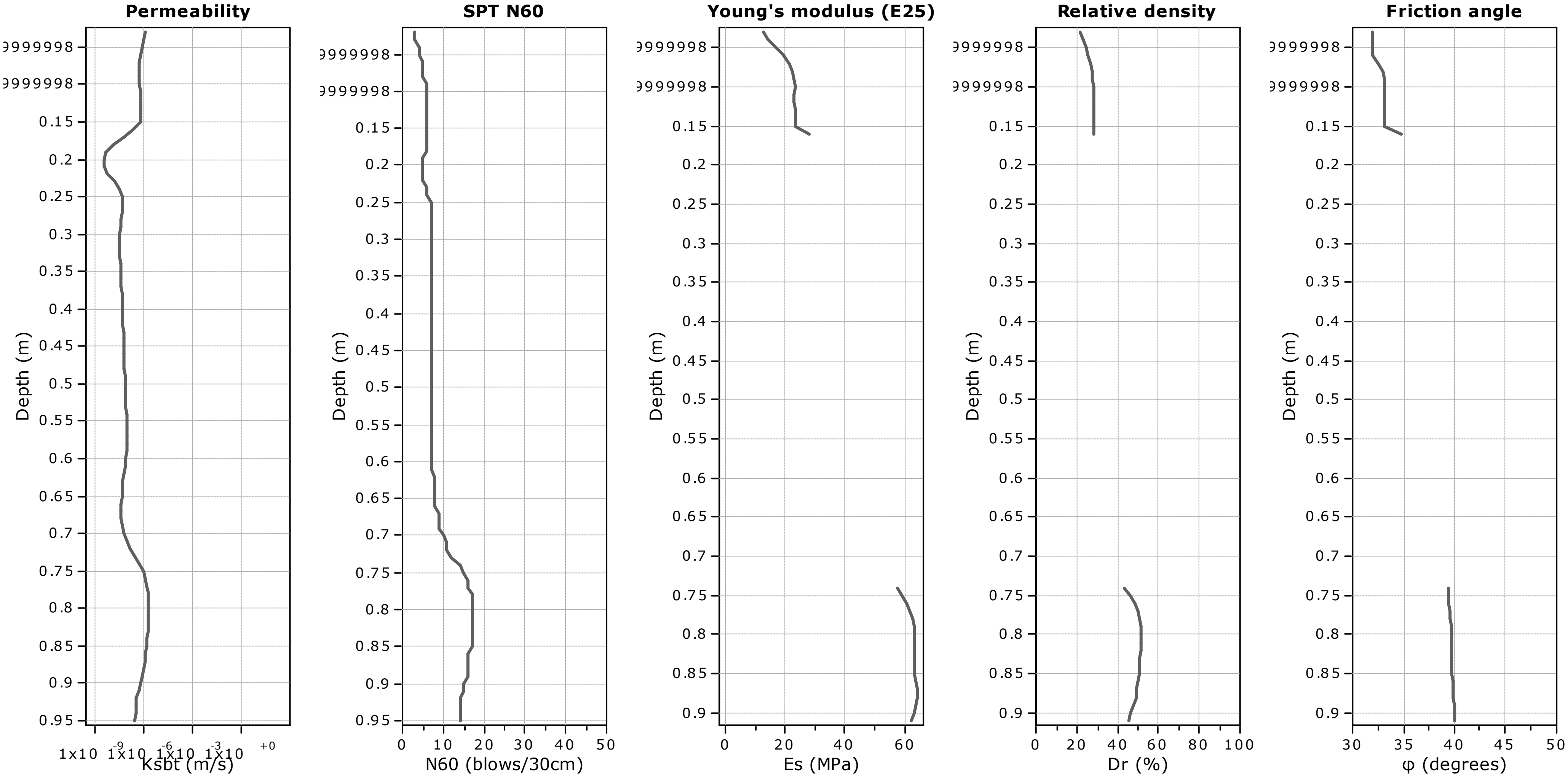
Mod. SBTn legend

🟥 1. CCS: ClayLike - Contractive, Sensitive
🟦 2. CC: Clay-like - Contractive
■ 3. CD: Clay-Like: Dilative
🟩 4. TC: Transitional - Contractive
■ 5. TD: Transitional - Dilative
🟧 6. SC: Sand-like - Contractive
■ 7. SD: Sand-like - Dilative

Cook Costello
Geotechnical Engineers

CPT: CPTM8
Total depth: 0.95 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



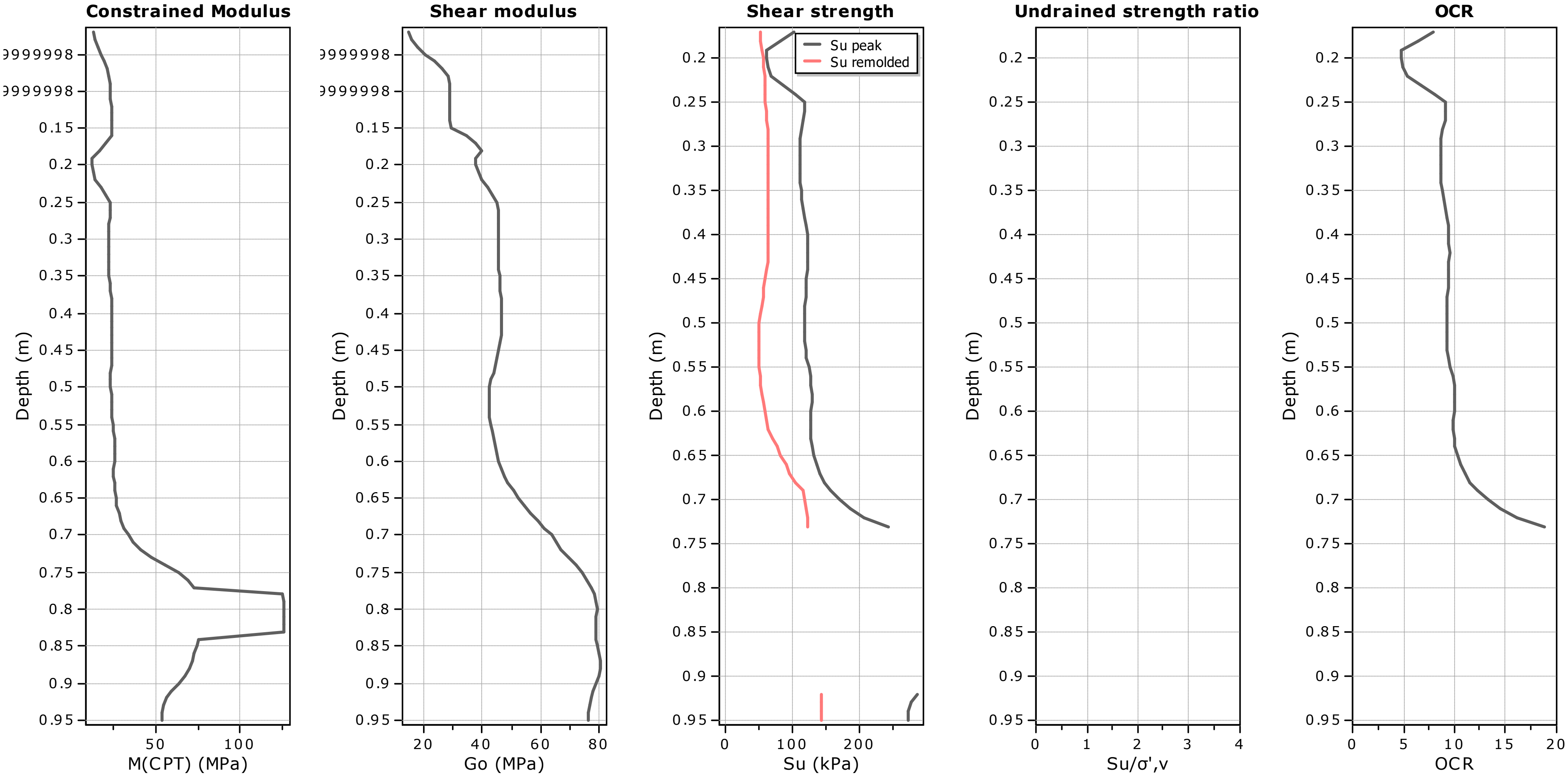
Calculation parameters

Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
—●— User defined estimation data

CPT: CPTM8
Total depth: 0.95 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



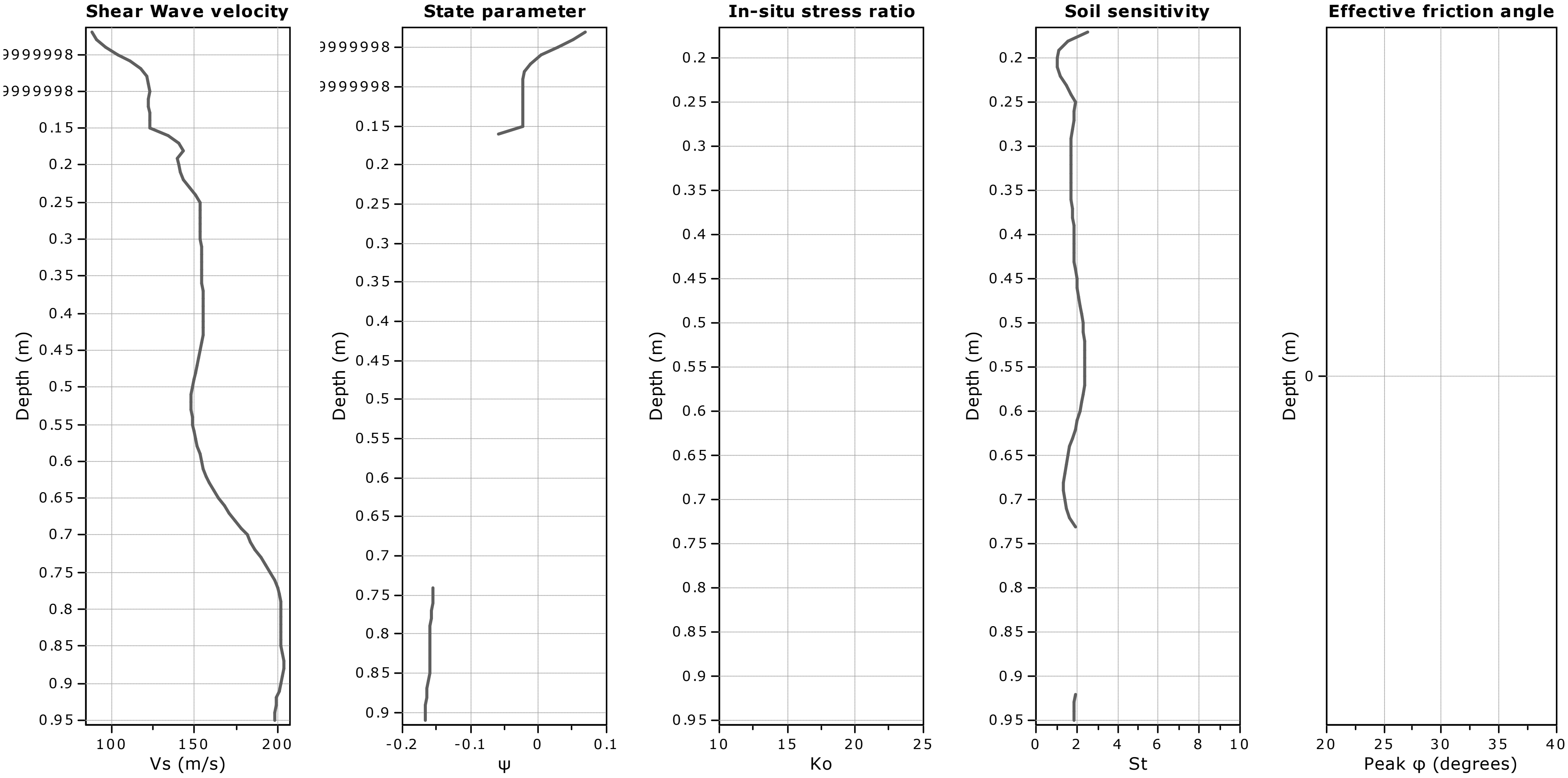
Calculation parameters
Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

Cook Costello
Geotechnical Engineers

CPT: CPTM8
Total depth: 0.95 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

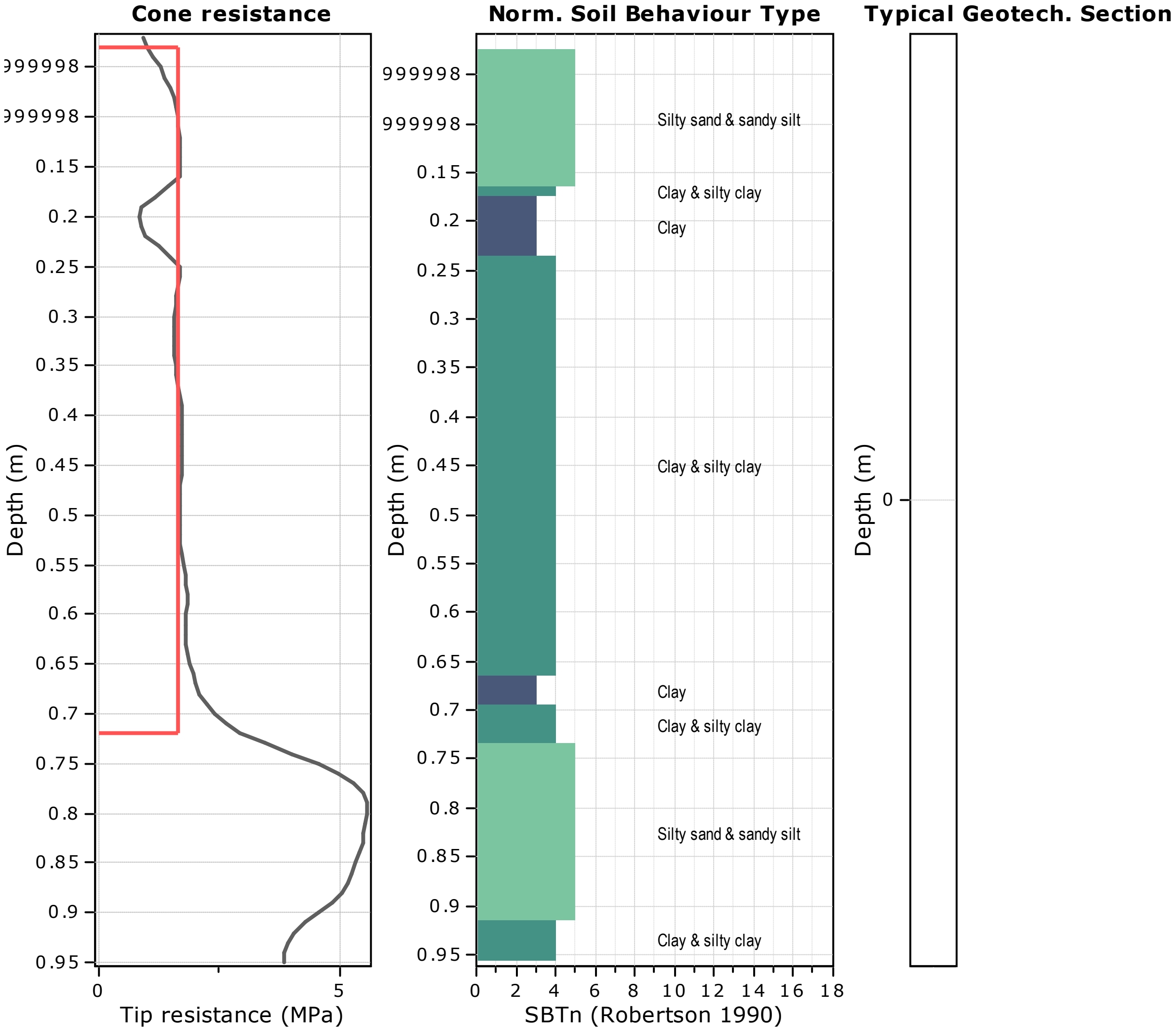
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters

Soil Sensitivity factor, N_S: 7.00

—●— User defined estimation data



Tabular results

.:: Layer No: 1 ::.

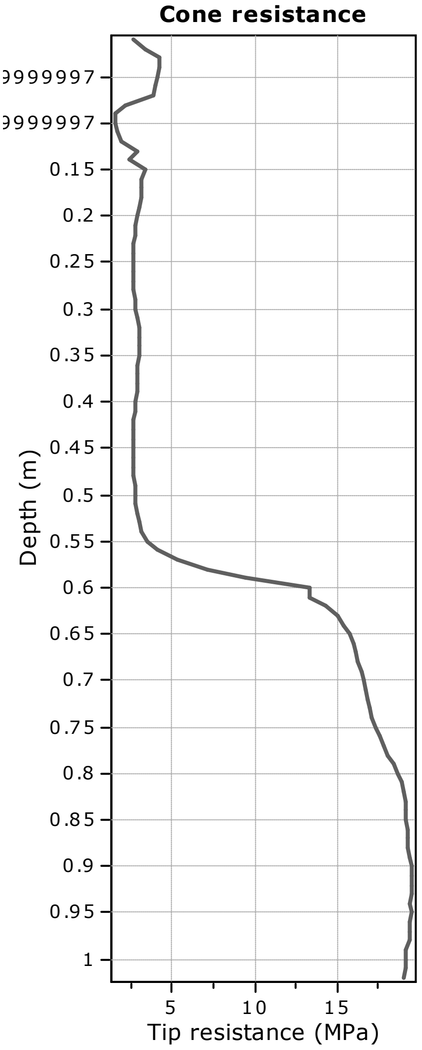
Code: Layer_1 **Start depth:** 0.03 (m), **End depth:** 0.72 (m)

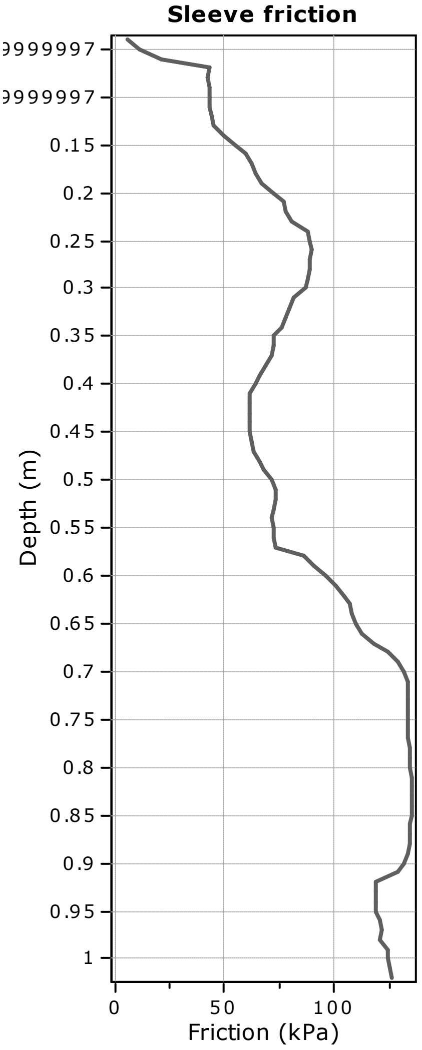
Description: Clay & silty clay

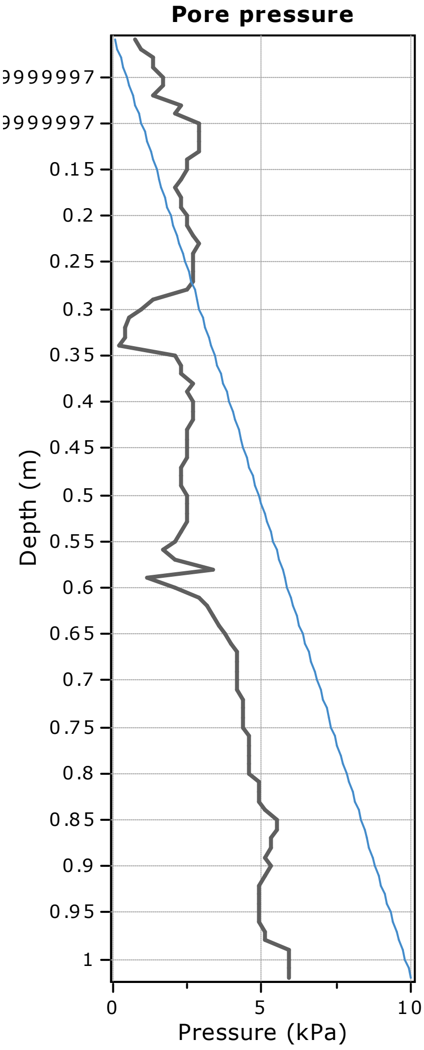
Basic results	**Estimation results**	
Total cone resistance: 1.65 ±0.34 MPa	Permeability: 1.90E-07 ±2.88E-07 m/s	Constrained Mod.: 23.04 ±4.71 MPa
Sleeve friction: 55.22 ±27.47 kPa	N_{60}: 6.80 ±1.37 blows	Go: 42.67 ±10.14 MPa
Ic: 2.64 ±0.18	Es: 0.00 ±0.00 MPa	Su: 120.02 ±25.13 kPa
SBT_n: 4	Dr (%): 0.00 ±0.00	Su ratio: 2.01 ±0.42
SBTn description: Clay & silty clay	φ (degrees): 0.00 ±0.00 °	O.C.R.: 9.30 ±1.95
	Unit weight: 19.00 ±0.00 kN/m³	

CPT: CPTN11
Total depth: 1.02 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

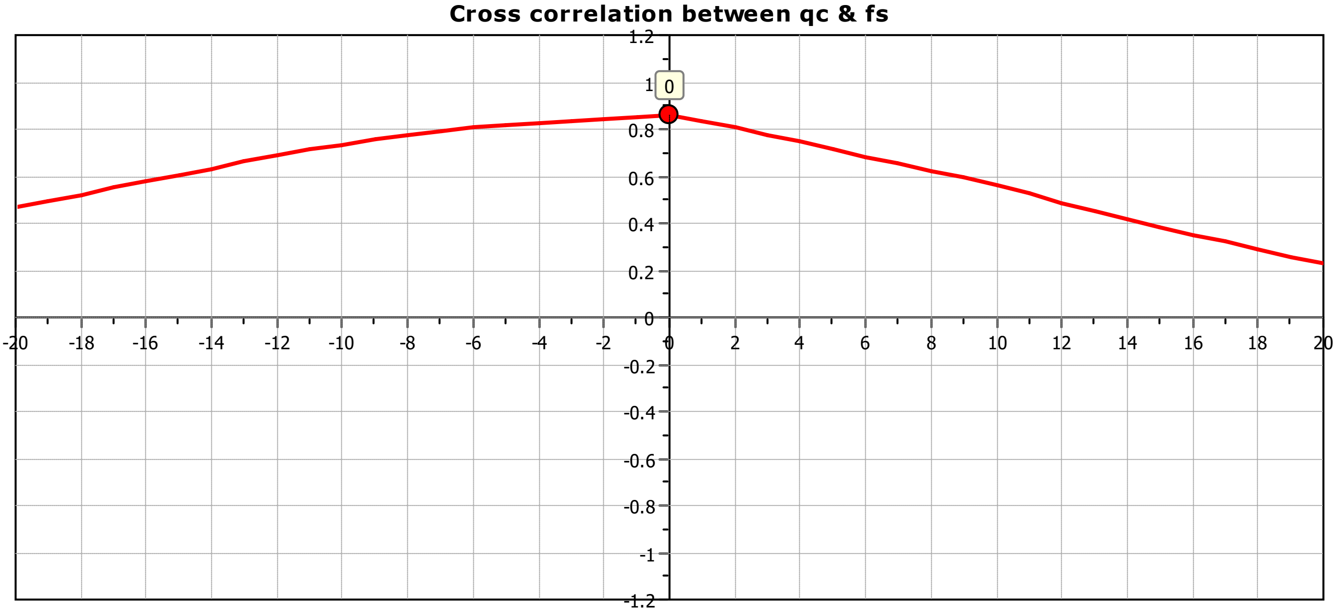
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**







The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



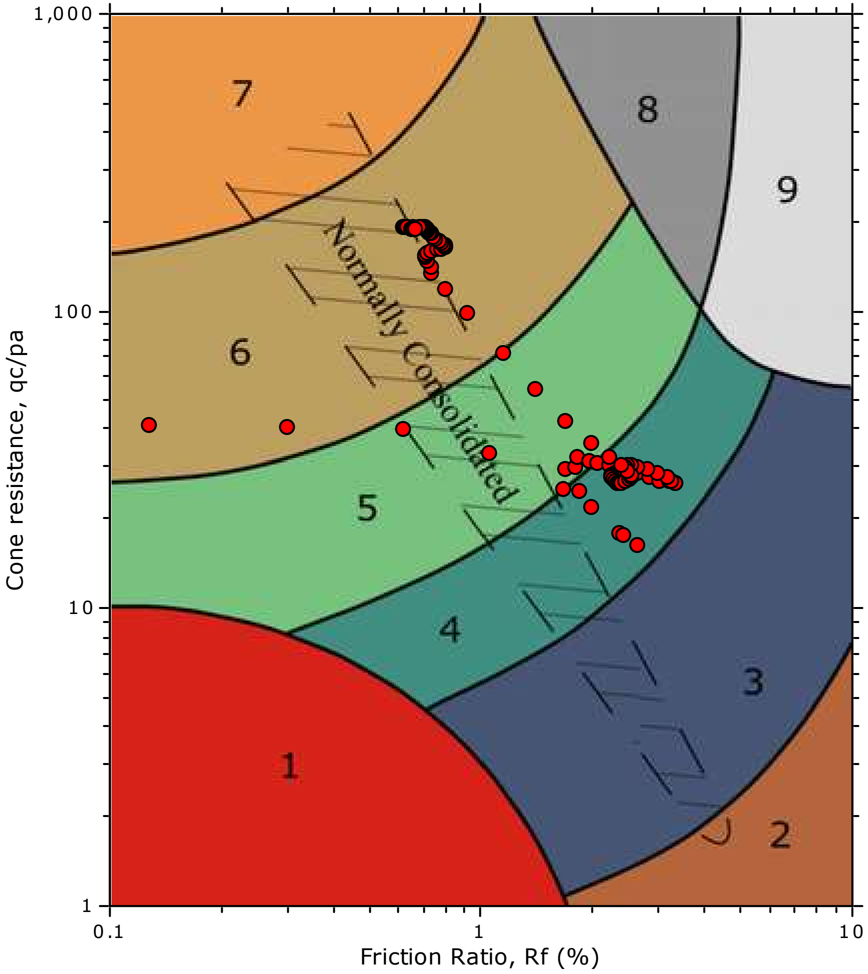
Cook Costello
Geotechnical Engineers

CPT: CPTN11
Total depth: 1.02 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

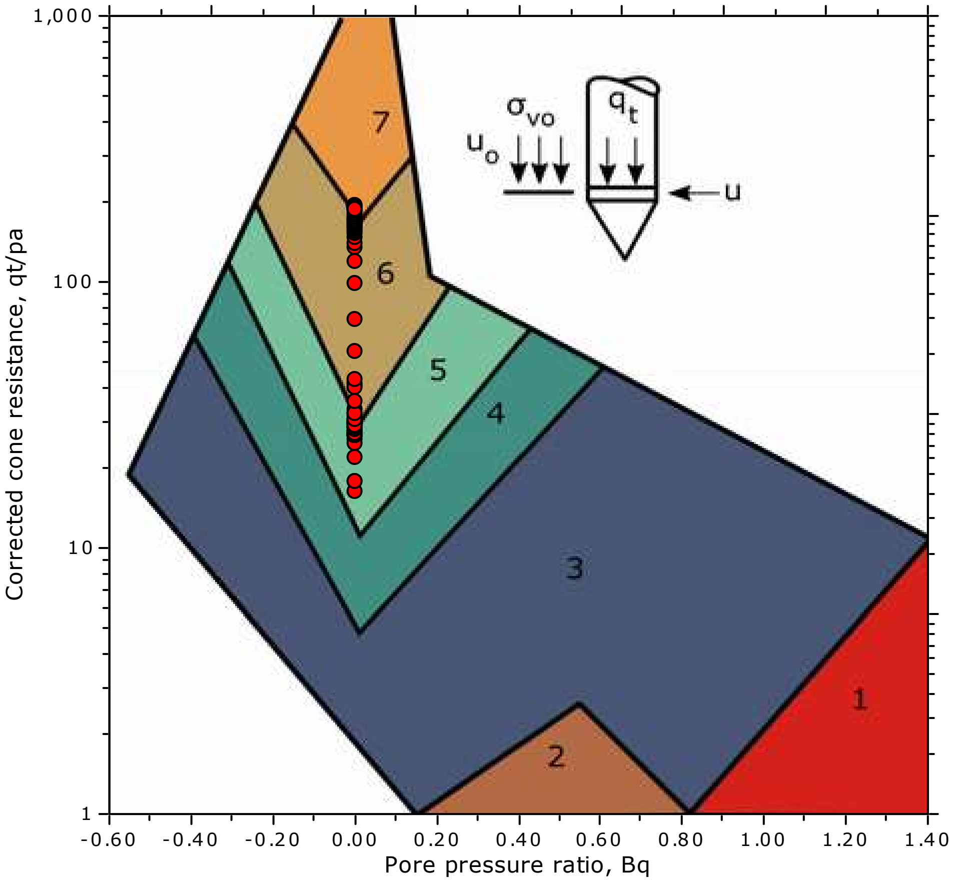
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**

SBT - Bq plots

SBT plot



Bq plot



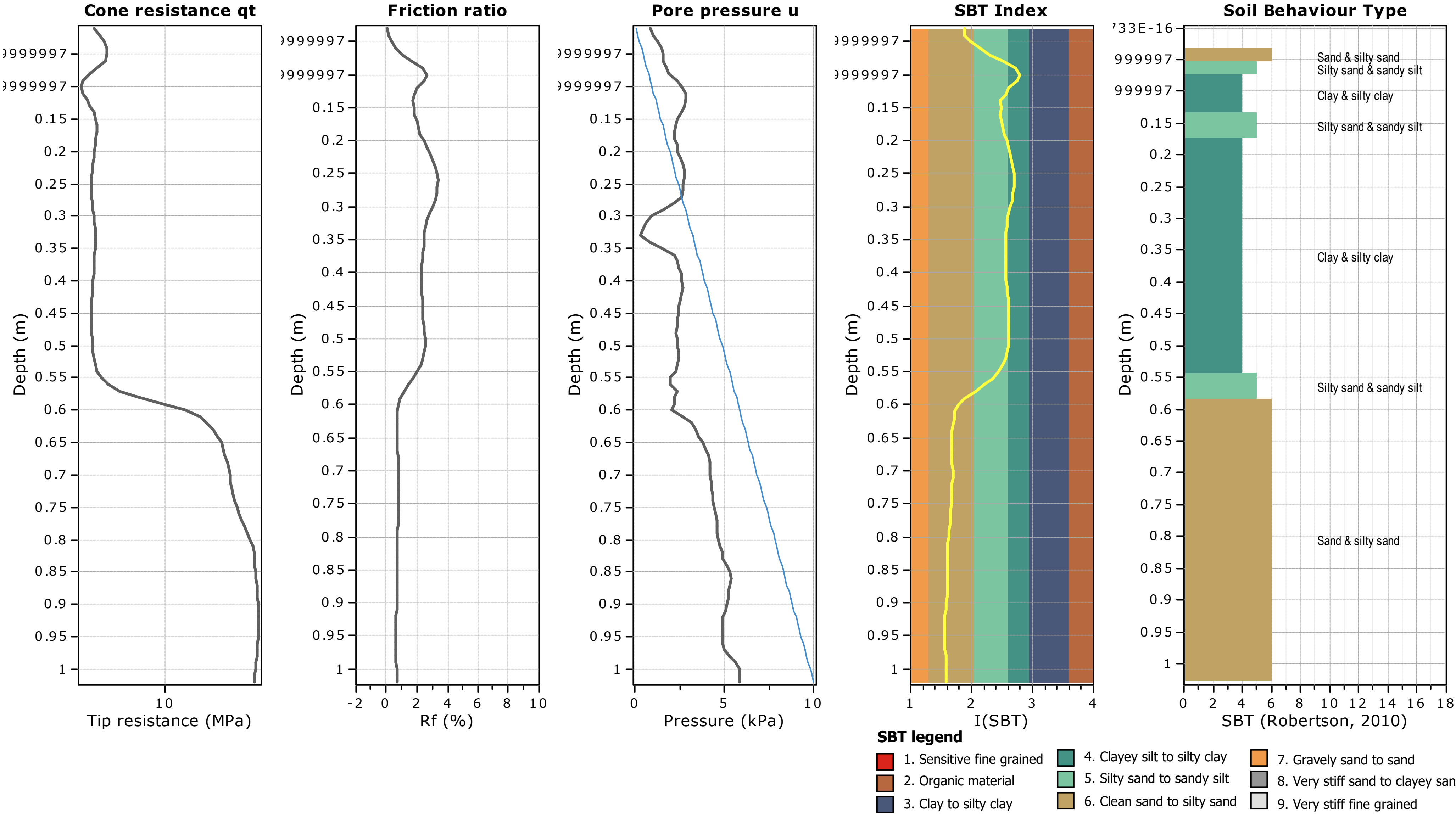
SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravelly sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

Cook Costello
Geotechnical Engineers

CPT: CPTN11
Total depth: 1.02 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

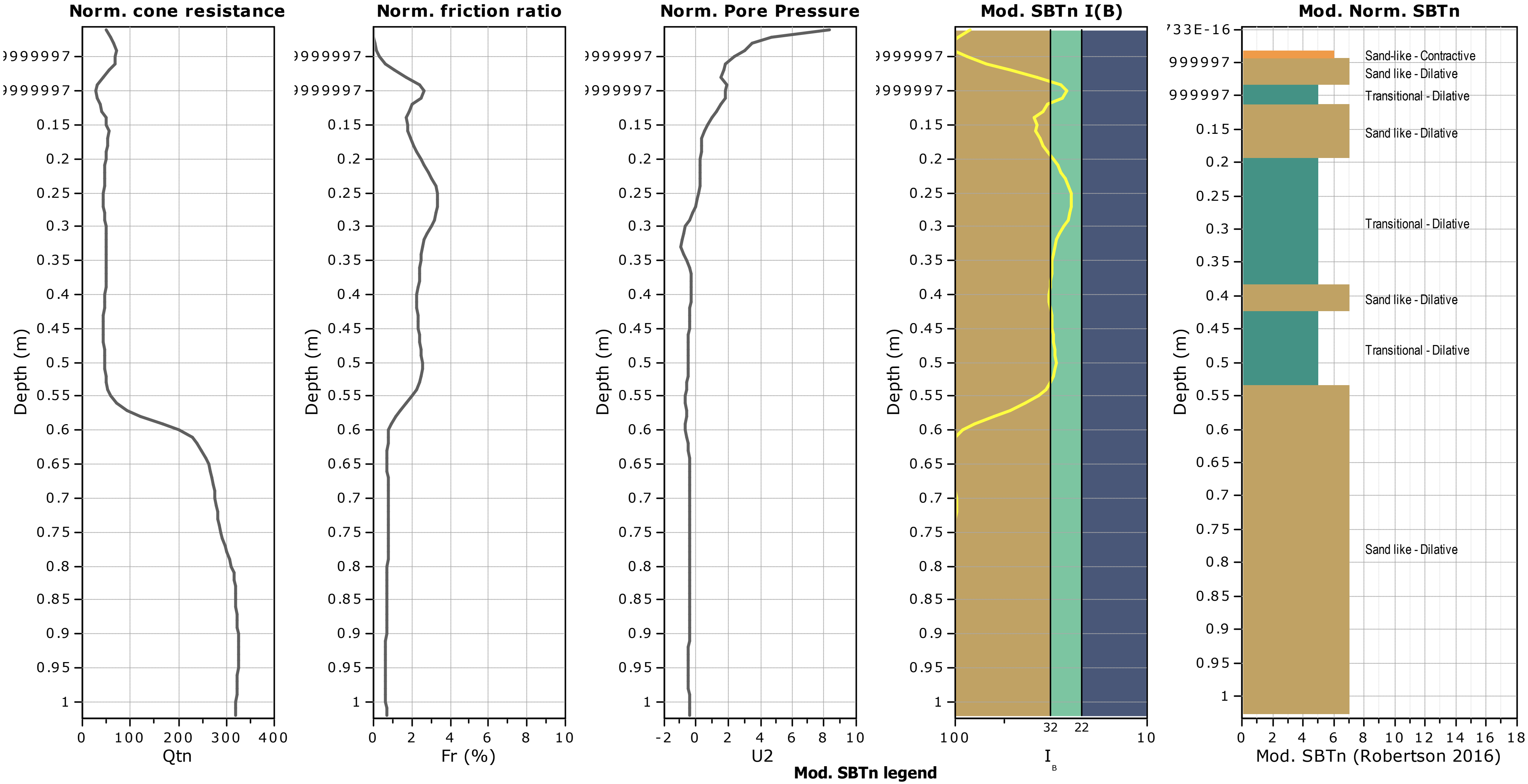
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Cook Costello
Geotechnical Engineers

CPT: CPTN11
Total depth: 1.02 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**

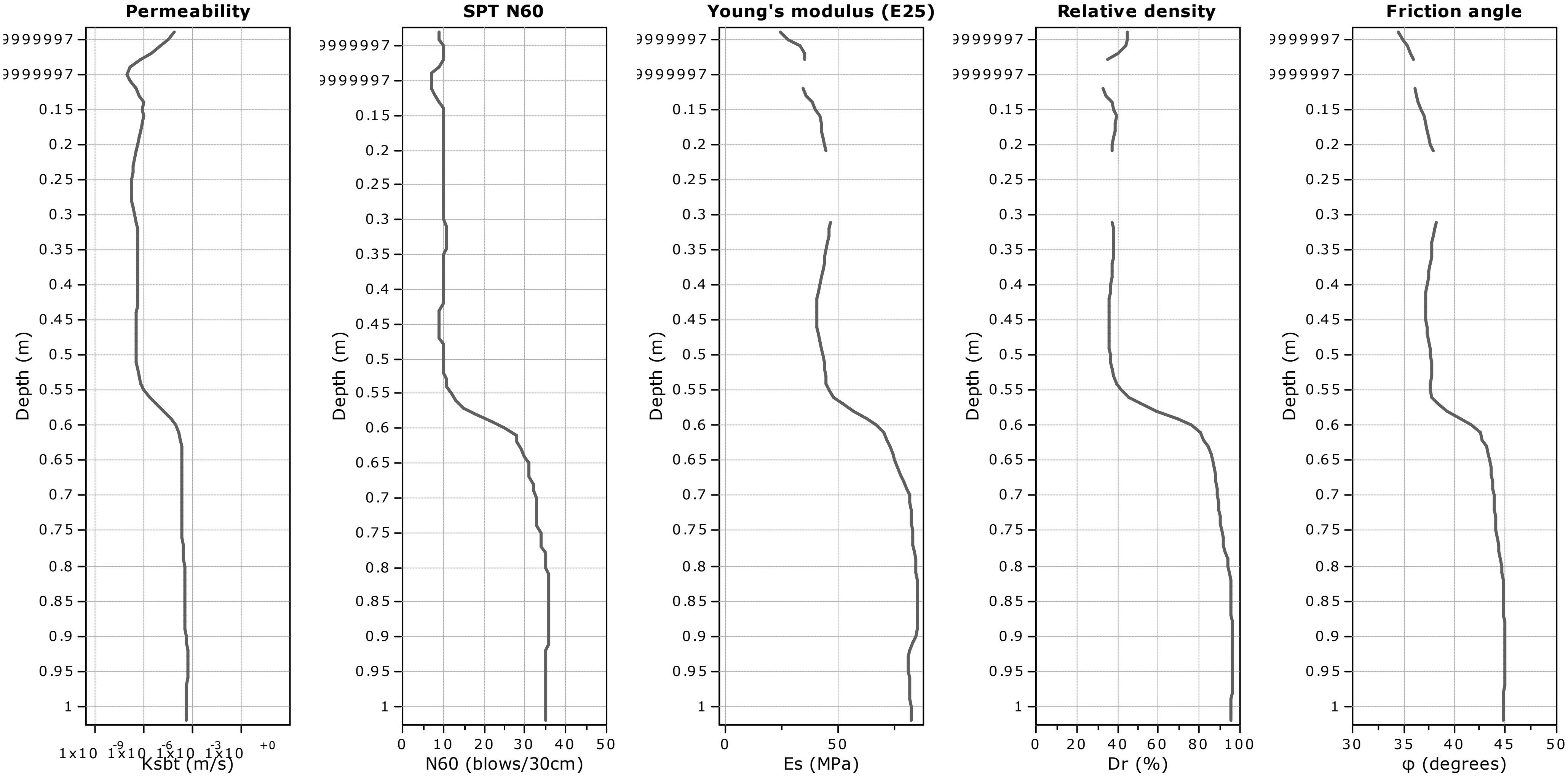


Mod. SBTn legend

- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- 🟦 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative

CPT: CPTN11
Total depth: 1.02 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



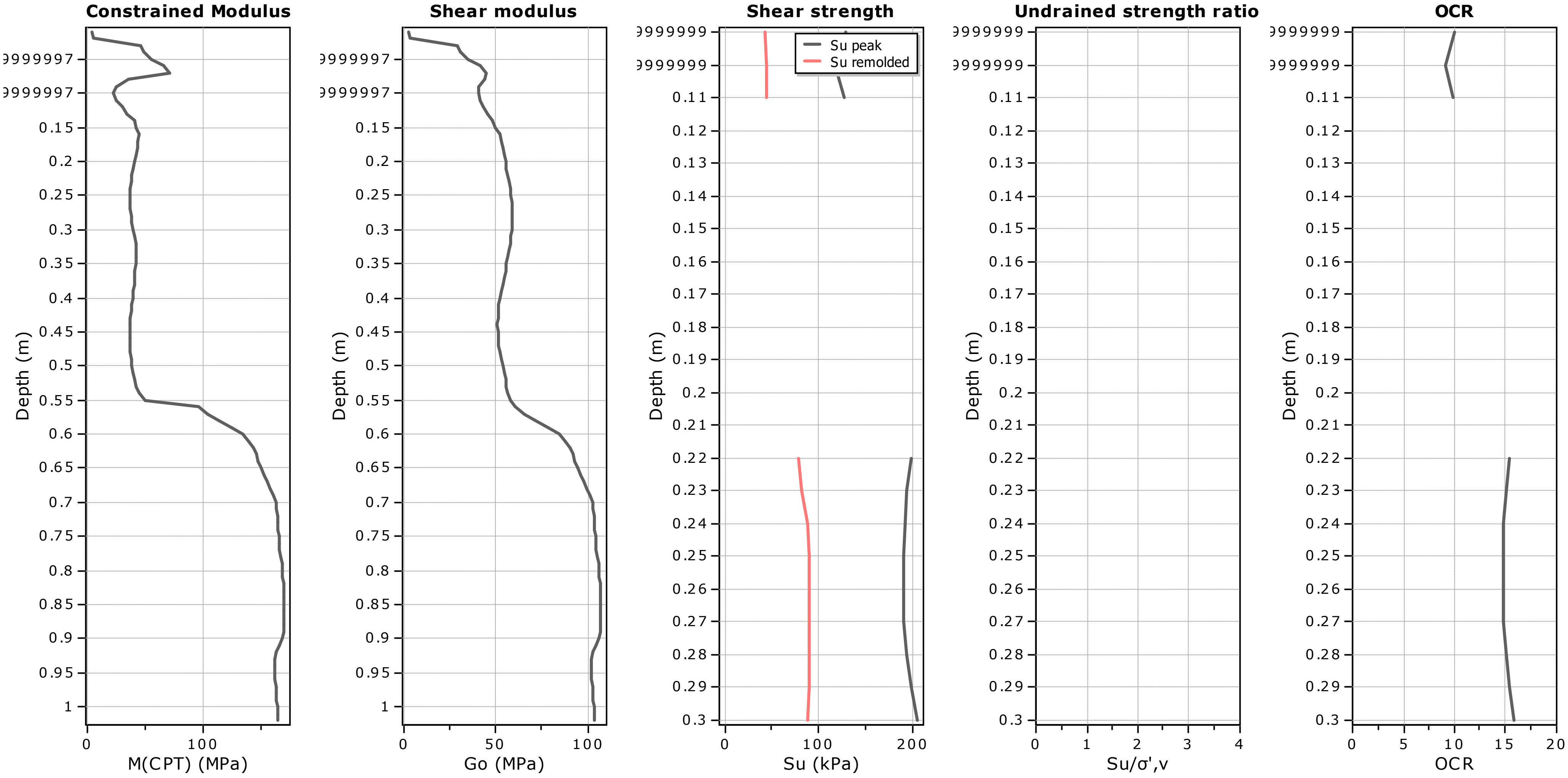
Calculation parameters

Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
—●— User defined estimation data

CPT: CPTN11
Total depth: 1.02 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



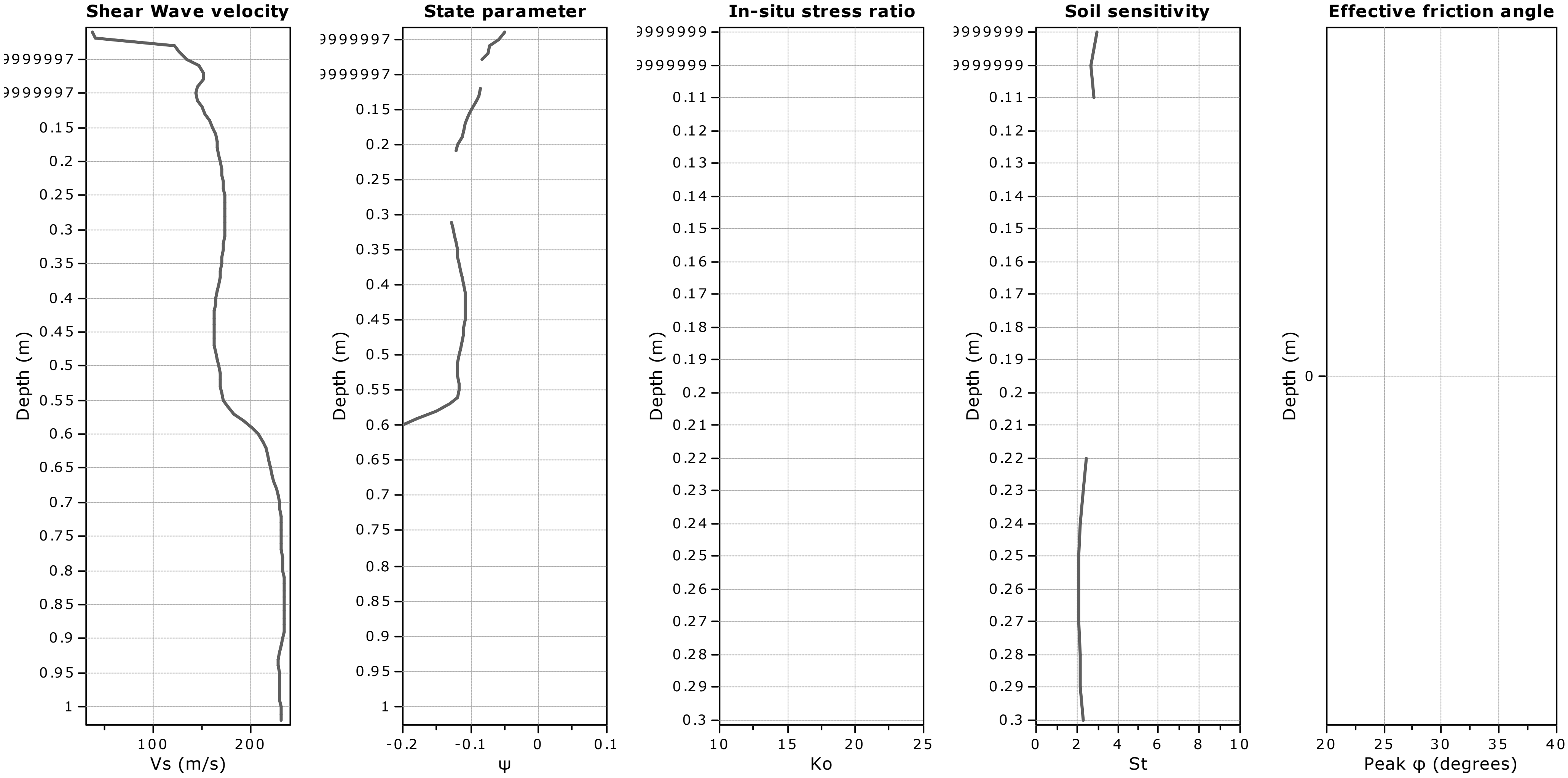
Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

CPT: CPTN11
Total depth: 1.02 m, Date: 11/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters

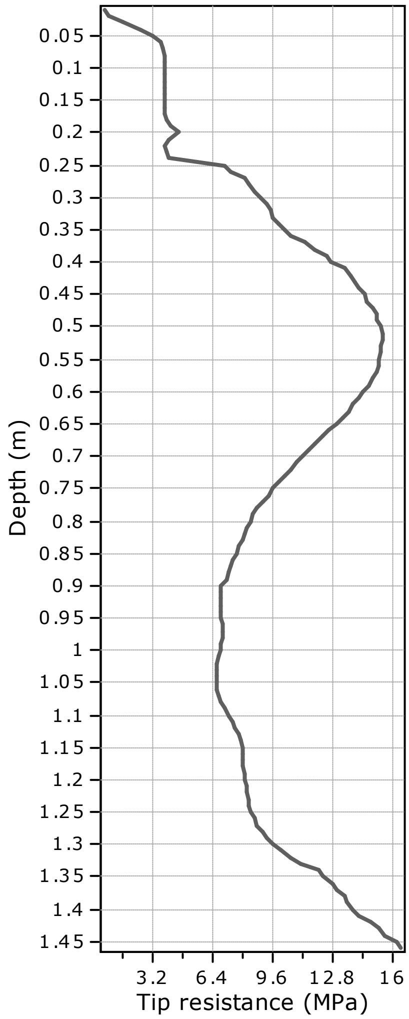
Soil Sensitivity factor, N_S: 7.00

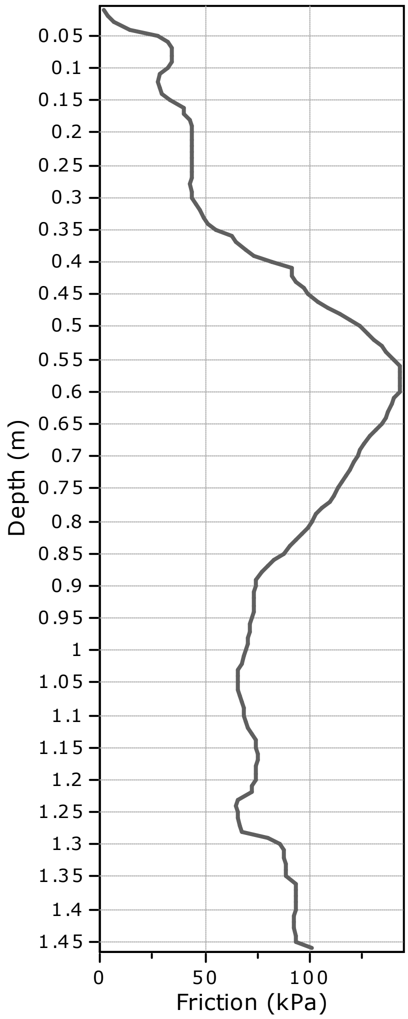
● User defined estimation data

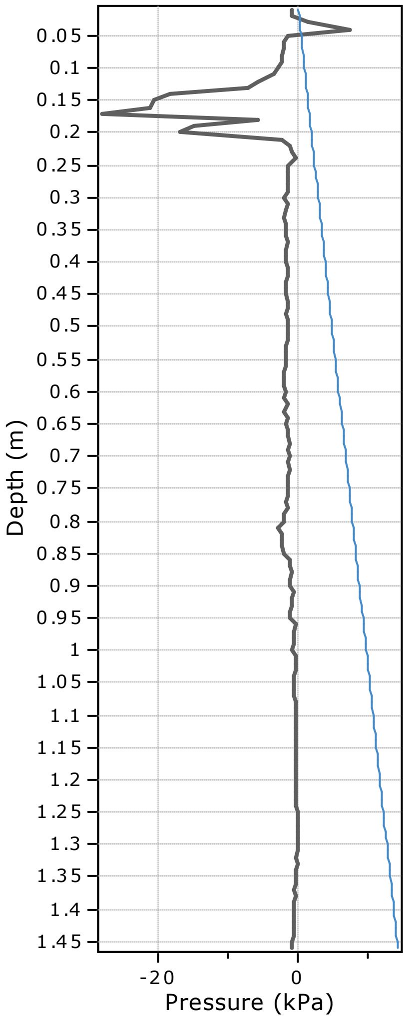
Cook Costello
Geotechnical Engineers
2 Norfolk St
Whangarei

CPT: CPTH13
Total depth: 1.46 m, Date: 29/04/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

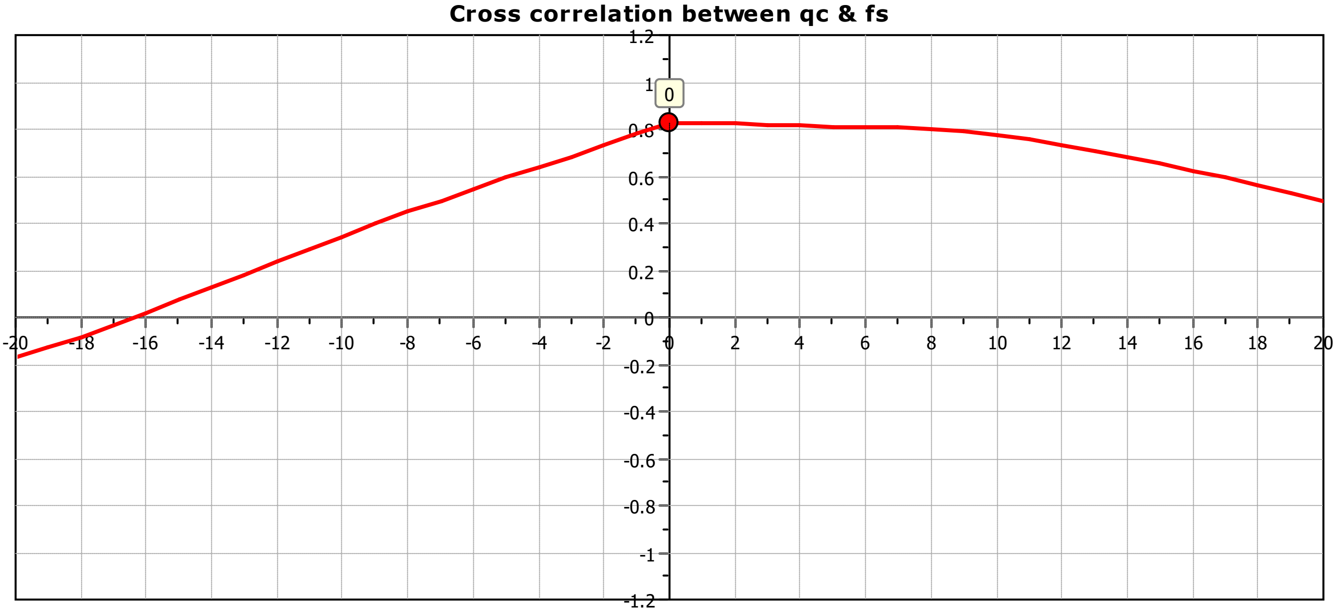
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**


Cone resistance


Sleeve friction

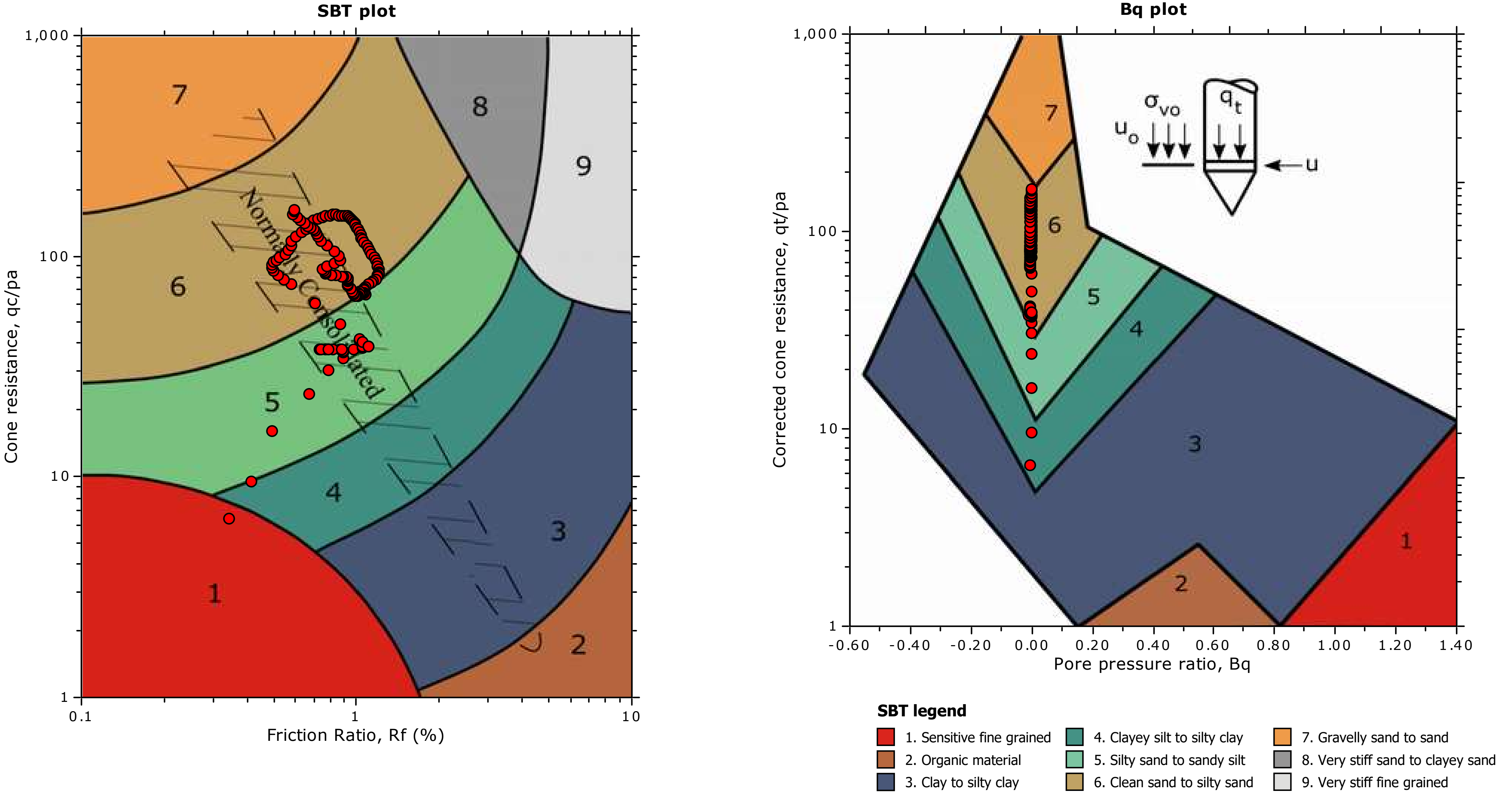

Pore pressure

The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).


Cross correlation between qc & fs

CPT: CPTH13
Total depth: 1.46 m, Date: 29/04/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

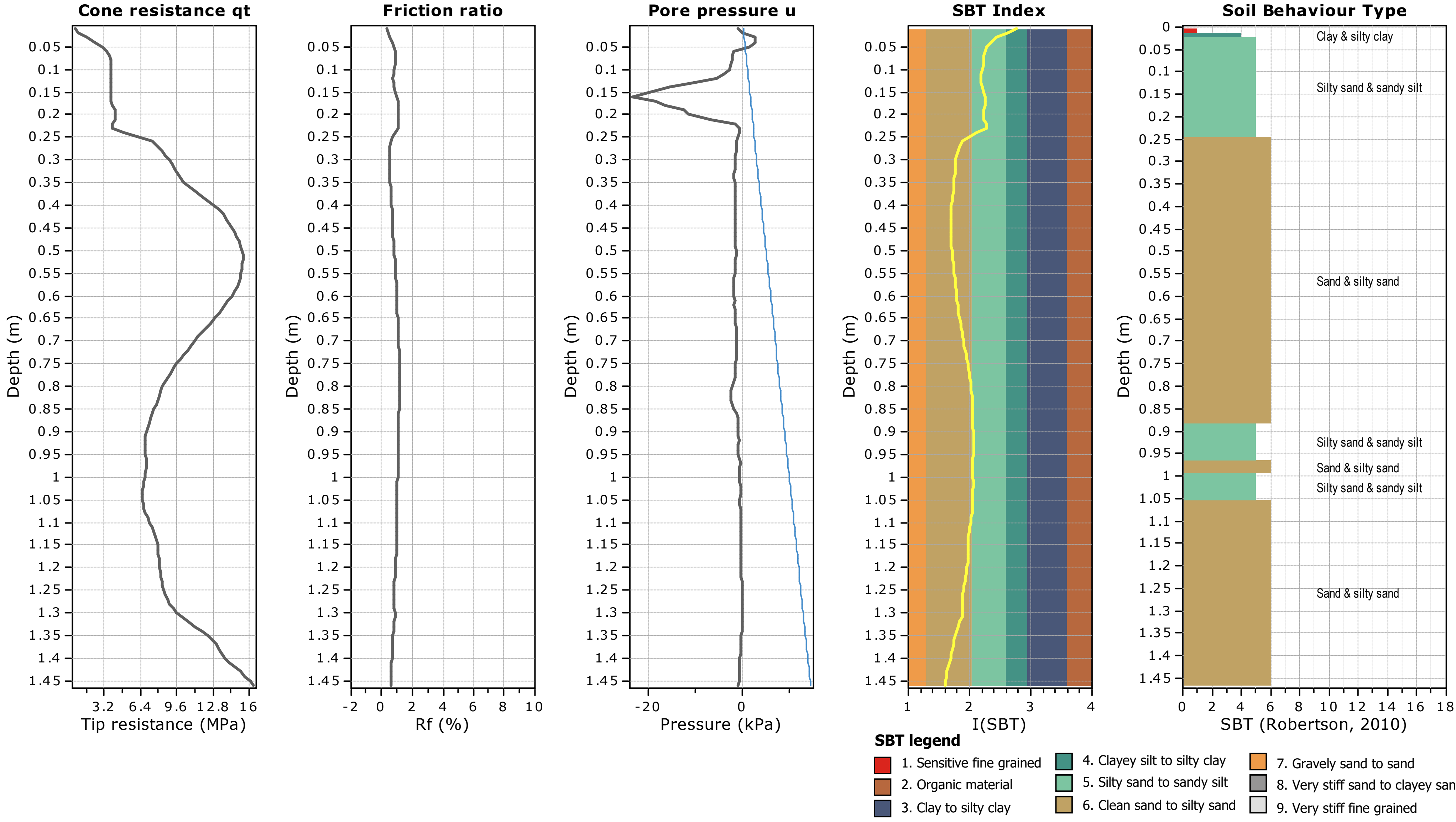
SBT - Bq plots



Cook Costello
Geotechnical Engineers
2 Norfolk St
Whangarei

CPT: CPTH13
Total depth: 1.46 m, Date: 29/04/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

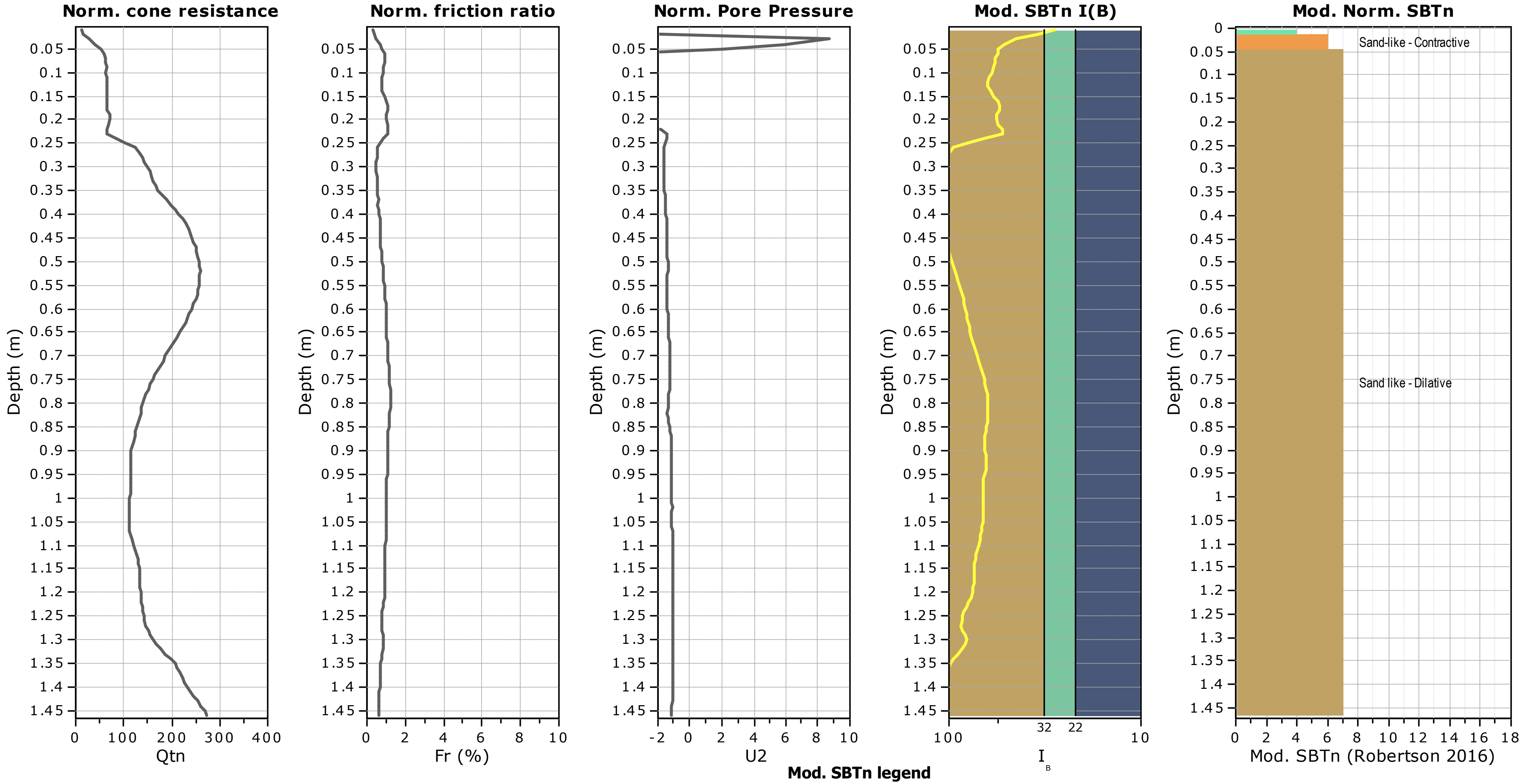
Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



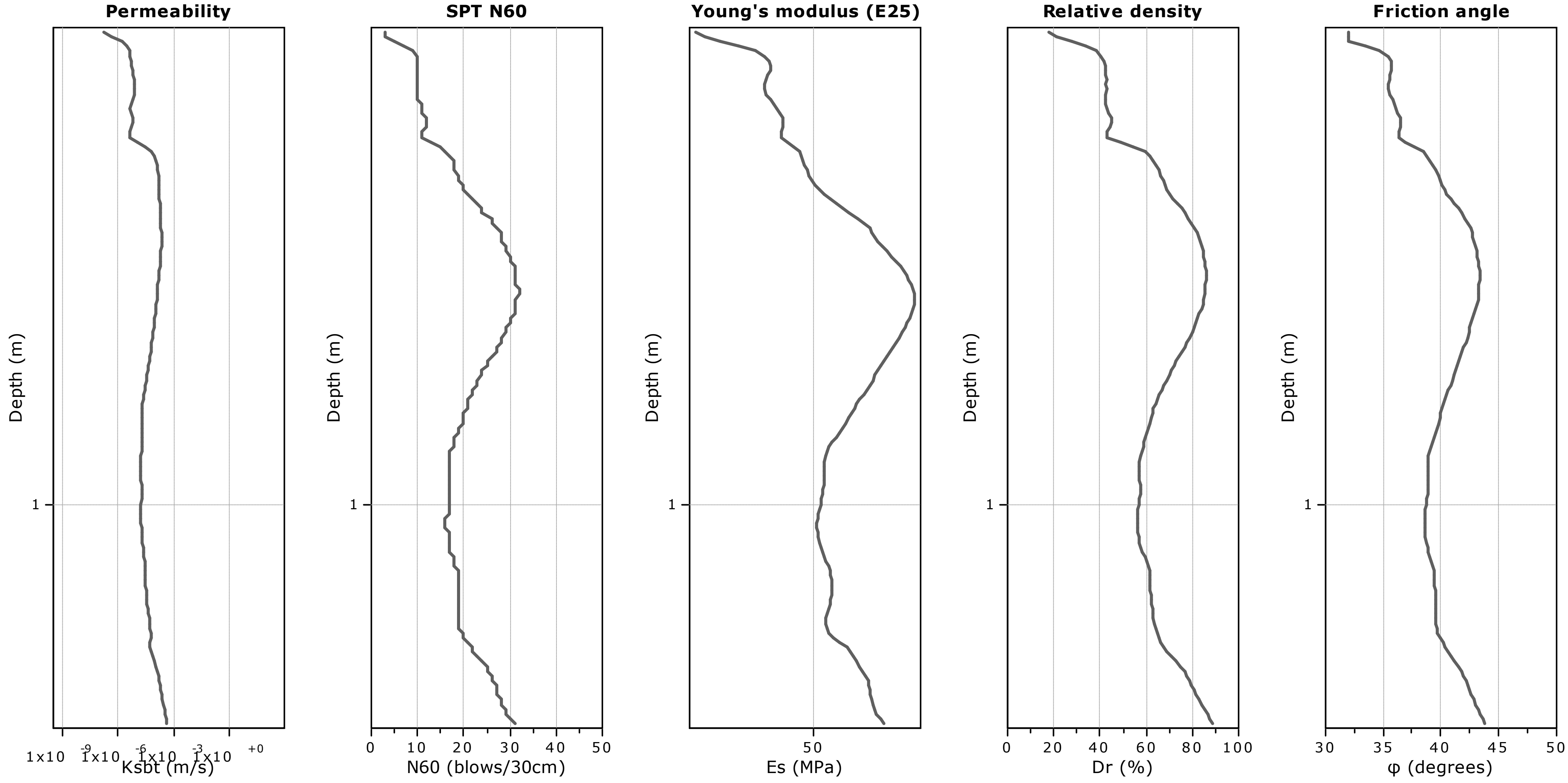
Cook Costello
Geotechnical Engineers
2 Norfolk St
Whangarei

CPT: CPTH13
Total depth: 1.46 m, Date: 29/04/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Mod. SBTn legend
- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- 🟦 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative



Calculation parameters

Permeability: Based on SBT_n

SPT N_{60}: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

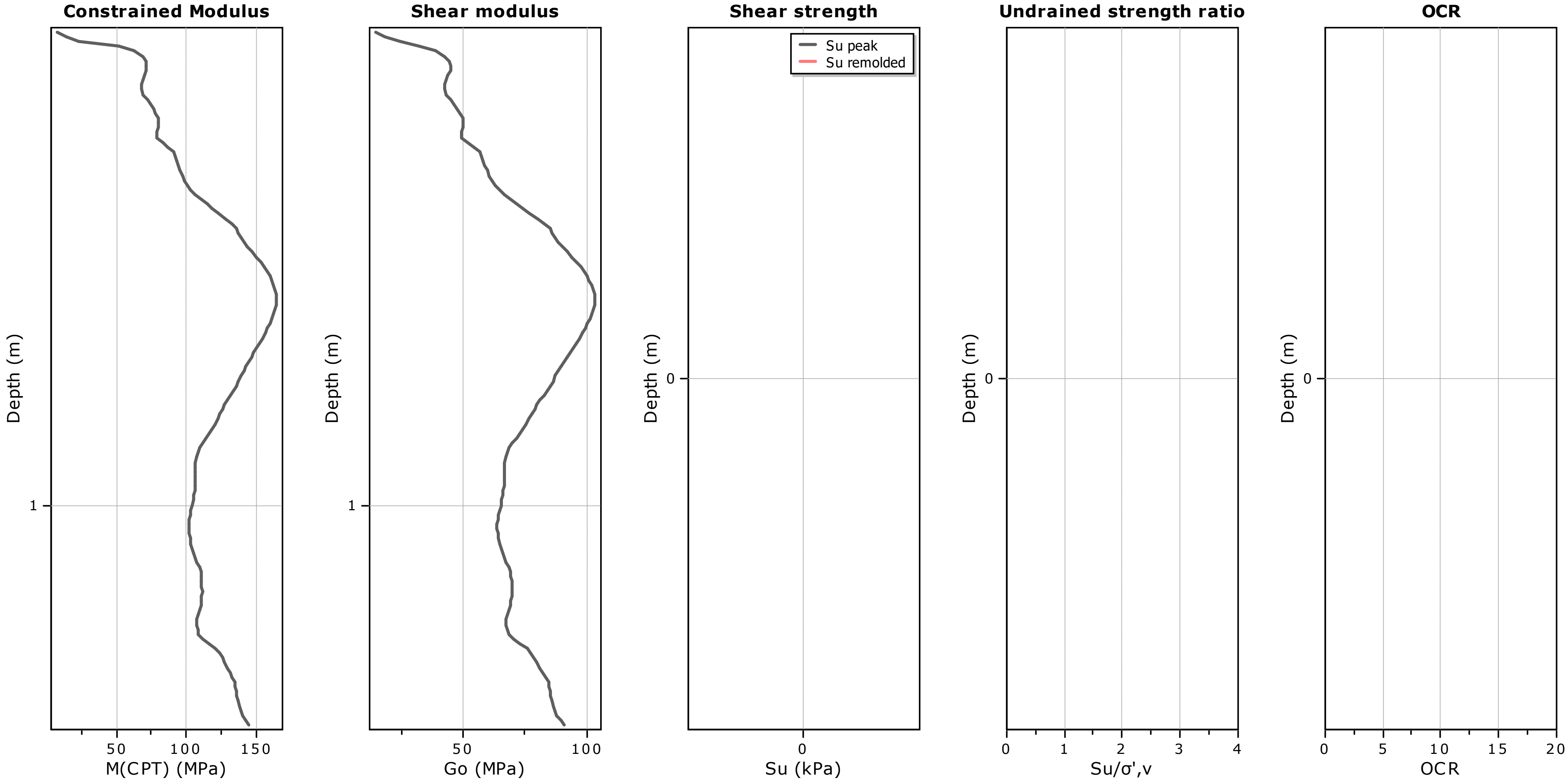
Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhawy & Mayne (1990)

● User defined estimation data

CPT: CPTH13
Total depth: 1.46 m, Date: 29/04/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters

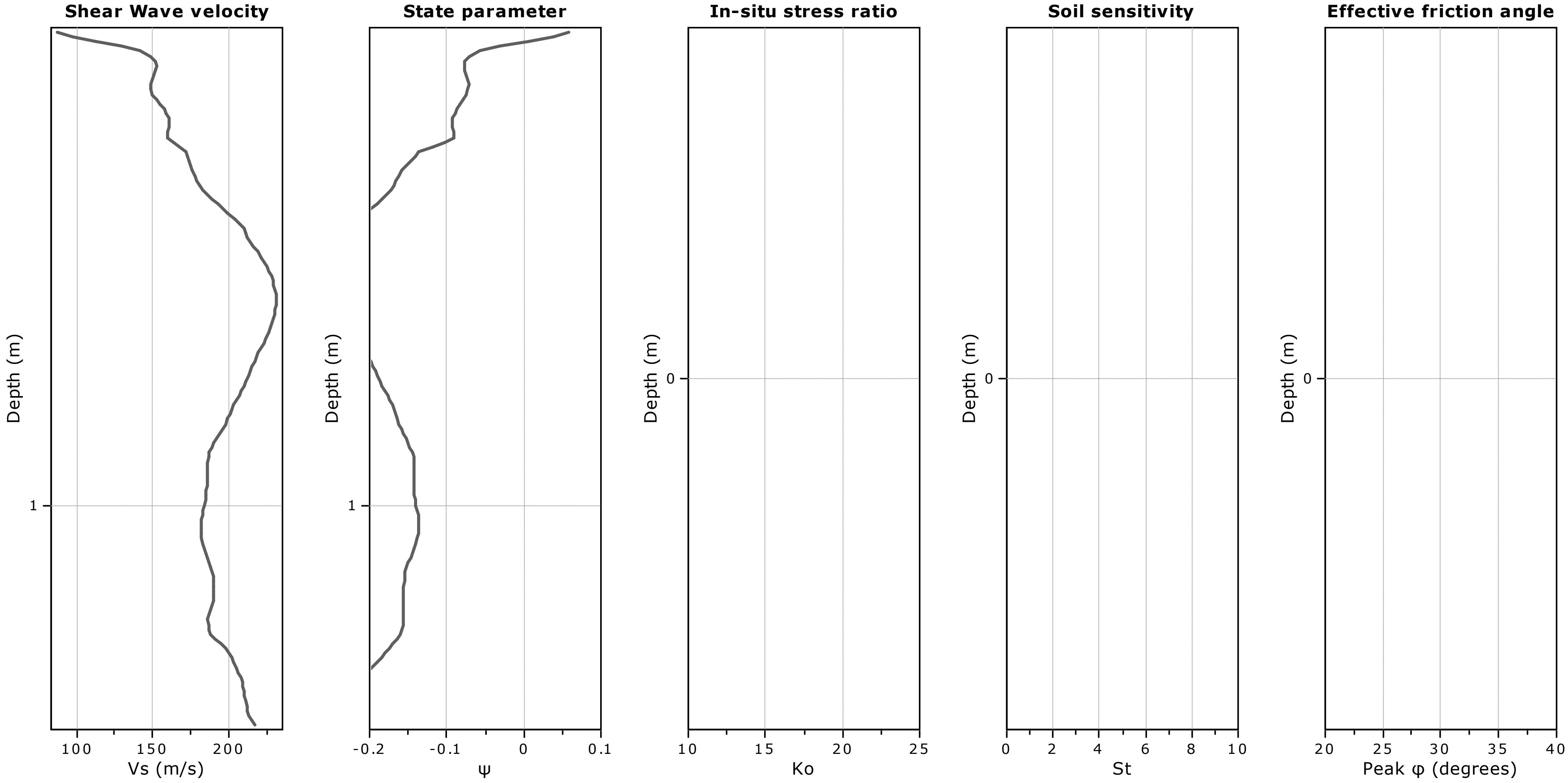
Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

Cook Costello
Geotechnical Engineers
2 Norfolk St
Whangarei

CPT: CPTH13
Total depth: 1.46 m, Date: 29/04/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **The Landings Stage 6 & 7 Pre-earthworks Testing**
Location: **One Tree Point, Landings Subdivision**



Calculation parameters

Soil Sensitivity factor, N_S: 7.00
● User defined estimation data

Whangarei Laboratory
166 Bank Street
Whangarei
M: 027 656 5226
E: info@geocivil.co.nz

TEST REPORT

Lab Job No: 8020-1727

Your ref.: -

Date of Issue: 31/05/2021

Date of Re-Issue: -

Page: 1 of 48

Test Report No.
W21-578

PROJECT: **The Landing**

CLIENT:
Cook Costello
2 Norfolk Street
Whangarei

ATTENTION: Bernard Devine

TEST METHODS: Test Pit Log where required (not accredited)

NZGS December 2005 (not accredited)

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

Alex Millar

A.Millar

Admin

S. Kokich

Senior Tecnicican

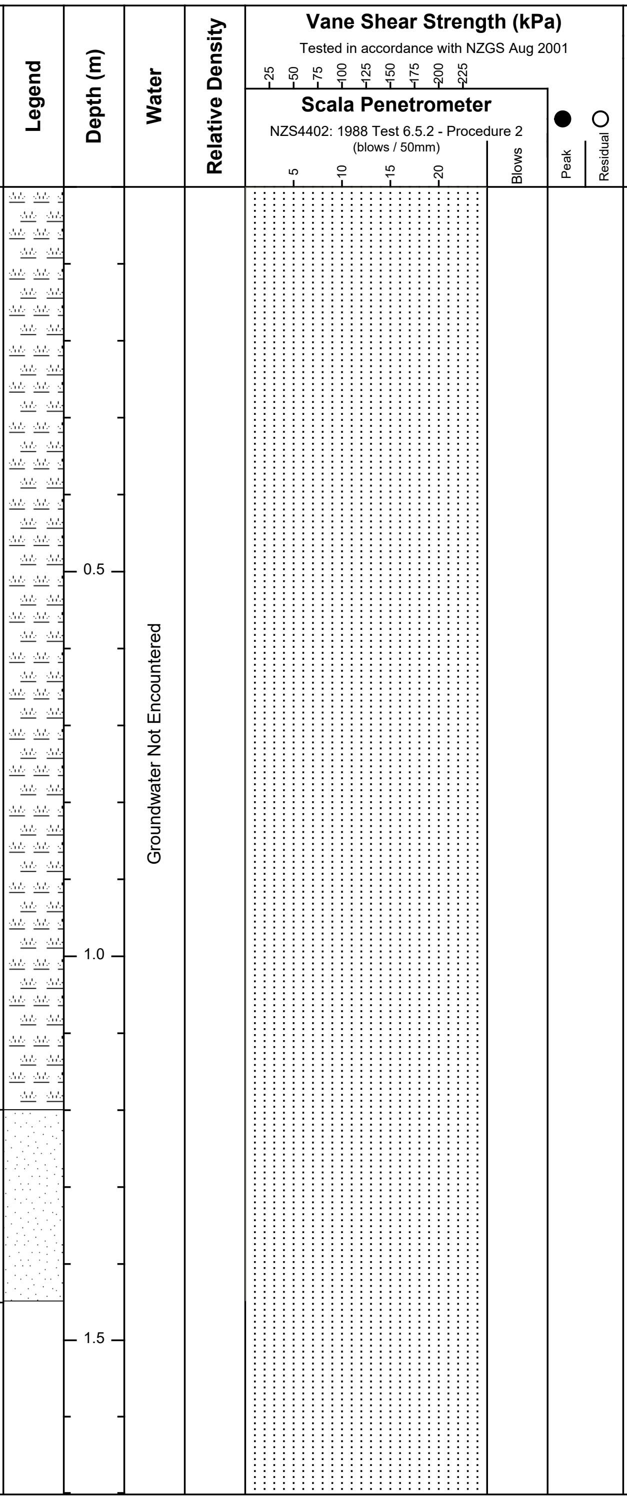
GEO CIVIL
TEST RIGHT • BUILD RIGHT

AUGERHOLE LOG

166 Bank Street,
Whangarei,
M:0276565226
E:info@geocivil.co.nz

Lab Job No.: **8020-1727**
Borehole No.: **C02**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.45 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS
	Amorphous PEAT, traces of sand and rootlets, black/dark brown, moist buried logs upto 400mm diameter	Pt
	Cemented SAND, some silt, traces of rootlets, brown, moist, sand is fine to medium, well graded	SW
	End of Test Pit	



Samples

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

Produced with CORE-GS by Geroc

Printed: 31/05/2021 9:45:49 am

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AUGERHOLE LOG

166 Bank Street,
Whangarei,
M:0276565226
E:info@geocivil.co.nz

Lab Job No.:	**8020-1727**	**Borehole No.:**	**C03**
Sheet:	1 of 1		
Client:	Cook Costello	**Hole Depth:**	0.80 m
Job:	Geotechnical Investigation	**Coordinates:**	
Date:	15/04/21		
Report No.:	W21-578	**Location:**	The Landing
Ground Level:			
Client Ref. No.:	14333-004		

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Cemented silty SAND, traces of rootlets, darkish brown, moist, sand is fine to medium, well graded	SM			Groundwater Not Encountered						
	Amorphous PEAT, some sand, traces of rootlets, black/dark brown, moist	Pt		0.5							
	Cemented SAND, some silt, traces of rootlets, brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

GEO CIVIL
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166 Bank Street,
Whangarei,
M:0276565226
E:info@geocivil.co.nz

AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **D03**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 3.20 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Amorphous PEAT, traces of rootlets, black/dark brown, moist	Pt		0.5	Groundwater Not Encountered						
	Buried TOPSOIL, minor sand, dark greyish brown, moist, traces of rootlets, (buried logs upto 300mm diam)	OL	TS	1.0 1.5 2.0 2.5 3.0							
	End of Test Pit (unable to dig further)										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

Produced with CORE-GS by Geroc

AUGERHOLE LOG

166 Bank Street,
Whangarei,
M:0276565226
E:info@geocivil.co.nz

Lab Job No.: **8020-1727**
Borehole No.: **E02**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.90 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 / Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	Peak ●	Residual ○	Samples
	TOPSOIL, traces of sands and rootlets, dark brown, moist	OL	TS		Groundwater Not Encountered						
	Amorphous PEAT, traces of rootlets, black/dark brown, moist	Pt		0.5							
	Cemented silty SAND, traces of rootlets, brown, moist, sand is fine to medium, well graded	SM									
	End of Test Pit			1.0							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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AUGERHOLE LOG

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**E04**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	1.50 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	Peak ●	Residual ○	Samples
	Amorphous PEAT, minor sand, traces of rootlets, black/dark brown, moist	Pt		0.5	Groundwater Not Encountered						
	Amorphous PEAT, minor sand, traces of rootlets, black/dark brown, saturated	Pt		1.0							
	SAND, minor silt, brown, moist, sand is fine to medium, well graded	SW		1.5							
	End of Test Pit										

Vane shear scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala scale: 5, 10, 15, 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- Standing Water Level
- Out flow
- In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **E05**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.60 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, traces of rootlets, brown, moist	OL			Groundwater Not Encountered						
	SAND, minor silt, brown with dark brown mottling, moist, sand is fine to medium, well graded	SM		0.5							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**F02**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.50 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	Peak ●	Residual ○	Samples
	Peaty TOPSOIL, traces of sand and rootlets, dark brown, moist	OL			Groundwater Not Encountered						
	Amorphous PEAT, traces of sand and rootlets, black/dark brown, moist	Pt									
	Cemented silty SAND, traces of rootlets, brown, moist to dry, sand is fine to medium, well graded	SM		0.5							
	End of Test Pit										

Vane shear scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala scale: 5, 10, 15, 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- Standing Water Level
- Out flow
- In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **F03**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.60 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Peaty TOPSOIL, traces of rootlets and bark, dark brown/black, moist, peat is amorphous	OL			Groundwater Not Encountered						
	Amorphous PEAT, some sand, traces of rootlets, black/dark brown, moist	Pt		0.5 1.0 1.5							
	Cemented SAND, orangey brown, moist, sand is fine to coarse, well graded	SW									
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**G01**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	1.35 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	TOPSOIL, traces of sand and rootlets, dark brown, moist	OL			Groundwater Not Encountered						
	Amorphous PEAT, traces of rootlets, dark brown/black, moist	Pt		0.5 1.0							
	Cemented silty SAND, brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit *Wood upto 400mm diam throughout test pit			1.5							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **G03**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.60 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	TOPSOIL, traces of sand and rootlets, dark brown, moist	OL	TS								
	Amorphous PEAT, traces of rootlets, dark brown/black, moist. Branches/logs found buried upto 200mm diameter	Pt		0.5 1.0 1.5	SWL 1.55m						
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- Standing Water Level
- Out flow
- In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B Recorded Date: 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: 8020-1727
Borehole No.: G04
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.55 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	Peak ●	Residual ○	Samples
	TOPSOIL, minor sand, traces of rootlets, dark brown, moist	OL	TS								
	Amorphous PEAT, traces of rootlets, dark brown/black, moist. (some small branches 20-30mm diameter)	Pt		0.5 1.0	Groundwater Not Encountered						
	Cemented silty SAND, brown, moist, sand is fine to medium, well graded	SW		1.5							
	End of Test Pit										

Vane shear scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala scale: 5, 10, 15, 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.: **8020-1727**
Borehole No.: **G08**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.30 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	SAND, traces of silt and rootlets, brown, moist, sand is fine to medium, well graded	SW			Groundwater Not Encountered						
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- Standing Water Level
- Out flow
- In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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Lab Job No.: **8020-1727**
Borehole No.: **H06**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.00 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Samples
	Sandy TOPSOIL, minor rootlets, dark brown, moist, sand is fine to medium, well graded	OL			Groundwater Not Encountered			
	Silty SAND, traces of rootlets, darkish brown, moist, sand is fine to medium, well graded	SW		0.5				
	Amorphous PEAT, some sand, black/dark brown, moist, sand is fine to medium	Pt						
	Cemented SAND, some silt, brown-orangey brown, moist, sand is fine to medium, well graded	SW		1.0				
	End of Test Pit							

Vane Shear Strength scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala Penetrometer scale: 5, 10, 15, 20; Blows; ● Peak; ○ Residual

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar	
		Recorded Date: 15/04/2021	Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **H09**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.80 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, traces of rootlets, dark brown, moist	OL			Groundwater Not Encountered						
	Sandy SILT, brown, moist, sand is fine to medium, well graded	ML									
	Sandy PEAT, traces of rootlets, black/dark brown, moist, peat is amorphous, sand is fine to medium, well graded	OL		0.5							
	Cemented SAND, minor silt, orangey brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit										

Vane shear scale: 25 50 75 100 125 150 175 200 225
Scala scale: 5 10 15 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **H11**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.40 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 / Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Samples
	Amorphous PEAT, minor sand, traces of rootlets, dark brown/black, moist	Pt			Groundwater Not Encountered			
	SAND, brown, moist, sand is fine to medium, well graded	SW						
	Colour Change: light brown	SW						
	End of Test Pit			0.5				

Vane Shear Strength scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala Penetrometer scale: 5, 10, 15, 20
Blows | ● Peak | ○ Residual

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar	
		Recorded Date:	Alex Millar	No accredited tests
		15/04/2021		

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**H12**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.80 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Amorphous PEAT, traces of sand and rootlets, dark brown, moist	Pt			Groundwater Not Encountered						
	SAND, traces of silt, brown, moist, sand is fine to medium, well graded	SW									
	Peaty SAND, traces of silt, dark brown, moist, sand is fine to medium, well graded	SW		0.5							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**H13**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.95 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 / Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Samples
	Peaty TOPSOIL, traces of sand and rootlets, dark brown, specks/spots of orangey brown sand, moist, peat is amorphous	OL	TS		Groundwater Not Encountered			
	SAND, traces of silt, brown, moist-wet, sand is fine to medium, well graded	SW		0.5				
	End of Test Pit			1.0				

Vane Shear Strength scale: 25, 50, 75, 100, 125, 150, 175, 200, 225 — ● Peak, ○ Residual
Scala Penetrometer scale: 5, 10, 15, 20 — Blows

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

AUGERHOLE LOG

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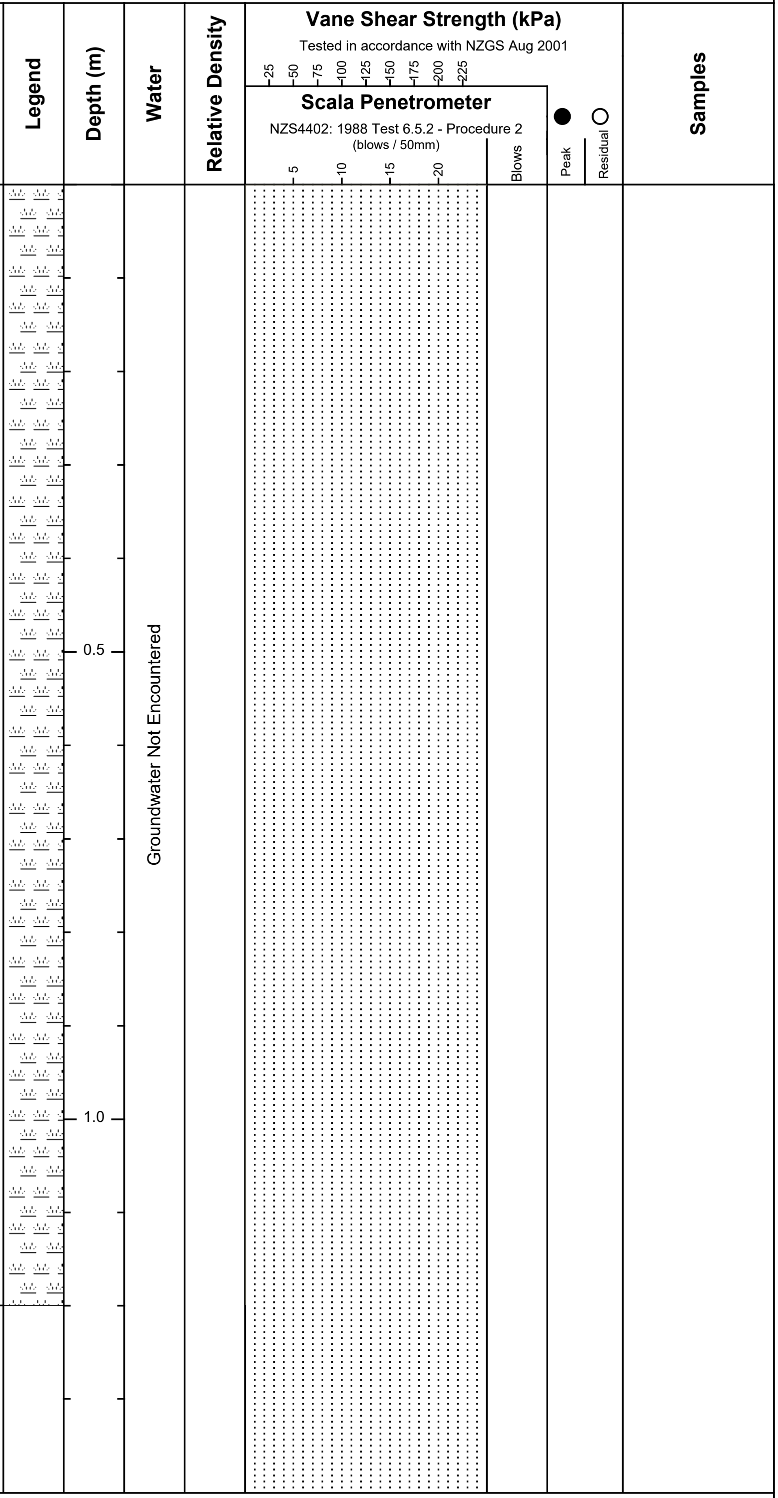
Lab Job No.: **8020-1727**
Borehole No.: **J03**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.20 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004



Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Depth (m)	Water	Samples
	Amorphous PEAT, traces of rootlets and barks, black/dark brown, moist. some buried logs 100-250mm diameter	Pt	0.0–1.2	Groundwater Not Encountered	
	End of Test pit				

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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AUGERHOLE LOG

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**J04**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.90 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Silty TOPSOIL, minor sand, traces of rootlets, dark brown, moist	OL									
	Amorphous PEAT, some silt, traces of rootlets, black/dark brown, wet	Pt		0.5	Groundwater Not Encountered						
	Cemented silty SAND, traces of rootlets, orangey brown, moist	SM									
	End of Test Pit			1.0							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **J05**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.20 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Peaty TOPSOIL, minor sand, traces of rootlets, dark brown/black, moist, peat is amorphous	OL									
	Silty SAND, traces of rootlets, orangey brown, moist, sand is fine to medium, well graded	SW									
	SAND, minor peat, dark brown, moist, sand is fine to medium, well graded	SW		0.5	Groundwater Not Encountered						
	Cemented SAND, greyish brown, moist, sand is fine to medium, well graded, hard	SW		1.0							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- Standing Water Level
- Out flow
- In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B Recorded Date: 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.: **8020-1727**
Borehole No.: **J06**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.00 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	SAND, light brown, moist, sand is fine to medium, well graded	SW		0.5	Groundwater Not Encountered						
	End of Test Pit			1.0							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**J08**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.70 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 / Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Samples
	Silty TOPSOIL, some sand, traces of rootlets, dark brown, moist	OL	TS		Groundwater Not Encountered			
	Sandy PEAT, dark brown, moist, peat is amorphous, sand is fine to medium, well graded	Pt						
	SAND, minor silt, brown, moist, sand is fine to medium, well graded	SW		0.5				
	End of Test Pit							

Vane Shear Strength scale: 25 50 75 100 125 150 175 200 225
Scala Penetrometer scale: 5 10 15 20 Blows
● Peak ○ Residual

Remarks	**Water**	**Investigation Type**
	▼ Standing Water Level ◁ Out flow ▷ In flow	☑ Hand Auger ☐ Hand Auger + Scala (DCP)

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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Lab Job No.: **8020-1727**
Borehole No.: **J09**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.40 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, brown, moist	OL									
	Amorphous PEAT, traces of sand, dark brown, moist	Pt		0.5							
	SAND, minor silt, brown, moist, sand is fine to medium, well graded	SW		1.0	Groundwater Not Encountered						
	End of Test Pit			1.5							

Remarks

Note: *All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test*
Note: *Scala Penetrometer interpretation is not endorsed*

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**J10**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	1.30 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Amorphous PEAT, traces of sand and rootlets, dark brown, moist	Pt			Groundwater Not Encountered						
	Silty SAND, traces of rootlets, brown, dry, sand is fine to coarse, well graded	SW		0.5							
	Friable Sandy SILT, traces of fine gravels, brown, dry, sand is fine to medium, well graded	ML									
	Sandy SILT, brown, dry, sand is fine to medium, well graded	ML		1.0							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.: **8020-1727**
Borehole No.: **J11**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.65 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	PEAT, traces of sand, traces of rootlets, dark brown, moist	Pt			Groundwater Not Encountered						
	Change: wet and no sand	Pt									
	SAND, minor peat, brown, moist, sand is fine to medium, well graded	SW		0.5							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.: **8020-1727**
Borehole No.: **J12**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.70 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, traces of rootlets, brown, moist, sand is fine to medium, well graded	OL			Groundwater Not Encountered						
	Amorphous PEAT, some sand, dark brown, moist	Pt									
	SAND, brown, moist, sand is fine to medium, well graded	SW		0.5							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.: **8020-1727**
Client: Cook Costello
Job: Geotechnical Investigation

Report No.: W21-578
Client Ref. No.: 14333-004

Borehole No.: **J13**
Hole Depth: 0.75 m
Coordinates:
Location: The Landing

Sheet: 1 of 1
Date: 15/04/21
Ground Level:

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	Peak ●	Residual ○	Samples
	Sandy TOPSOIL, brown, moist, sand is fine to medium, well graded	OL			Groundwater Not Encountered						
	Amorphous PEAT, some sand, traces of rootlets, dark brown, moist	Pt									
	SAND, traces of silt, brown, dry to moist, sand is fine to medium, well graded	SW		0.5							
	End of Test Pit										

Vane shear scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala scale: 5, 10, 15, 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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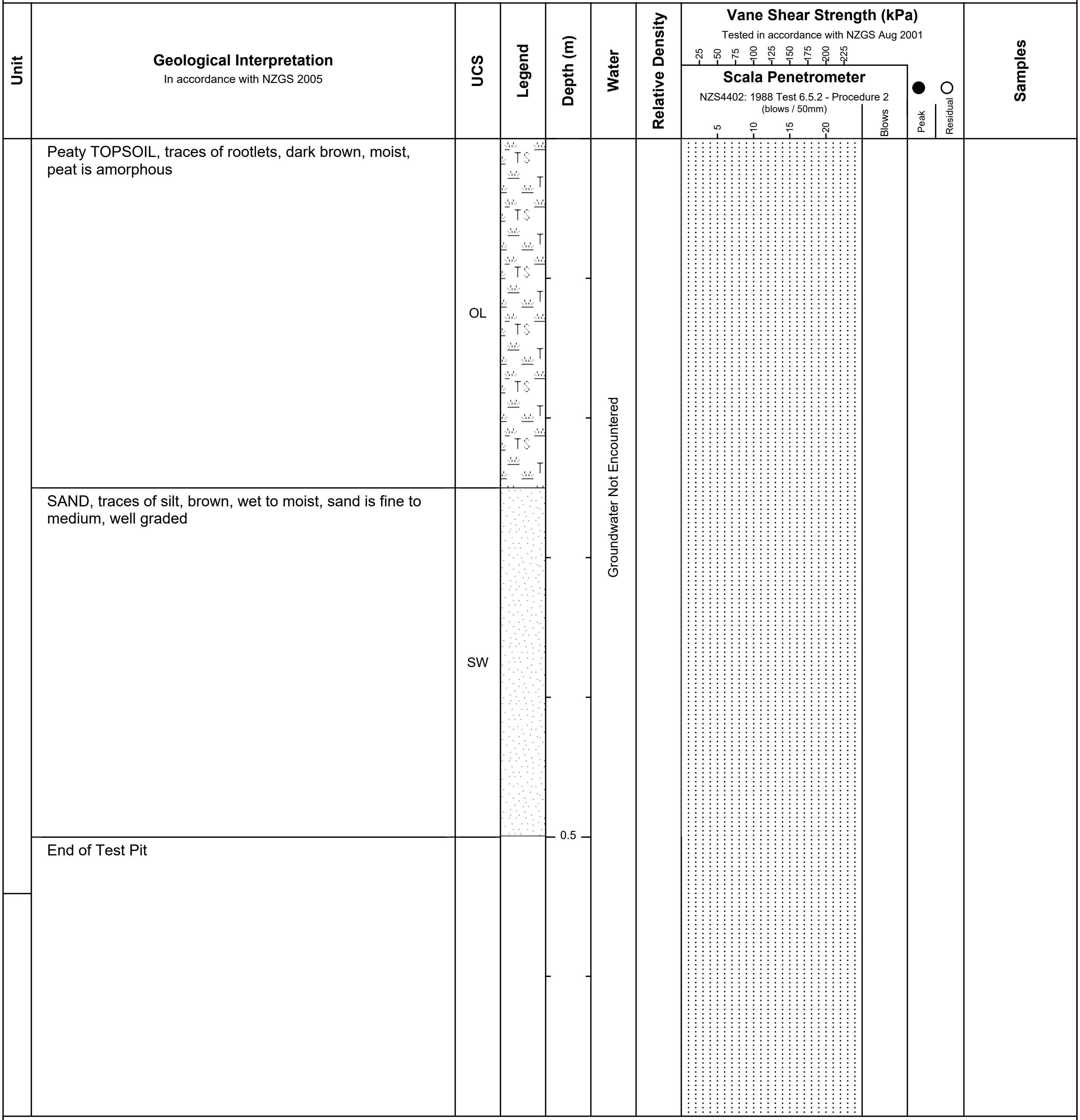
AUGERHOLE LOG

Lab Job No.:	**8020-1727**	**Borehole No.:**	**J14**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.50 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				



Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Samples
	Peaty TOPSOIL, traces of rootlets, dark brown, moist, peat is amorphous	OL			Groundwater Not Encountered		
	SAND, traces of silt, brown, wet to moist, sand is fine to medium, well graded	SW		0.5			
	End of Test Pit						

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.: **8020-1727**
Borehole No.: **K05**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.75 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Silty TOPSOIL, traces of rootlets, dark brown, moist	OL	TS		Groundwater Not Encountered						
	Amorphous PEAT, traces of sand and rootlets, dark brown/black, moist. (some bark found buried)	Pt		0.5							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**K06**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.55 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Peaty TOPSOIL, some sand, traces of rootlets, dark brown/black, moist.	OL			Groundwater Not Encountered						
	Amorphous PEAT, some sand, traces of rootlets, dark brown/black, moist	Pt									
	Cemented SAND, some silt, orangey brown, moist, sand is fine to medium, well graded	SW		0.5							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- Standing Water Level
- Out flow
- In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: 8020-1727
Client: Cook Costello
Job: Geotechnical Investigation

Report No.: W21-578
Client Ref. No.: 14333-004

Borehole No.: K08
Hole Depth: 0.85 m
Coordinates:

Location: The Landing

Sheet: 1 of 1
Date: 15/04/21

Ground Level:

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	Peak ●	Residual ○	Samples
	Peaty TOPSOIL, some sand, traces of rootlets, dark brown/black, moist.	OL			Groundwater Not Encountered						
	Silty PEAT, minor sand, traces of rootlets, dark brown/black, moist, peat is amorphous	Pt		0.5							
	Cemented SAND, traces of silt, light brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit			1.0							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- Standing Water Level
- Out flow
- In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**K12**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.90 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Amorphous PEAT, traces of sand and rootlets, dark brown, wet	Pt		0.5	Groundwater Not Encountered						
	SAND, brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit			1.0							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- Standing Water Level
- Out flow
- In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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AUGERHOLE LOG

Lab Job No.:	**8020-1727**	**Borehole No.:**	**K13**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	1.40 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	**Geological Interpretation** In accordance with NZGS 2005	**UCS**	**Legend**	**Depth (m)**	**Water**	**Relative Density**	**Vane Shear Strength (kPa)** Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 **Scala Penetrometer** NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	**Samples**
	Sandy TOPSOIL, traces of rootlets and roots, dark brown, moist	OL	TS	0.0 – 0.5	Groundwater Not Encountered						
	SAND, minor silt, brown with orangey brown mottling, moist, sand is fine to medium, well graded	SW		0.5 – 1.4							
	End of Test Pit			1.4							

Depth scale: 0.5, 1.0, 1.5

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **L08**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.00 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	Peak ●	Residual ○	Samples
	Peaty TOPSOIL, dark brown, moist, peat is amorphous	OL			Groundwater Not Encountered						
	Amorphous PEAT, traces of roots, rootlets and sand, black/dark brown, moist	Pt		0.5							
	Silty SAND, traces of rootlets, brown, dry, sand is fine to coarse	SM									
	Cemented SAND, some silt, orangey brown, moist, fine to medium, well graded	SW		1.0							
	End of Test Pit										

Vane Shear Strength scale: 25 50 75 100 125 150 175 200 225
Scala Penetrometer scale: 5 10 15 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- Standing Water Level
- Out flow
- In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

166 Bank Street,
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Lab Job No.: **8020-1727**
Borehole No.: **L09**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.85 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	● Peak	○ Residual	Samples
	Peaty TOPSOIL, dark brown, moist, peat is amorphous	OL	TS		Groundwater Not Encountered						
	Amorphous PEAT, minor sand, traces of rootlets, spots of orangey brown sand, black/dark brown, moist	Pt		0.5							
	SILT, traces of sand and rootlets, greyish light brown, moist	ML									
	End of Test Pit			1.0							

Vane shear scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala scale: 5, 10, 15, 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B Recorded Date: 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Borehole No.: **L11**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.80 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	Peak ●	Residual ○	Samples
	Sandy TOPSOIL, dark brown, moist	OL			Groundwater Not Encountered						
	Amorphous PEAT, some sand, traces of rootlets, dark brown with orangey brown streaks, moist	Pt		0.5							
	SAND, traces of silt, orangey brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

AUGERHOLE LOG

166 Bank Street,
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Lab Job No.: **8020-1727**
Borehole No.: **L12**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 1.20 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, traces of rootlets and roots, dark brown, moist	OL			Groundwater Not Encountered						
	Sandy SILT, light brown, moist, friable, sand is fine to medium, well graded	ML		0.5							
	SAND, some silt, brown, moist, sand is fine to medium, well graded	SW		1.0							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**M07**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.90 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	● Peak	○ Residual	Samples
	Peaty TOPSOIL, dark brown, moist, peat is amorphous	OL	TS								
	Amorphous PEAT, minor sand, traces of rootlets, black/dark brown, moist	Pt									
	Change: wet, no rootlets	Pt		0.5	Groundwater Not Encountered						
	Silty SAND, traces of rootlets, brown, moist, sand is fine to medium, well graded	SW									
	SAND, minor silt, orangey brown, moist, fine to medium, well graded	SW									
	End of test pit			1.0							

Vane shear scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala scale: 5, 10, 15, 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- Standing Water Level
- Out flow
- In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Client: Cook Costello
Job: Geotechnical Investigation

Report No.: W21-578
Client Ref. No.: 14333-004

Borehole No.: **M09**
Hole Depth: 0.60 m
Coordinates:

Location: The Landing

Sheet: 1 of 1
Date: 15/04/21

Ground Level:

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm)	Blows	● Peak	○ Residual	Samples
	Peaty TOPSOIL, traces of sand and rootlets, dark brown, moist	OL			Groundwater Not Encountered						
	Silty SAND, traces of rootlets, brown, moist, sand is fine to medium, well graded	SM									
	SAND, some silt, traces of rootlets, light brown, moist, sand is fine to medium, well graded	SW		0.5							
	End of Test Pit										

Vane shear scale: 25, 50, 75, 100, 125, 150, 175, 200, 225
Scala scale: 5, 10, 15, 20

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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AUGERHOLE LOG

Lab Job No.:	**8020-1727**	**Borehole No.:**	**M11**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.80 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, traces of rootlets, dark brown, moist, sand is fine to medium, well graded	OL	TS		Groundwater Not Encountered						
	SAND, minor silt, brown, moist, sand is fine to medium, well graded	SW		0.5							
	Colour Change: light brown	SW									
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.:	**8020-1727**	**Borehole No.:**	**N08**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.65 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	Peak ●	Residual ○	Samples
	Peaty TOPSOIL, minor sand, traces of rootlets, dark brown, moist.	OL			Groundwater Not Encountered						
	Amorphous PEAT, traces of sand and rootlets, black/dark brown, moist	Pt									
	SILT, minor sand, traces of clays and rootlets, brown, moist	ML									
	Cemented SAND, some silt, brown, moist, sand is fine to medium, well graded	SW		0.5							
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

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Lab Job No.: **8020-1727**
Borehole No.: **N09**
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.55 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225	Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	TOPSOIL, some sand, traces of rootlets, brown, dry.	OL			Groundwater Not Encountered							
	Amorphous PEAT, traces of rootlets, dark brown, moist	Pt										
	SAND, some silt, brown, moist, sand is fine to medium, well graded	SW		0.5								
	End of Test Pit											

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar	
		Recorded Date: 15/04/2021	Alex Millar	No accredited tests

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AUGERHOLE LOG

166 Bank Street,
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Lab Job No.:	**8020-1727**	**Borehole No.:**	**N11**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	0.90 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, traces of rootlets, dark brown, moist, sand is fine to medium, well graded	OL			Groundwater Not Encountered						
	Peaty SAND, traces of rootlets, dark brown with brown mottling, moist, sand is fine to medium, well graded, peat is amorphous	SW		0.5							
	SAND, traces of silt, light brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit			1.0							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type
- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B **Recorded Date:** 15/04/2021	Alex Millar Alex Millar	No accredited tests

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AUGERHOLE LOG

Lab Job No.: **8020-1727**
Client: Cook Costello
Job: Geotechnical Investigation

Report No.: W21-578
Client Ref. No.: 14333-004

Borehole No.: **P08**
Hole Depth: 0.80 m
Coordinates:

Location: The Landing

Sheet: 1 of 1
Date: 15/04/21
Ground Level:

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Amorphous PEAT, some roots and rootlets, dark brown/black, moist	OL			Groundwater Not Encountered						
				0.5							
	Cemented silty SAND, traces of rootlets, dark brown, moist, sand is fine to medium, well graded	SW									
	End of Test Pit										

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

▼ Standing Water Level
◁ Out flow
▷ In flow

Investigation Type

☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar	No accredited tests
		Recorded Date: 15/04/2021	Alex Millar	

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AUGERHOLE LOG

166 Bank Street,
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Lab Job No.: 8020-1727
Borehole No.: P09
Sheet: 1 of 1
Client: Cook Costello
Hole Depth: 0.90 m
Job: Geotechnical Investigation
Coordinates:
Date: 15/04/21
Report No.: W21-578
Location: The Landing
Ground Level:
Client Ref. No.: 14333-004

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225	Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	Peak ●	Residual ○	Samples
	Sandy TOPSOIL, brown, moist, sand is fine to medium, well graded	OL	TS		Groundwater Not Encountered							
	Amorphous PEAT, traces of sand and rootlets, black/dark brown, moist	Pt		0.5								
	SAND, some silt, reddish brown, moist, sand is fine to medium, well graded	SW										
	End of Test Pit			1.0								

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water
- Standing Water Level
- Out flow
- In flow

Investigation Type
☑ Hand Auger
☐ Hand Auger + Scala (DCP)

Contractor:	Equipment:	Recorded By:	Laboratory Technician:	Approved Signatory:
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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AUGERHOLE LOG

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Lab Job No.:	**8020-1727**	**Borehole No.:**	**Q10**	**Sheet:**	1 of 1
Client:	Cook Costello	**Hole Depth:**	1.50 m		
Job:	Geotechnical Investigation	**Coordinates:**		**Date:**	15/04/21
Report No.:	W21-578	**Location:**	The Landing	**Ground Level:**	
Client Ref. No.:	14333-004				

Unit	Geological Interpretation In accordance with NZGS 2005	UCS	Legend	Depth (m)	Water	Relative Density	Vane Shear Strength (kPa) Tested in accordance with NZGS Aug 2001 25 50 75 100 125 150 175 200 225 Scala Penetrometer NZS4402: 1988 Test 6.5.2 - Procedure 2 (blows / 50mm) 5 10 15 20	Blows	● Peak	○ Residual	Samples
	Sandy TOPSOIL, traces of rootlets, dark brown, moist, sand is fine to medium, well graded	OL			Groundwater Not Encountered						
	Silty SAND, some peat, dark brown, moist, sand is fine to medium, well graded	SW		0.5							
	SAND, minor silt, light brown, moist, sand is fine to medium, well graded	SW		1.0							
	End of Test Pit			1.5							

Remarks

Note: All Scala Penetrometer readings taken below 1.5m from start depth are outside the scope of this test
Note: Scala Penetrometer interpretation is not endorsed

Water

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

Investigation Type

- ☑ Hand Auger
- ☐ Hand Auger + Scala (DCP)

Contractor:	**Equipment:**	**Recorded By:**	**Laboratory Technician:**	**Approved Signatory:**
Geocivil	12T Excavator	D.O/A.B	Alex Millar Alex Millar	No accredited tests
		Recorded Date: 15/04/2021		

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SITE PLAN

166 Bank Street,
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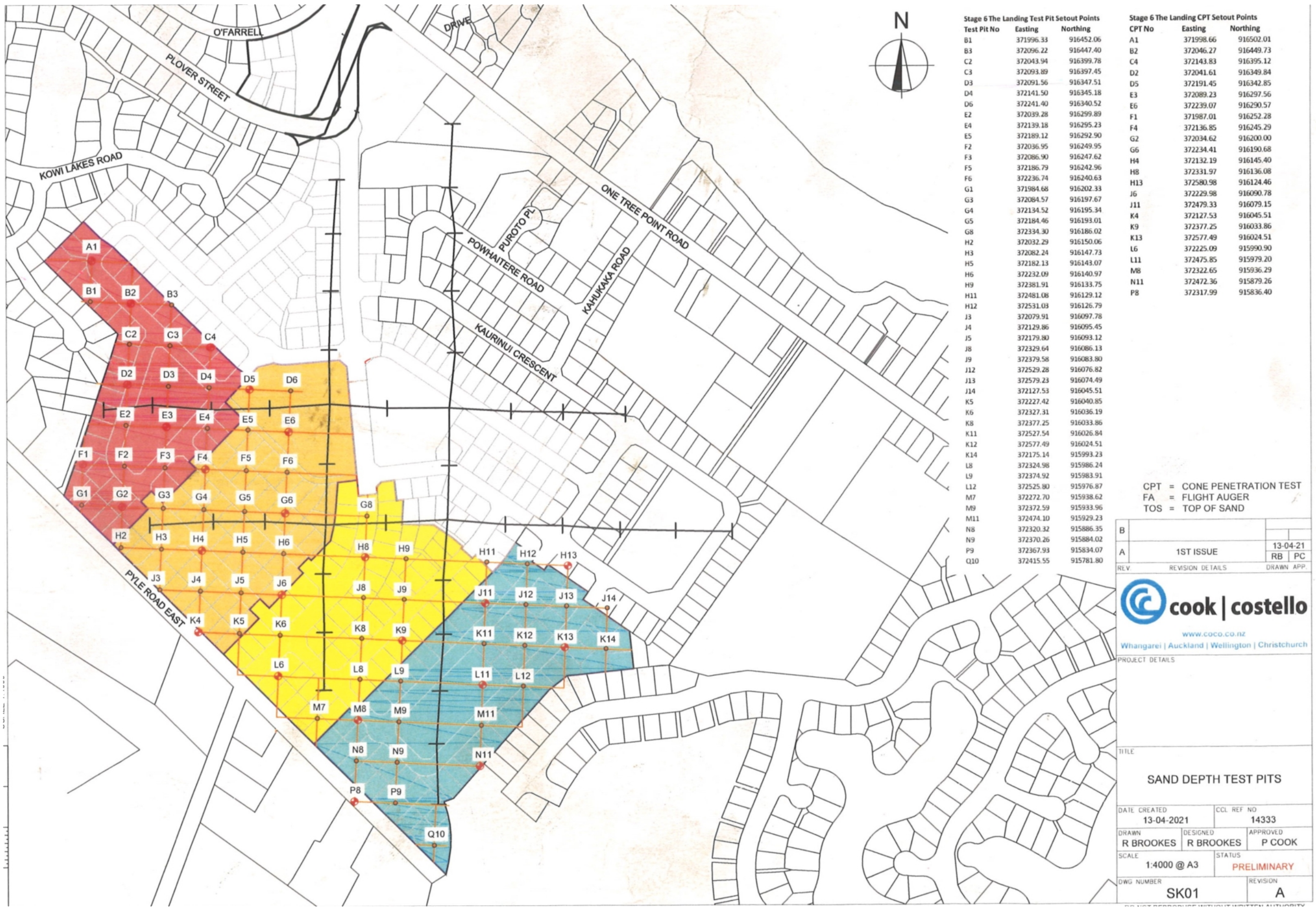
Lab Job No: 8020-1727
Client: Cook Costello
Job: Geotechnical Investigation
Location: The Landing
Client Ref. No.: 14333-004
Report No.: W21-578



Stage 6 The Landing Test Pit Setout Points

Test Pit No	Easting	Northing
B1	371996.33	916452.06
B3	372096.22	916447.40
C2	372043.94	916399.78
C3	372093.89	916397.45
D3	372091.56	916347.51
D4	372141.50	916345.18
D6	372241.40	916340.52
E2	372039.28	916299.89
E4	372139.18	916295.23
E5	372189.12	916292.90
F2	372036.95	916249.95
F3	372086.90	916247.62
F5	372186.79	916242.96
F6	372236.74	916240.63
G1	371984.68	916202.33
G3	372084.57	916197.67
G4	372134.52	916195.34
G5	372184.46	916193.01
G8	372334.30	916186.02
H2	372032.29	916150.06
H3	372082.24	916147.73
H5	372182.13	916143.07
H6	372232.09	916140.97
H9	372381.91	916133.75
H11	372481.08	916129.12
H12	372531.03	916126.79
J3	372079.91	916097.78
J4	372129.86	916095.45
J5	372179.80	916093.12
J8	372329.64	916086.13
J9	372379.58	916083.80
J12	372529.28	916076.82
J13	372579.23	916074.49
J14	372127.53	916045.51
K5	372227.42	916040.85
K6	372327.31	916036.19
K8	372377.25	916033.86
K11	372527.54	916026.84
K12	372577.49	916024.51
K14	372175.14	915993.23
L8	372324.98	915986.24
L9	372374.92	915983.91
L12	372525.80	915976.87
M7	372272.70	915938.62
M9	372372.59	915933.96
M11	372474.10	915929.23
N8	372320.32	915886.35
N9	372370.26	915884.02
P9	372367.93	915834.07
Q10	372415.55	915781.80

Stage 6 The Landing CPT Setout Points

CPT No	Easting	Northing
A1	371998.66	916502.01
B2	372046.27	916449.73
C4	372143.83	916395.12
D2	372041.61	916349.84
D5	372191.45	916342.85
E3	372089.23	916297.56
E6	372239.07	916290.57
F1	371987.01	916252.28
F4	372136.85	916245.29
G2	372034.62	916200.00
G6	372234.41	916190.68
H4	372132.19	916145.40
H8	372331.97	916136.08
H13	372580.98	916124.46
J6	372229.98	916090.78
J11	372479.33	916079.15
K4	372127.53	916045.51
K9	372377.25	916033.86
K13	372577.49	916024.51
L6	372225.09	915990.90
L11	372475.85	915979.20
M8	372322.65	915936.29
N11	372472.36	915879.26
P8	372317.99	915836.40

CPT = CONE PENETRATION TEST
FA = FLIGHT AUGER
TOS = TOP OF SAND

REV.	REVISION DETAILS	DRAWN	APP.
B			
A	1ST ISSUE	13-04-21 RB	PC

cook | costello
www.coco.co.nz
Whangarei | Auckland | Wellington | Christchurch

PROJECT DETAILS

TITLE
SAND DEPTH TEST PITS

DATE CREATED 13-04-2021
CCL REF NO 14333
DRAWN R BROOKES
DESIGNED R BROOKES
APPROVED P COOK
SCALE 1:4000 @ A3
STATUS PRELIMINARY
DWG NUMBER SK01
REVISION A

GEO CIVIL
TEST RIGHT • BUILD RIGHT

Whangarei Laboratory
166 Bank Street
Whangarei
M: 027 656 5226
E: info@geocivil.co.nz

TEST REPORT

Lab Job No: 8020-1727

Your ref.: -

Date of Issue: 15/02/2022

Date of Re-Issue: -

Page: 1 of 31

Test Report No.
W21-1400

PROJECT: **The Landing Stage 6/7 Scala Testing 30/11/21**

CLIENT:
Cook Costello
2 Norfolk Street,
Whangārei 0110

ATTENTION: Stefano Rotatori

TEST METHODS: Determination of the penetration resistance using a dynamic cone (scala) Penetrometer
NZS 4402: 1988 Test 6.5.2

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

Alex Millar

A. Millar

Administrator

S. Kokich

Approved Signatory

ACCREDITED
IANZ
TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

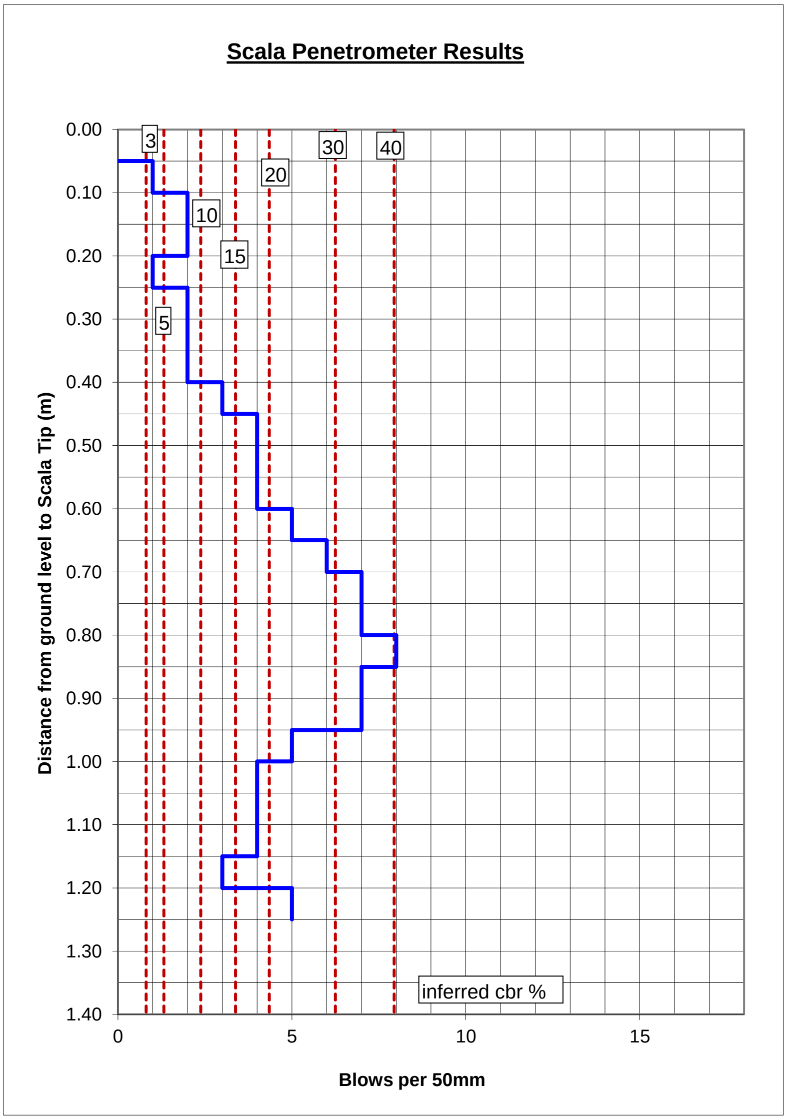
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 1
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	2 of 31
Start Depth (m):	0.05		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
2	4	12	3	0.15
2	4	12	5	0.20
1	2	6	6	0.25
2	4	12	8	0.30
2	4	12	10	0.35
2	4	12	12	0.40
3	6	18	15	0.45
4	8	24	19	0.50
4	8	24	23	0.55
4	8	24	27	0.60
5	10	30	32	0.65
6	12	36	38	0.70
7	14	42	45	0.75
7	14	42	52	0.80
8	16	48	60	0.85
7	14	42	67	0.90
7	14	42	74	0.95
5	10	30	79	1.00
4	8	24	83	1.05
4	8	24	87	1.10
4	8	24	91	1.15
3	6	18	94	1.20
5	10	30	99	1.25


Scala Penetrometer Results

Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

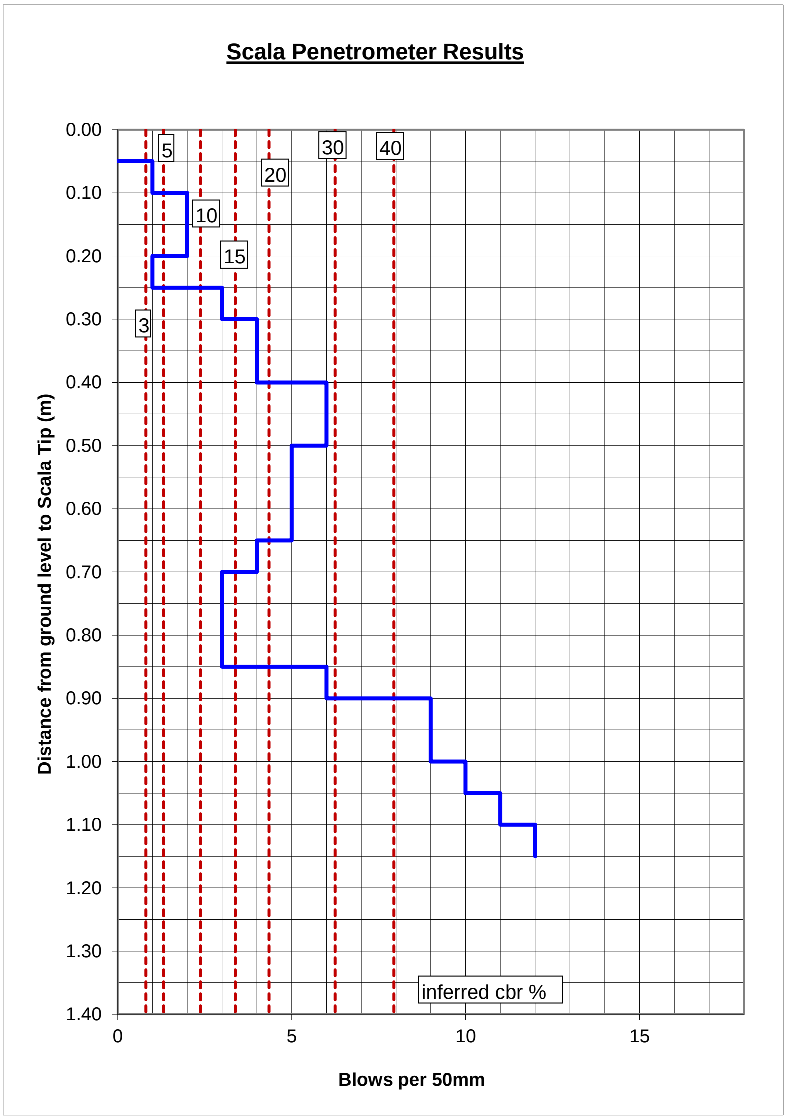
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

Scala No: SCB 2
Ref : -
Report No: W21-1400
Page: 3 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
2	4	12	3	0.15
2	4	12	5	0.20
1	2	6	6	0.25
3	6	18	9	0.30
4	8	24	13	0.35
4	8	24	17	0.40
6	12	36	23	0.45
6	12	36	29	0.50
5	10	30	34	0.55
5	10	30	39	0.60
5	10	30	44	0.65
4	8	24	48	0.70
3	6	18	51	0.75
3	6	18	54	0.80
3	6	18	57	0.85
6	12	36	63	0.90
9	18	54	72	0.95
9	18	54	81	1.00
10	20	60	91	1.05
11	22	66	102	1.10
12	24	72	114	1.15



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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Approved Signatory

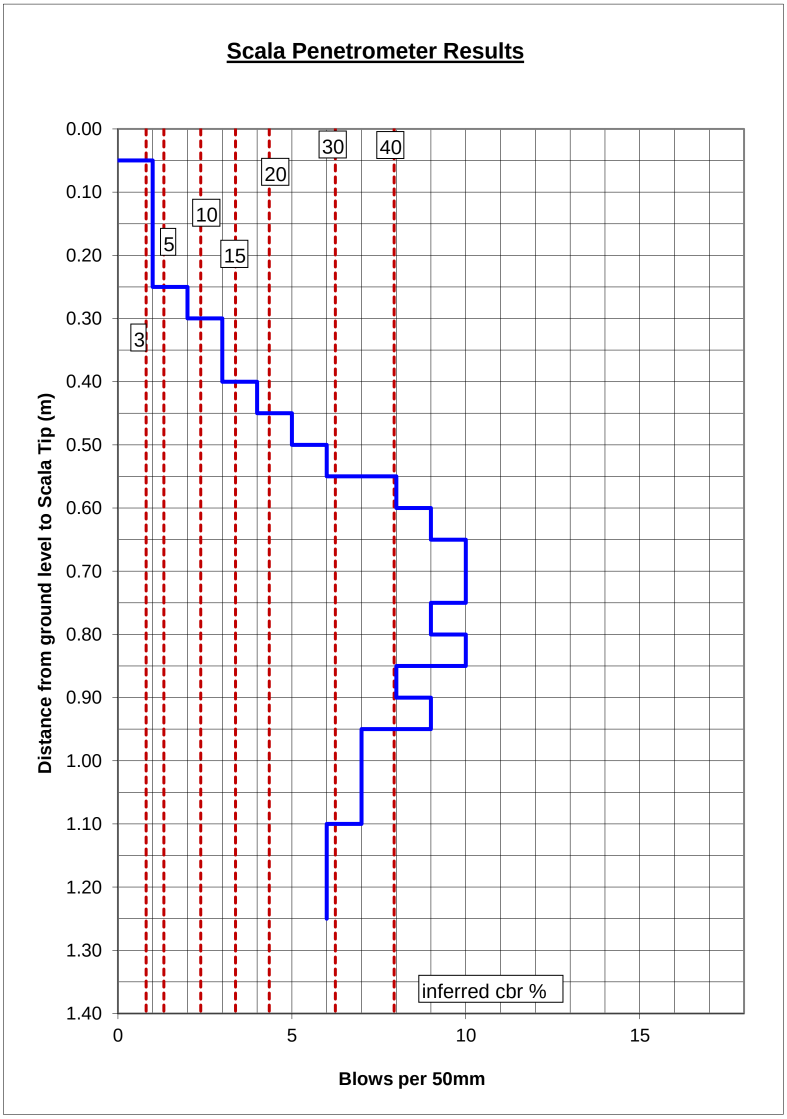
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 6
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	4 of 31
Start Depth (m):	0.05		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
1	2	6	2	0.15
1	2	6	3	0.20
1	2	6	4	0.25
2	4	12	6	0.30
3	6	18	9	0.35
3	6	18	12	0.40
4	8	24	16	0.45
5	10	30	21	0.50
6	12	36	27	0.55
8	16	48	35	0.60
9	18	54	44	0.65
10	20	60	54	0.70
10	20	60	64	0.75
9	18	54	73	0.80
10	20	60	83	0.85
8	16	48	91	0.90
9	18	54	100	0.95
7	14	42	107	1.00
7	14	42	114	1.05
7	14	42	121	1.10
6	12	36	127	1.15
6	12	36	133	1.20
6	12	36	139	1.25



Scala Penetrometer Results

Recorded By:	A.B
Date:	30/11/2021
Checked by:	A.M
Date:	16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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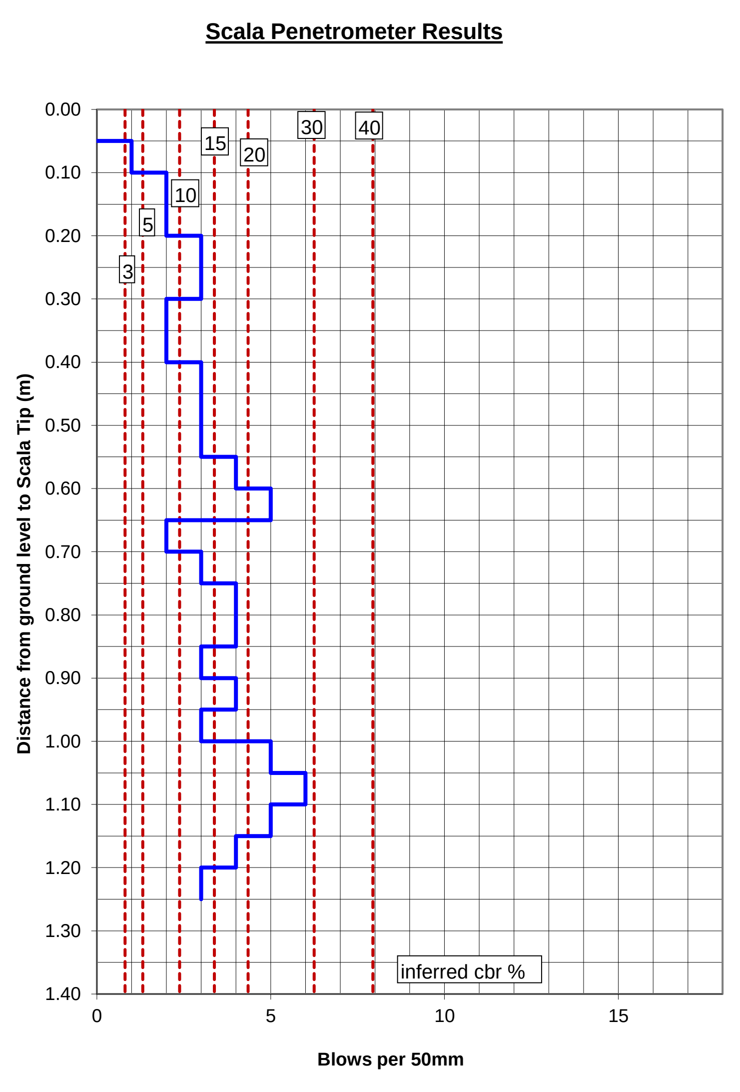
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 7
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	5 of 31
Start Depth (m):	0.05		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
2	4	12	3	0.15
2	4	12	5	0.20
3	6	18	8	0.25
3	6	18	11	0.30
2	4	12	13	0.35
2	4	12	15	0.40
3	6	18	18	0.45
3	6	18	21	0.50
3	6	18	24	0.55
4	8	24	28	0.60
5	10	30	33	0.65
2	4	12	35	0.70
3	6	18	38	0.75
4	8	24	42	0.80
4	8	24	46	0.85
3	6	18	49	0.90
4	8	24	53	0.95
3	6	18	56	1.00
5	10	30	61	1.05
6	12	36	67	1.10
5	10	30	72	1.15
4	8	24	76	1.20
3	6	18	79	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

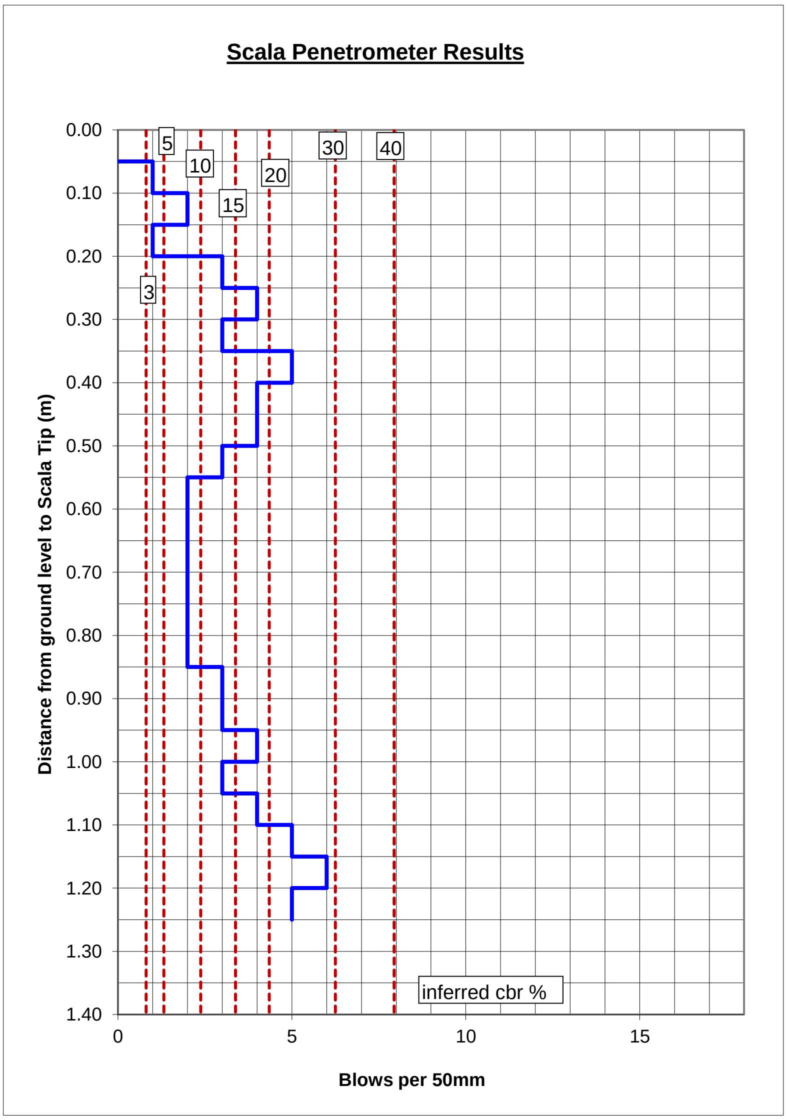
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 8
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	6 of 31
Start Depth (m):	0.05		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
2	4	12	3	0.15
1	2	6	4	0.20
3	6	18	7	0.25
4	8	24	11	0.30
3	6	18	14	0.35
5	10	30	19	0.40
4	8	24	23	0.45
4	8	24	27	0.50
3	6	18	30	0.55
2	4	12	32	0.60
2	4	12	34	0.65
2	4	12	36	0.70
2	4	12	38	0.75
2	4	12	40	0.80
2	4	12	42	0.85
3	6	18	45	0.90
3	6	18	48	0.95
4	8	24	52	1.00
3	6	18	55	1.05
4	8	24	59	1.10
5	10	30	64	1.15
6	12	36	70	1.20
5	10	30	75	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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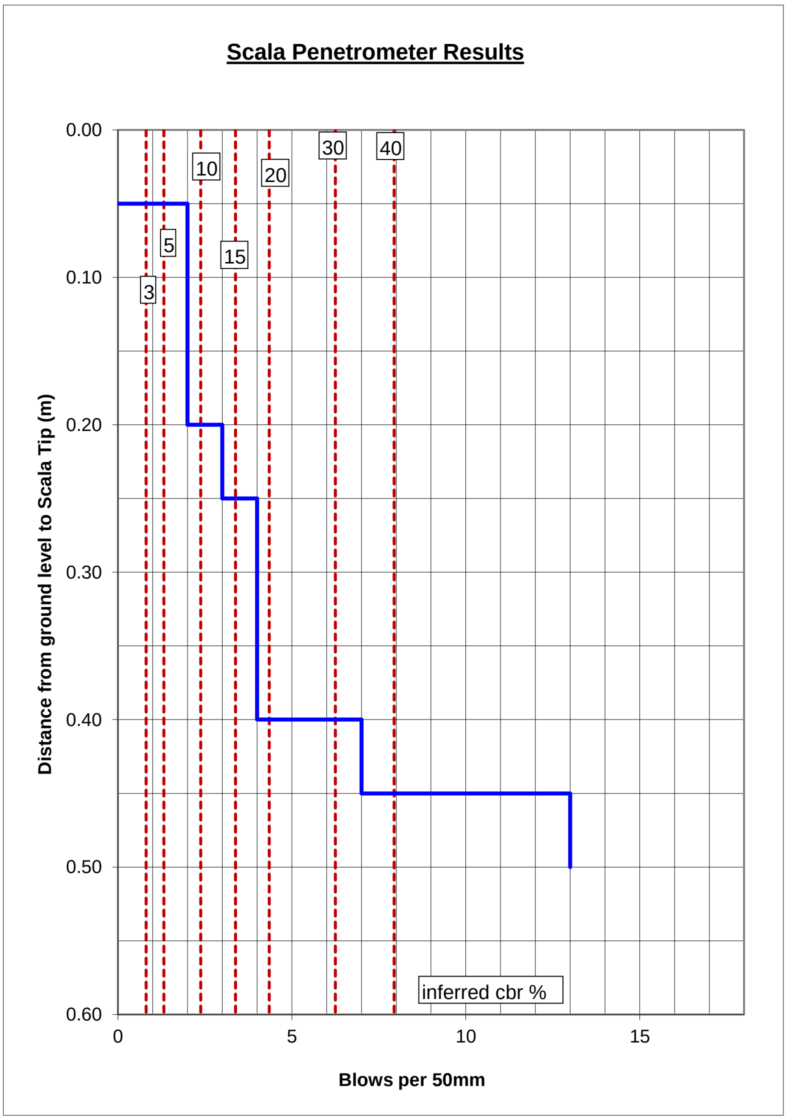
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 9
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	7 of 31
Start Depth (m):	0.05		

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
3	6	18	9	0.25
4	8	24	13	0.30
4	8	24	17	0.35
4	8	24	21	0.40
7	14	42	28	0.45
13	26	78	41	0.50



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
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DYNAMIC CONE (SCALA) PENETROMETER

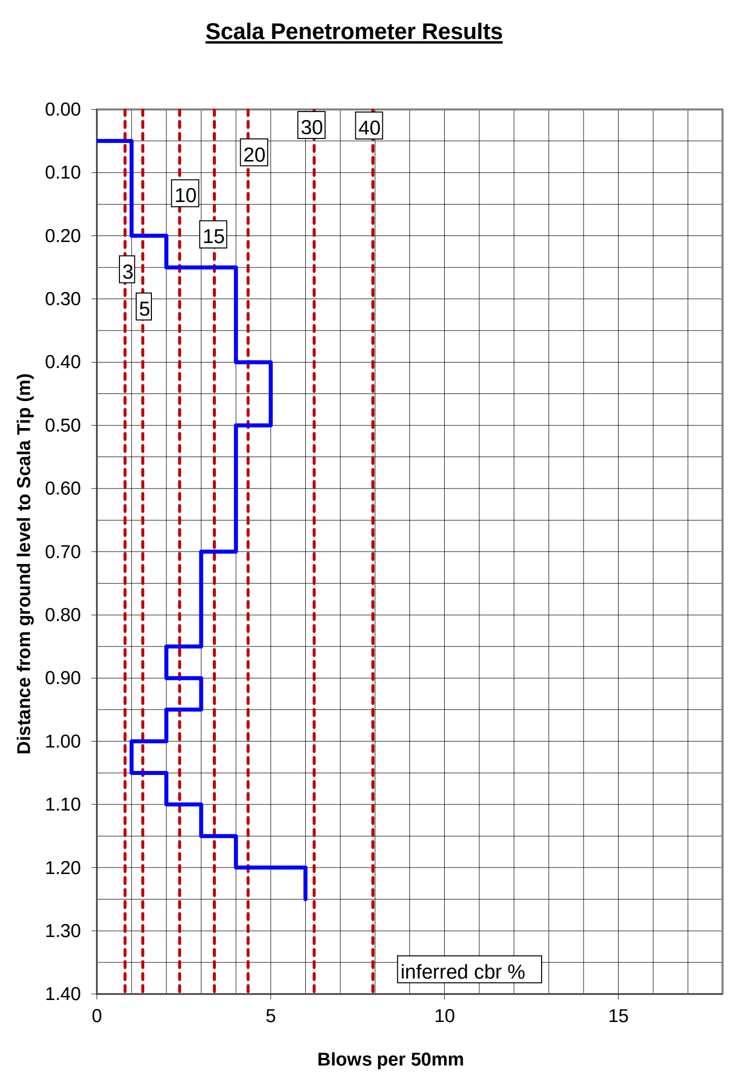
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

Scala No: SCB 10
Ref : -
Report No: W21-1400
Page: 8 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
1	2	6	2	0.15
1	2	6	3	0.20
2	4	12	5	0.25
4	8	24	9	0.30
4	8	24	13	0.35
4	8	24	17	0.40
5	10	30	22	0.45
5	10	30	27	0.50
4	8	24	31	0.55
4	8	24	35	0.60
4	8	24	39	0.65
4	8	24	43	0.70
3	6	18	46	0.75
3	6	18	49	0.80
3	6	18	52	0.85
2	4	12	54	0.90
3	6	18	57	0.95
2	4	12	59	1.00
1	2	6	60	1.05
2	4	12	62	1.10
3	6	18	65	1.15
4	8	24	69	1.20
6	12	36	75	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

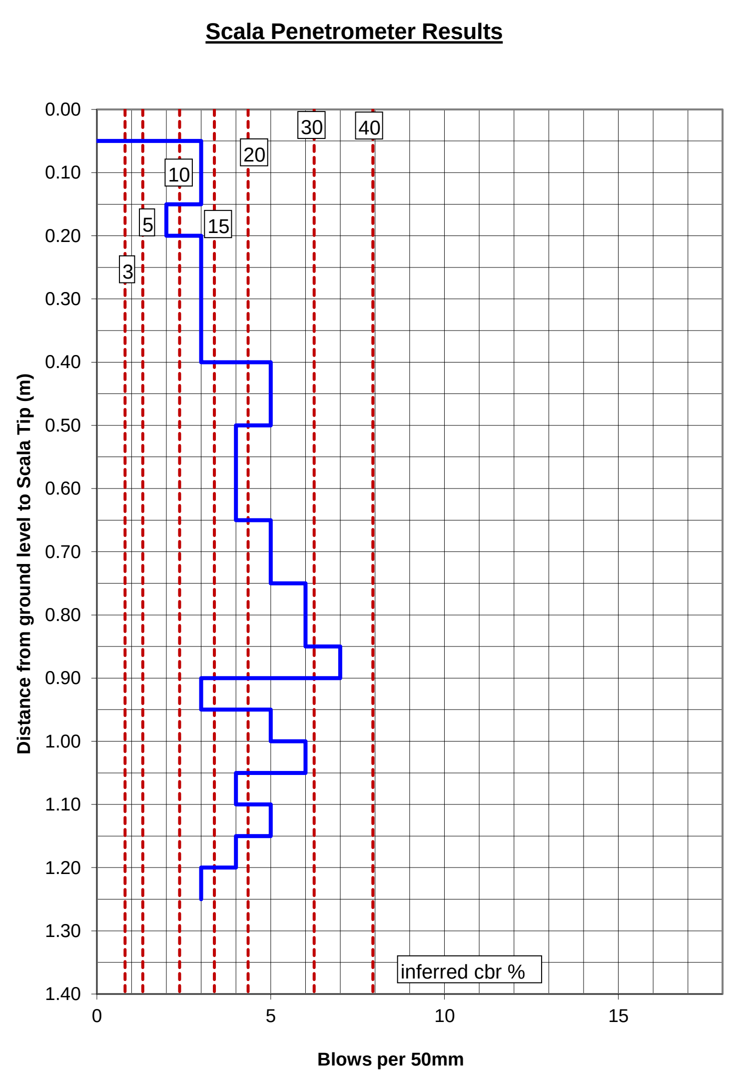
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 46.4

Scala No: SCB 11
Ref : -
Report No: W21-1400
Page: 9 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
3	6	18	6	0.15
2	4	12	8	0.20
3	6	18	11	0.25
3	6	18	14	0.30
3	6	18	17	0.35
3	6	18	20	0.40
5	10	30	25	0.45
5	10	30	30	0.50
4	8	24	34	0.55
4	8	24	38	0.60
4	8	24	42	0.65
5	10	30	47	0.70
5	10	30	52	0.75
6	12	36	58	0.80
6	12	36	64	0.85
7	14	42	71	0.90
3	6	18	74	0.95
5	10	30	79	1.00
6	12	36	85	1.05
4	8	24	89	1.10
5	10	30	94	1.15
4	8	24	98	1.20
3	6	18	101	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

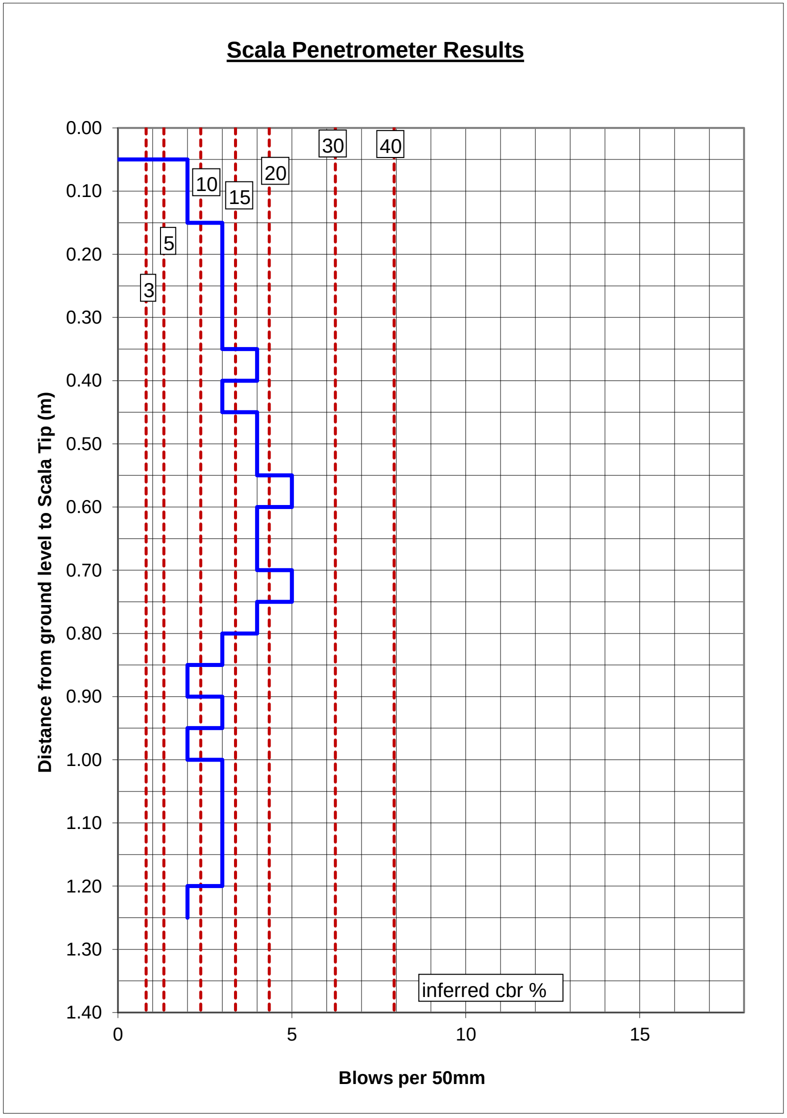
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 58

Scala No: SCB 12
Ref : -
Report No: W21-1400
Page: 10 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
3	6	18	7	0.20
3	6	18	10	0.25
3	6	18	13	0.30
3	6	18	16	0.35
4	8	24	20	0.40
3	6	18	23	0.45
4	8	24	27	0.50
4	8	24	31	0.55
5	10	30	36	0.60
4	8	24	40	0.65
4	8	24	44	0.70
5	10	30	49	0.75
4	8	24	53	0.80
3	6	18	56	0.85
2	4	12	58	0.90
3	6	18	61	0.95
2	4	12	63	1.00
3	6	18	66	1.05
3	6	18	69	1.10
3	6	18	72	1.15
3	6	18	75	1.20
2	4	12	77	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

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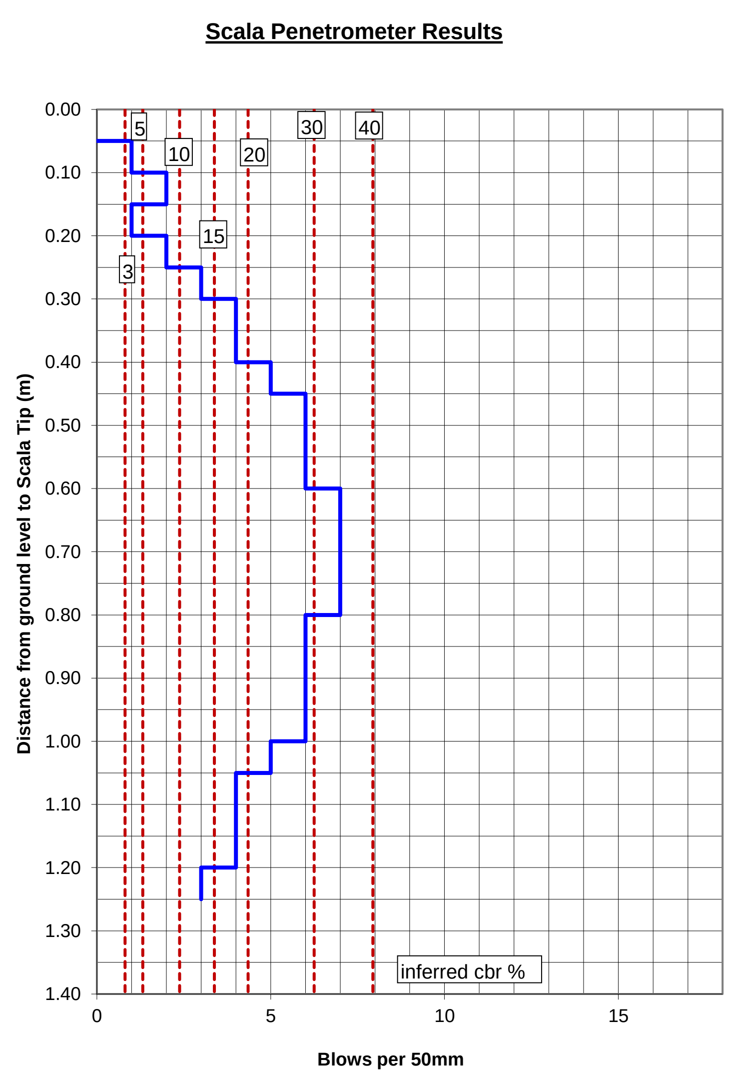
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 13
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	11 of 31
Start Depth (m):	0.05		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
2	4	12	3	0.15
1	2	6	4	0.20
2	4	12	6	0.25
3	6	18	9	0.30
4	8	24	13	0.35
4	8	24	17	0.40
5	10	30	22	0.45
6	12	36	28	0.50
6	12	36	34	0.55
6	12	36	40	0.60
7	14	42	47	0.65
7	14	42	54	0.70
7	14	42	61	0.75
7	14	42	68	0.80
6	12	36	74	0.85
6	12	36	80	0.90
6	12	36	86	0.95
6	12	36	92	1.00
5	10	30	97	1.05
4	8	24	101	1.10
4	8	24	105	1.15
4	8	24	109	1.20
3	6	18	112	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

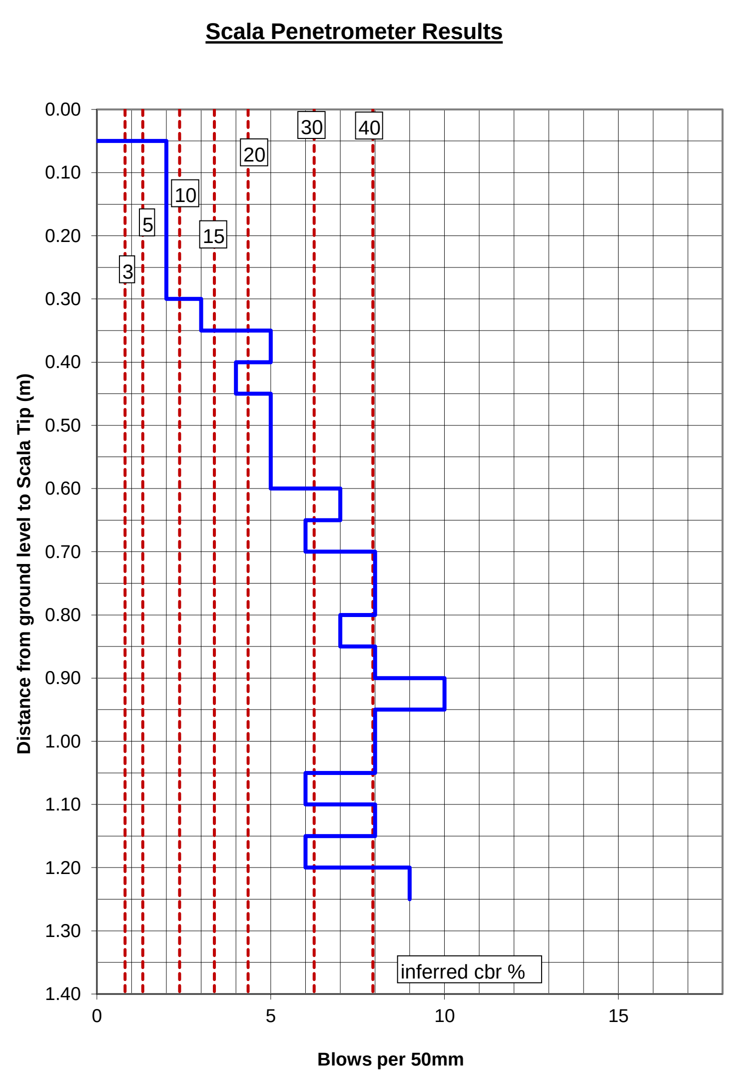
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

Scala No: SCB 14
Ref : -
Report No: W21-1400
Page: 12 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
2	4	12	8	0.25
2	4	12	10	0.30
3	6	18	13	0.35
5	10	30	18	0.40
4	8	24	22	0.45
5	10	30	27	0.50
5	10	30	32	0.55
5	10	30	37	0.60
7	14	42	44	0.65
6	12	36	50	0.70
8	16	48	58	0.75
8	16	48	66	0.80
7	14	42	73	0.85
8	16	48	81	0.90
10	20	60	91	0.95
8	16	48	99	1.00
8	16	48	107	1.05
6	12	36	113	1.10
8	16	48	121	1.15
6	12	36	127	1.20
9	18	54	136	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

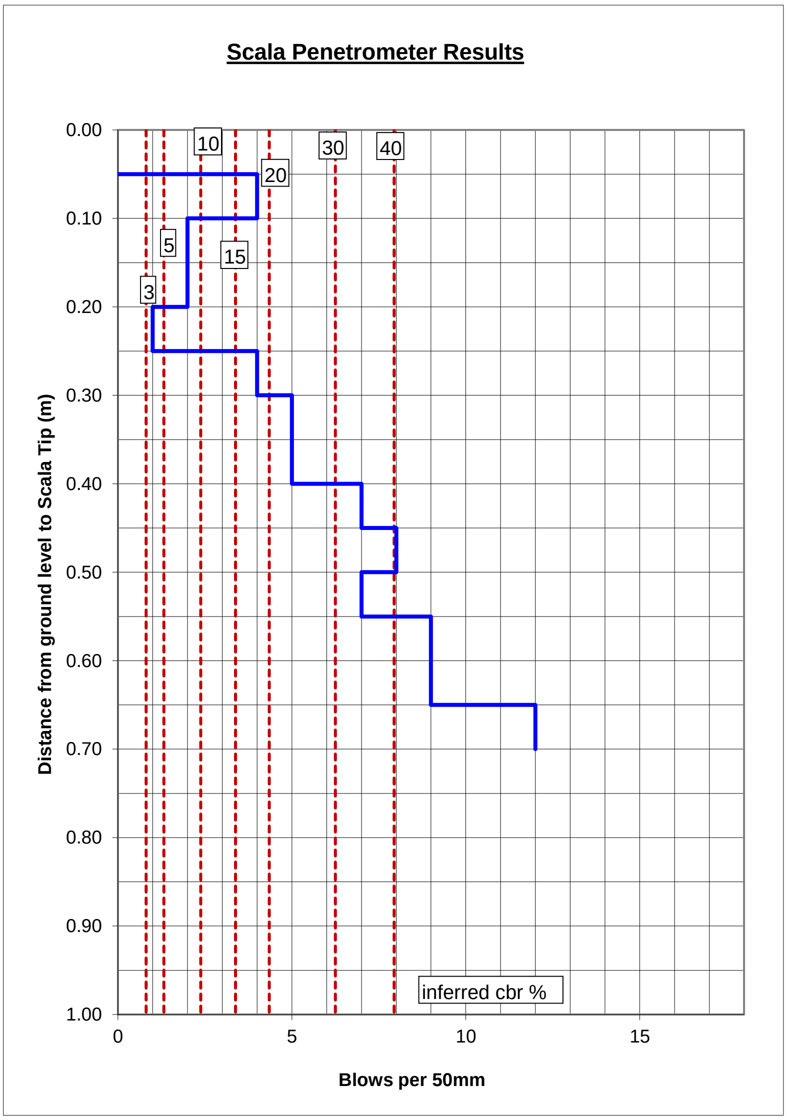
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 17.3

Scala No: SCB 15
Ref : -
Report No: W21-1400
Page: 13 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
4	8	24	4	0.10
2	4	12	6	0.15
2	4	12	8	0.20
1	2	6	9	0.25
4	8	24	13	0.30
5	10	30	18	0.35
5	10	30	23	0.40
7	14	42	30	0.45
8	16	48	38	0.50
7	14	42	45	0.55
9	18	54	54	0.60
9	18	54	63	0.65
12	24	72	75	0.70



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

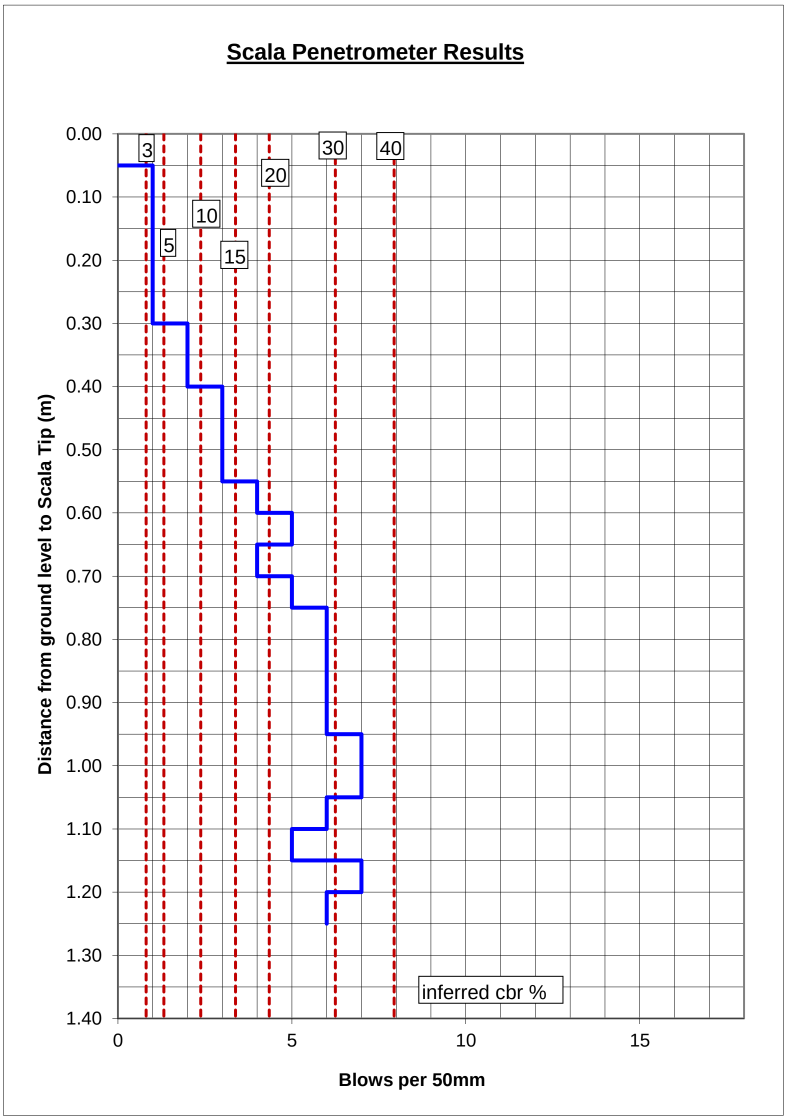
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 11.4

Scala No: SCB 17
Ref : -
Report No: W21-1400
Page: 14 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
1	2	6	2	0.15
1	2	6	3	0.20
1	2	6	4	0.25
1	2	6	5	0.30
2	4	12	7	0.35
2	4	12	9	0.40
3	6	18	12	0.45
3	6	18	15	0.50
3	6	18	18	0.55
4	8	24	22	0.60
5	10	30	27	0.65
4	8	24	31	0.70
5	10	30	36	0.75
6	12	36	42	0.80
6	12	36	48	0.85
6	12	36	54	0.90
6	12	36	60	0.95
7	14	42	67	1.00
7	14	42	74	1.05
6	12	36	80	1.10
5	10	30	85	1.15
7	14	42	92	1.20
6	12	36	98	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

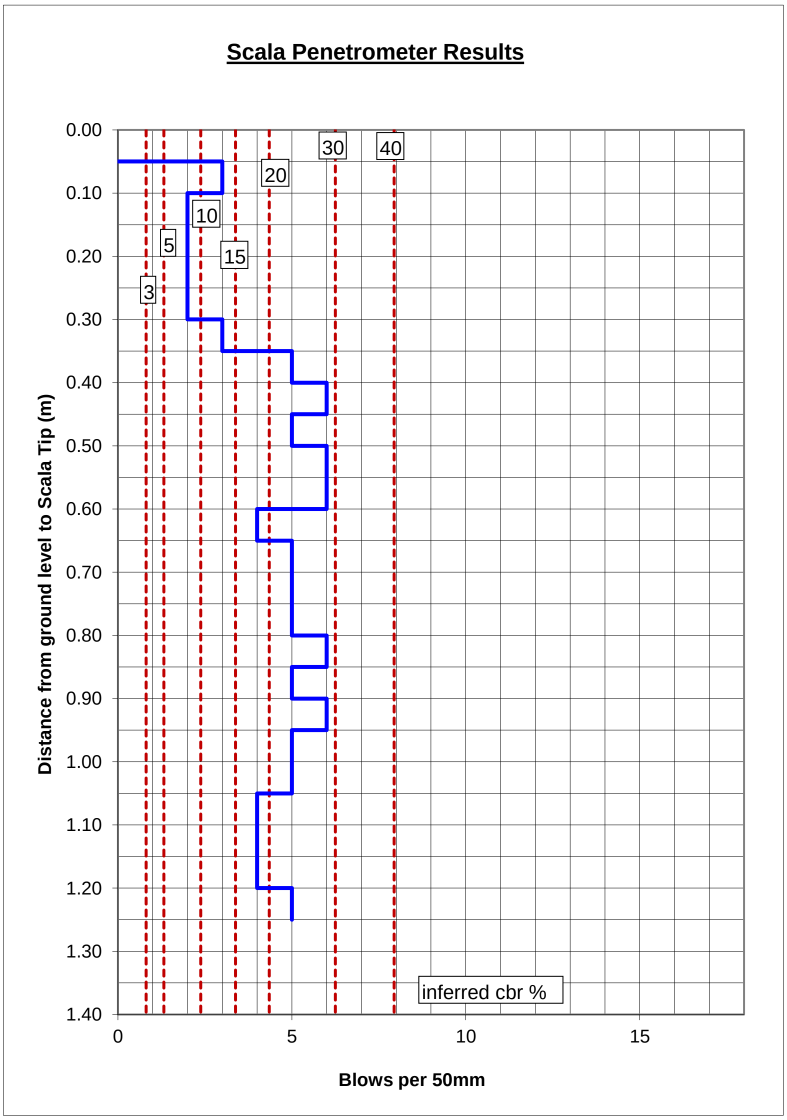
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: BP21 on GPS
Start Depth (m): 0.05

LWD (MPa): 25.1

Scala No: SCB 18
Ref : -
Report No: W21-1400
Page: 15 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
2	4	12	9	0.25
2	4	12	11	0.30
3	6	18	14	0.35
5	10	30	19	0.40
6	12	36	25	0.45
5	10	30	30	0.50
6	12	36	36	0.55
6	12	36	42	0.60
4	8	24	46	0.65
5	10	30	51	0.70
5	10	30	56	0.75
5	10	30	61	0.80
6	12	36	67	0.85
5	10	30	72	0.90
6	12	36	78	0.95
5	10	30	83	1.00
5	10	30	88	1.05
4	8	24	92	1.10
4	8	24	96	1.15
4	8	24	100	1.20
5	10	30	105	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

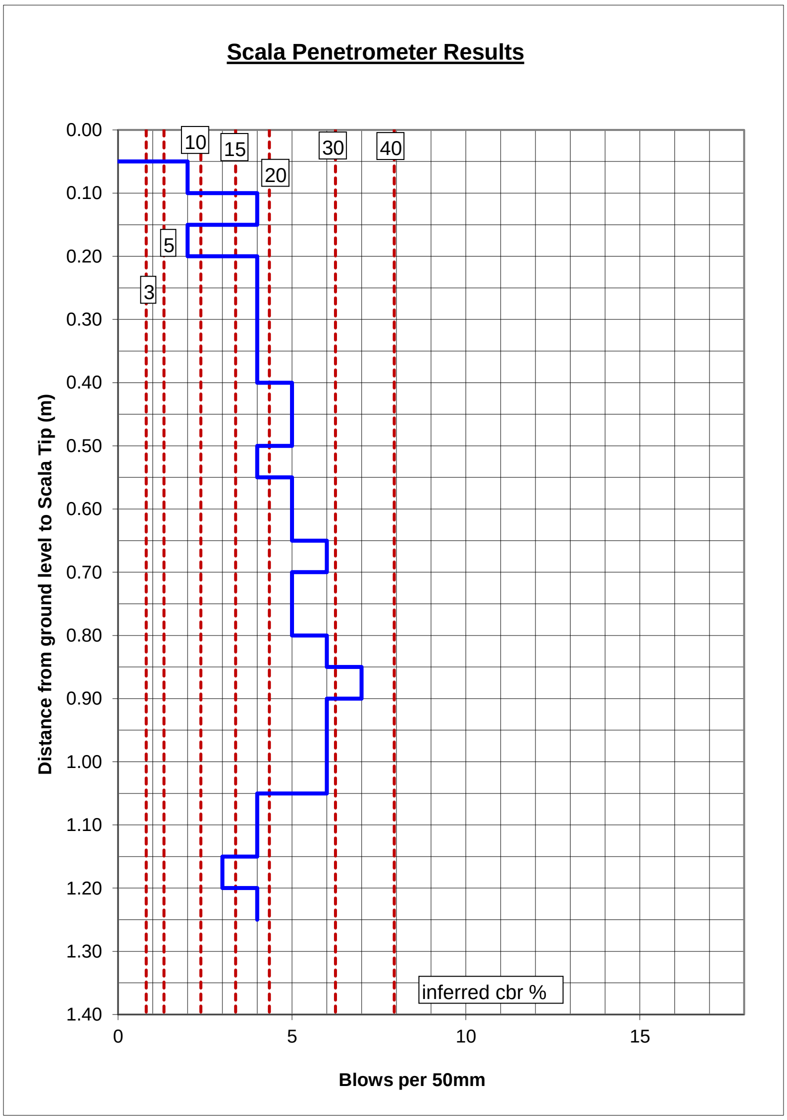
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: B18 on GPS
Start Depth (m): 0.05

LWD (MPa): 122.3

Scala No: SCB 19
Ref : -
Report No: W21-1400
Page: 16 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
4	8	24	6	0.15
2	4	12	8	0.20
4	8	24	12	0.25
4	8	24	16	0.30
4	8	24	20	0.35
4	8	24	24	0.40
5	10	30	29	0.45
5	10	30	34	0.50
4	8	24	38	0.55
5	10	30	43	0.60
5	10	30	48	0.65
6	12	36	54	0.70
5	10	30	59	0.75
5	10	30	64	0.80
6	12	36	70	0.85
7	14	42	77	0.90
6	12	36	83	0.95
6	12	36	89	1.00
6	12	36	95	1.05
4	8	24	99	1.10
4	8	24	103	1.15
3	6	18	106	1.20
4	8	24	110	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

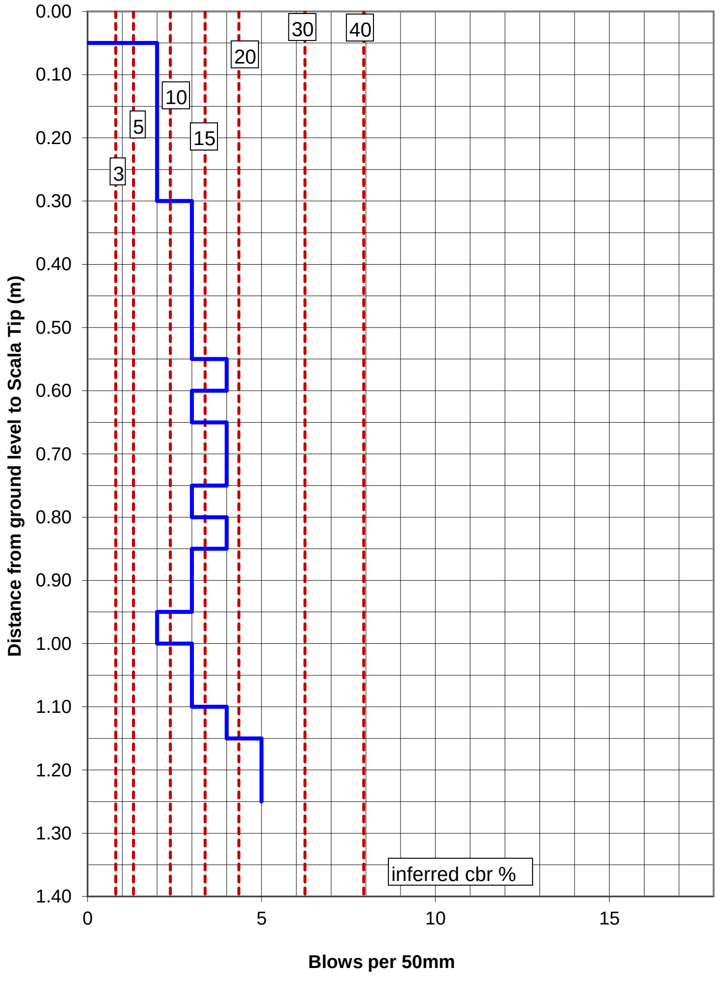
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 20
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	B19 on GPS	**Page:**	17 of 31
Start Depth (m):	0.05		
LWD (MPa):	78.7		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
2	4	12	8	0.25
2	4	12	10	0.30
3	6	18	13	0.35
3	6	18	16	0.40
3	6	18	19	0.45
3	6	18	22	0.50
3	6	18	25	0.55
4	8	24	29	0.60
3	6	18	32	0.65
4	8	24	36	0.70
4	8	24	40	0.75
3	6	18	43	0.80
4	8	24	47	0.85
3	6	18	50	0.90
3	6	18	53	0.95
2	4	12	55	1.00
3	6	18	58	1.05
3	6	18	61	1.10
4	8	24	65	1.15
5	10	30	70	1.20
5	10	30	75	1.25

Scala Penetrometer Results



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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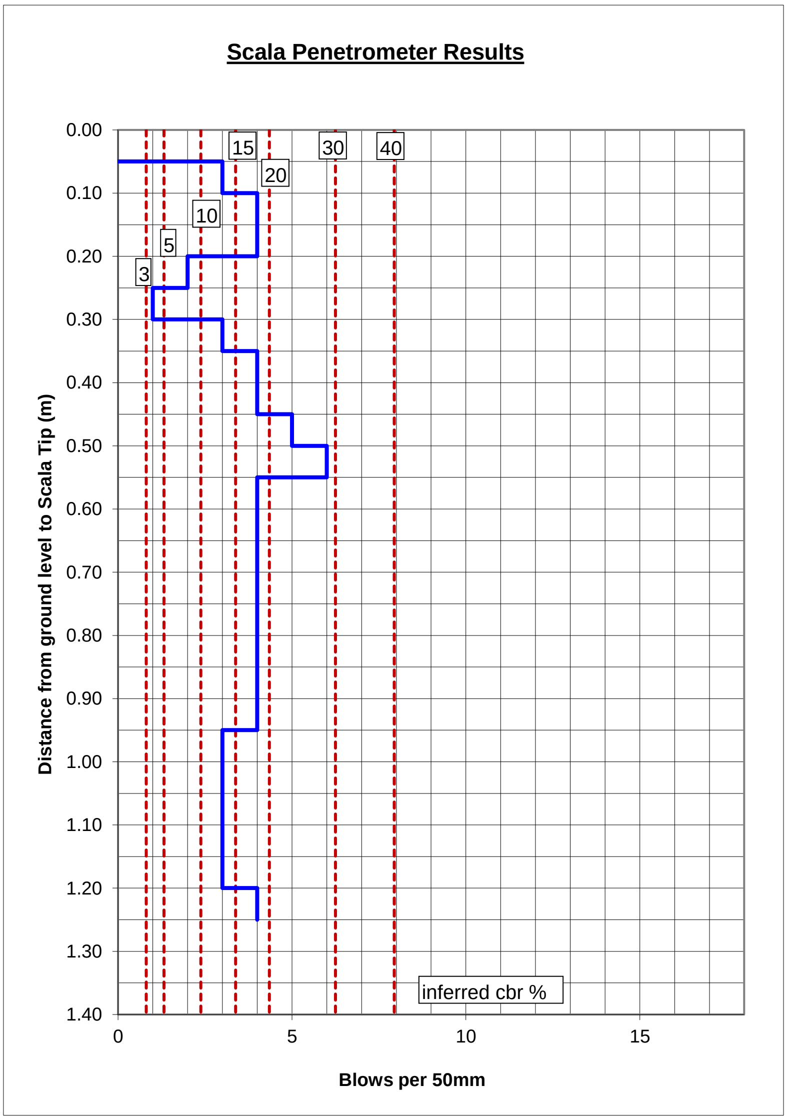
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 21
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	B20 on GPS	**Page:**	18 of 31
Start Depth (m):	0.05		
LWD (MPa):	21.5		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
4	8	24	7	0.15
4	8	24	11	0.20
2	4	12	13	0.25
1	2	6	14	0.30
3	6	18	17	0.35
4	8	24	21	0.40
4	8	24	25	0.45
5	10	30	30	0.50
6	12	36	36	0.55
4	8	24	40	0.60
4	8	24	44	0.65
4	8	24	48	0.70
4	8	24	52	0.75
4	8	24	56	0.80
4	8	24	60	0.85
4	8	24	64	0.90
4	8	24	68	0.95
3	6	18	71	1.00
3	6	18	74	1.05
3	6	18	77	1.10
3	6	18	80	1.15
3	6	18	83	1.20
4	8	24	87	1.25



Recorded By:	A.B
Date:	30/11/2021
Checked by:	A.M
Date:	17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

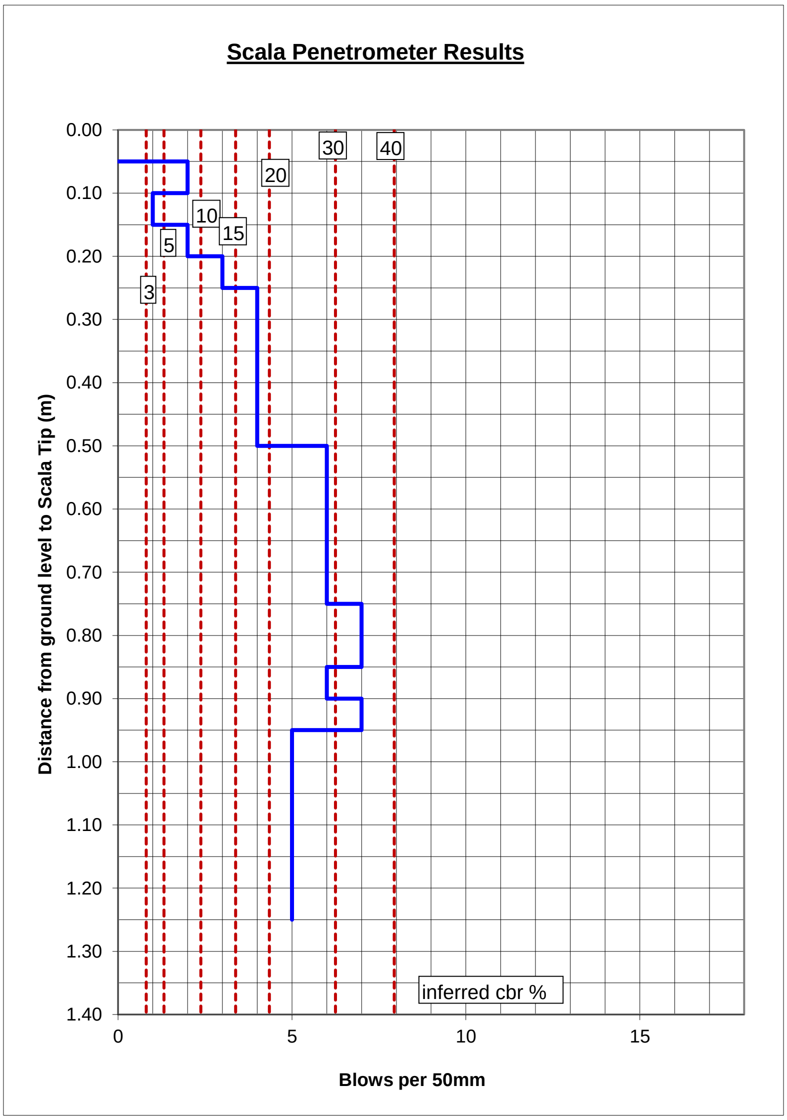
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 25.6

Scala No: SCB 22
Ref : -
Report No: W21-1400
Page: 19 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
1	2	6	3	0.15
2	4	12	5	0.20
3	6	18	8	0.25
4	8	24	12	0.30
4	8	24	16	0.35
4	8	24	20	0.40
4	8	24	24	0.45
4	8	24	28	0.50
6	12	36	34	0.55
6	12	36	40	0.60
6	12	36	46	0.65
6	12	36	52	0.70
6	12	36	58	0.75
7	14	42	65	0.80
7	14	42	72	0.85
6	12	36	78	0.90
7	14	42	85	0.95
5	10	30	90	1.00
5	10	30	95	1.05
5	10	30	100	1.10
5	10	30	105	1.15
5	10	30	110	1.20
5	10	30	115	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

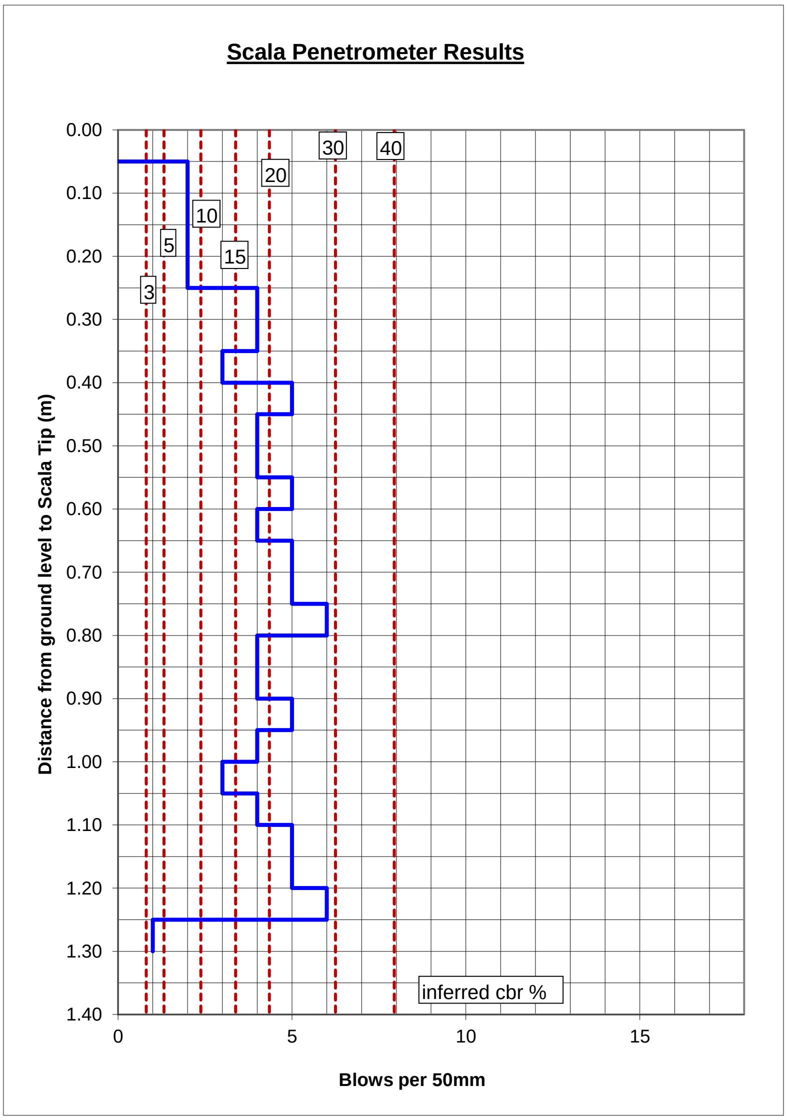
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 16.0

Scala No: SCB 23
Ref : -
Report No: W21-1400
Page: 20 of 31

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road
Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
2	4	12	8	0.25
4	8	24	12	0.30
4	8	24	16	0.35
3	6	18	19	0.40
5	10	30	24	0.45
4	8	24	28	0.50
4	8	24	32	0.55
5	10	30	37	0.60
4	8	24	41	0.65
5	10	30	46	0.70
5	10	30	51	0.75
6	12	36	57	0.80
4	8	24	61	0.85
4	8	24	65	0.90
5	10	30	70	0.95
4	8	24	74	1.00
3	6	18	77	1.05
4	8	24	81	1.10
5	10	30	86	1.15
5	10	30	91	1.20
6	12	36	97	1.25
1	2	6	98	1.30



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

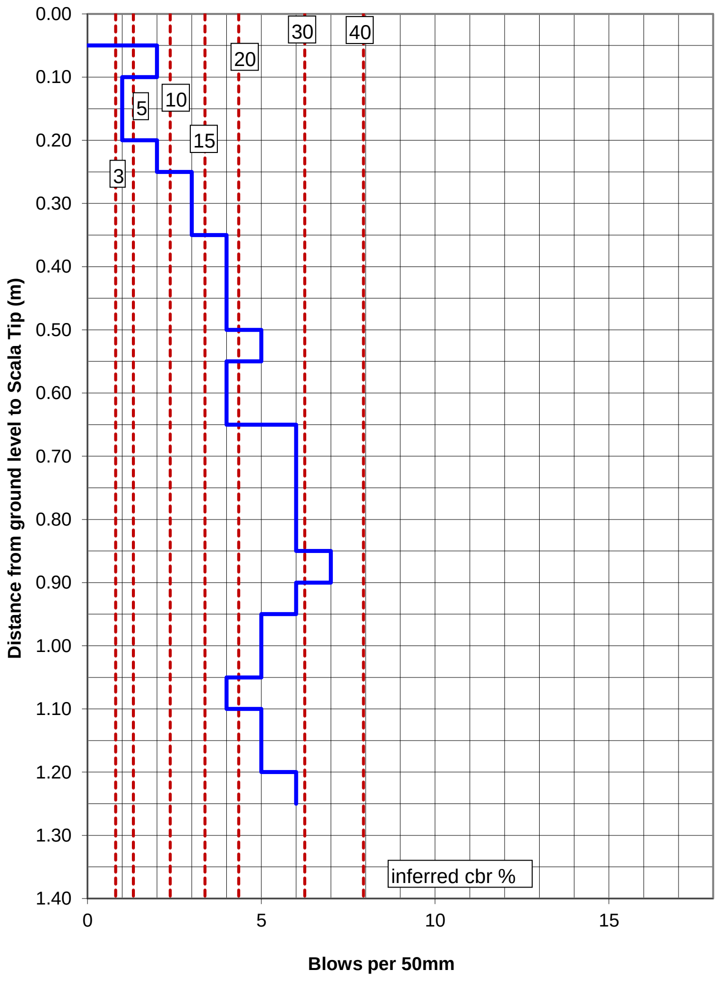
LWD (MPa): 12.6

Scala No: SCB 24
Ref : -
Report No: W21-1400
Page: 21 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
1	2	6	3	0.15
1	2	6	4	0.20
2	4	12	6	0.25
3	6	18	9	0.30
3	6	18	12	0.35
4	8	24	16	0.40
4	8	24	20	0.45
4	8	24	24	0.50
5	10	30	29	0.55
4	8	24	33	0.60
4	8	24	37	0.65
6	12	36	43	0.70
6	12	36	49	0.75
6	12	36	55	0.80
6	12	36	61	0.85
7	14	42	68	0.90
6	12	36	74	0.95
5	10	30	79	1.00
5	10	30	84	1.05
4	8	24	88	1.10
5	10	30	93	1.15
5	10	30	98	1.20
6	12	36	104	1.25

Scala Penetrometer Results



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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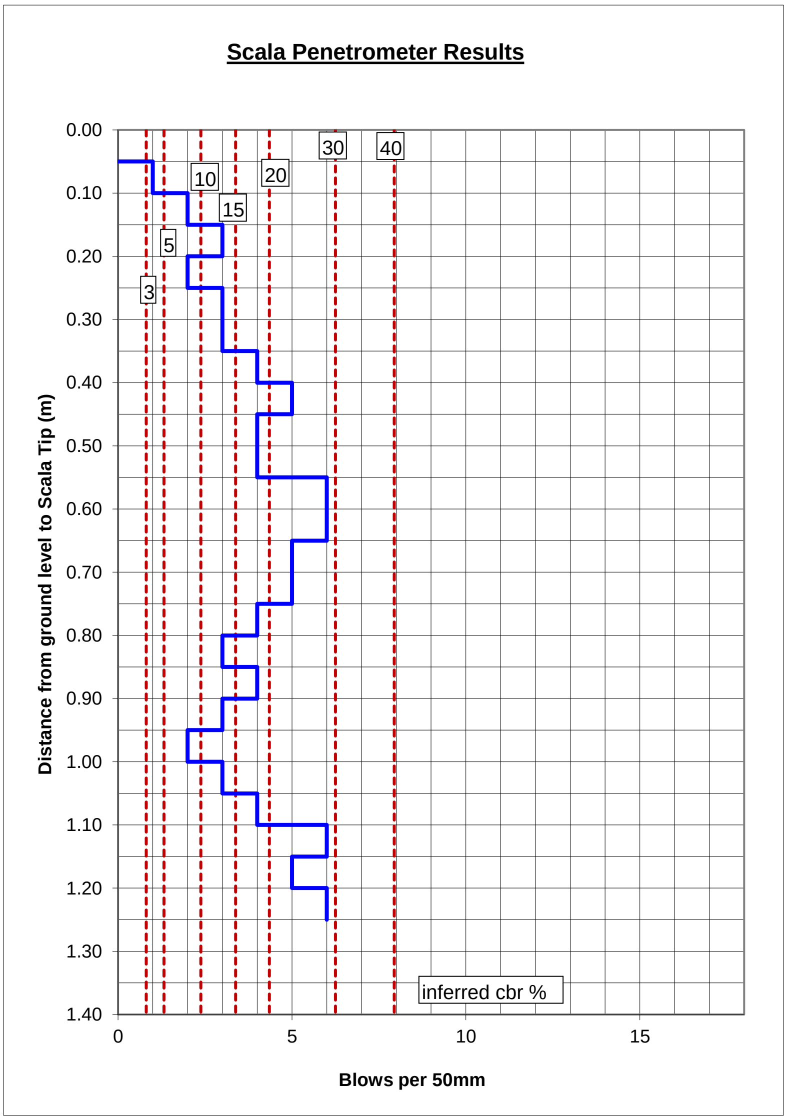
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 25
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	22 of 31
Start Depth (m):	0.05		
LWD (MPa):	33.8		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
1	2	6	1	0.10
2	4	12	3	0.15
3	6	18	6	0.20
2	4	12	8	0.25
3	6	18	11	0.30
3	6	18	14	0.35
4	8	24	18	0.40
5	10	30	23	0.45
4	8	24	27	0.50
4	8	24	31	0.55
6	12	36	37	0.60
6	12	36	43	0.65
5	10	30	48	0.70
5	10	30	53	0.75
4	8	24	57	0.80
3	6	18	60	0.85
4	8	24	64	0.90
3	6	18	67	0.95
2	4	12	69	1.00
3	6	18	72	1.05
4	8	24	76	1.10
6	12	36	82	1.15
5	10	30	87	1.20
6	12	36	93	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
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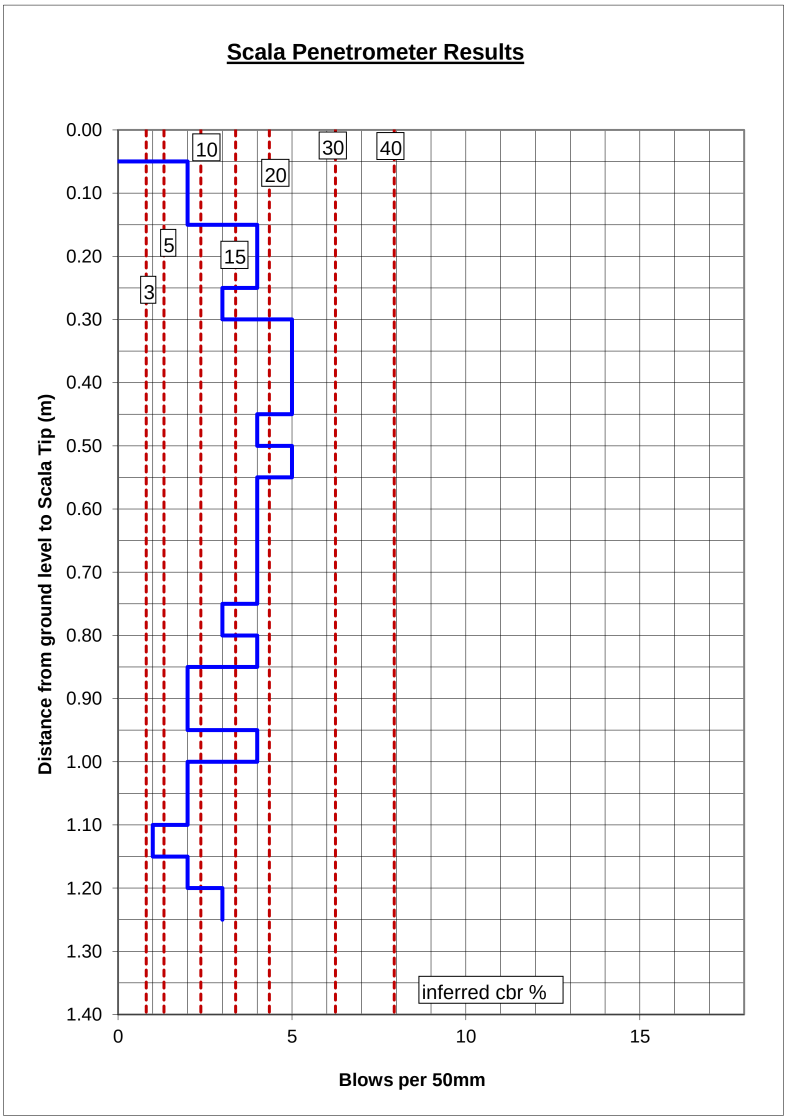
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 26
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	23 of 31
Start Depth (m):	0.05		
LWD (MPa):	24.5		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
4	8	24	8	0.20
4	8	24	12	0.25
3	6	18	15	0.30
5	10	30	20	0.35
5	10	30	25	0.40
5	10	30	30	0.45
4	8	24	34	0.50
5	10	30	39	0.55
4	8	24	43	0.60
4	8	24	47	0.65
4	8	24	51	0.70
4	8	24	55	0.75
3	6	18	58	0.80
4	8	24	62	0.85
2	4	12	64	0.90
2	4	12	66	0.95
4	8	24	70	1.00
2	4	12	72	1.05
2	4	12	74	1.10
1	2	6	75	1.15
2	4	12	77	1.20
3	6	18	80	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

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DYNAMIC CONE (SCALA) PENETROMETER

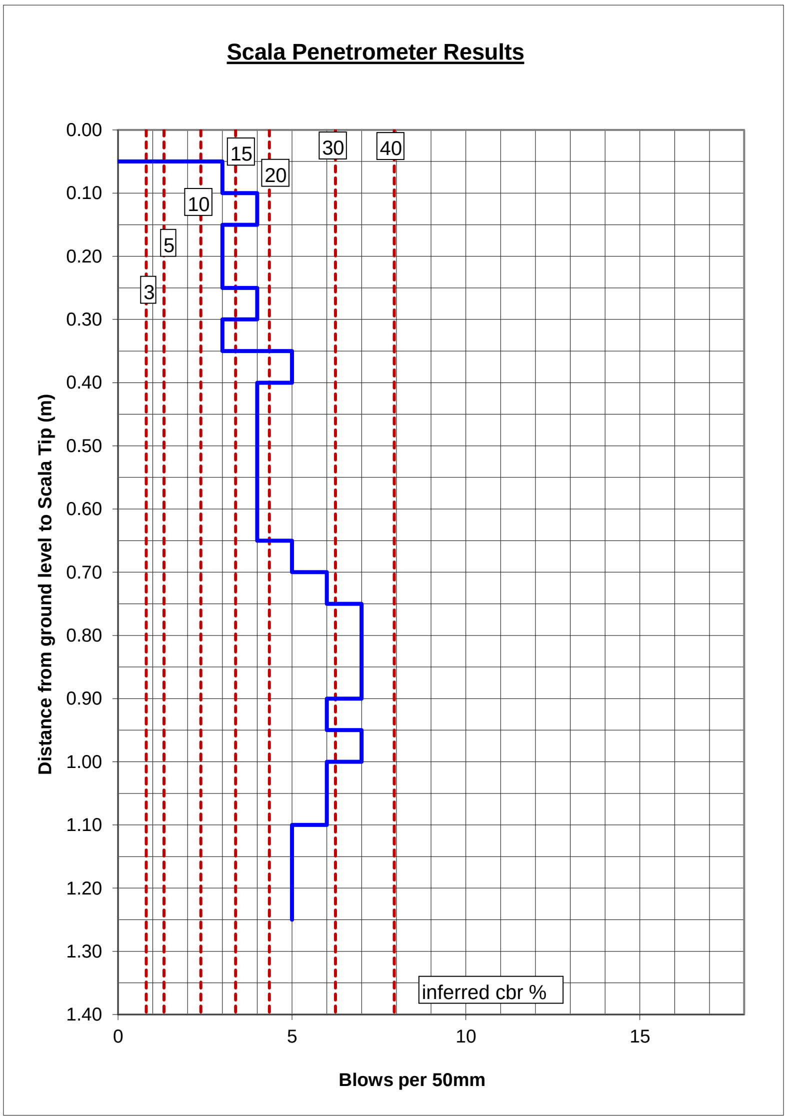
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

Scala No: SCB 27
Ref : -
Report No: W21-1400
Page: 24 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
4	8	24	7	0.15
3	6	18	10	0.20
3	6	18	13	0.25
4	8	24	17	0.30
3	6	18	20	0.35
5	10	30	25	0.40
4	8	24	29	0.45
4	8	24	33	0.50
4	8	24	37	0.55
4	8	24	41	0.60
4	8	24	45	0.65
5	10	30	50	0.70
6	12	36	56	0.75
7	14	42	63	0.80
7	14	42	70	0.85
7	14	42	77	0.90
6	12	36	83	0.95
7	14	42	90	1.00
6	12	36	96	1.05
6	12	36	102	1.10
5	10	30	107	1.15
5	10	30	112	1.20
5	10	30	117	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

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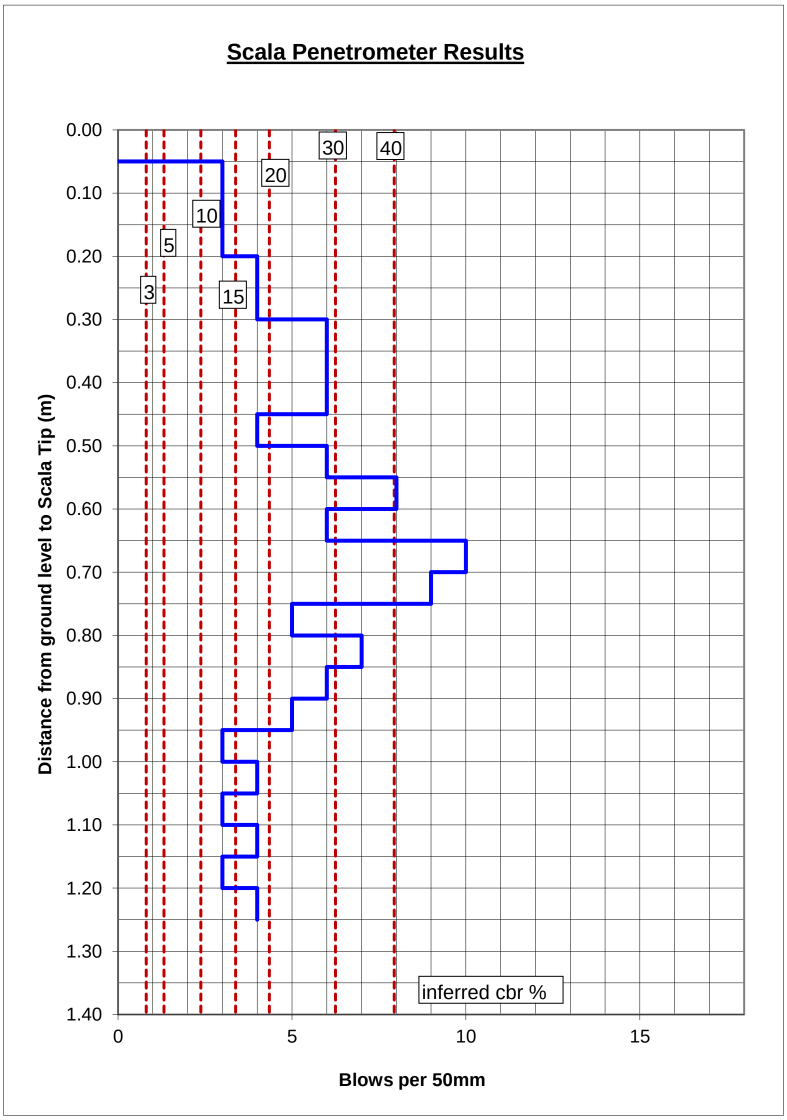
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 28
Client:	Cook Costello	**Ref :**	-
Job:	The Landing, Stage 6-7	**Report No:**	W21-1400
Location:	Stage 6-7	**Page:**	25 of 31
Start Depth (m):	0.05		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
3	6	18	6	0.15
3	6	18	9	0.20
4	8	24	13	0.25
4	8	24	17	0.30
6	12	36	23	0.35
6	12	36	29	0.40
6	12	36	35	0.45
4	8	24	39	0.50
6	12	36	45	0.55
8	16	48	53	0.60
6	12	36	59	0.65
10	20	60	69	0.70
9	18	54	78	0.75
5	10	30	83	0.80
7	14	42	90	0.85
6	12	36	96	0.90
5	10	30	101	0.95
3	6	18	104	1.00
4	8	24	108	1.05
3	6	18	111	1.10
4	8	24	115	1.15
3	6	18	118	1.20
4	8	24	122	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

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DYNAMIC CONE (SCALA) PENETROMETER

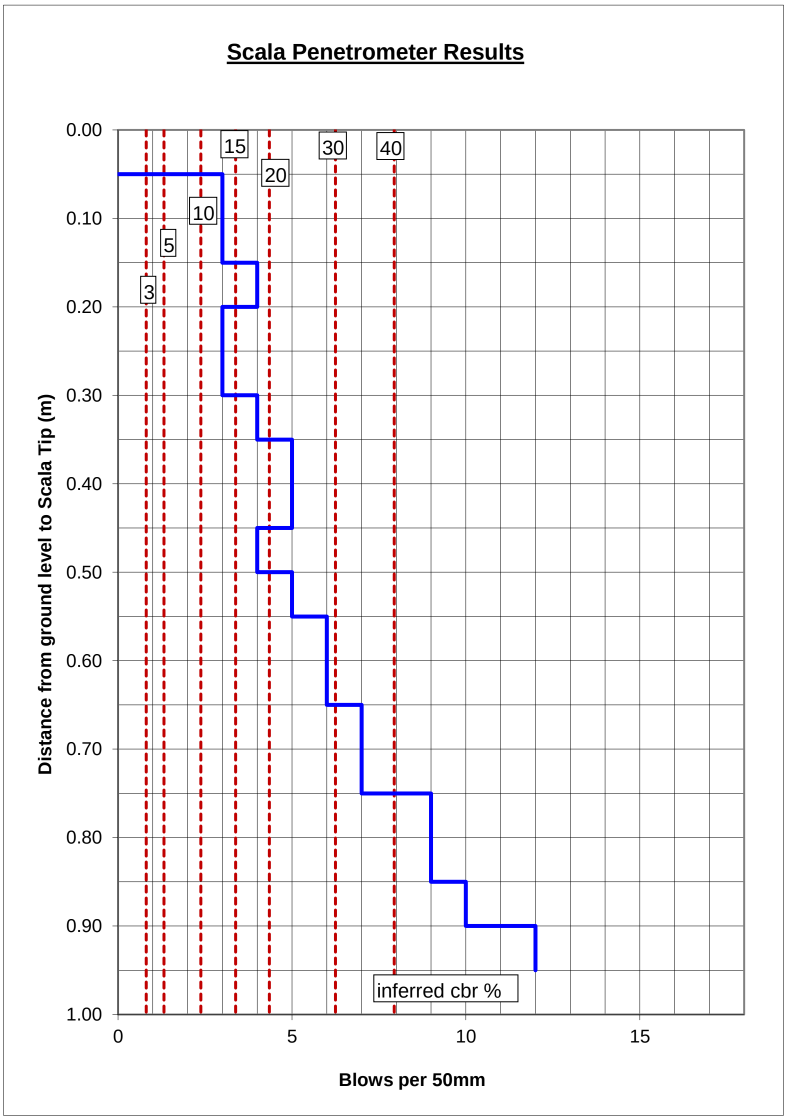
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

Scala No: SCB 29
Ref : -
Report No: W21-1400
Page: 26 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
3	6	18	6	0.15
4	8	24	10	0.20
3	6	18	13	0.25
3	6	18	16	0.30
4	8	24	20	0.35
5	10	30	25	0.40
5	10	30	30	0.45
4	8	24	34	0.50
5	10	30	39	0.55
6	12	36	45	0.60
6	12	36	51	0.65
7	14	42	58	0.70
7	14	42	65	0.75
9	18	54	74	0.80
9	18	54	83	0.85
10	20	60	93	0.90
12	24	72	105	0.95



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

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DYNAMIC CONE (SCALA) PENETROMETER

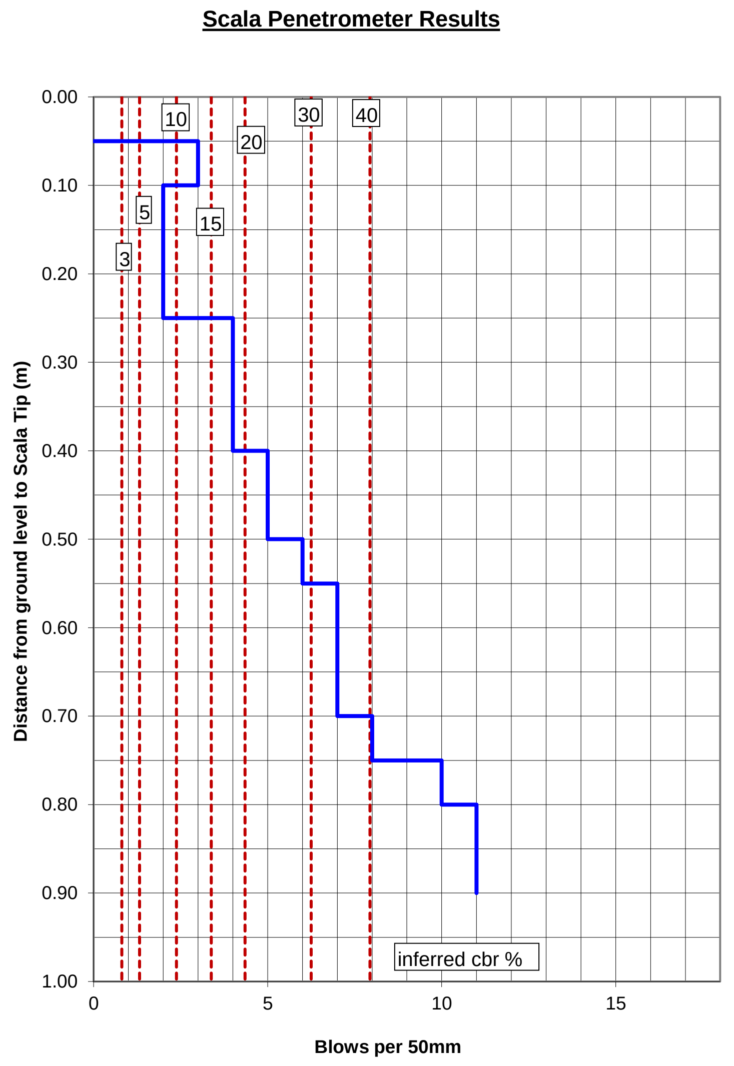
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

Scala No: SCB 30
Ref : -
Report No: W21-1400
Page: 27 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
2	4	12	9	0.25
4	8	24	13	0.30
4	8	24	17	0.35
4	8	24	21	0.40
5	10	30	26	0.45
5	10	30	31	0.50
6	12	36	37	0.55
7	14	42	44	0.60
7	14	42	51	0.65
7	14	42	58	0.70
8	16	48	66	0.75
10	20	60	76	0.80
11	22	66	87	0.85
11	22	66	98	0.90



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

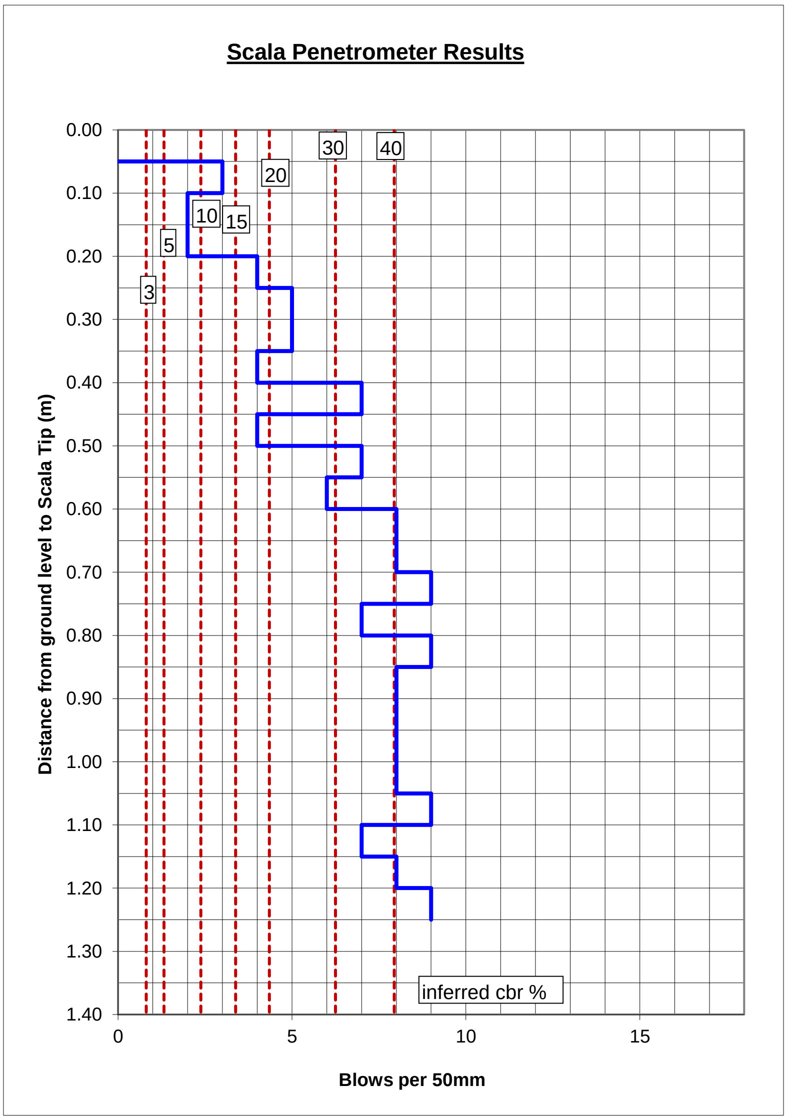
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

Scala No: SCB 31
Ref : -
Report No: W21-1400
Page: 28 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
4	8	24	11	0.25
5	10	30	16	0.30
5	10	30	21	0.35
4	8	24	25	0.40
7	14	42	32	0.45
4	8	24	36	0.50
7	14	42	43	0.55
6	12	36	49	0.60
8	16	48	57	0.65
8	16	48	65	0.70
9	18	54	74	0.75
7	14	42	81	0.80
9	18	54	90	0.85
8	16	48	98	0.90
8	16	48	106	0.95
8	16	48	114	1.00
8	16	48	122	1.05
9	18	54	131	1.10
7	14	42	138	1.15
8	16	48	146	1.20
9	18	54	155	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

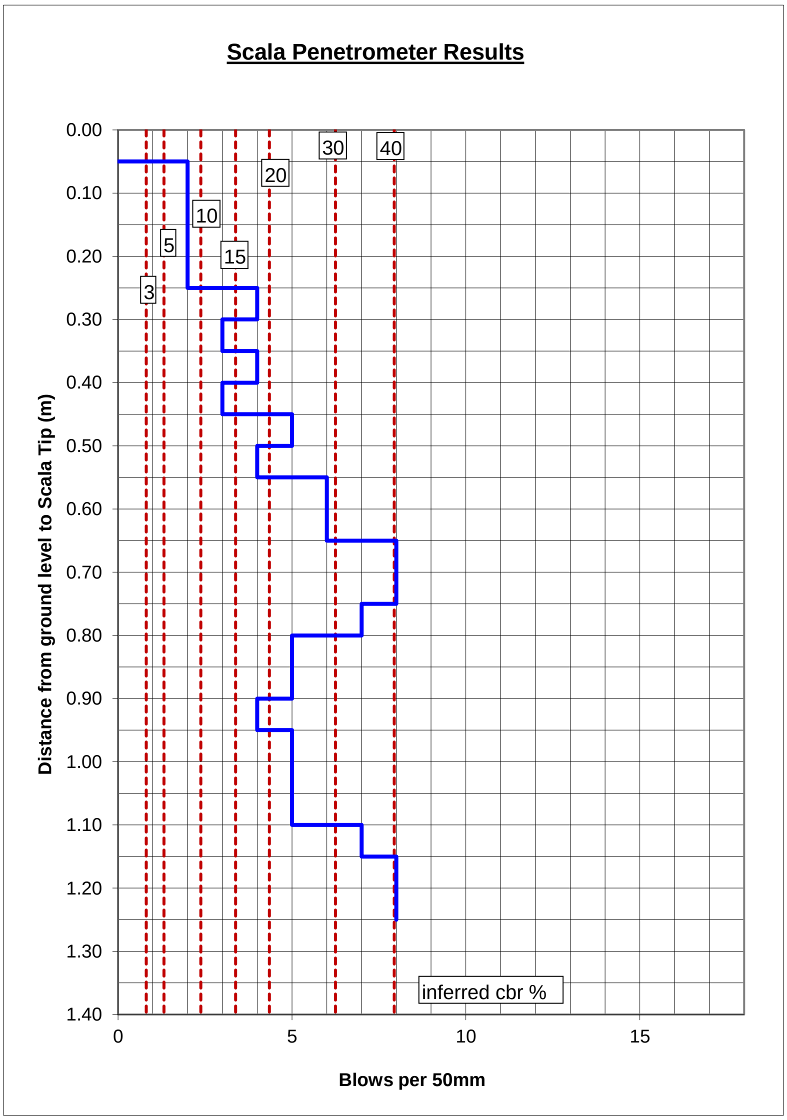
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 55.4

Scala No: SCB 32
Ref : -
Report No: W21-1400
Page: 29 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
2	4	12	8	0.25
4	8	24	12	0.30
3	6	18	15	0.35
4	8	24	19	0.40
3	6	18	22	0.45
5	10	30	27	0.50
4	8	24	31	0.55
6	12	36	37	0.60
6	12	36	43	0.65
8	16	48	51	0.70
8	16	48	59	0.75
7	14	42	66	0.80
5	10	30	71	0.85
5	10	30	76	0.90
4	8	24	80	0.95
5	10	30	85	1.00
5	10	30	90	1.05
5	10	30	95	1.10
7	14	42	102	1.15
8	16	48	110	1.20
8	16	48	118	1.25



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

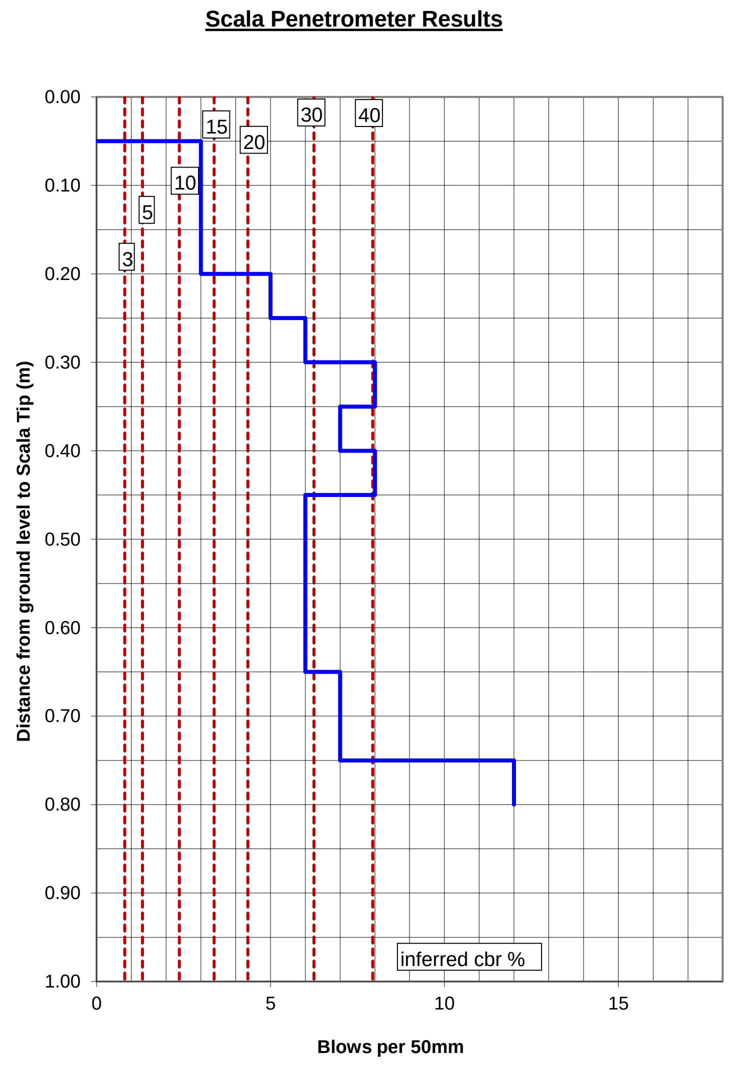
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 57.7

Scala No: SCB 33
Ref : -
Report No: W21-1400
Page: 30 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
3	6	18	6	0.15
3	6	18	9	0.20
5	10	30	14	0.25
6	12	36	20	0.30
8	16	48	28	0.35
7	14	42	35	0.40
8	16	48	43	0.45
6	12	36	49	0.50
6	12	36	55	0.55
6	12	36	61	0.60
6	12	36	67	0.65
7	14	42	74	0.70
7	14	42	81	0.75
12	24	72	93	0.80



Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

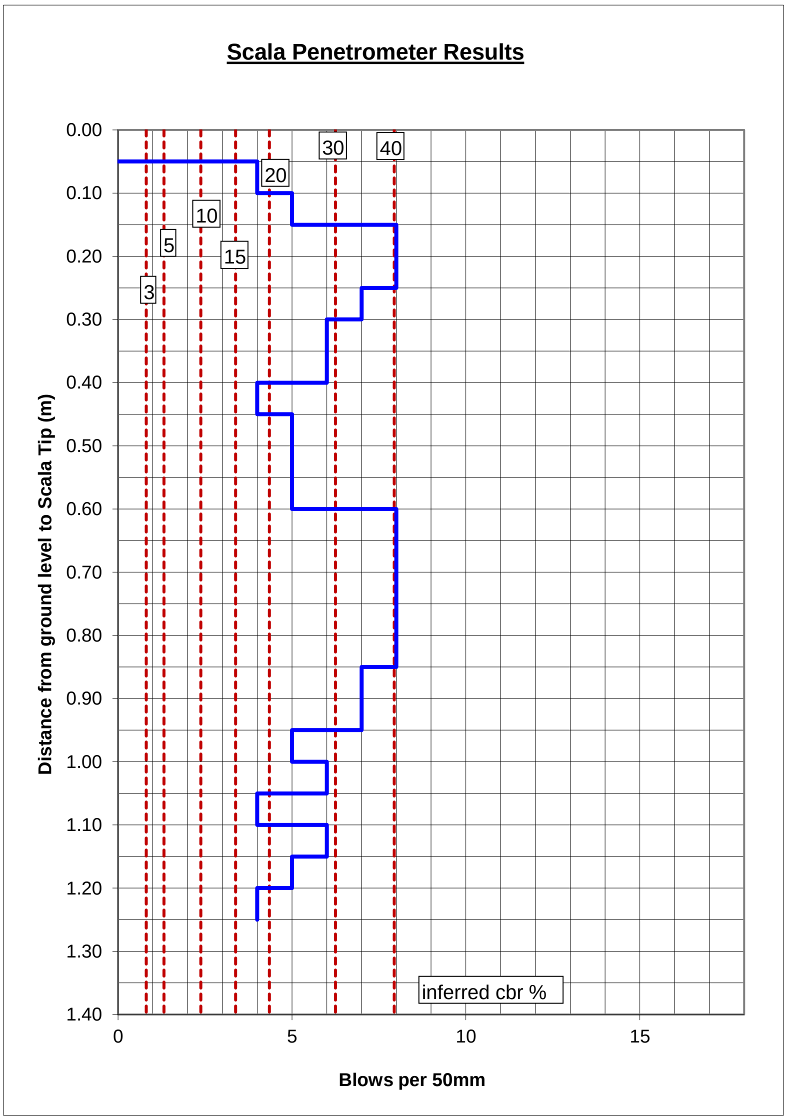
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 6-7
Start Depth (m): 0.05

LWD (MPa): 64.5

Scala No: SCB 34
Ref : -
Report No: W21-1400
Page: 31 of 31

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
4	8	24	4	0.10
5	10	30	9	0.15
8	16	48	17	0.20
8	16	48	25	0.25
7	14	42	32	0.30
6	12	36	38	0.35
6	12	36	44	0.40
4	8	24	48	0.45
5	10	30	53	0.50
5	10	30	58	0.55
5	10	30	63	0.60
8	16	48	71	0.65
8	16	48	79	0.70
8	16	48	87	0.75
8	16	48	95	0.80
8	16	48	103	0.85
7	14	42	110	0.90
7	14	42	117	0.95
5	10	30	122	1.00
6	12	36	128	1.05
4	8	24	132	1.10
6	12	36	138	1.15
5	10	30	143	1.20
4	8	24	147	1.25


Scala Penetrometer Results

Recorded By: A.B
Date: 30/11/2021
Checked by: A.M
Date: 17/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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LIGHTWEIGHT DEFLECTOMETER READINGS

ASTM E2583-07 (2015)

Lab Job No.:	8020-1727	**Tested By:**	J.H
Client:	CCL	**Date:**	1/12/2021
Job:	The Landing Stage 6 - 7	**Checked By:**	A.M
Location:	Ruakaka	**Date:**	12/01/2022
Report No:	**Preliminary**	**Page:**	2 of 15
Ref:			

Date	Location	Evd (MPa)	Comments	Approximate Depth of Excavation (mm)
1/12/2021	SCB1	76.3	**Retest**	300
1/12/2021	SCB2	76.8	**Retest**	275
1/12/2021	SCB6	73.5	**Retest**	250
1/12/2021	SCB7	84.6	**Retest**	300
1/12/2021	SCB8	81.5	**Retest**	200
1/12/2021	SCB9	40	**Retest**	200
1/12/2021	SCB10	76.5	**Retest**	200
1/12/2021	SCB13	60.5	**Retest**	300
1/12/2021	SCB14	65.2	**Retest**	300
1/12/2021	SCB27	75.5	**Retest**	250
1/12/2021	SCB28	95.3	**Retest**	250
1/12/2021	SCB29	69.9	**Retest**	250
1/12/2021	SCB30	84.6	**Retest**	250
1/12/2021	SCB31	85.2	**Retest**	300

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LIGHTWEIGHT DEFLECTOMETER READINGS

ASTM E2583-07 (2015)

Lab Job No.:	8020-1727	**Tested By:**	A.B
Client:	CCL	**Date:**	14/01/2022
Job:	The Landing Stage 6 - 7	**Checked By:**	A.M
Location:	Ruakaka	**Date:**	27/01/2022
Report No:	**Preliminary**	**Page:**	2 of 17
Ref:	-		

Date	Location	Evd (MPa)	Comments	Approximate Depth of Excavation (mm)
14/01/2022	SCB17	108.7	**Retest**	300
14/01/2022	SCB18	51.6	**Retest**	300

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LIGHTWEIGHT DEFLECTOMETER READINGS

ASTM E2583-07 (2015)

Lab Job No.:	8020-1727	**Tested By:**	D.O
Client:	CCL	**Date:**	21/01/2022
Job:	The Landing Stage 6 - 7	**Checked By:**	A.B
Location:	Ruakaka	**Date:**	9/02/2022
Report No:	**Preliminary**	**Page:**	2 of 2
Ref:	-		

Date	Location	Evd (MPa)	Comments	Approximate Depth of Excavation (mm)
21/01/2022	SCB22	126.4	**Retest**	300
21/01/2022	SCB23	86.2	**Retest**	300
21/01/2022	SCB24	85.9	**Retest**	300
21/01/2022	SCB25	89.3	**Retest**	300
21/01/2022	SCB26	82.4	**Retest**	300
21/01/2022	SCB21	115.4	**Retest**	300

S. Kokich
Approved Signatory

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TEST REPORT

Lab Job No: 8020-1727

Your ref.: -

Date of Issue: 11/01/2022

Date of Re-Issue: -

Page: 1 of 5

Test Report No.
W21-1399

PROJECT: **The Landing Stage 4/5 Scala Retest Testing 13/10/21**

CLIENT: Cook Costello
2 Norfolk Street,
Whangarei 0110

ATTENTION: Bernard Devine

TEST METHODS: Determination of the penetration resistance using a dynamic cone (scala) Penetrometer

NZS 4402: 1988 Test 6.5.2

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

Alex Millar

A. Millar

Administrator

S. Kokich

Approved Signatory

ACCREDITED IANZ TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

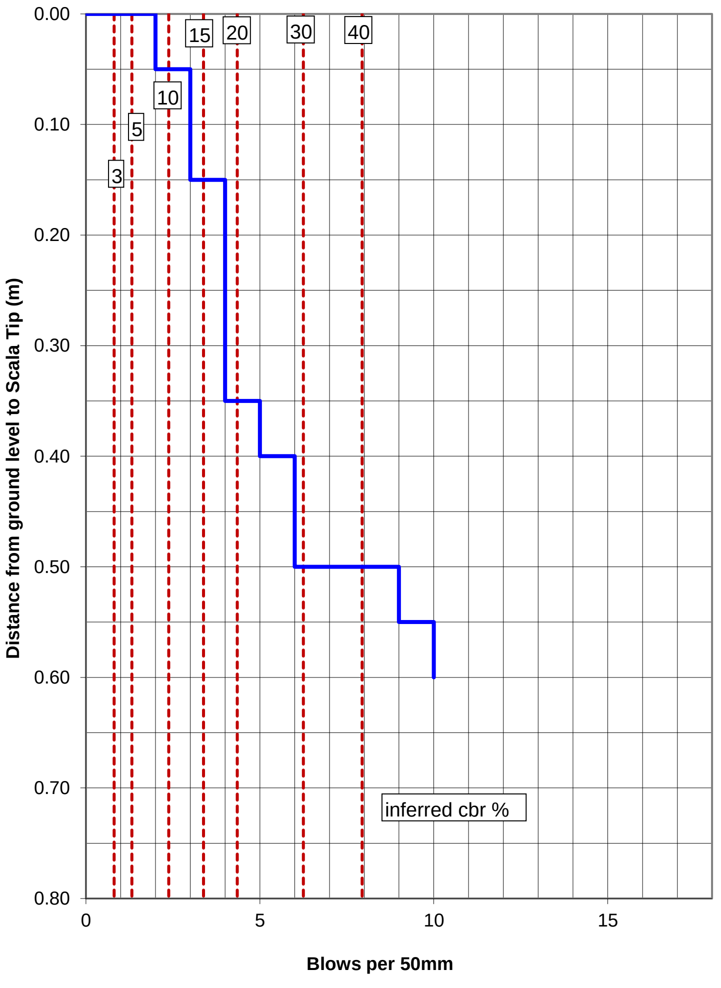
Lab Job No: 8020-1727
Client: CCL
Job: The Landing Stage 4/5
Location: Road 10 retest
Start Depth (m): 0
CH540

Scala No: SP1
Ref : -
Report No: W21-1399
Page: 2 of 5

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
2	4	12	2	0.05
3	6	18	5	0.10
3	6	18	8	0.15
4	8	24	12	0.20
4	8	24	16	0.25
4	8	24	20	0.30
4	8	24	24	0.35
5	10	30	29	0.40
6	12	36	35	0.45
6	12	36	41	0.50
9	18	54	50	0.55
10	20	60	60	0.60

Scala Penetrometer Results



Recorded By: J.A
Date: 13/10/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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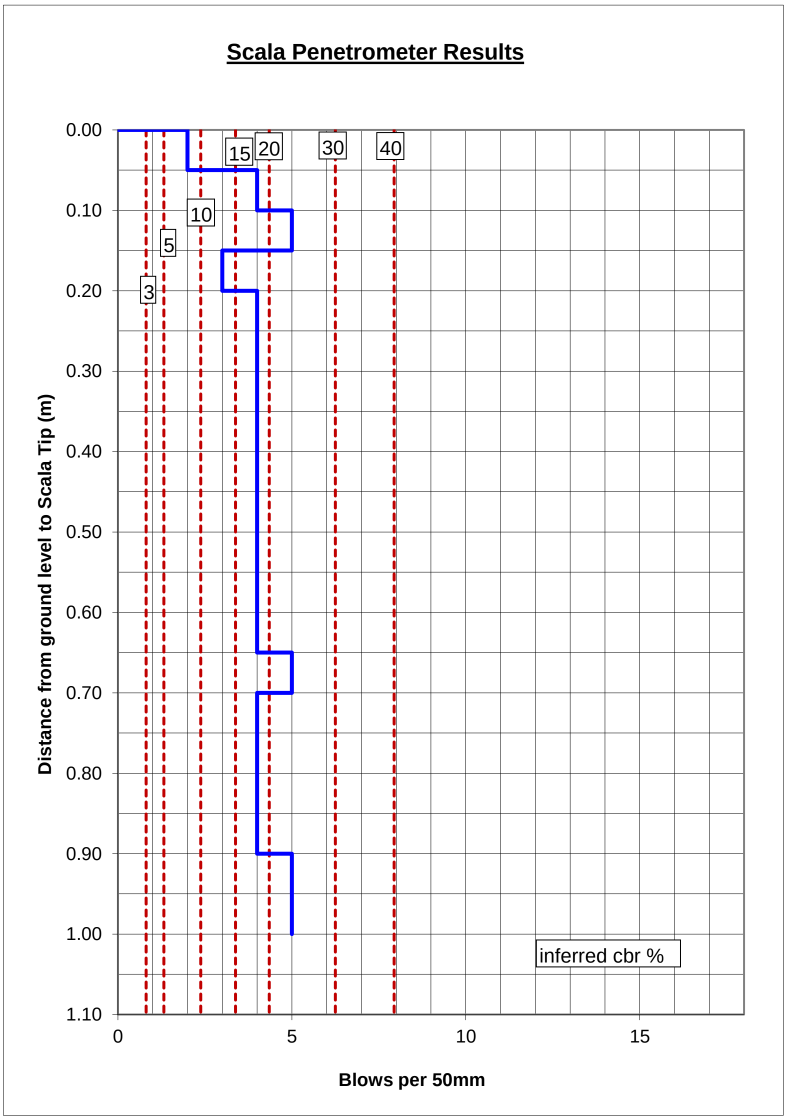
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SP2
Client:	CCL	**Ref :**	-
Job:	The Landing Stage 4/5	**Report No:**	W21-1399
Location:	Road 19	**Page:**	3 of 5
Start Depth (m):	0 CH140		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
2	4	12	2	0.05
4	8	24	6	0.10
5	10	30	11	0.15
3	6	18	14	0.20
4	8	24	18	0.25
4	8	24	22	0.30
4	8	24	26	0.35
4	8	24	30	0.40
4	8	24	34	0.45
4	8	24	38	0.50
4	8	24	42	0.55
4	8	24	46	0.60
4	8	24	50	0.65
5	10	30	55	0.70
4	8	24	59	0.75
4	8	24	63	0.80
4	8	24	67	0.85
4	8	24	71	0.90
5	10	30	76	0.95
5	10	30	81	1.00



Recorded By: J.A
Date: 13/10/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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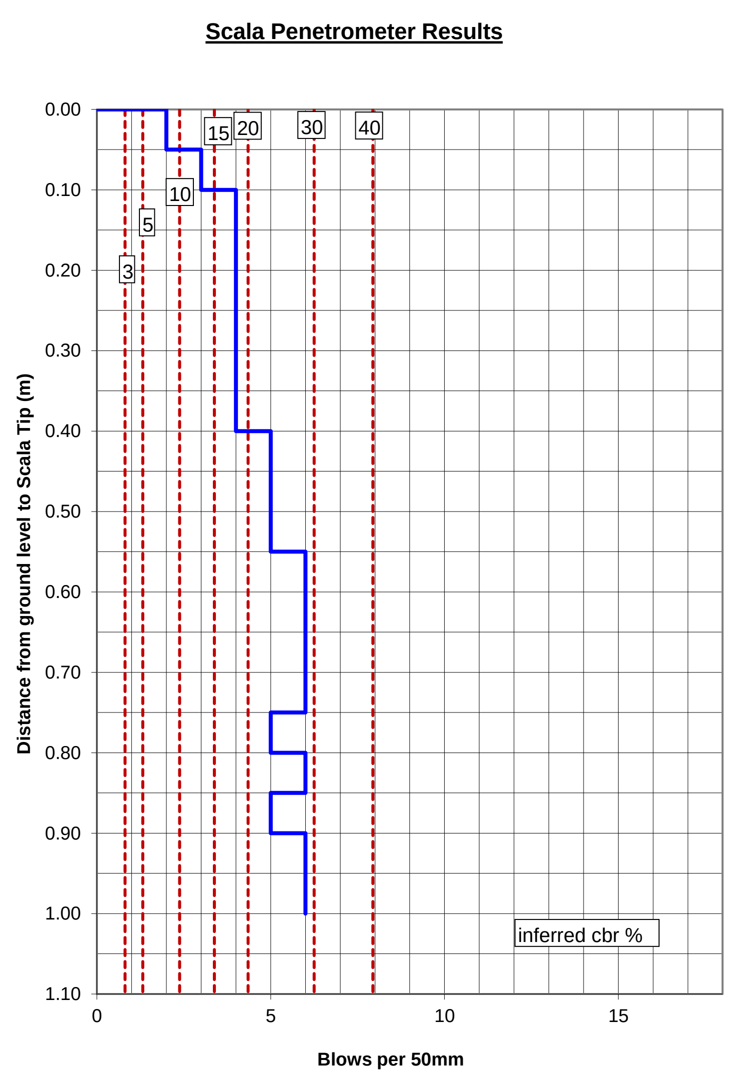
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SP3
Client:	CCL	**Ref :**	-
Job:	The Landing Stage 4/5	**Report No:**	W21-1399
Location:	Road 7	**Page:**	4 of 5
Start Depth (m):	0 CH20		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
2	4	12	2	0.05
3	6	18	5	0.10
4	8	24	9	0.15
4	8	24	13	0.20
4	8	24	17	0.25
4	8	24	21	0.30
4	8	24	25	0.35
4	8	24	29	0.40
5	10	30	34	0.45
5	10	30	39	0.50
5	10	30	44	0.55
6	12	36	50	0.60
6	12	36	56	0.65
6	12	36	62	0.70
6	12	36	68	0.75
5	10	30	73	0.80
6	12	36	79	0.85
5	10	30	84	0.90
6	12	36	90	0.95
6	12	36	96	1.00



Recorded By: J.A
Date: 13/10/2021
Checked by: A.M
Date: 16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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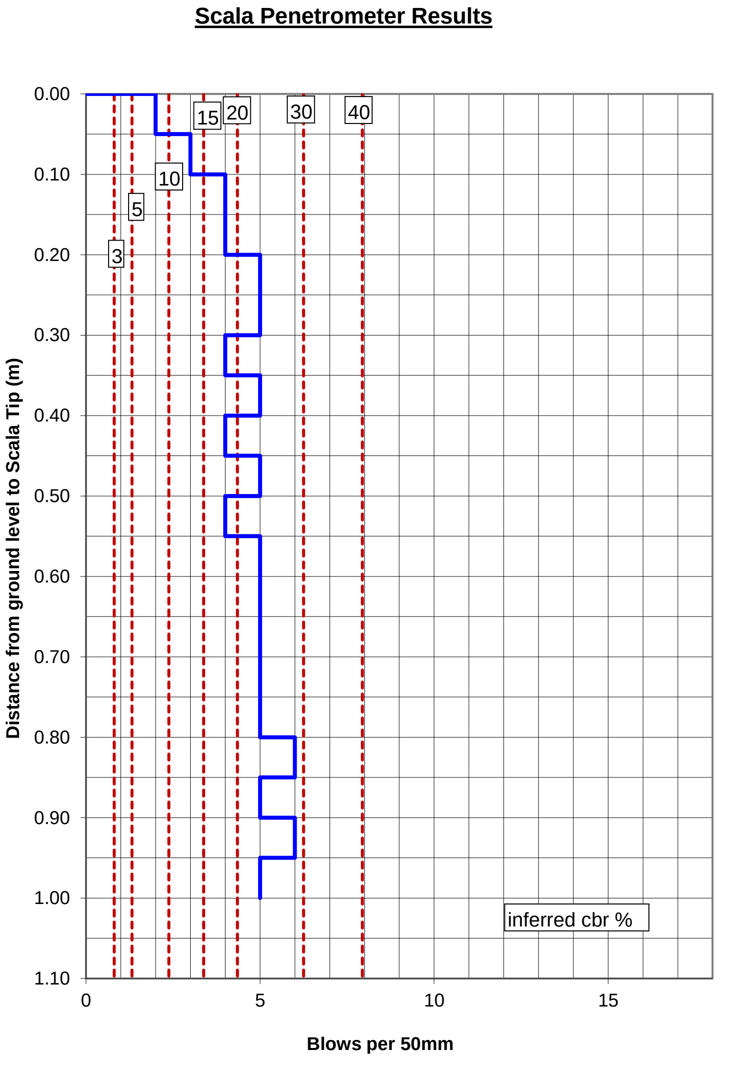
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SP4
Client:	CCL	**Ref :**	-
Job:	The Landing Stage 4/5	**Report No:**	W21-1399
Location:	Road 7	**Page:**	5 of 5
Start Depth (m):	0 CH60		

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
2	4	12	2	0.05
3	6	18	5	0.10
4	8	24	9	0.15
4	8	24	13	0.20
5	10	30	18	0.25
5	10	30	23	0.30
4	8	24	27	0.35
5	10	30	32	0.40
4	8	24	36	0.45
5	10	30	41	0.50
4	8	24	45	0.55
5	10	30	50	0.60
5	10	30	55	0.65
5	10	30	60	0.70
5	10	30	65	0.75
5	10	30	70	0.80
6	12	36	76	0.85
5	10	30	81	0.90
6	12	36	87	0.95
5	10	30	92	1.00



Recorded By:	J.A
Date:	13/10/2021
Checked by:	A.M
Date:	16/12/2021

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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TEST REPORT

Lab Job No: 8020-1727

Your ref.: 16103

Date of Issue: 14/02/2022

Date of Re-Issue: -

Page: 1 of 15

Test Report No.
WRE8020-1727-R003

PROJECT: **The Landing - Stage 7a Scala and LWD Testing 1/12/2021**

CLIENT:
Cook Costello
2 Norfolk Street,
Whangarei 0110

ATTENTION: Stefano Rotatori

TEST METHODS:
Light Weight Deflectometer (LWD) (Not accredited)
ASTM E2835-11 (Not accredited)
Determination of the penetration resistance using a dynamic cone (scala) Penetrometer
NZS 4402: 1988 Test 6.5.2

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

Alex Millar

A. Millar

Administrator

S. Kokich

Approved Signatory

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

LIGHTWEIGHT DEFLECTOMETER READINGS

ASTM E2583-07 (2015)

Lab Job No.:	8020-1727	**Tested By:**	J.H
Client:	CCL	**Date:**	1/12/2021
Job:	The Landing Stage 6 - 7	**Checked By:**	A.M
Location:	Ruakaka	**Date:**	12/01/2022
Report No:	WRE8020-1727-R003	**Page:**	2 of 15
Ref:	16103		

Date	Location	Evd (MPa)	Comments	Approximate Depth of Excavation (mm)
1/12/2021	SCB1	76.3	**Retest**	300
1/12/2021	SCB2	76.8	**Retest**	275
1/12/2021	SCB6	73.5	**Retest**	250
1/12/2021	SCB7	84.6	**Retest**	300
1/12/2021	SCB8	81.5	**Retest**	200
1/12/2021	SCB9	40.0	**Retest**	200
1/12/2021	SCB10	76.5	**Retest**	200
1/12/2021	SCB13	60.5	**Retest**	300
1/12/2021	SCB14	65.2	**Retest**	300
1/12/2021	SCB27	75.5	**Retest**	250
1/12/2021	SCB28	95.3	**Retest**	250
1/12/2021	SCB29	69.9	**Retest**	250
1/12/2021	SCB30	84.6	**Retest**	250
1/12/2021	SCB31	85.2	**Retest**	300

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

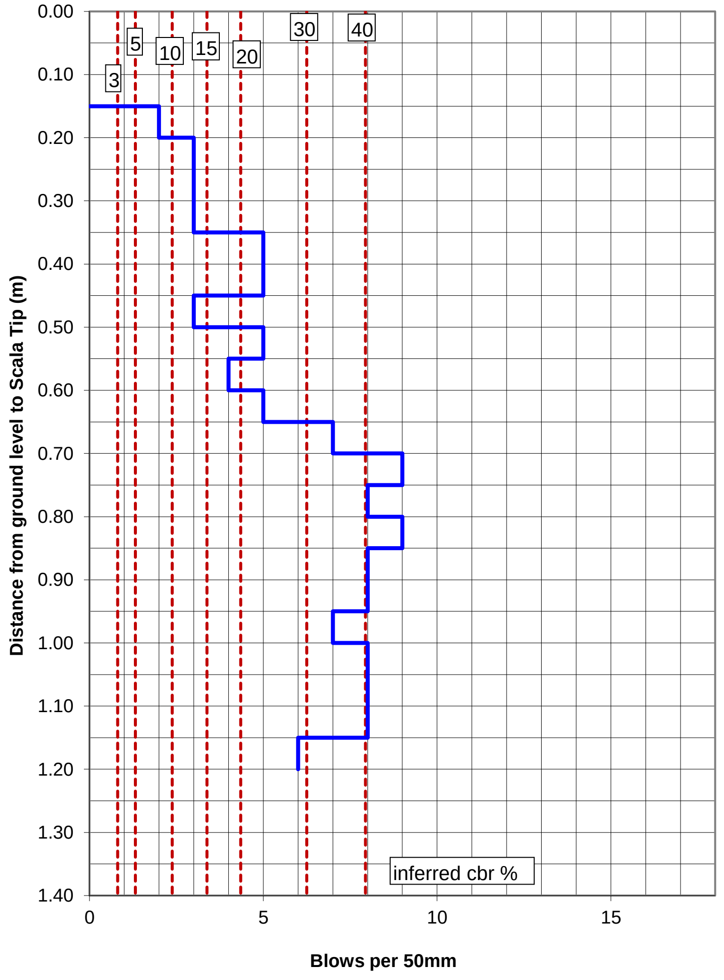
Lab Job No:	8020-1727	**Scala No:**	SCB 3
Client:	Cook Costello	**Ref :**	16103
Job:	The Landing, Stage 6-7	**Report No:**	WRE8020-1727-R003
Location:	Stage 7a	**Page:**	3 of 15
Start Depth (m):	0.15		

LWD (MPa): **56.4**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.15
2	4	12	2	0.20
3	6	18	5	0.25
3	6	18	8	0.30
3	6	18	11	0.35
5	10	30	16	0.40
5	10	30	21	0.45
3	6	18	24	0.50
5	10	30	29	0.55
4	8	24	33	0.60
5	10	30	38	0.65
7	14	42	45	0.70
9	18	54	54	0.75
8	16	48	62	0.80
9	18	54	71	0.85
8	16	48	79	0.90
8	16	48	87	0.95
7	14	42	94	1.00
8	16	48	102	1.05
8	16	48	110	1.10
8	16	48	118	1.15
6	12	36	124	1.20

Scala Penetrometer Results



Recorded By:	A.B
Date:	1/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

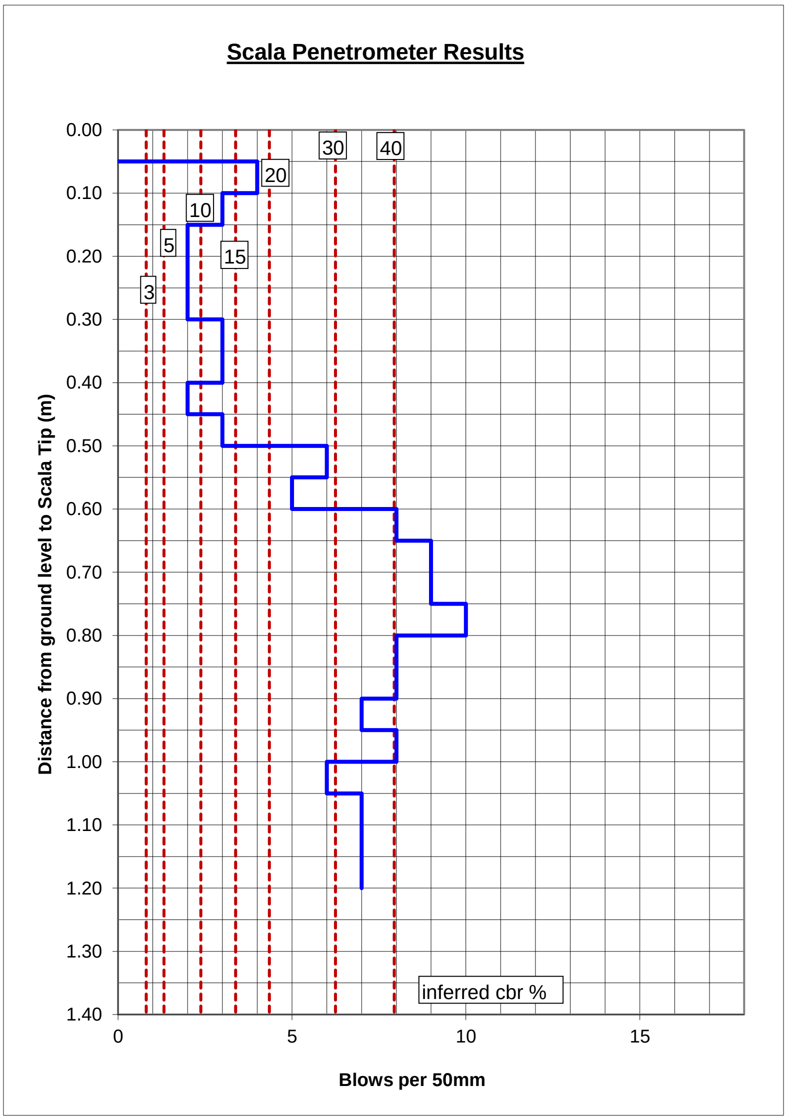
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 4
Client:	Cook Costello	**Ref :**	16103
Job:	The Landing, Stage 6-7	**Report No:**	WRE8020-1727-R003
Location:	Stage 7a	**Page:**	4 of 15
Start Depth (m):	0.05		

LWD (MPa): **49.1**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
4	8	24	4	0.10
3	6	18	7	0.15
2	4	12	9	0.20
2	4	12	11	0.25
2	4	12	13	0.30
3	6	18	16	0.35
3	6	18	19	0.40
2	4	12	21	0.45
3	6	18	24	0.50
6	12	36	30	0.55
5	10	30	35	0.60
8	16	48	43	0.65
9	18	54	52	0.70
9	18	54	61	0.75
10	20	60	71	0.80
8	16	48	79	0.85
8	16	48	87	0.90
7	14	42	94	0.95
8	16	48	102	1.00
6	12	36	108	1.05
7	14	42	115	1.10
7	14	42	122	1.15
7	14	42	129	1.20



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

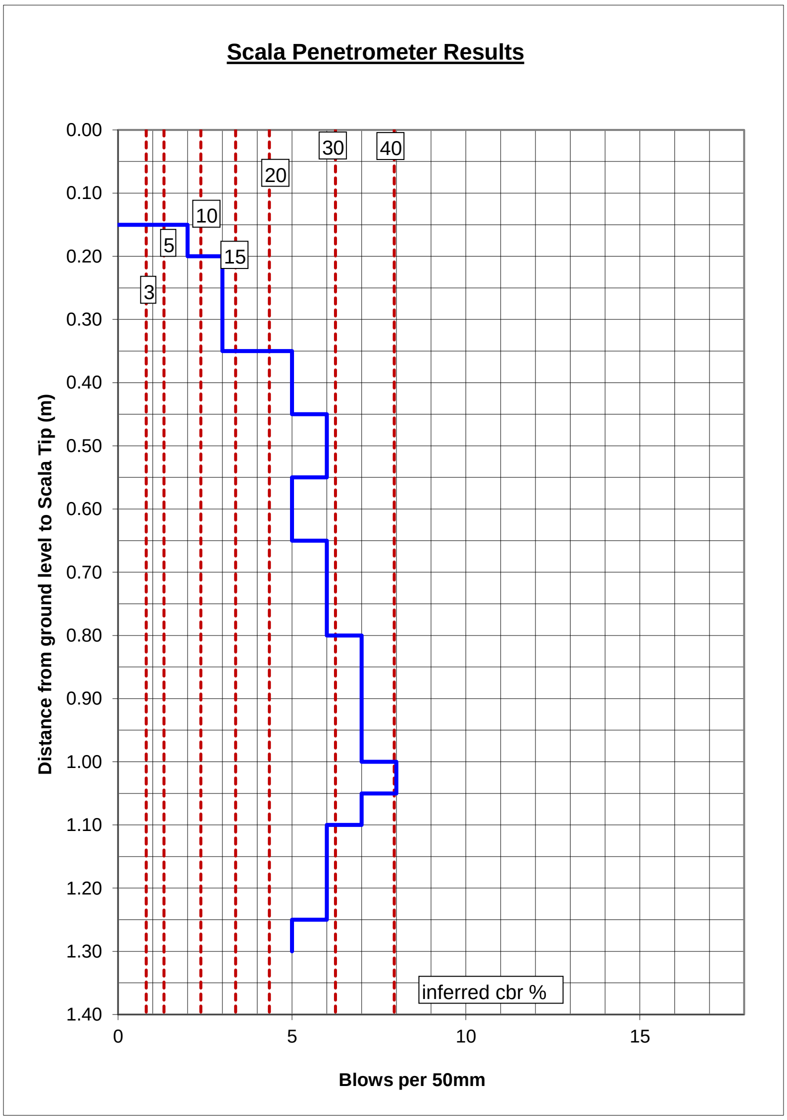
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.15

LWD (MPa): **55.7**

Scala No: SCB 5
Ref : 16103
Report No: WRE8020-1727-R003
Page: 5 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.15
2	4	12	2	0.20
3	6	18	5	0.25
3	6	18	8	0.30
3	6	18	11	0.35
5	10	30	16	0.40
5	10	30	21	0.45
6	12	36	27	0.50
6	12	36	33	0.55
5	10	30	38	0.60
5	10	30	43	0.65
6	12	36	49	0.70
6	12	36	55	0.75
6	12	36	61	0.80
7	14	42	68	0.85
7	14	42	75	0.90
7	14	42	82	0.95
7	14	42	89	1.00
8	16	48	97	1.05
7	14	42	104	1.10
6	12	36	110	1.15
6	12	36	116	1.20
6	12	36	122	1.25
5	10	30	127	1.30



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

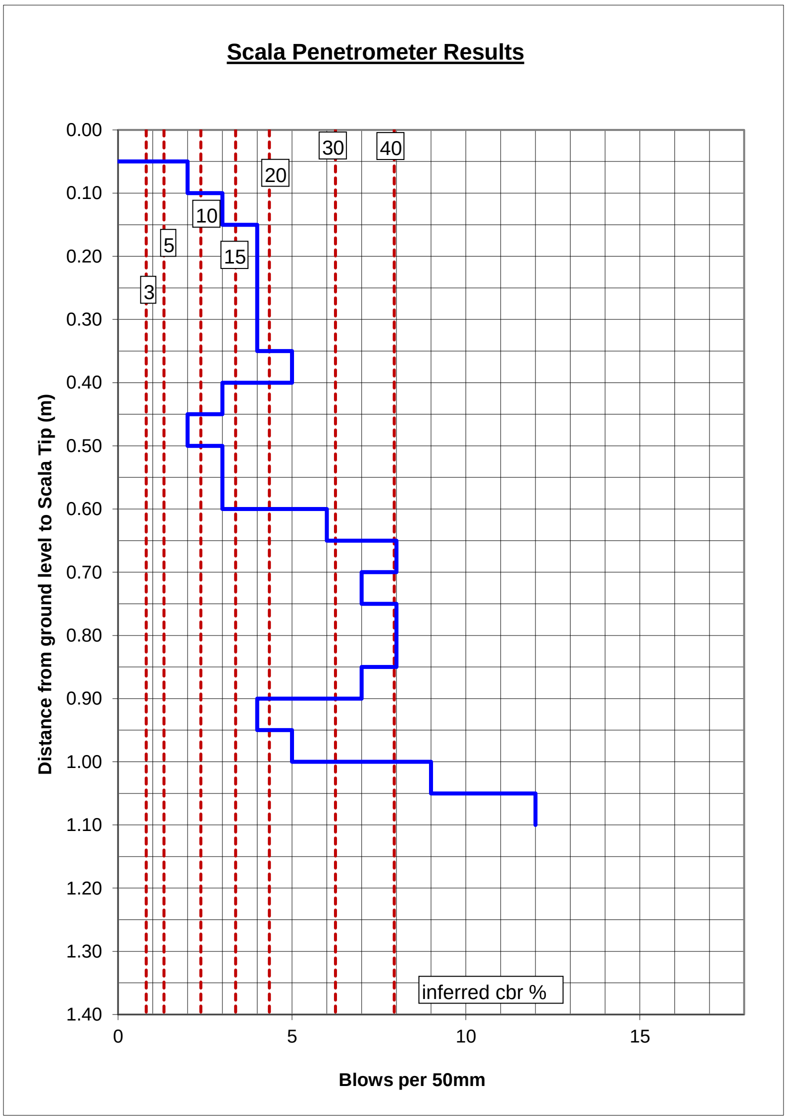
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.05

LWD (MPa): **49**

Scala No: SCB 35
Ref : 16103
Report No: WRE8020-1727-R003
Page: 6 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
3	6	18	5	0.15
4	8	24	9	0.20
4	8	24	13	0.25
4	8	24	17	0.30
4	8	24	21	0.35
5	10	30	26	0.40
3	6	18	29	0.45
2	4	12	31	0.50
3	6	18	34	0.55
3	6	18	37	0.60
6	12	36	43	0.65
8	16	48	51	0.70
7	14	42	58	0.75
8	16	48	66	0.80
8	16	48	74	0.85
7	14	42	81	0.90
4	8	24	85	0.95
5	10	30	90	1.00
9	18	54	99	1.05
12	24	72	111	1.10



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

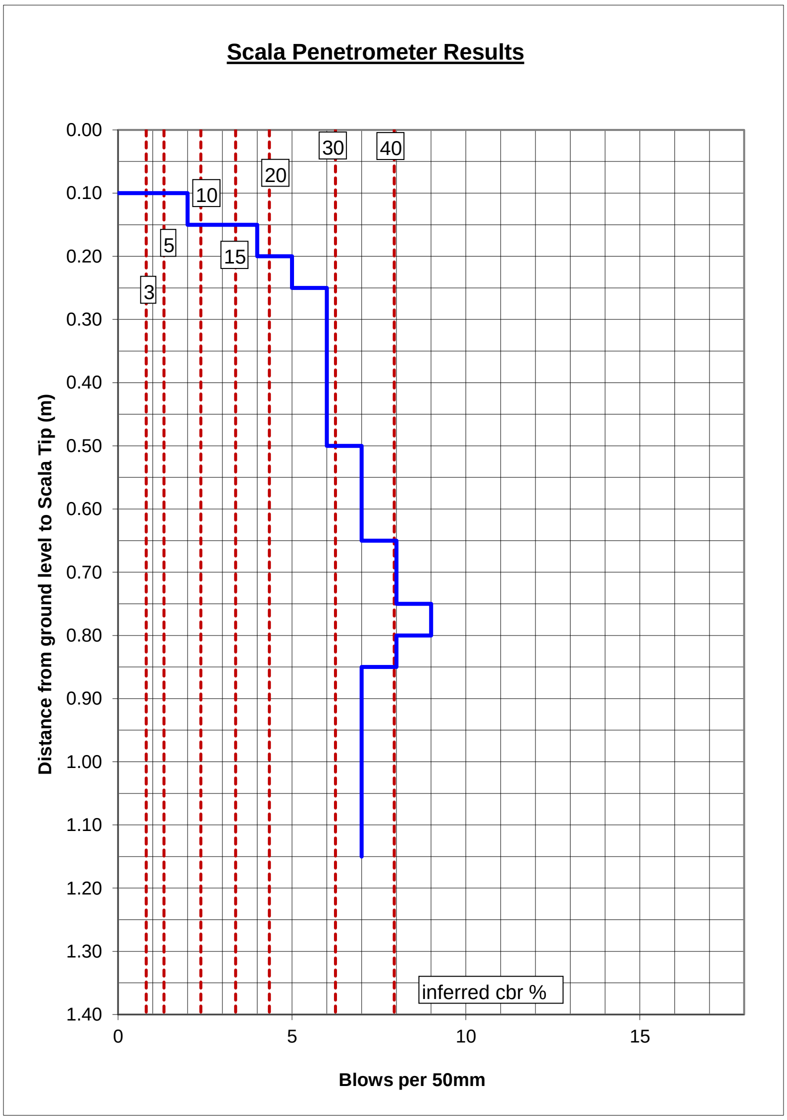
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.1

LWD (MPa): **69.7**

Scala No: SCB 36
Ref : 16103
Report No: WRE8020-1727-R003
Page: 7 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.10
2	4	12	2	0.15
4	8	24	6	0.20
5	10	30	11	0.25
6	12	36	17	0.30
6	12	36	23	0.35
6	12	36	29	0.40
6	12	36	35	0.45
6	12	36	41	0.50
7	14	42	48	0.55
7	14	42	55	0.60
7	14	42	62	0.65
8	16	48	70	0.70
8	16	48	78	0.75
9	18	54	87	0.80
8	16	48	95	0.85
7	14	42	102	0.90
7	14	42	109	0.95
7	14	42	116	1.00
7	14	42	123	1.05
7	14	42	130	1.10
7	14	42	137	1.15



Scala Penetrometer Results

Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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Approved Signatory

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

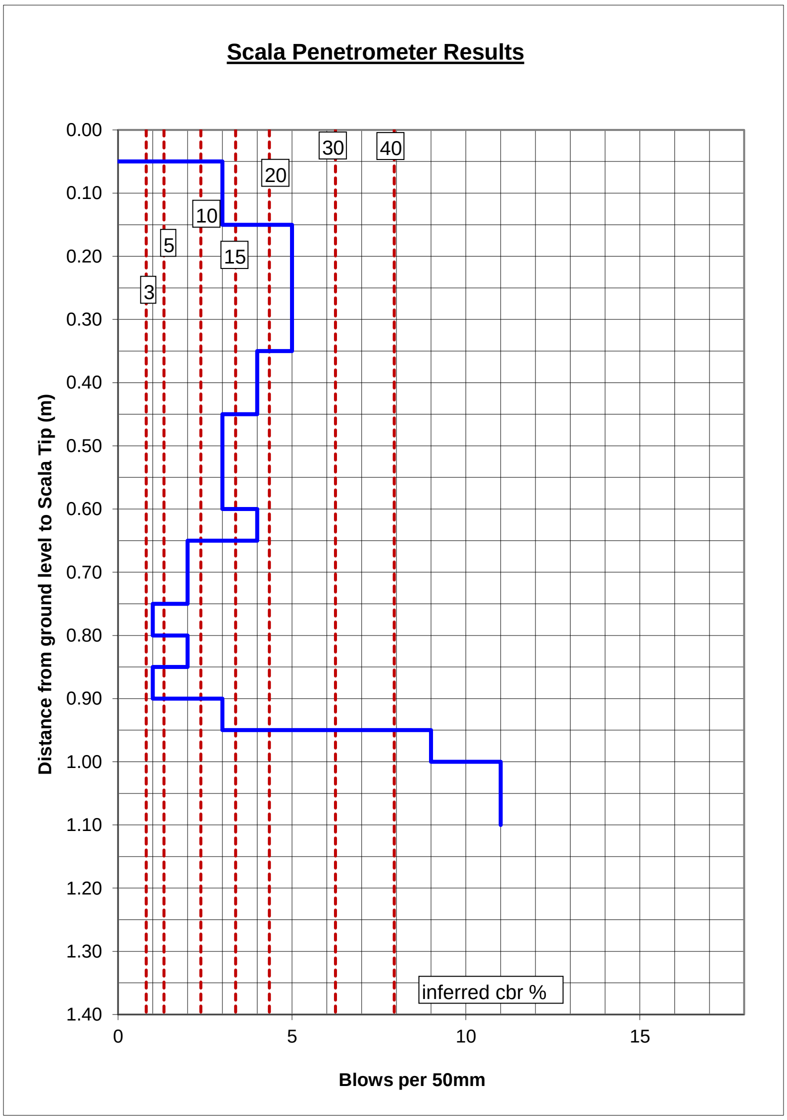
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.05

LWD (MPa): **58.1**

Scala No: SCB 37
Ref : 16103
Report No: WRE8020-1727-R003
Page: 8 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
3	6	18	6	0.15
5	10	30	11	0.20
5	10	30	16	0.25
5	10	30	21	0.30
5	10	30	26	0.35
4	8	24	30	0.40
4	8	24	34	0.45
3	6	18	37	0.50
3	6	18	40	0.55
3	6	18	43	0.60
4	8	24	47	0.65
2	4	12	49	0.70
2	4	12	51	0.75
1	2	6	52	0.80
2	4	12	54	0.85
1	2	6	55	0.90
3	6	18	58	0.95
9	18	54	67	1.00
11	22	66	78	1.05
11	22	66	89	1.10



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

Whangarei Laboratory
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Whangarei
P: 09 438 4417
E: info@geocivil.co.nz

DYNAMIC CONE (SCALA) PENETROMETER

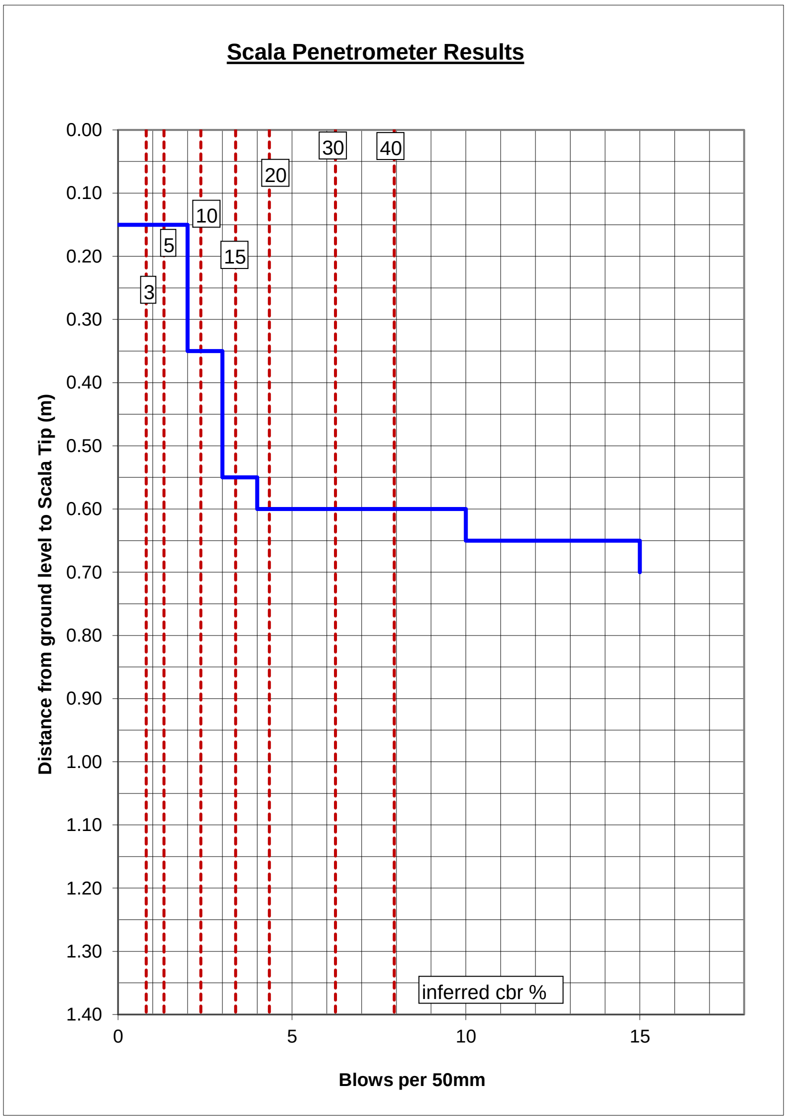
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 38
Client:	Cook Costello	**Ref :**	16103
Job:	The Landing, Stage 6-7	**Report No:**	WRE8020-1727-R003
Location:	Stage 7a	**Page:**	9 of 15
Start Depth (m):	0.15		

LWD (MPa): **32.7**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.15
2	4	12	2	0.20
2	4	12	4	0.25
2	4	12	6	0.30
2	4	12	8	0.35
3	6	18	11	0.40
3	6	18	14	0.45
3	6	18	17	0.50
3	6	18	20	0.55
4	8	24	24	0.60
10	20	60	34	0.65
15	30	90	49	0.70



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

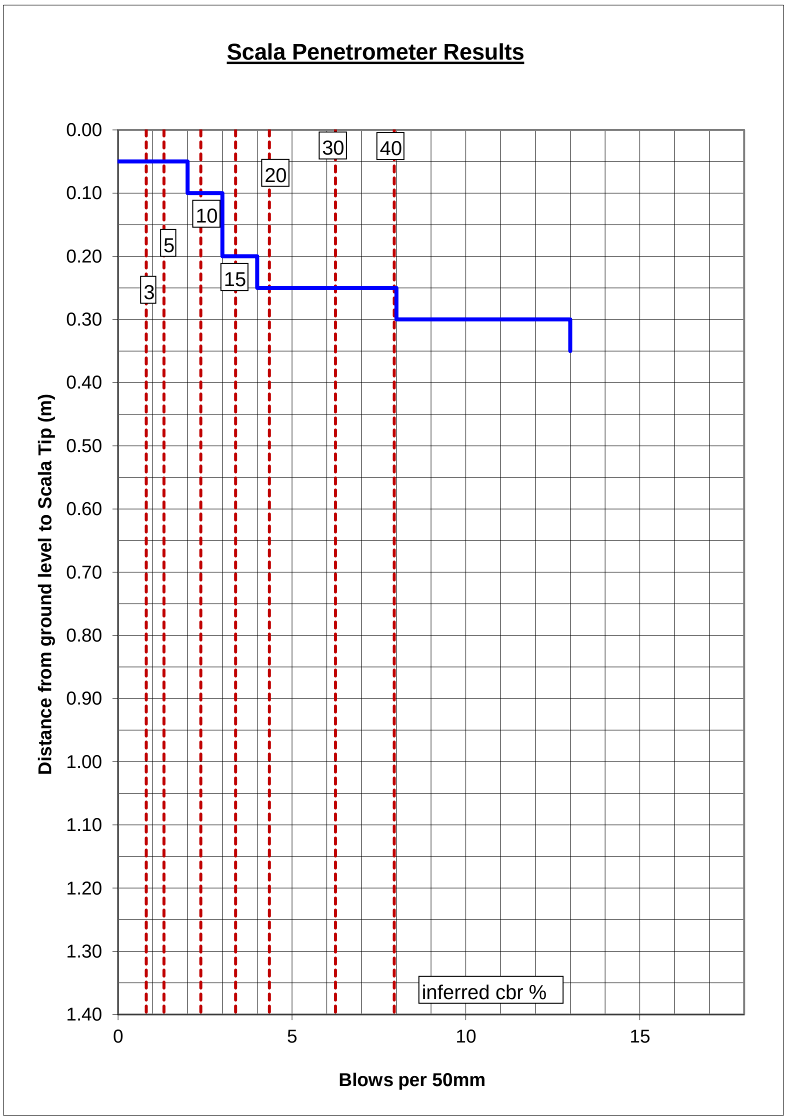
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.05

LWD (MPa): **55.7**

Scala No: SCB 39
Ref : 16103
Report No: WRE8020-1727-R003
Page: 10 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
3	6	18	5	0.15
3	6	18	8	0.20
4	8	24	12	0.25
8	16	48	20	0.30
13	26	78	33	0.35



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

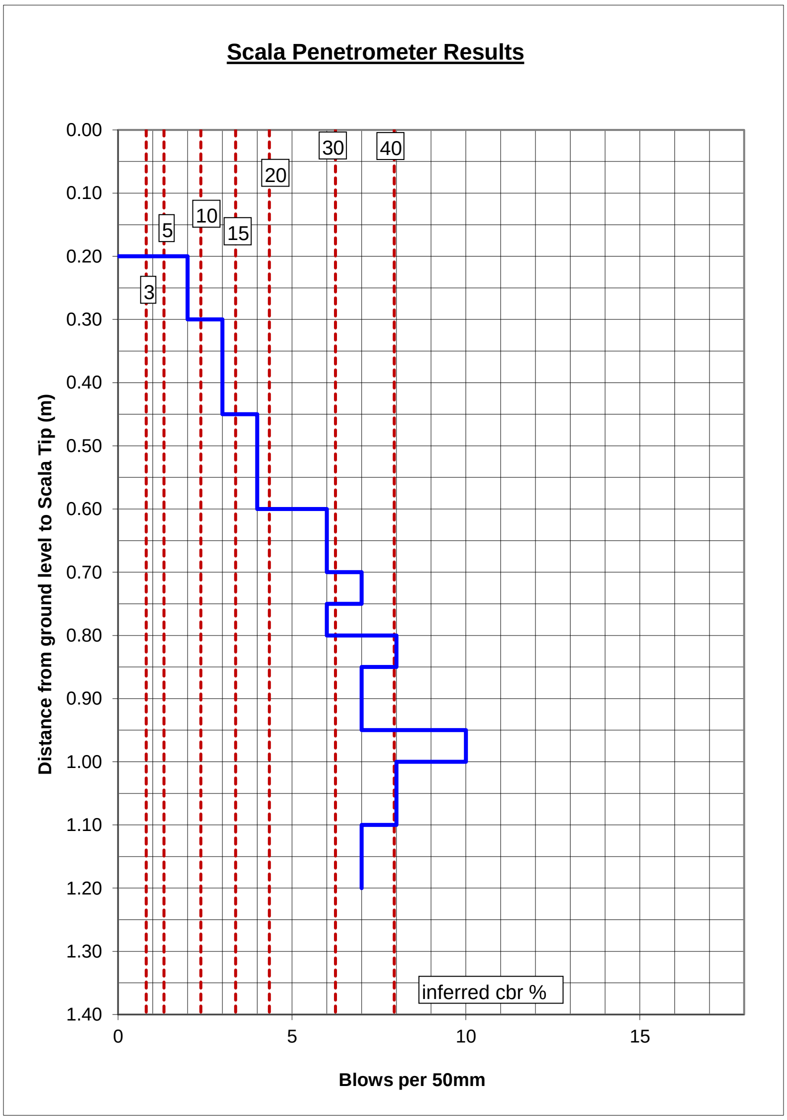
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCB 40
Client:	Cook Costello	**Ref :**	16103
Job:	The Landing, Stage 6-7	**Report No:**	WRE8020-1727-R003
Location:	Stage 7a	**Page:**	11 of 15
Start Depth (m):	0.2		

LWD (MPa): 83

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.20
2	4	12	2	0.25
2	4	12	4	0.30
3	6	18	7	0.35
3	6	18	10	0.40
3	6	18	13	0.45
4	8	24	17	0.50
4	8	24	21	0.55
4	8	24	25	0.60
6	12	36	31	0.65
6	12	36	37	0.70
7	14	42	44	0.75
6	12	36	50	0.80
8	16	48	58	0.85
7	14	42	65	0.90
7	14	42	72	0.95
10	20	60	82	1.00
8	16	48	90	1.05
8	16	48	98	1.10
7	14	42	105	1.15
7	14	42	112	1.20



Recorded By:	A.B
Date:	1/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

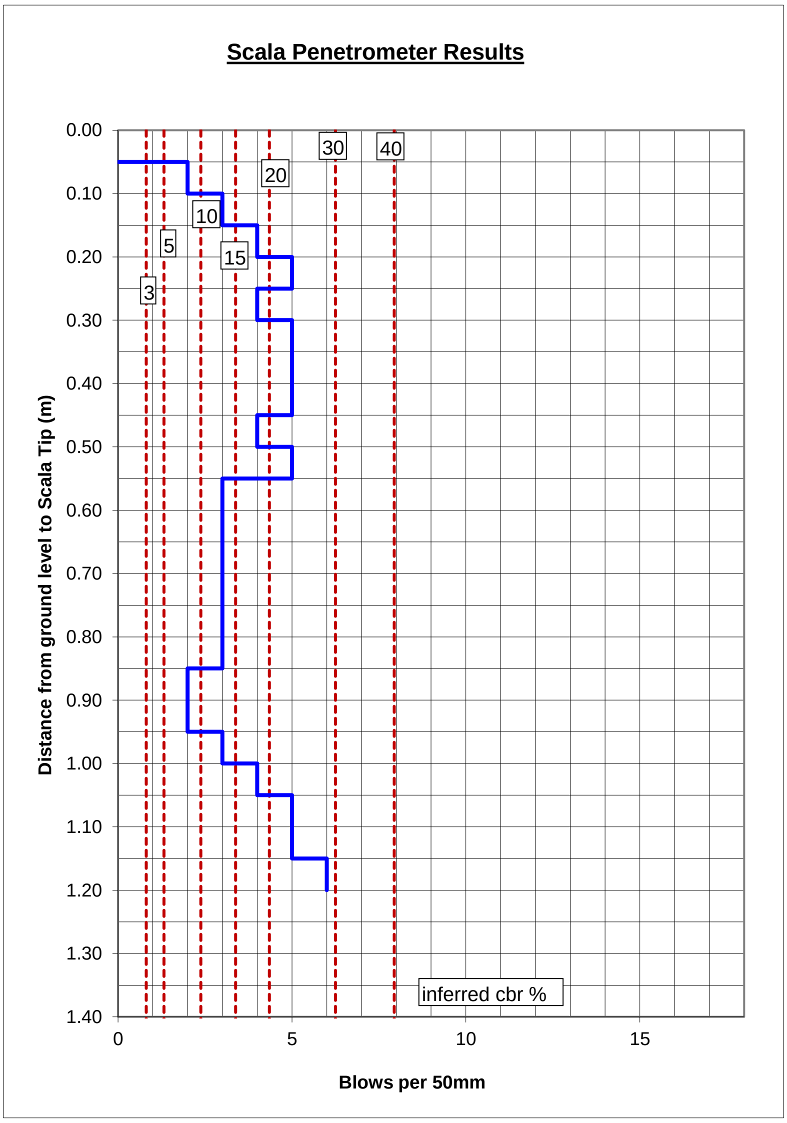
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.05

LWD (MPa): **78.4**

Scala No: SCB 41
Ref : 16103
Report No: WRE8020-1727-R003
Page: 12 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
3	6	18	5	0.15
4	8	24	9	0.20
5	10	30	14	0.25
4	8	24	18	0.30
5	10	30	23	0.35
5	10	30	28	0.40
5	10	30	33	0.45
4	8	24	37	0.50
5	10	30	42	0.55
3	6	18	45	0.60
3	6	18	48	0.65
3	6	18	51	0.70
3	6	18	54	0.75
3	6	18	57	0.80
3	6	18	60	0.85
2	4	12	62	0.90
2	4	12	64	0.95
3	6	18	67	1.00
4	8	24	71	1.05
5	10	30	76	1.10
5	10	30	81	1.15
6	12	36	87	1.20
6	12	36	93	1.25



Scala Penetrometer Results

Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.2

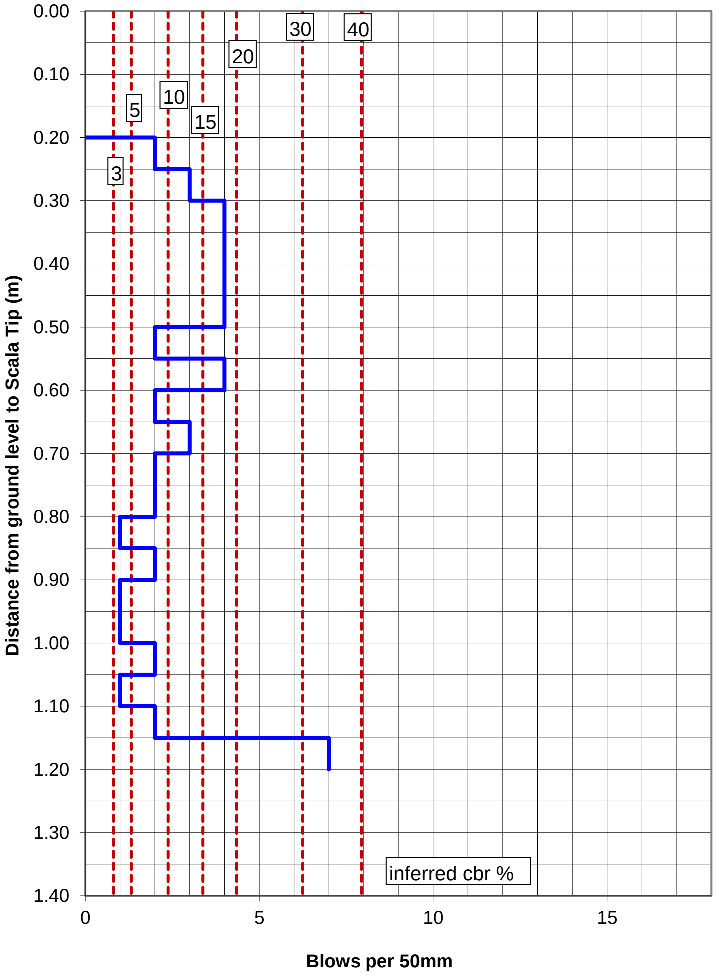
LWD (MPa): **53.3**

Scala No: SCB 42
Ref : 16103
Report No: WRE8020-1727-R003
Page: 13 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.20
2	4	12	2	0.25
3	6	18	5	0.30
4	8	24	9	0.35
4	8	24	13	0.40
4	8	24	17	0.45
4	8	24	21	0.50
2	4	12	23	0.55
4	8	24	27	0.60
2	4	12	29	0.65
3	6	18	32	0.70
2	4	12	34	0.75
2	4	12	36	0.80
1	2	6	37	0.85
2	4	12	39	0.90
1	2	6	40	0.95
1	2	6	41	1.00
2	4	12	43	1.05
1	2	6	44	1.10
2	4	12	46	1.15
7	14	42	53	1.20

Scala Penetrometer Results



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

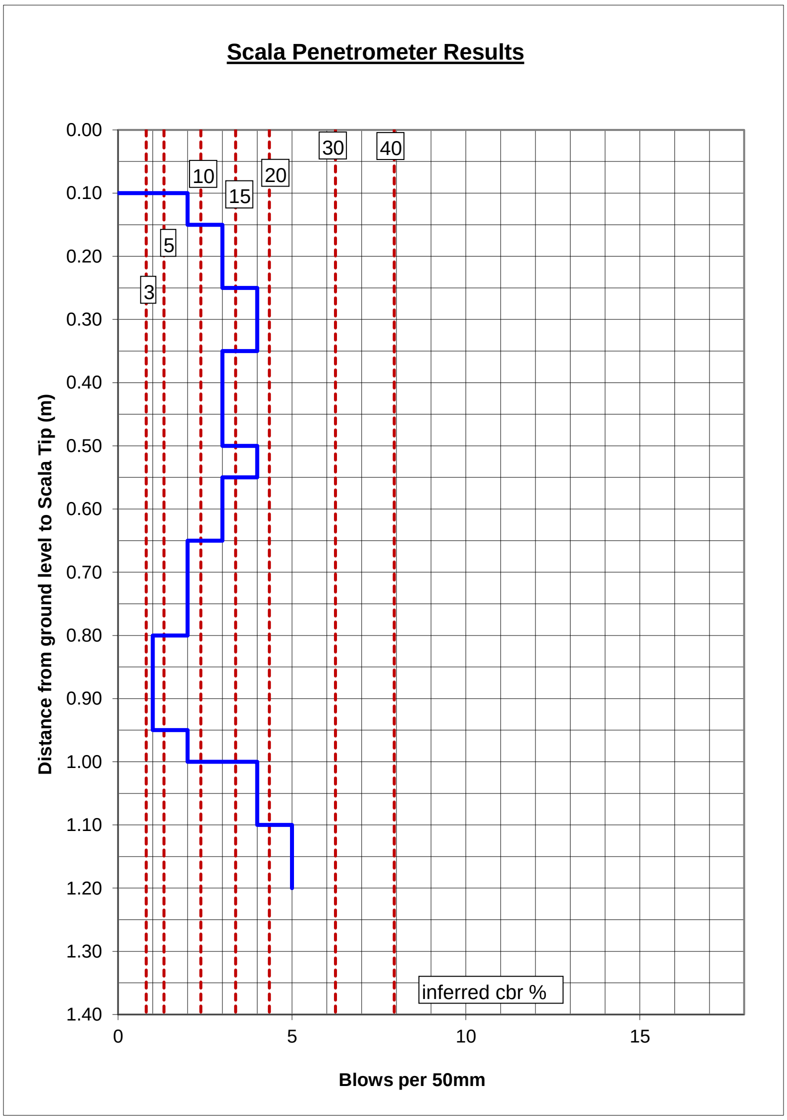
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.1

LWD (MPa): **52.9**

Scala No: SCB 43
Ref : 16103
Report No: WRE8020-1727-R003
Page: 14 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.10
2	4	12	2	0.15
3	6	18	5	0.20
3	6	18	8	0.25
4	8	24	12	0.30
4	8	24	16	0.35
3	6	18	19	0.40
3	6	18	22	0.45
3	6	18	25	0.50
4	8	24	29	0.55
3	6	18	32	0.60
3	6	18	35	0.65
2	4	12	37	0.70
2	4	12	39	0.75
2	4	12	41	0.80
1	2	6	42	0.85
1	2	6	43	0.90
1	2	6	44	0.95
2	4	12	46	1.00
4	8	24	50	1.05
4	8	24	54	1.10
5	10	30	59	1.15
5	10	30	64	1.20


Scala Penetrometer Results

Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing, Stage 6-7
Location: Stage 7a
Start Depth (m): 0.15

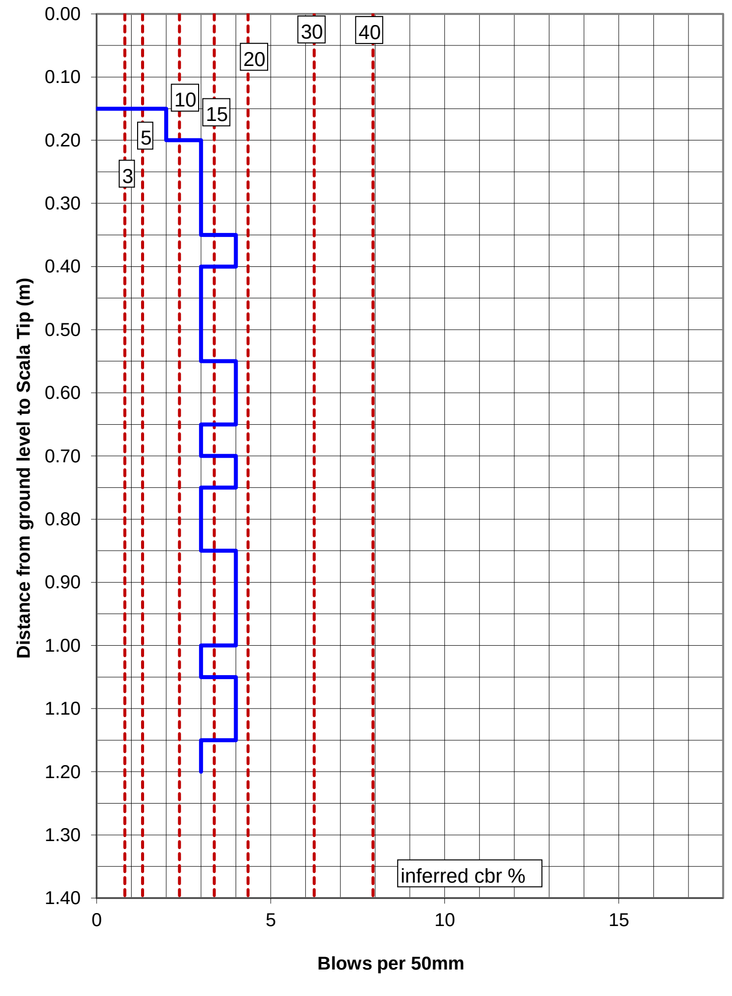
LWD (MPa): **56**

Scala No: SCB 44
Ref : 16103
Report No: WRE8020-1727-R003
Page: 15 of 15

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.15
2	4	12	2	0.20
3	6	18	5	0.25
3	6	18	8	0.30
3	6	18	11	0.35
4	8	24	15	0.40
3	6	18	18	0.45
3	6	18	21	0.50
3	6	18	24	0.55
4	8	24	28	0.60
4	8	24	32	0.65
3	6	18	35	0.70
4	8	24	39	0.75
3	6	18	42	0.80
3	6	18	45	0.85
4	8	24	49	0.90
4	8	24	53	0.95
4	8	24	57	1.00
3	6	18	60	1.05
4	8	24	64	1.10
4	8	24	68	1.15
3	6	18	71	1.20

Scala Penetrometer Results



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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E: martin@geocivil.co.nz

TEST REPORT

Lab Job No: 8020-1727

Your ref.: -

Date of Issue: 15/02/2022

Date of Re-Issue: -

Page: 1 of 42

Test Report No.
WRE8020-1727-R004

PROJECT: **The Landing - Stage 6-7 Scala Fill Testing 1/12/2021 & 16/12/2021**

CLIENT:
Cook Costello
2 Norfolk Street,
Whangarei 0110

ATTENTION: Stefano Rotatori

TEST METHODS:
Determination of the penetration resistance using a dynamic cone (scala) Penetrometer
NZS 4402: 1988 Test 6.5.2
Light Weight Deflectometer (LWD) (Not accredited)
ASTM E2835-11 (Not accredited)

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

Alex Millar
A. Millar
Administrator

S. Kokich
Approved Signatory

ACCREDITED IANZ TESTING LABORATORY

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

DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

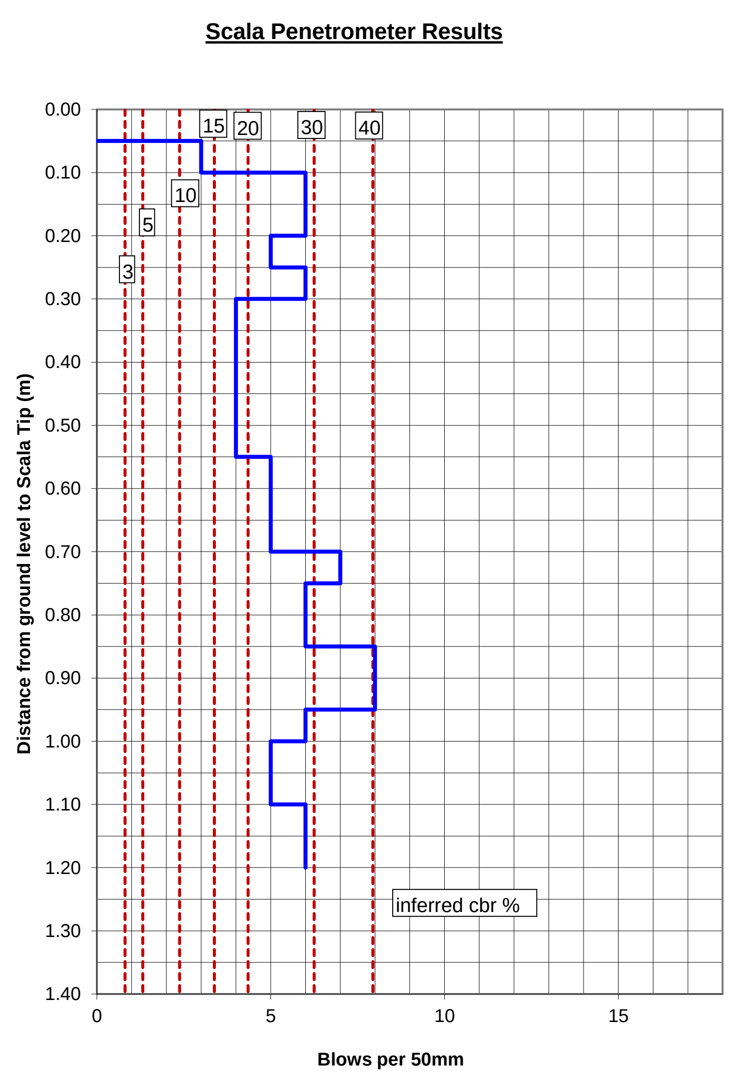
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.05

LWD (MPa): 62

Scala No: SCP1
Ref : -
Report No: WRE8020-1727-R004
Page: 2 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
6	12	36	9	0.15
6	12	36	15	0.20
5	10	30	20	0.25
6	12	36	26	0.30
4	8	24	30	0.35
4	8	24	34	0.40
4	8	24	38	0.45
4	8	24	42	0.50
4	8	24	46	0.55
5	10	30	51	0.60
5	10	30	56	0.65
5	10	30	61	0.70
7	14	42	68	0.75
6	12	36	74	0.80
6	12	36	80	0.85
8	16	48	88	0.90
8	16	48	96	0.95
6	12	36	102	1.00
5	10	30	107	1.05
5	10	30	112	1.10
6	12	36	118	1.15
6	12	36	124	1.20



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

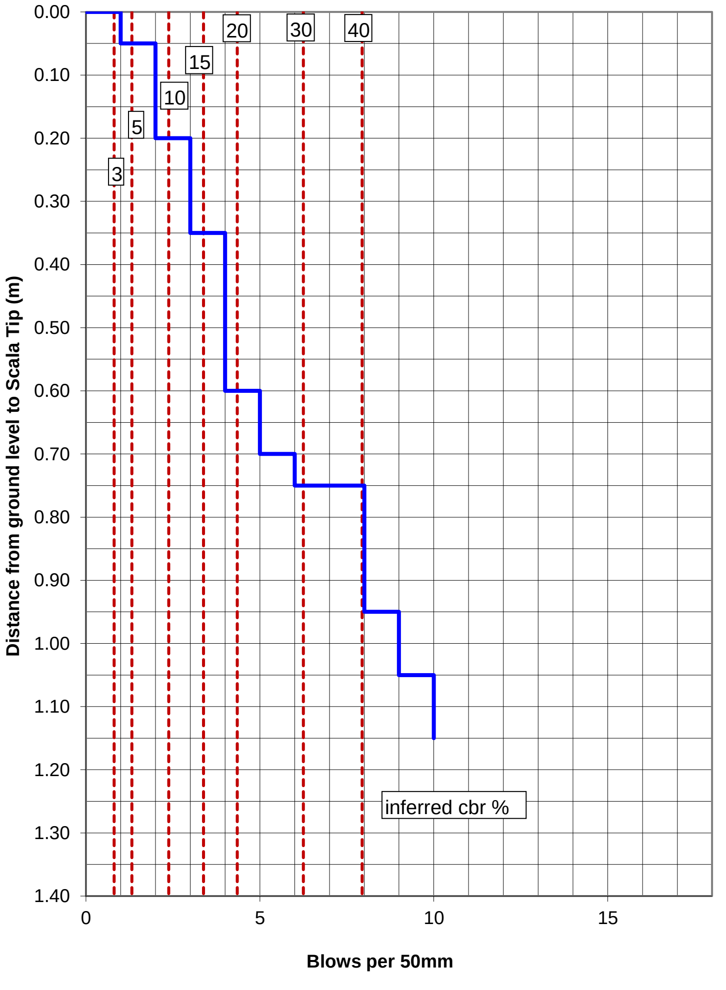
LWD (MPa): **47.7**

Scala No: SCP2
Ref : -
Report No: WRE8020-1727-R004
Page: 3 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
3	6	18	10	0.25
3	6	18	13	0.30
3	6	18	16	0.35
4	8	24	20	0.40
4	8	24	24	0.45
4	8	24	28	0.50
4	8	24	32	0.55
4	8	24	36	0.60
5	10	30	41	0.65
5	10	30	46	0.70
6	12	36	52	0.75
8	16	48	60	0.80
8	16	48	68	0.85
8	16	48	76	0.90
8	16	48	84	0.95
9	18	54	93	1.00
9	18	54	102	1.05
10	20	60	112	1.10
10	20	60	122	1.15

Scala Penetrometer Results



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

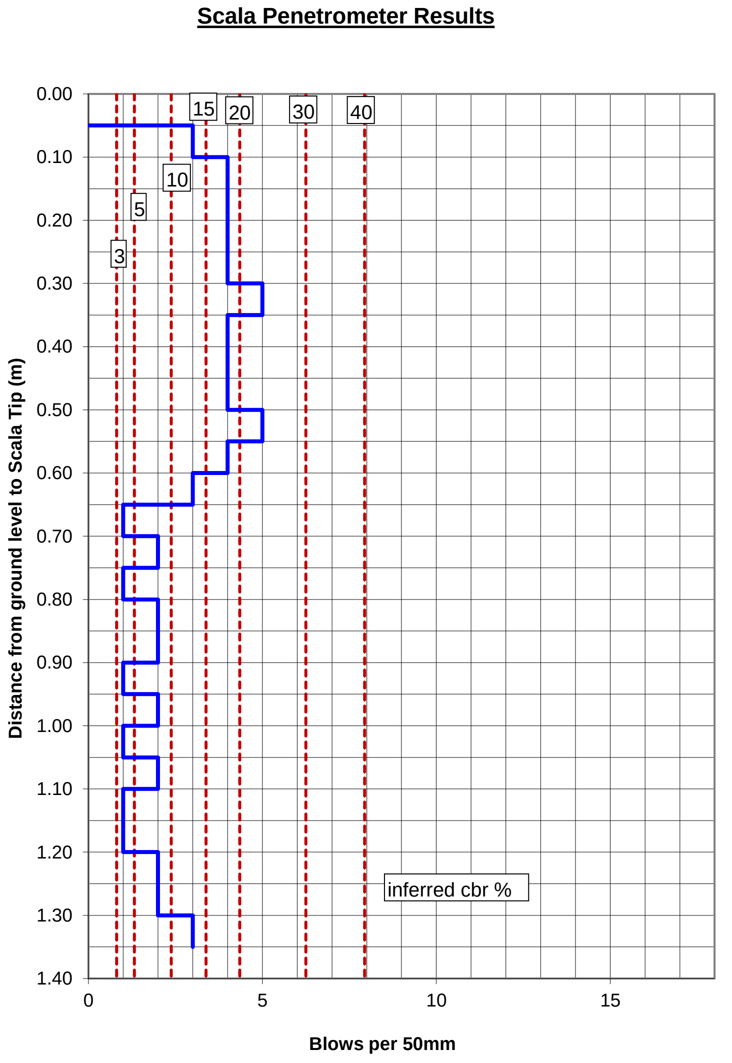
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP3
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	4 of 42
Start Depth (m):	0.05		

LWD (MPa): 59

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
4	8	24	7	0.15
4	8	24	11	0.20
4	8	24	15	0.25
4	8	24	19	0.30
5	10	30	24	0.35
4	8	24	28	0.40
4	8	24	32	0.45
4	8	24	36	0.50
5	10	30	41	0.55
4	8	24	45	0.60
3	6	18	48	0.65
1	2	6	49	0.70
2	4	12	51	0.75
1	2	6	52	0.80
2	4	12	54	0.85
2	4	12	56	0.90
1	2	6	57	0.95
2	4	12	59	1.00
1	2	6	60	1.05
2	4	12	62	1.10
1	2	6	63	1.15
1	2	6	64	1.20
2	4	12	66	1.25
2	4	12	68	1.30
3	6	18	71	1.35



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

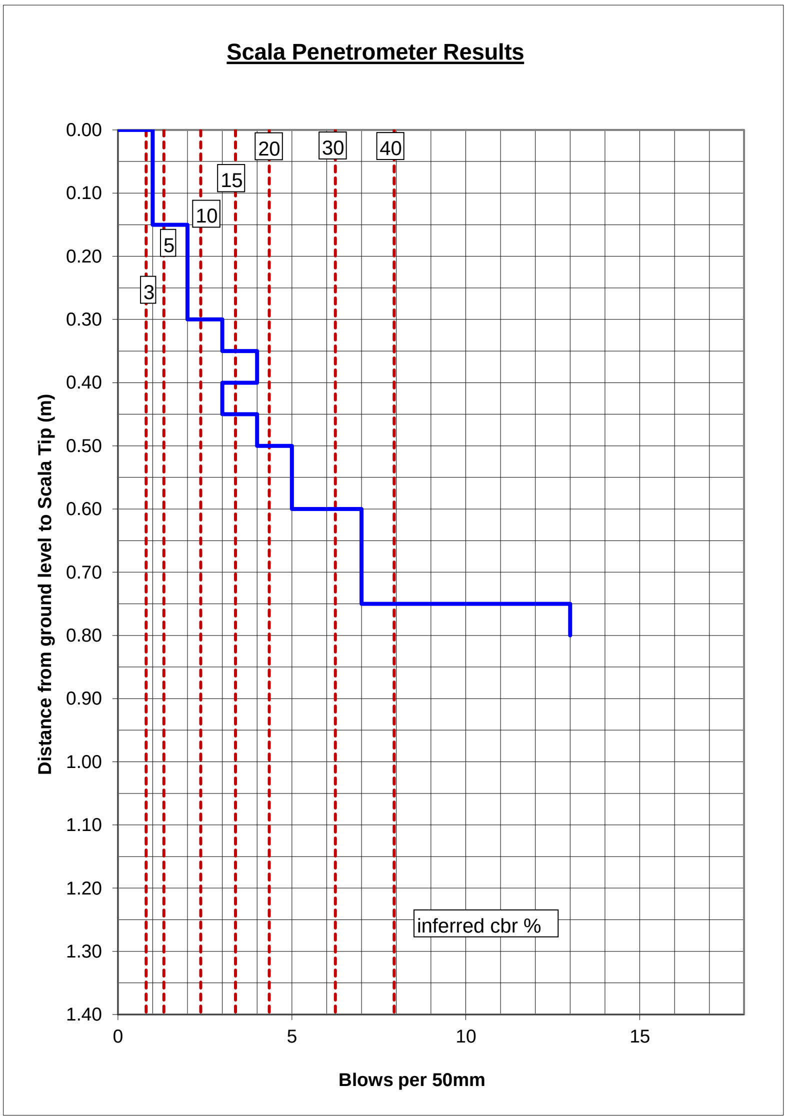
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): **49.9**
-35.83209, 174.45813

Scala No: SCP4
Ref : -
Report No: WRE8020-1727-R004
Page: 5 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
1	2	6	3	0.15
2	4	12	5	0.20
2	4	12	7	0.25
2	4	12	9	0.30
3	6	18	12	0.35
4	8	24	16	0.40
3	6	18	19	0.45
4	8	24	23	0.50
5	10	30	28	0.55
5	10	30	33	0.60
7	14	42	40	0.65
7	14	42	47	0.70
7	14	42	54	0.75
13	26	78	67	0.80



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

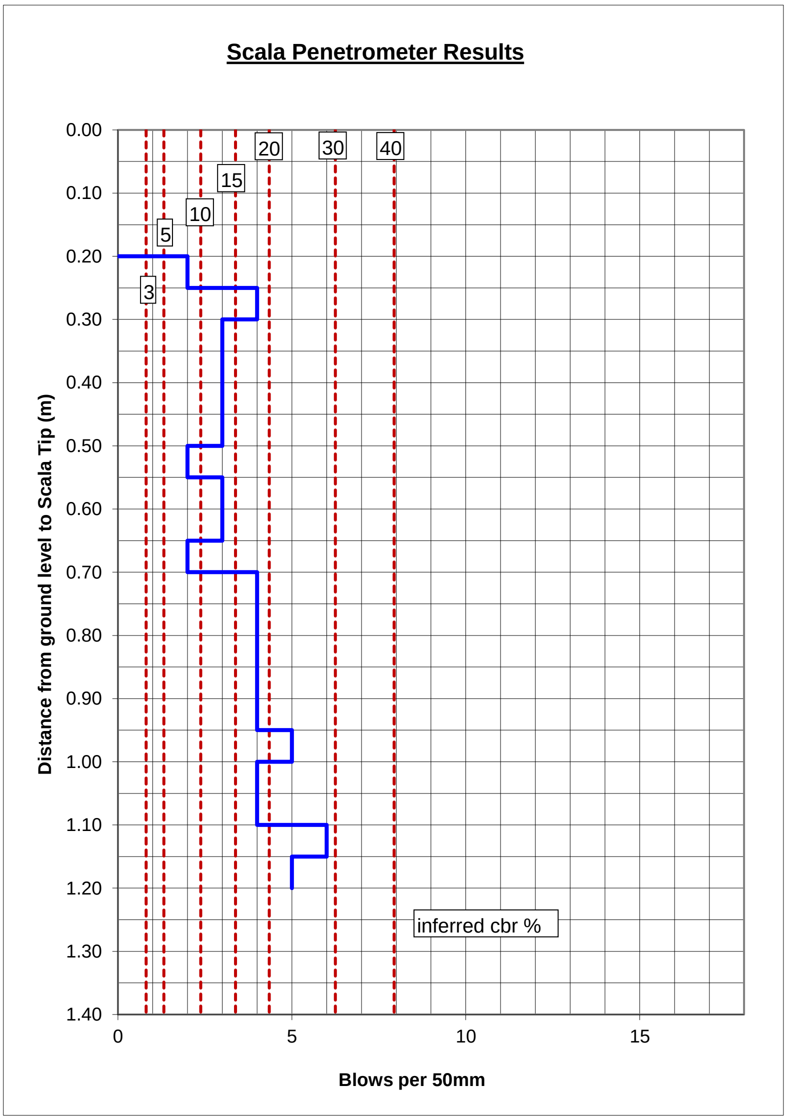
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.20

LWD (MPa): **40**

Scala No: SCP5
Ref : -
Report No: WRE8020-1727-R004
Page: 6 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.20
2	4	12	2	0.25
4	8	24	6	0.30
3	6	18	9	0.35
3	6	18	12	0.40
3	6	18	15	0.45
3	6	18	18	0.50
2	4	12	20	0.55
3	6	18	23	0.60
3	6	18	26	0.65
2	4	12	28	0.70
4	8	24	32	0.75
4	8	24	36	0.80
4	8	24	40	0.85
4	8	24	44	0.90
4	8	24	48	0.95
5	10	30	53	1.00
4	8	24	57	1.05
4	8	24	61	1.10
6	12	36	67	1.15
5	10	30	72	1.20



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

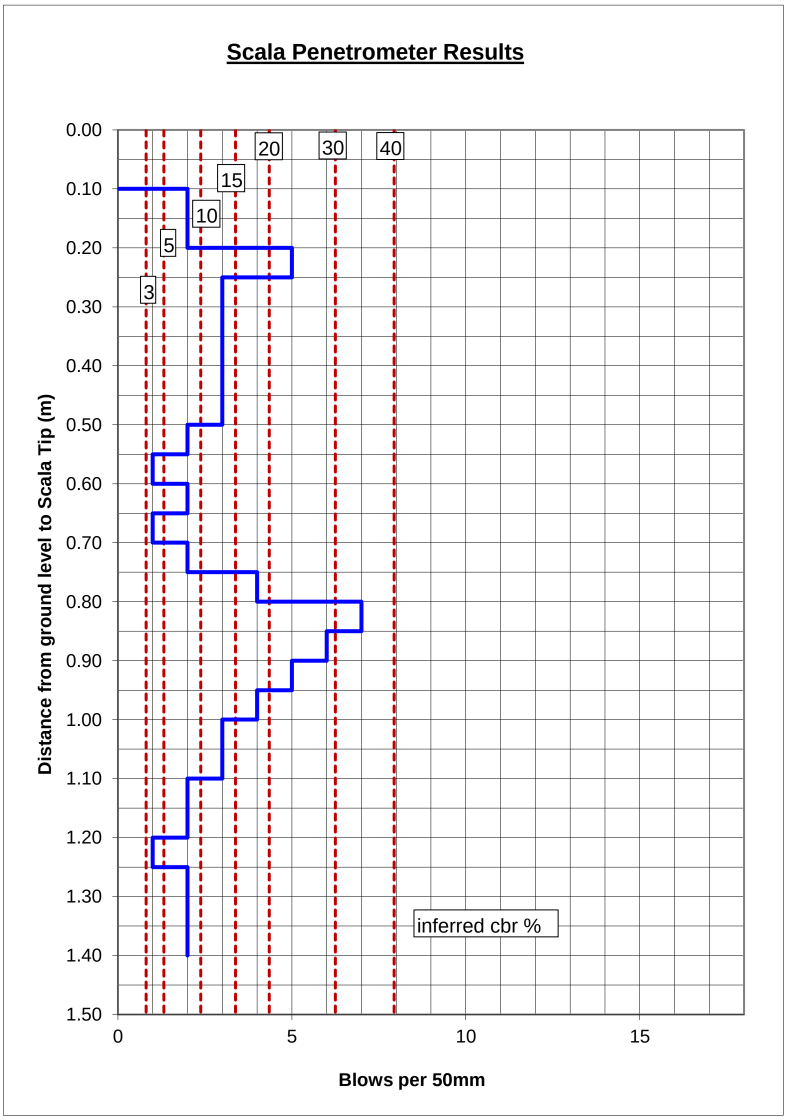
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.10

LWD (MPa): **35**

Scala No: SCP6
Ref : -
Report No: WRE8020-1727-R004
Page: 7 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.10
2	4	12	2	0.15
2	4	12	4	0.20
5	10	30	9	0.25
3	6	18	12	0.30
3	6	18	15	0.35
3	6	18	18	0.40
3	6	18	21	0.45
3	6	18	24	0.50
2	4	12	26	0.55
1	2	6	27	0.60
2	4	12	29	0.65
1	2	6	30	0.70
2	4	12	32	0.75
4	8	24	36	0.80
7	14	42	43	0.85
6	12	36	49	0.90
5	10	30	54	0.95
4	8	24	58	1.00
3	6	18	61	1.05
3	6	18	64	1.10
2	4	12	66	1.15
2	4	12	68	1.20
1	2	6	69	1.25
2	4	12	71	1.30
2	4	12	73	1.35
2	4	12	75	1.40



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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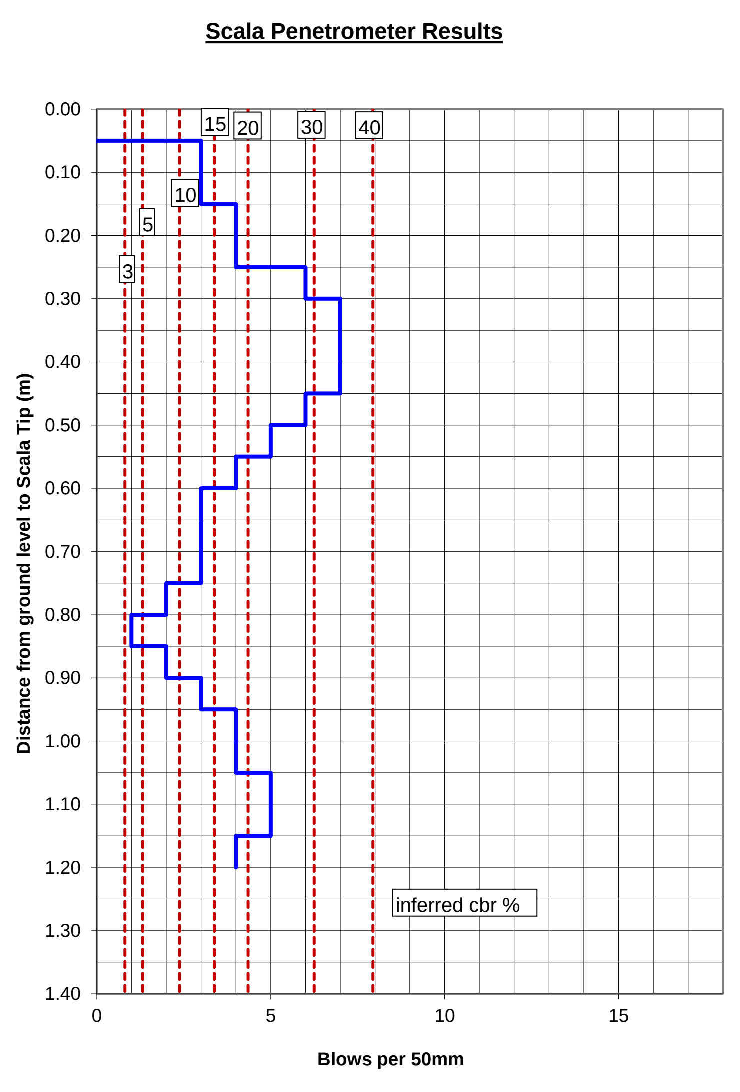
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP7
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	8 of 42
Start Depth (m):	0.05		
LWD (MPa):	**42**		

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road
Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
3	6	18	6	0.15
4	8	24	10	0.20
4	8	24	14	0.25
6	12	36	20	0.30
7	14	42	27	0.35
7	14	42	34	0.40
7	14	42	41	0.45
6	12	36	47	0.50
5	10	30	52	0.55
4	8	24	56	0.60
3	6	18	59	0.65
3	6	18	62	0.70
3	6	18	65	0.75
2	4	12	67	0.80
1	2	6	68	0.85
2	4	12	70	0.90
3	6	18	73	0.95
4	8	24	77	1.00
4	8	24	81	1.05
5	10	30	86	1.10
5	10	30	91	1.15
4	8	24	95	1.20



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

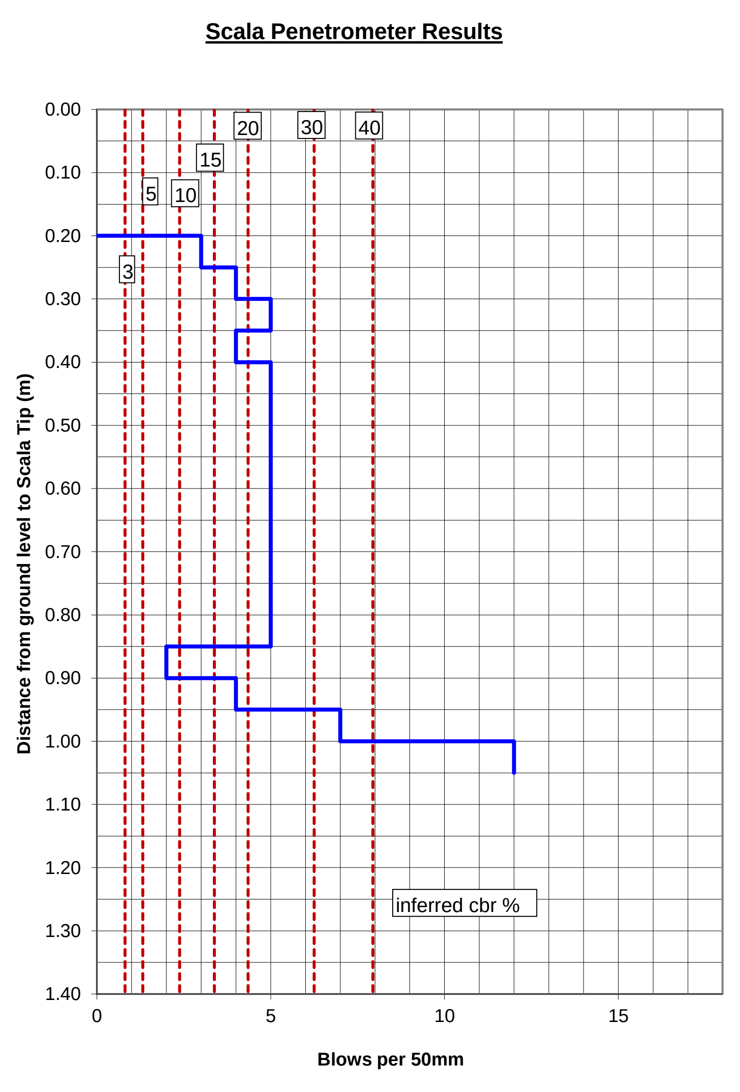
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP8
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	9 of 42
Start Depth (m):	0.20		

LWD (MPa): **38**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.20
3	6	18	3	0.25
4	8	24	7	0.30
5	10	30	12	0.35
4	8	24	16	0.40
5	10	30	21	0.45
5	10	30	26	0.50
5	10	30	31	0.55
5	10	30	36	0.60
5	10	30	41	0.65
5	10	30	46	0.70
5	10	30	51	0.75
5	10	30	56	0.80
5	10	30	61	0.85
2	4	12	63	0.90
4	8	24	67	0.95
7	14	42	74	1.00
12	24	72	86	1.05



Recorded By:	A.B
Date:	1/12/2021
Checked by:	A.M
Date:	12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

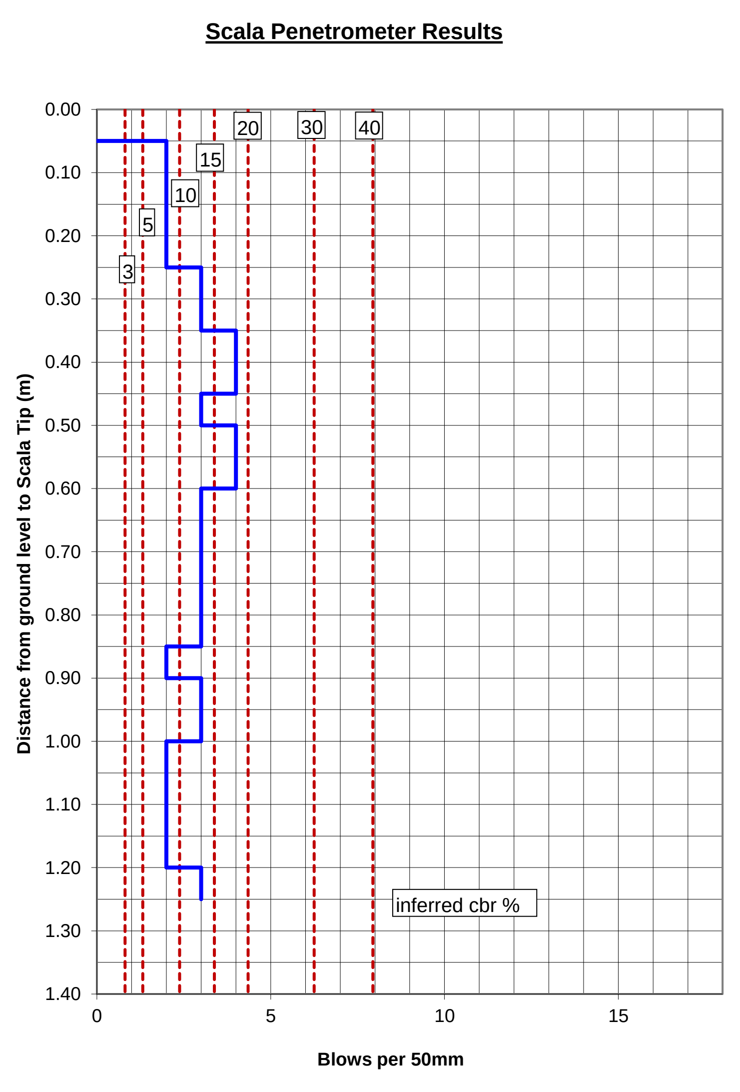
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.05

LWD (MPa): **48**

Scala No: SCP10
Ref : -
Report No: WRE8020-1727-R004
Page: 10 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
2	4	12	8	0.25
3	6	18	11	0.30
3	6	18	14	0.35
4	8	24	18	0.40
4	8	24	22	0.45
3	6	18	25	0.50
4	8	24	29	0.55
4	8	24	33	0.60
3	6	18	36	0.65
3	6	18	39	0.70
3	6	18	42	0.75
3	6	18	45	0.80
3	6	18	48	0.85
2	4	12	50	0.90
3	6	18	53	0.95
3	6	18	56	1.00
2	4	12	58	1.05
2	4	12	60	1.10
2	4	12	62	1.15
2	4	12	64	1.20
3	6	18	67	1.25



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

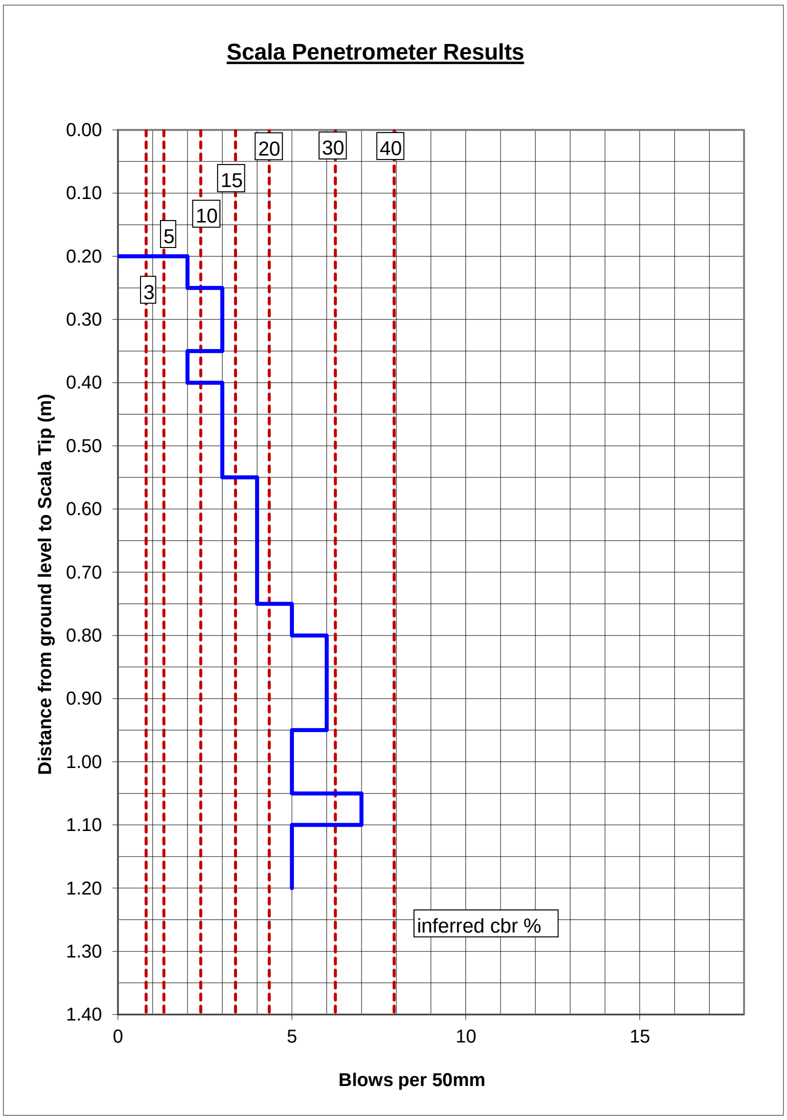
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.20

LWD (MPa): **39**

Scala No: SCP11
Ref : -
Report No: WRE8020-1727-R004
Page: 11 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.20
2	4	12	2	0.25
3	6	18	5	0.30
3	6	18	8	0.35
2	4	12	10	0.40
3	6	18	13	0.45
3	6	18	16	0.50
3	6	18	19	0.55
4	8	24	23	0.60
4	8	24	27	0.65
4	8	24	31	0.70
4	8	24	35	0.75
5	10	30	40	0.80
6	12	36	46	0.85
6	12	36	52	0.90
6	12	36	58	0.95
5	10	30	63	1.00
5	10	30	68	1.05
7	14	42	75	1.10
5	10	30	80	1.15
5	10	30	85	1.20



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

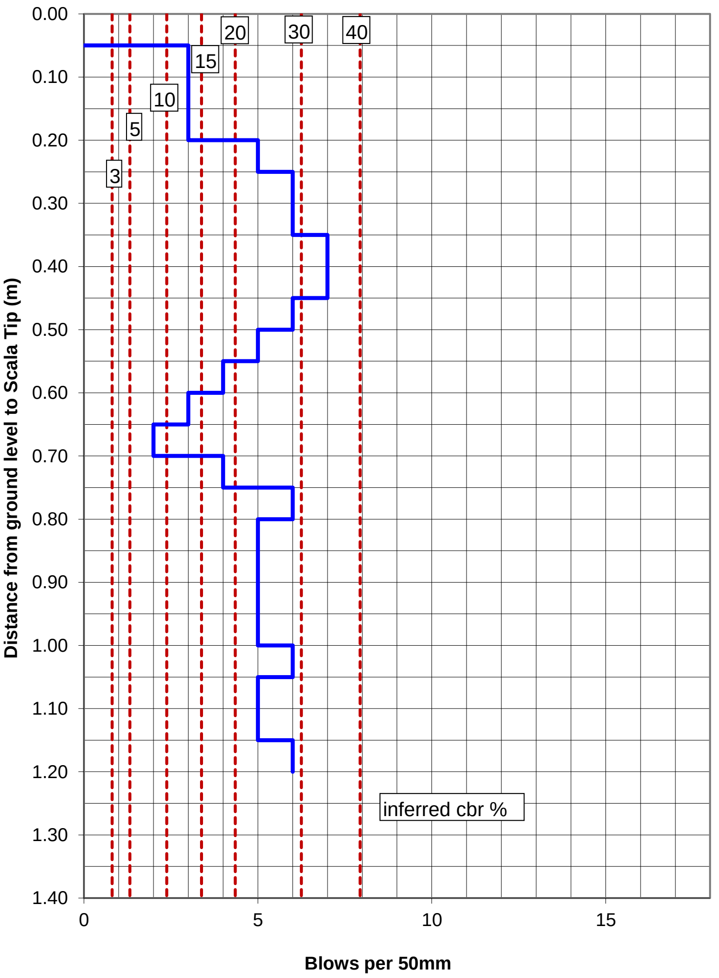
Lab Job No:	8020-1727	**Scala No:**	SCP12
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	12 of 42
Start Depth (m):	0.05		

LWD (MPa): 39

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
3	6	18	6	0.15
3	6	18	9	0.20
5	10	30	14	0.25
6	12	36	20	0.30
6	12	36	26	0.35
7	14	42	33	0.40
7	14	42	40	0.45
6	12	36	46	0.50
5	10	30	51	0.55
4	8	24	55	0.60
3	6	18	58	0.65
2	4	12	60	0.70
4	8	24	64	0.75
6	12	36	70	0.80
5	10	30	75	0.85
5	10	30	80	0.90
5	10	30	85	0.95
5	10	30	90	1.00
6	12	36	96	1.05
5	10	30	101	1.10
5	10	30	106	1.15
6	12	36	112	1.20

Scala Penetrometer Results



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

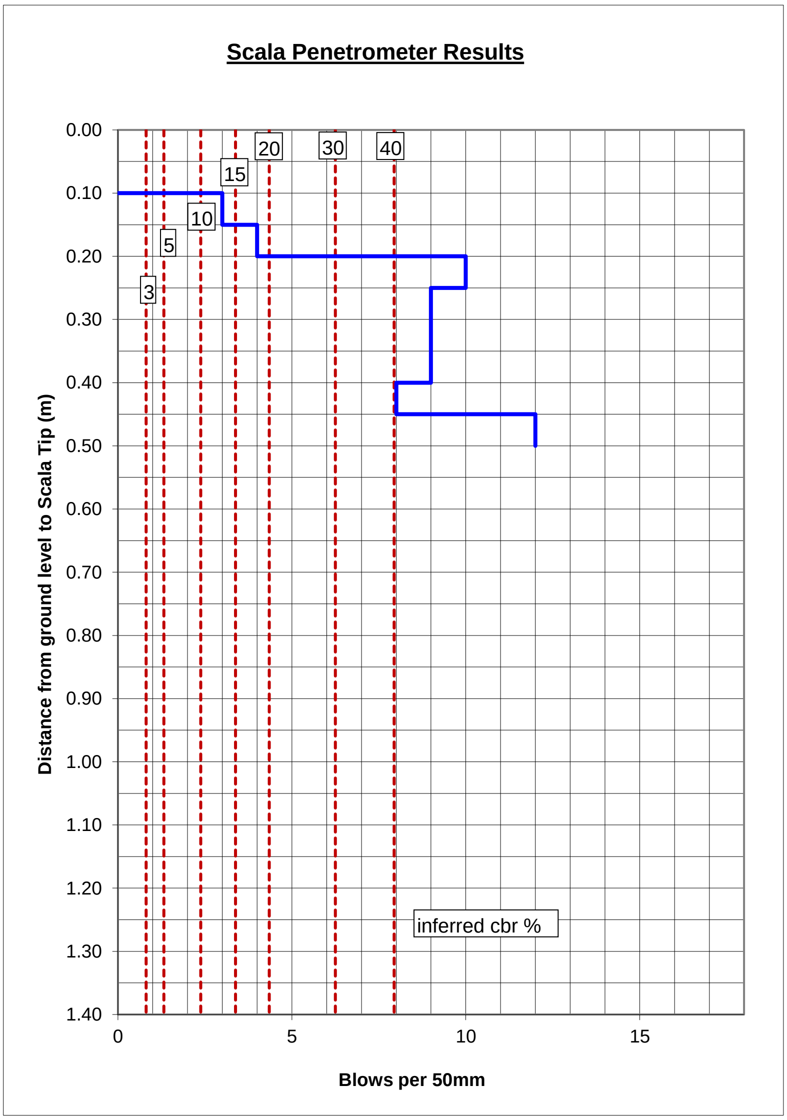
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.10

LWD (MPa): **56**

Scala No: SCP13
Ref : -
Report No: WRE8020-1727-R004
Page: 13 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.10
3	6	18	3	0.15
4	8	24	7	0.20
10	20	60	17	0.25
9	18	54	26	0.30
9	18	54	35	0.35
9	18	54	44	0.40
8	16	48	52	0.45
12	24	72	64	0.50



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

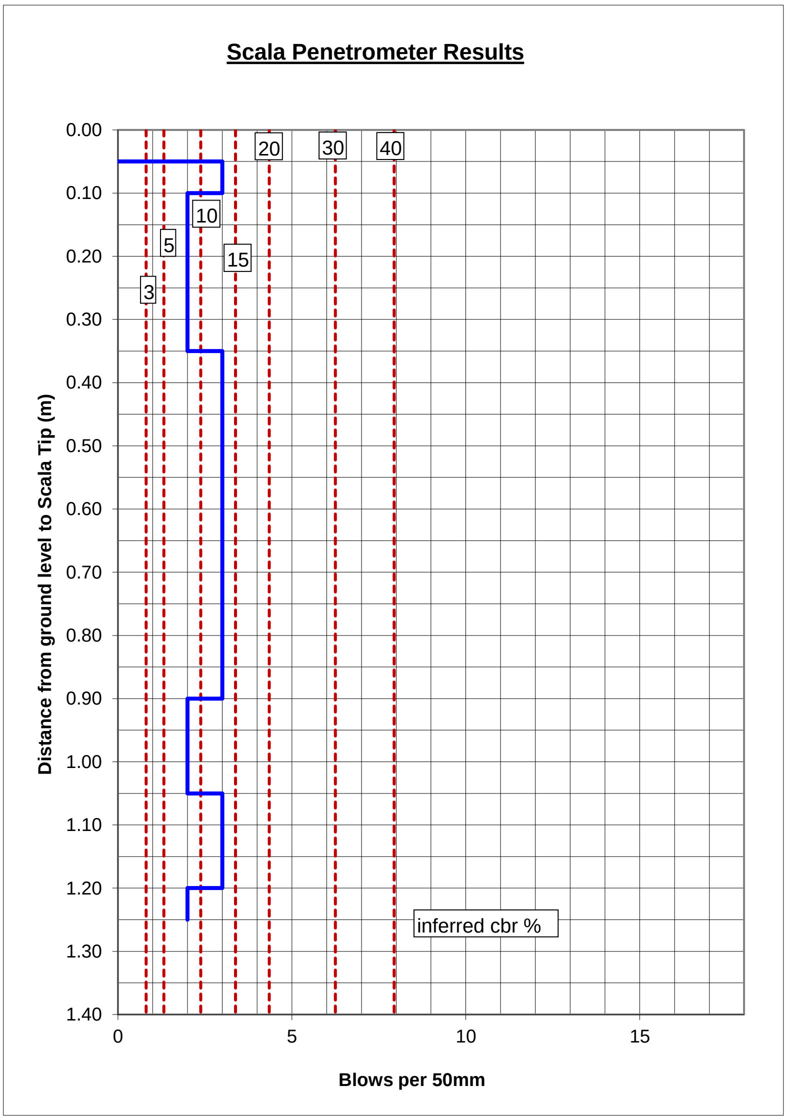
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.05

LWD (MPa): **57**

Scala No: SCP14
Ref : -
Report No: WRE8020-1727-R004
Page: 14 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
2	4	12	9	0.25
2	4	12	11	0.30
2	4	12	13	0.35
3	6	18	16	0.40
3	6	18	19	0.45
3	6	18	22	0.50
3	6	18	25	0.55
3	6	18	28	0.60
3	6	18	31	0.65
3	6	18	34	0.70
3	6	18	37	0.75
3	6	18	40	0.80
3	6	18	43	0.85
3	6	18	46	0.90
2	4	12	48	0.95
2	4	12	50	1.00
2	4	12	52	1.05
3	6	18	55	1.10
3	6	18	58	1.15
3	6	18	61	1.20
2	4	12	63	1.25



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.10

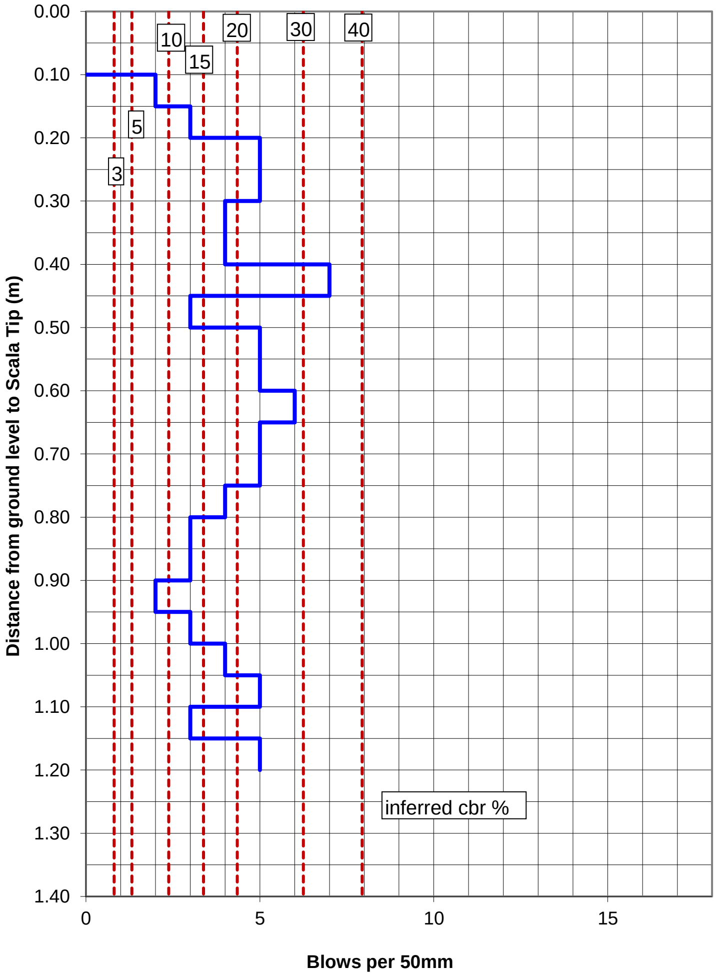
LWD (MPa): **45**

Scala No: SCP15
Ref : -
Report No: WRE8020-1727-R004
Page: 15 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.10
2	4	12	2	0.15
3	6	18	5	0.20
5	10	30	10	0.25
5	10	30	15	0.30
4	8	24	19	0.35
4	8	24	23	0.40
7	14	42	30	0.45
3	6	18	33	0.50
5	10	30	38	0.55
5	10	30	43	0.60
6	12	36	49	0.65
5	10	30	54	0.70
5	10	30	59	0.75
4	8	24	63	0.80
3	6	18	66	0.85
3	6	18	69	0.90
2	4	12	71	0.95
3	6	18	74	1.00
4	8	24	78	1.05
5	10	30	83	1.10
3	6	18	86	1.15
5	10	30	91	1.20

Scala Penetrometer Results



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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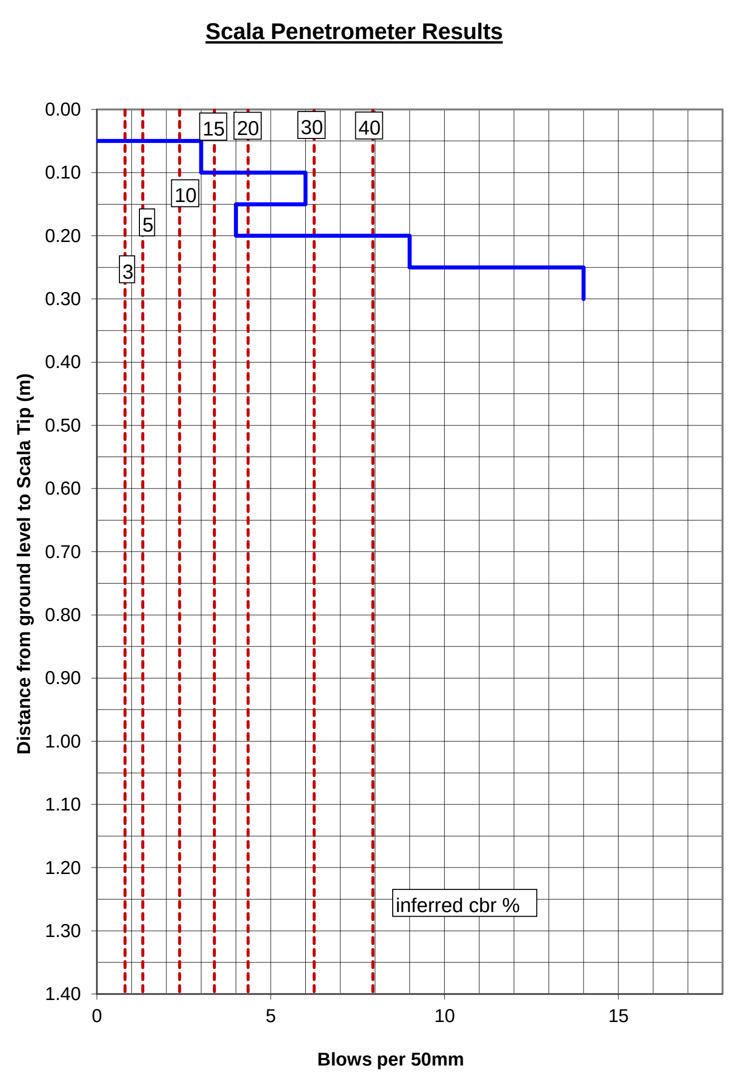
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP16
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	16 of 42
Start Depth (m):	0.05		
LWD (MPa):	**46**		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
3	6	18	3	0.10
6	12	36	9	0.15
4	8	24	13	0.20
9	18	54	22	0.25
14	28	84	36	0.30



Recorded By: A.B
Date: 1/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

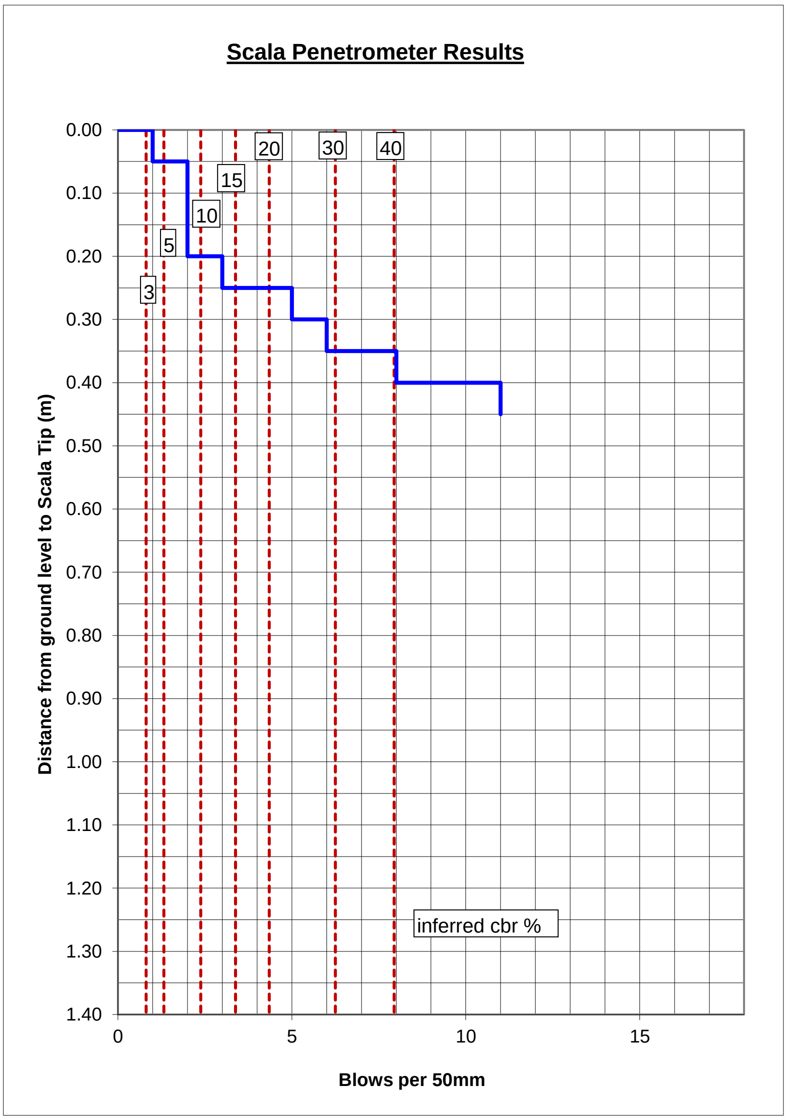
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): **64**

Scala No: SCP17
Ref : -
Report No: WRE8020-1727-R004
Page: 17 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
3	6	18	10	0.25
5	10	30	15	0.30
6	12	36	21	0.35
8	16	48	29	0.40
11	22	66	40	0.45



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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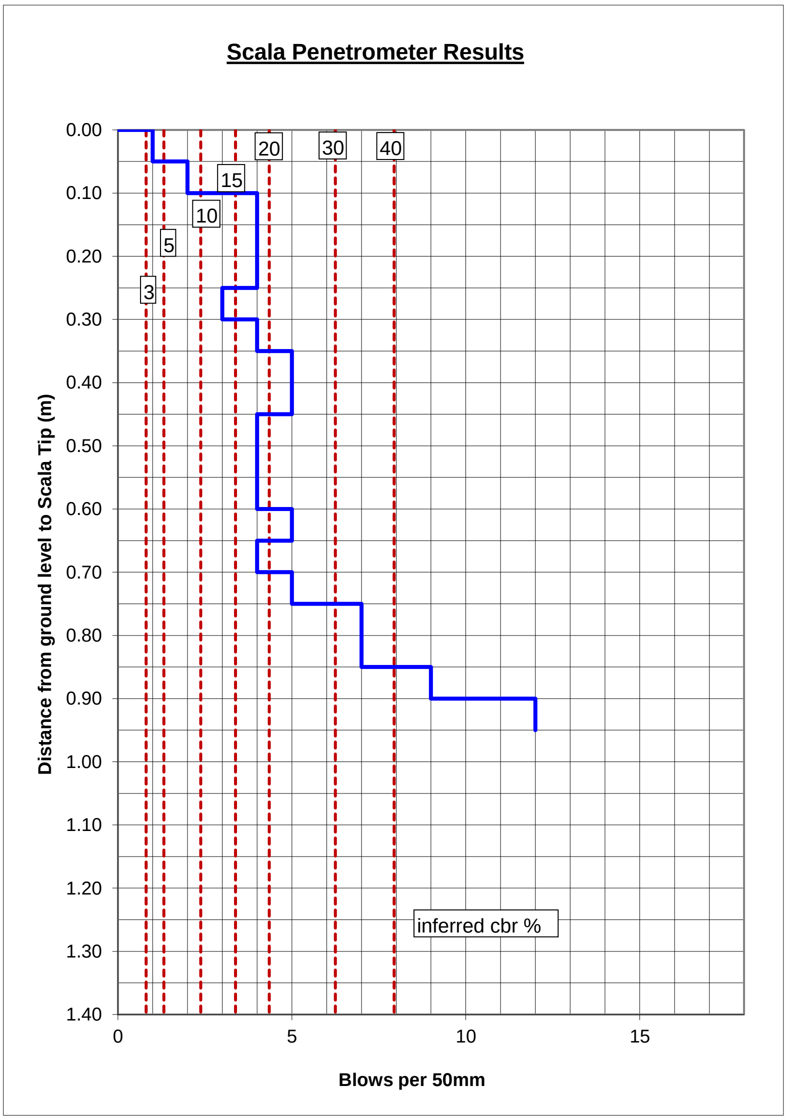
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP18
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	18 of 42
Start Depth (m):	0.00		
LWD (MPa):	**46**		

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
4	8	24	7	0.15
4	8	24	11	0.20
4	8	24	15	0.25
3	6	18	18	0.30
4	8	24	22	0.35
5	10	30	27	0.40
5	10	30	32	0.45
4	8	24	36	0.50
4	8	24	40	0.55
4	8	24	44	0.60
5	10	30	49	0.65
4	8	24	53	0.70
5	10	30	58	0.75
7	14	42	65	0.80
7	14	42	72	0.85
9	18	54	81	0.90
12	24	72	93	0.95



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

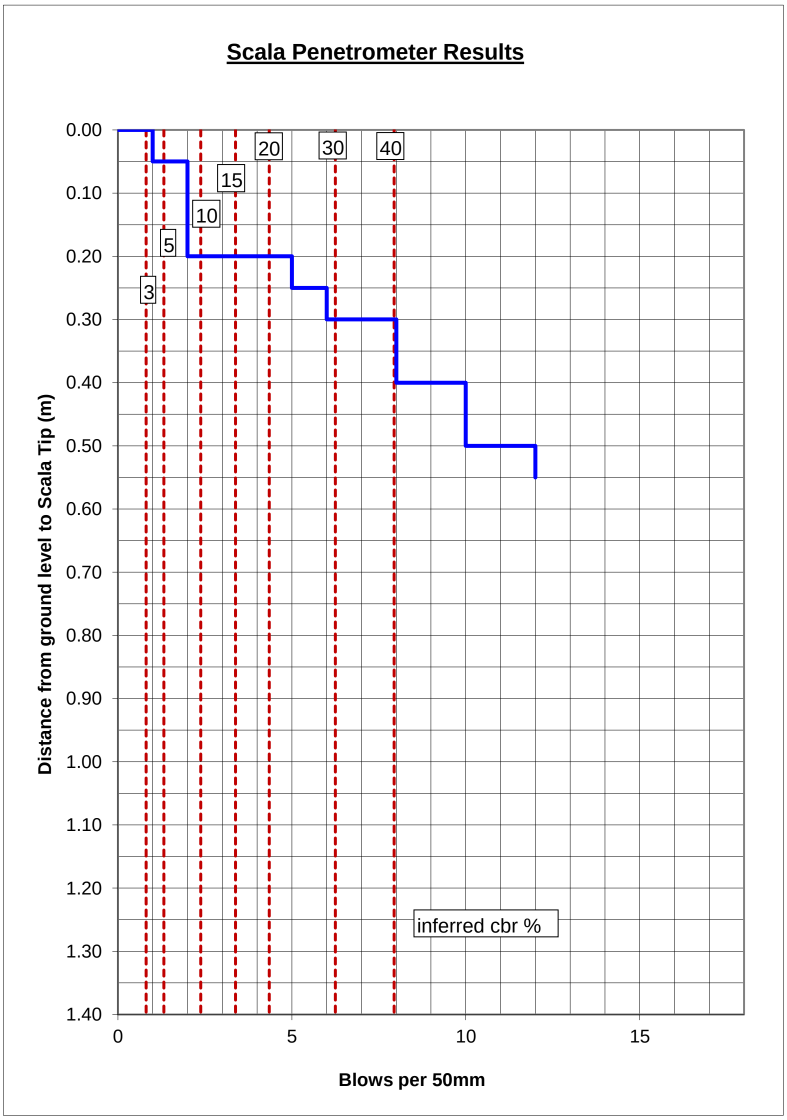
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP19
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	19 of 42
Start Depth (m):	0.00		

LWD (MPa): **42**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
5	10	30	12	0.25
6	12	36	18	0.30
8	16	48	26	0.35
8	16	48	34	0.40
10	20	60	44	0.45
10	20	60	54	0.50
12	24	72	66	0.55



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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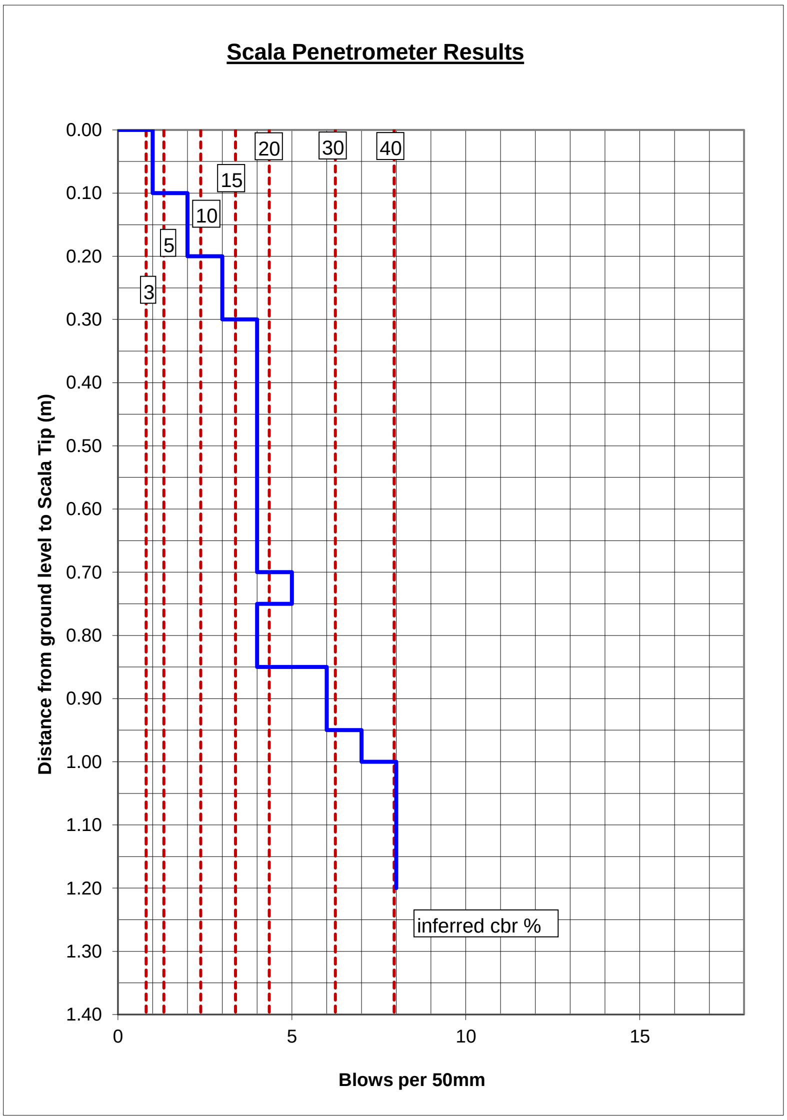
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP20
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	20 of 42
Start Depth (m):	0.00		
LWD (MPa):	**65**		

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
3	6	18	9	0.25
3	6	18	12	0.30
4	8	24	16	0.35
4	8	24	20	0.40
4	8	24	24	0.45
4	8	24	28	0.50
4	8	24	32	0.55
4	8	24	36	0.60
4	8	24	40	0.65
4	8	24	44	0.70
5	10	30	49	0.75
4	8	24	53	0.80
4	8	24	57	0.85
6	12	36	63	0.90
6	12	36	69	0.95
7	14	42	76	1.00
8	16	48	84	1.05
8	16	48	92	1.10
8	16	48	100	1.15
8	16	48	108	1.20



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

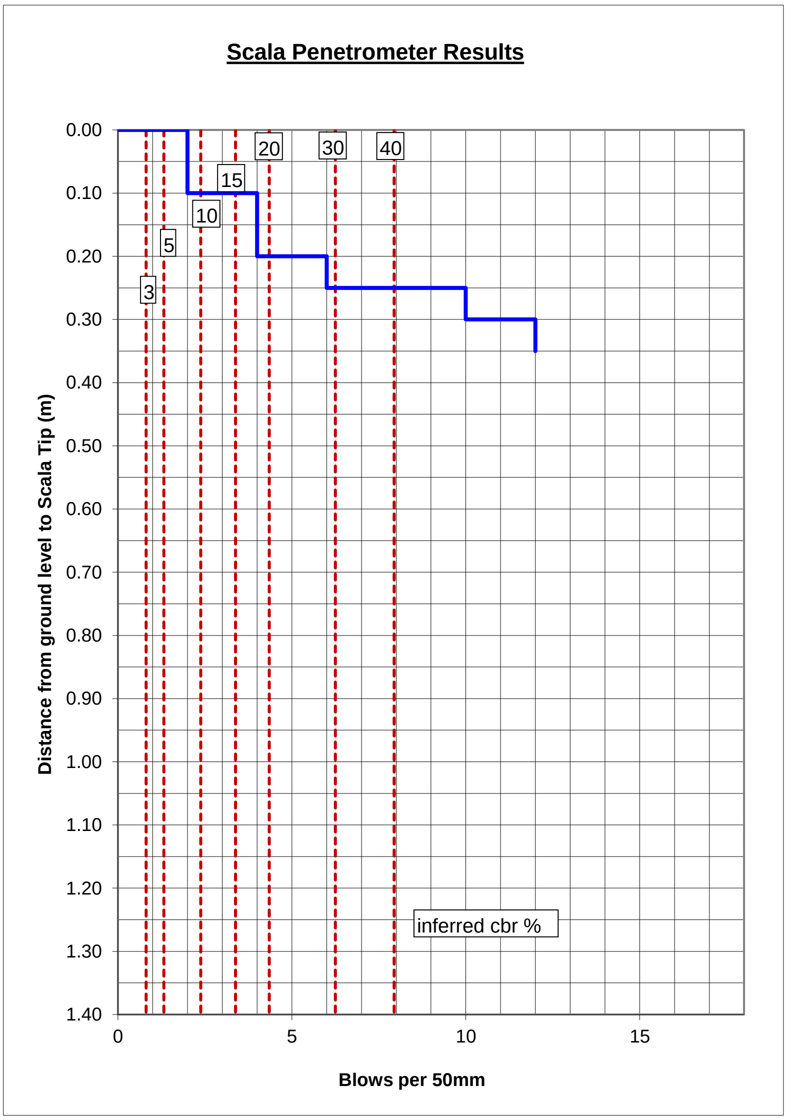
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): **42**

Scala No: SCP21
Ref : -
Report No: WRE8020-1727-R004
Page: 21 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
2	4	12	2	0.05
2	4	12	4	0.10
4	8	24	8	0.15
4	8	24	12	0.20
6	12	36	18	0.25
10	20	60	28	0.30
12	24	72	40	0.35



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

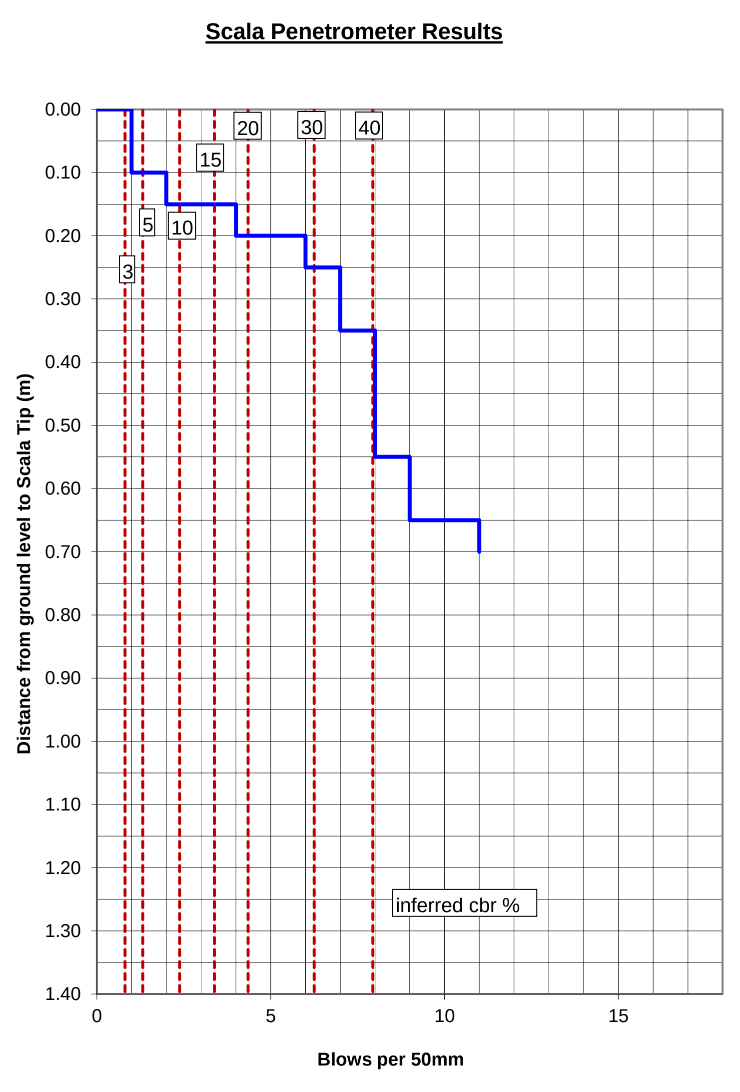
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): **73**

Scala No: SCP22
Ref : -
Report No: WRE8020-1727-R004
Page: 22 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
4	8	24	8	0.20
6	12	36	14	0.25
7	14	42	21	0.30
7	14	42	28	0.35
8	16	48	36	0.40
8	16	48	44	0.45
8	16	48	52	0.50
8	16	48	60	0.55
9	18	54	69	0.60
9	18	54	78	0.65
11	22	66	89	0.70



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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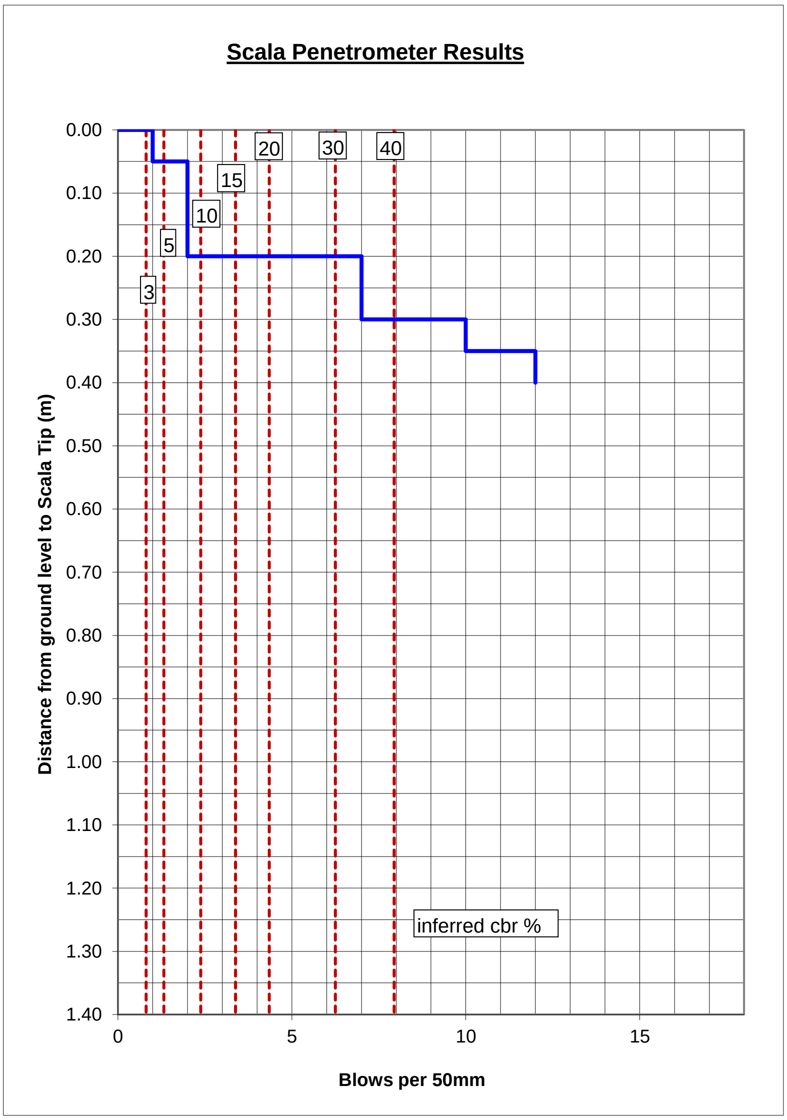
DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP23
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	23 of 42
Start Depth (m):	0.00		
LWD (MPa):	**54**		

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
7	14	42	14	0.25
7	14	42	21	0.30
10	20	60	31	0.35
12	24	72	43	0.40



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

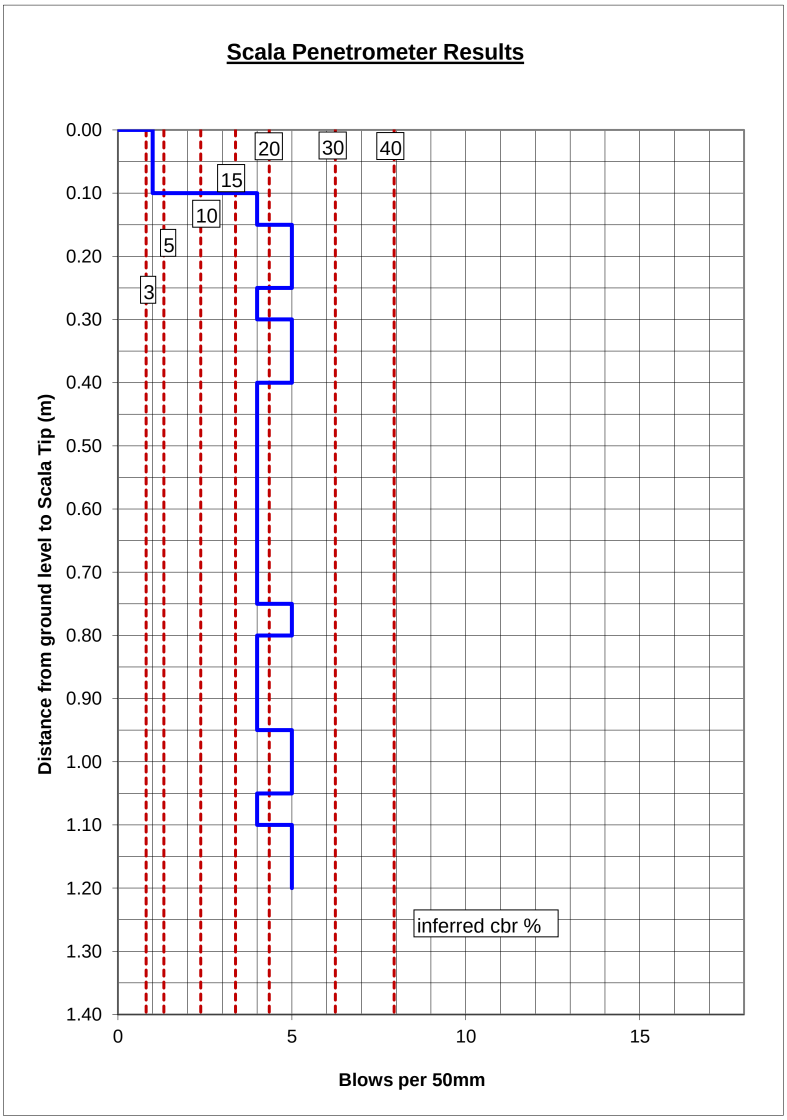
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP24
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	24 of 42
Start Depth (m):	0.00		

LWD (MPa): 41

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
4	8	24	6	0.15
5	10	30	11	0.20
5	10	30	16	0.25
4	8	24	20	0.30
5	10	30	25	0.35
5	10	30	30	0.40
4	8	24	34	0.45
4	8	24	38	0.50
4	8	24	42	0.55
4	8	24	46	0.60
4	8	24	50	0.65
4	8	24	54	0.70
4	8	24	58	0.75
5	10	30	63	0.80
4	8	24	67	0.85
4	8	24	71	0.90
4	8	24	75	0.95
5	10	30	80	1.00
5	10	30	85	1.05
4	8	24	89	1.10
5	10	30	94	1.15
5	10	30	99	1.20



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

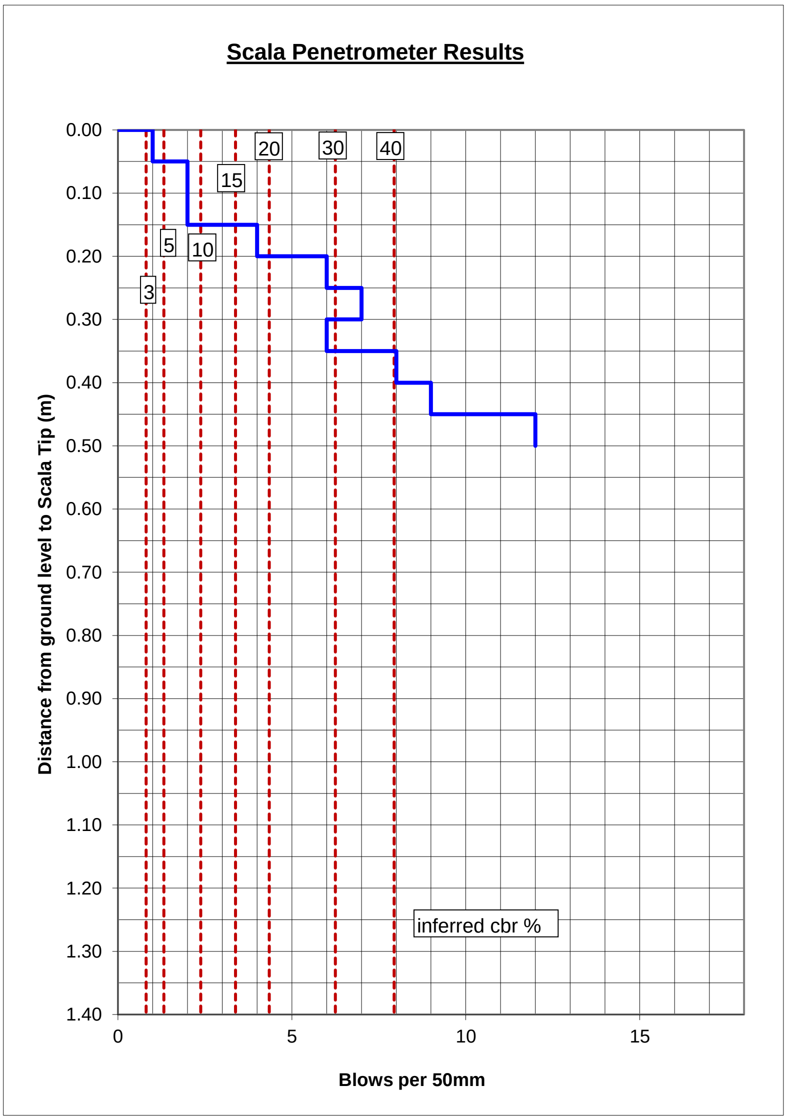
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP25
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	25 of 42
Start Depth (m):	0.00		

LWD (MPa): **68**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
2	4	12	5	0.15
4	8	24	9	0.20
6	12	36	15	0.25
7	14	42	22	0.30
6	12	36	28	0.35
8	16	48	36	0.40
9	18	54	45	0.45
12	24	72	57	0.50



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

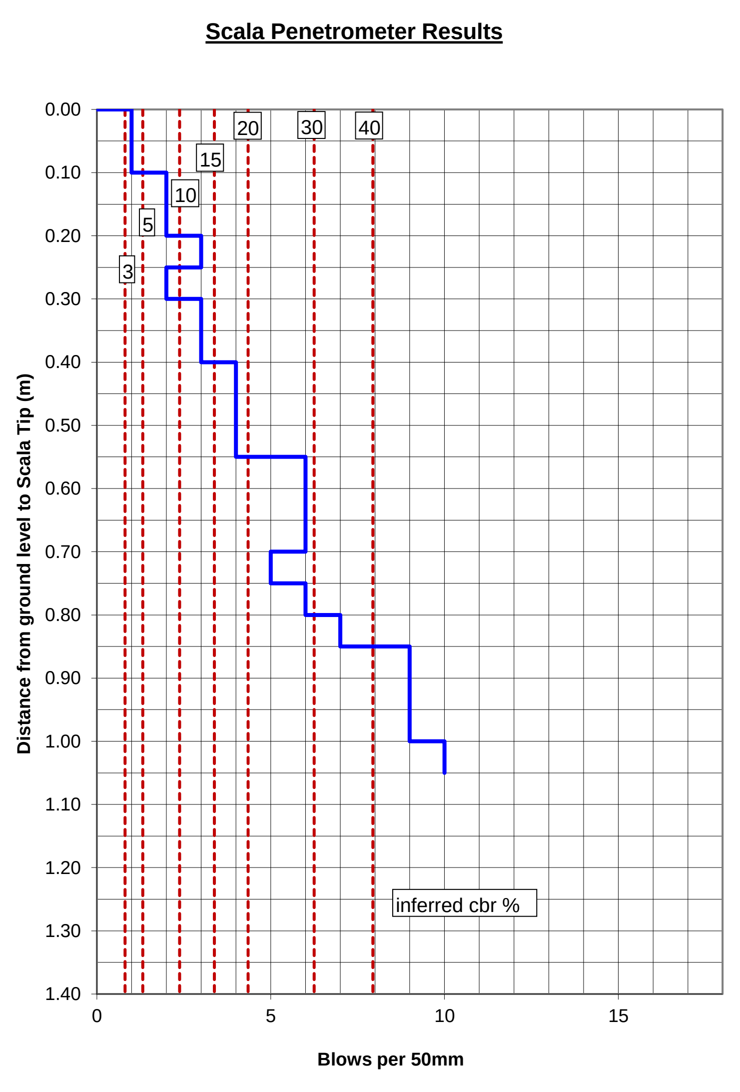
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): 38

Scala No: SCP26
Ref : -
Report No: WRE8020-1727-R004
Page: 26 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
3	6	18	9	0.25
2	4	12	11	0.30
3	6	18	14	0.35
3	6	18	17	0.40
4	8	24	21	0.45
4	8	24	25	0.50
4	8	24	29	0.55
6	12	36	35	0.60
6	12	36	41	0.65
6	12	36	47	0.70
5	10	30	52	0.75
6	12	36	58	0.80
7	14	42	65	0.85
9	18	54	74	0.90
9	18	54	83	0.95
9	18	54	92	1.00
10	20	60	102	1.05


Scala Penetrometer Results

Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

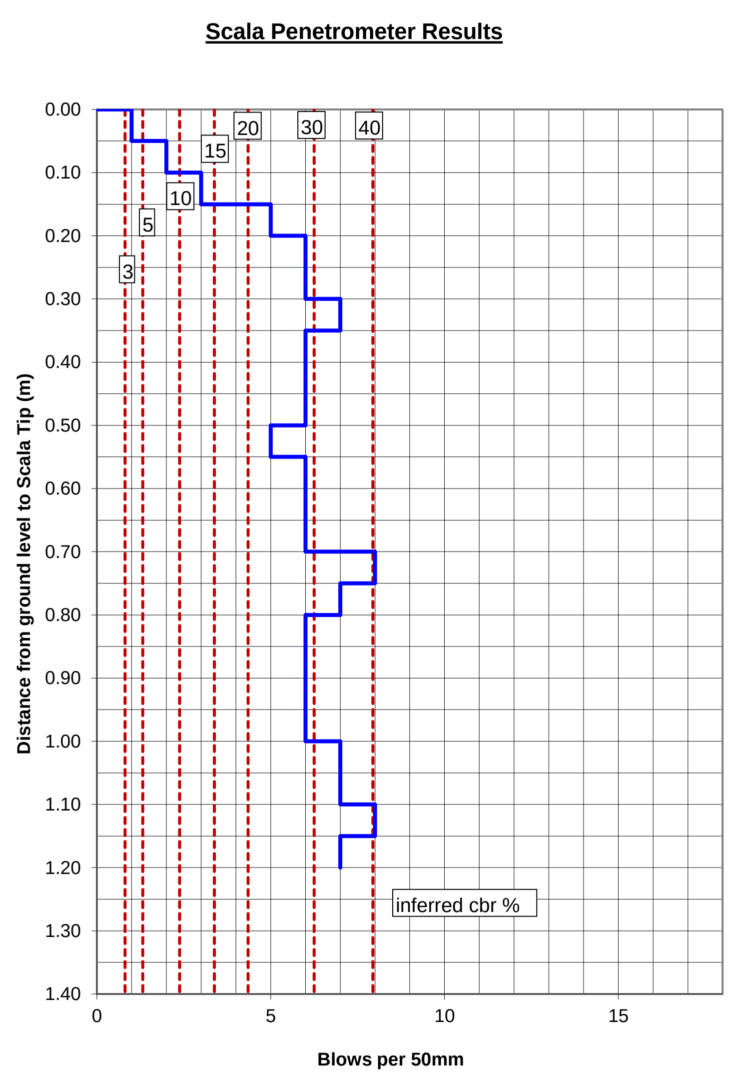
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP27
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	27 of 42
Start Depth (m):	0.00		

LWD (MPa): 47

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
3	6	18	6	0.15
5	10	30	11	0.20
6	12	36	17	0.25
6	12	36	23	0.30
7	14	42	30	0.35
6	12	36	36	0.40
6	12	36	42	0.45
6	12	36	48	0.50
5	10	30	53	0.55
6	12	36	59	0.60
6	12	36	65	0.65
6	12	36	71	0.70
8	16	48	79	0.75
7	14	42	86	0.80
6	12	36	92	0.85
6	12	36	98	0.90
6	12	36	104	0.95
6	12	36	110	1.00
7	14	42	117	1.05
7	14	42	124	1.10
8	16	48	132	1.15
7	14	42	139	1.20



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

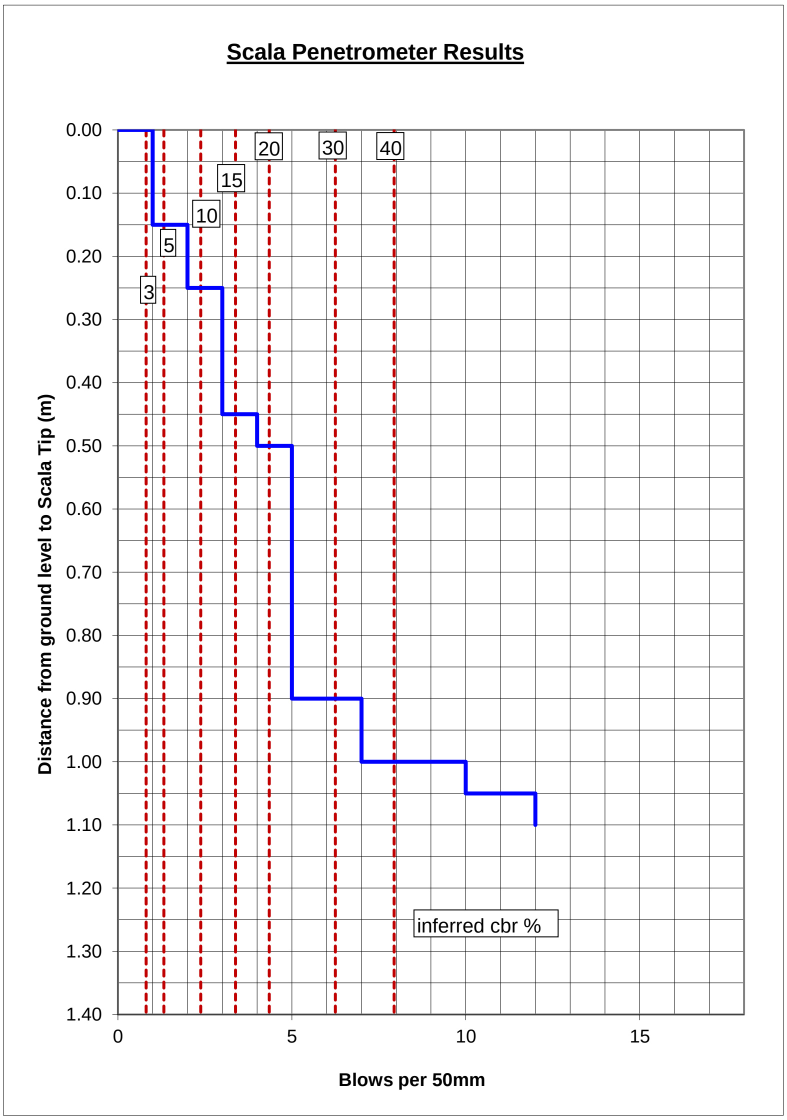
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP28
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	28 of 42
Start Depth (m):	0.00		

LWD (MPa): 56

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
1	2	6	3	0.15
2	4	12	5	0.20
2	4	12	7	0.25
3	6	18	10	0.30
3	6	18	13	0.35
3	6	18	16	0.40
3	6	18	19	0.45
4	8	24	23	0.50
5	10	30	28	0.55
5	10	30	33	0.60
5	10	30	38	0.65
5	10	30	43	0.70
5	10	30	48	0.75
5	10	30	53	0.80
5	10	30	58	0.85
5	10	30	63	0.90
7	14	42	70	0.95
7	14	42	77	1.00
10	20	60	87	1.05
12	24	72	99	1.10



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

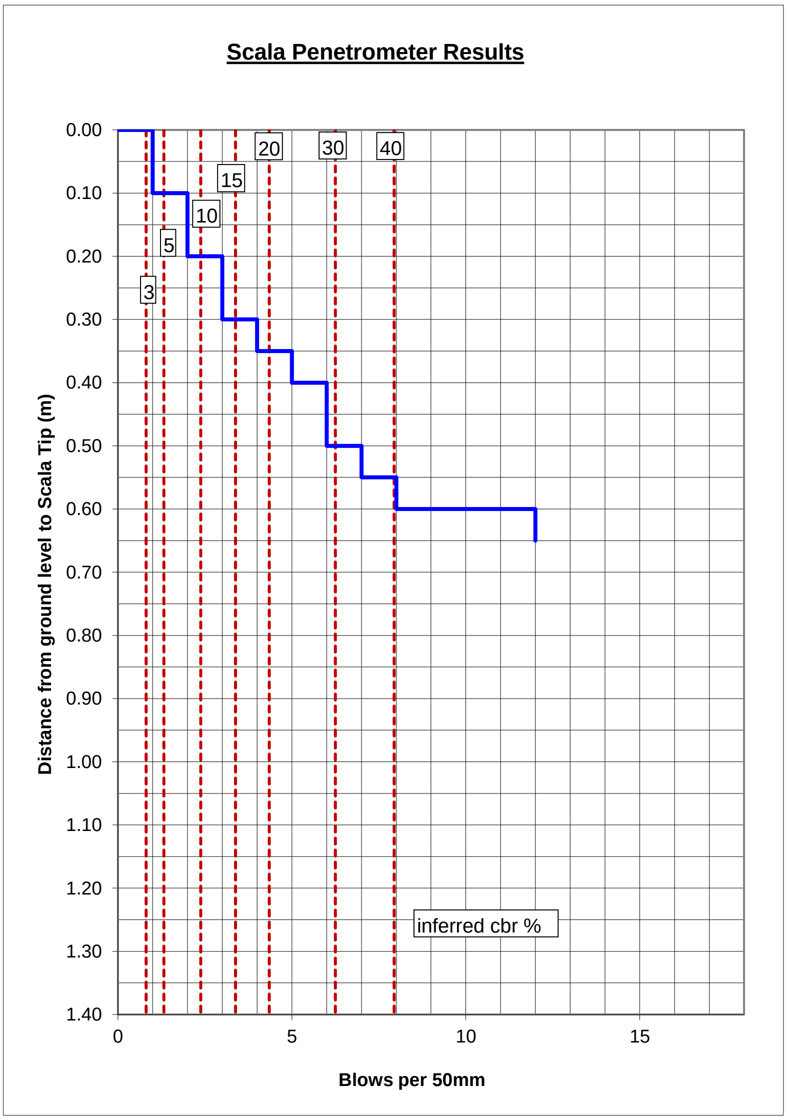
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

Scala No: SCP29
Ref : -
Report No: WRE8020-1727-R004
Page: 29 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
3	6	18	9	0.25
3	6	18	12	0.30
4	8	24	16	0.35
5	10	30	21	0.40
6	12	36	27	0.45
6	12	36	33	0.50
7	14	42	40	0.55
8	16	48	48	0.60
12	24	72	60	0.65



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

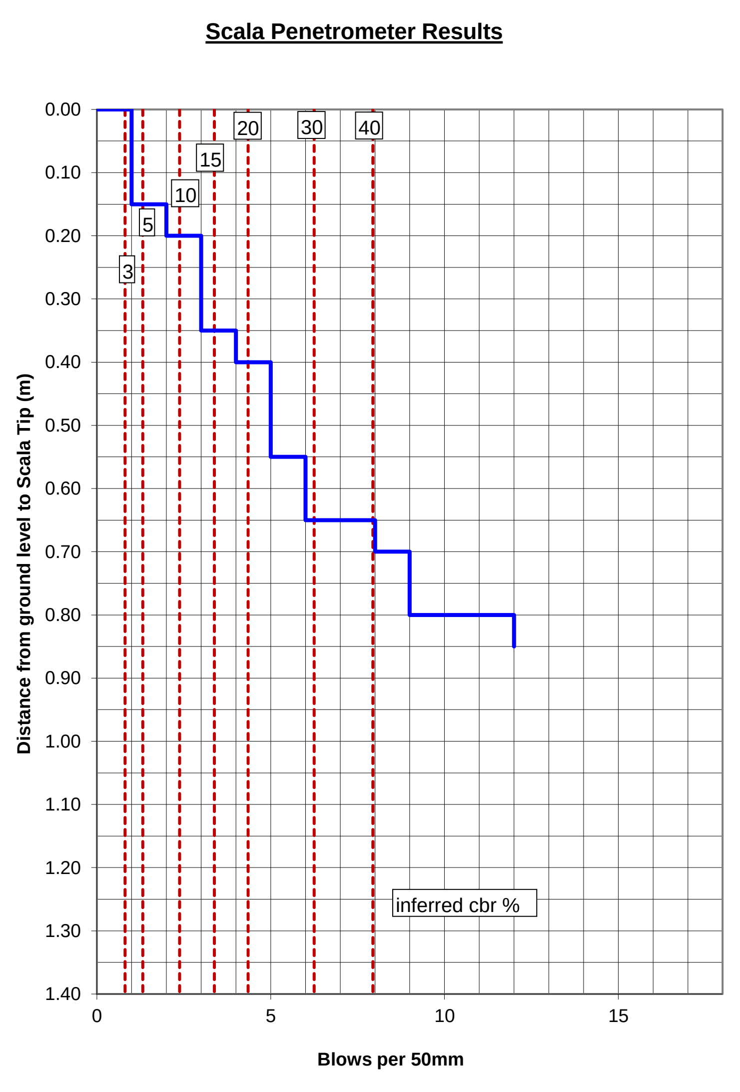
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): 42

Scala No: SCP30
Ref : -
Report No: WRE8020-1727-R004
Page: 30 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
1	2	6	3	0.15
2	4	12	5	0.20
3	6	18	8	0.25
3	6	18	11	0.30
3	6	18	14	0.35
4	8	24	18	0.40
5	10	30	23	0.45
5	10	30	28	0.50
5	10	30	33	0.55
6	12	36	39	0.60
6	12	36	45	0.65
8	16	48	53	0.70
9	18	54	62	0.75
9	18	54	71	0.80
12	24	72	83	0.85



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

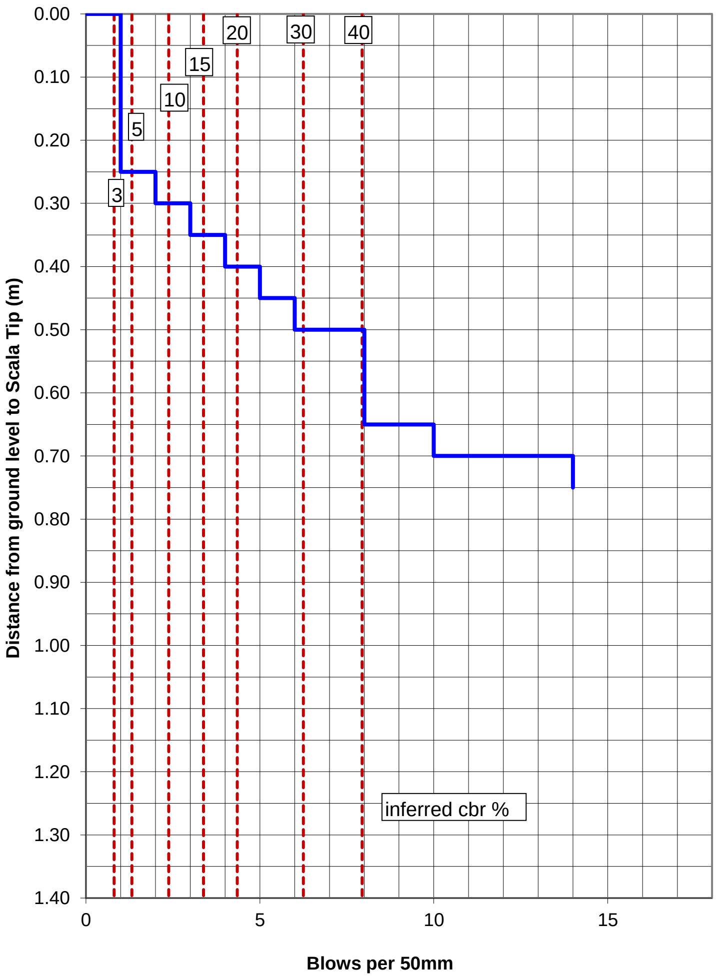
Lab Job No:	8020-1727	**Scala No:**	SCP31
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	31 of 42
Start Depth (m):	0.00		

LWD (MPa): **46**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
1	2	6	3	0.15
1	2	6	4	0.20
1	2	6	5	0.25
2	4	12	7	0.30
3	6	18	10	0.35
4	8	24	14	0.40
5	10	30	19	0.45
6	12	36	25	0.50
8	16	48	33	0.55
8	16	48	41	0.60
8	16	48	49	0.65
10	20	60	59	0.70
14	28	84	73	0.75

Scala Penetrometer Results



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

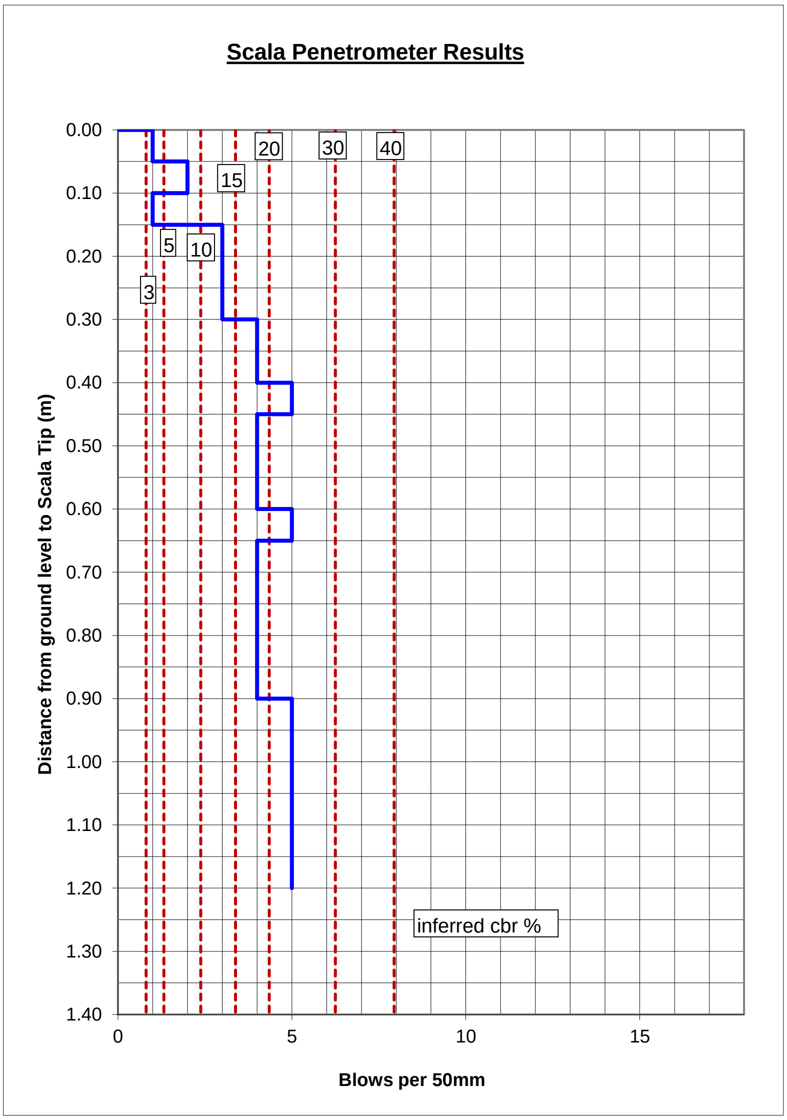
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP32
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	32 of 42
Start Depth (m):	0.00		

LWD (MPa): **40**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
1	2	6	4	0.15
3	6	18	7	0.20
3	6	18	10	0.25
3	6	18	13	0.30
4	8	24	17	0.35
4	8	24	21	0.40
5	10	30	26	0.45
4	8	24	30	0.50
4	8	24	34	0.55
4	8	24	38	0.60
5	10	30	43	0.65
4	8	24	47	0.70
4	8	24	51	0.75
4	8	24	55	0.80
4	8	24	59	0.85
4	8	24	63	0.90
5	10	30	68	0.95
5	10	30	73	1.00
5	10	30	78	1.05
5	10	30	83	1.10
5	10	30	88	1.15
5	10	30	93	1.20



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

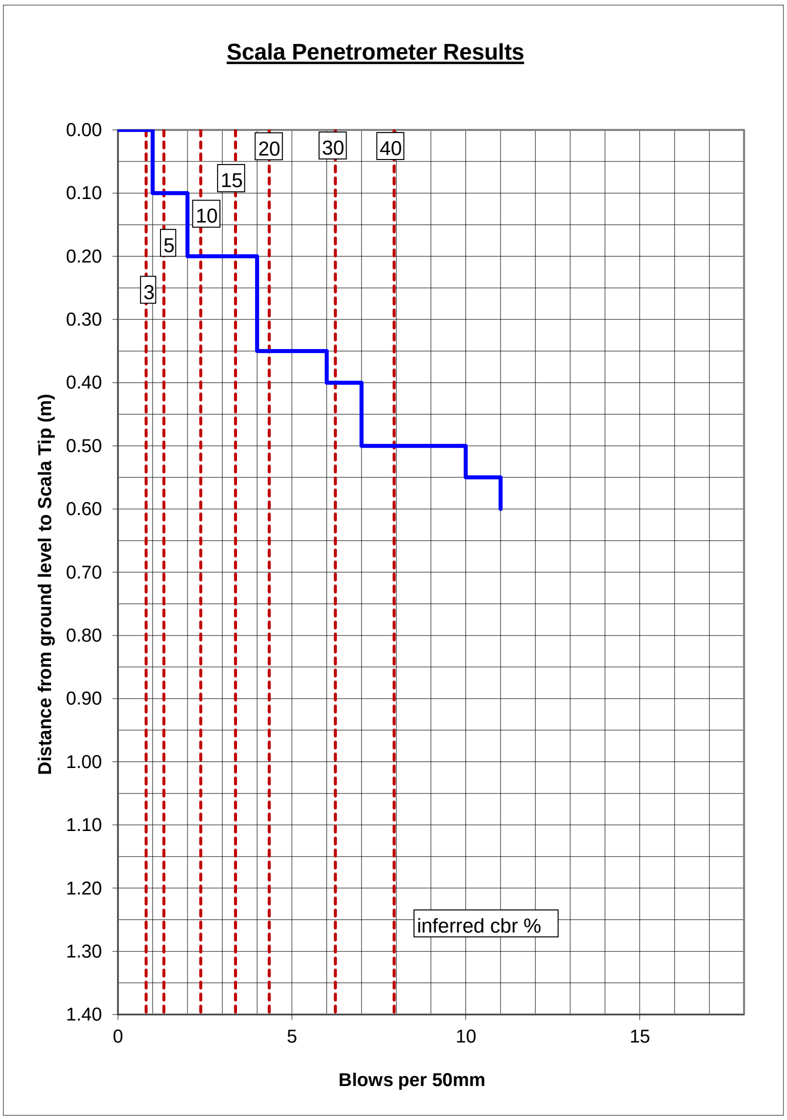
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP33
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	33 of 42
Start Depth (m):	0.00		

LWD (MPa): **56**

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
4	8	24	10	0.25
4	8	24	14	0.30
4	8	24	18	0.35
6	12	36	24	0.40
7	14	42	31	0.45
7	14	42	38	0.50
10	20	60	48	0.55
11	22	66	59	0.60



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

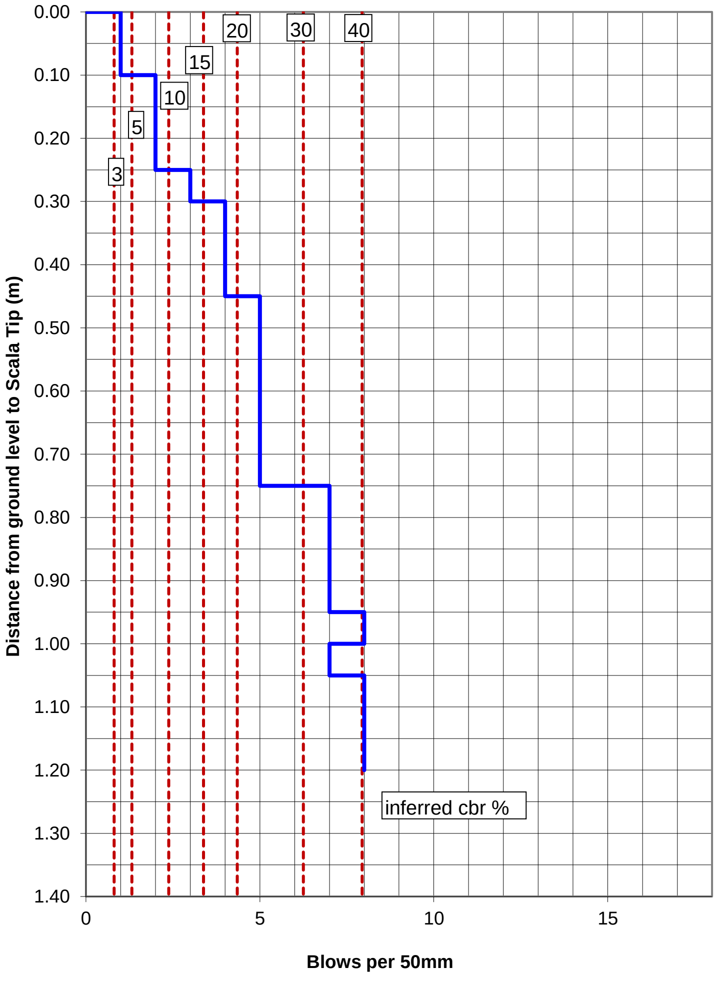
LWD (MPa): **65**

Scala No: SCP34
Ref : -
Report No: WRE8020-1727-R004
Page: 34 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
2	4	12	8	0.25
3	6	18	11	0.30
4	8	24	15	0.35
4	8	24	19	0.40
4	8	24	23	0.45
5	10	30	28	0.50
5	10	30	33	0.55
5	10	30	38	0.60
5	10	30	43	0.65
5	10	30	48	0.70
5	10	30	53	0.75
7	14	42	60	0.80
7	14	42	67	0.85
7	14	42	74	0.90
7	14	42	81	0.95
8	16	48	89	1.00
7	14	42	96	1.05
8	16	48	104	1.10
8	16	48	112	1.15
8	16	48	120	1.20

Scala Penetrometer Results



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

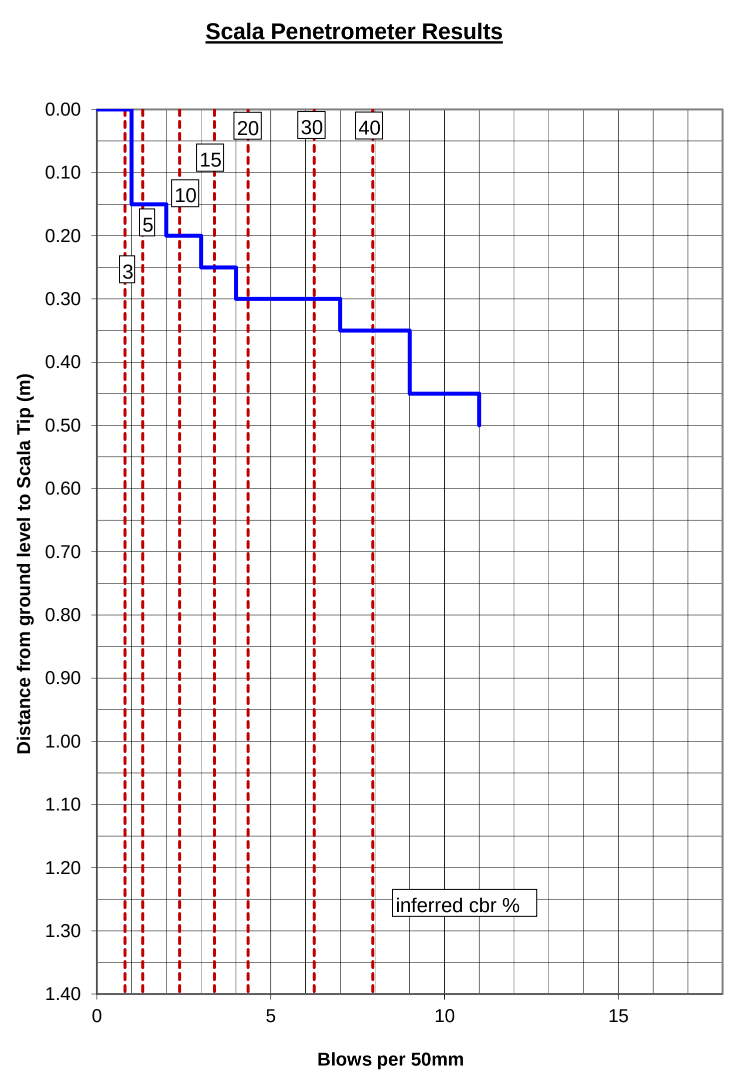
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): **63**

Scala No: SCP35
Ref : -
Report No: WRE8020-1727-R004
Page: 35 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
1	2	6	3	0.15
2	4	12	5	0.20
3	6	18	8	0.25
4	8	24	12	0.30
7	14	42	19	0.35
9	18	54	28	0.40
9	18	54	37	0.45
11	22	66	48	0.50



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

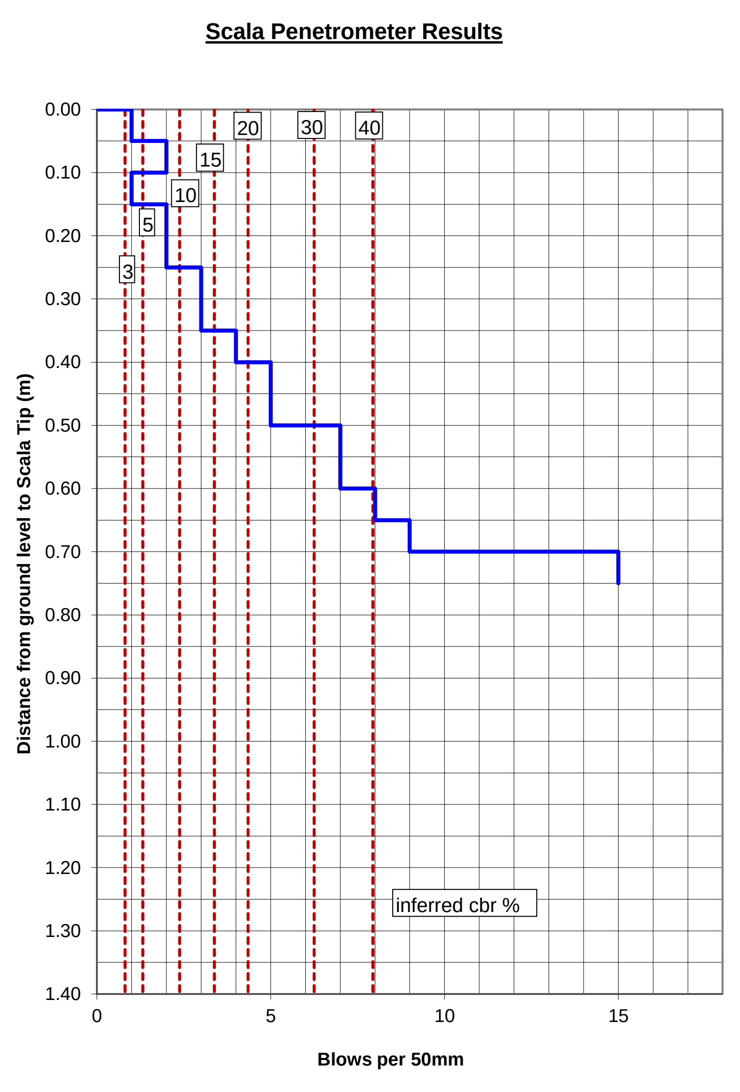
Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

LWD (MPa): **48**

Scala No: SCP36
Ref : -
Report No: WRE8020-1727-R004
Page: 36 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
1	2	6	4	0.15
2	4	12	6	0.20
2	4	12	8	0.25
3	6	18	11	0.30
3	6	18	14	0.35
4	8	24	18	0.40
5	10	30	23	0.45
5	10	30	28	0.50
7	14	42	35	0.55
7	14	42	42	0.60
8	16	48	50	0.65
9	18	54	59	0.70
15	30	90	74	0.75



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

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DYNAMIC CONE (SCALA) PENETROMETER

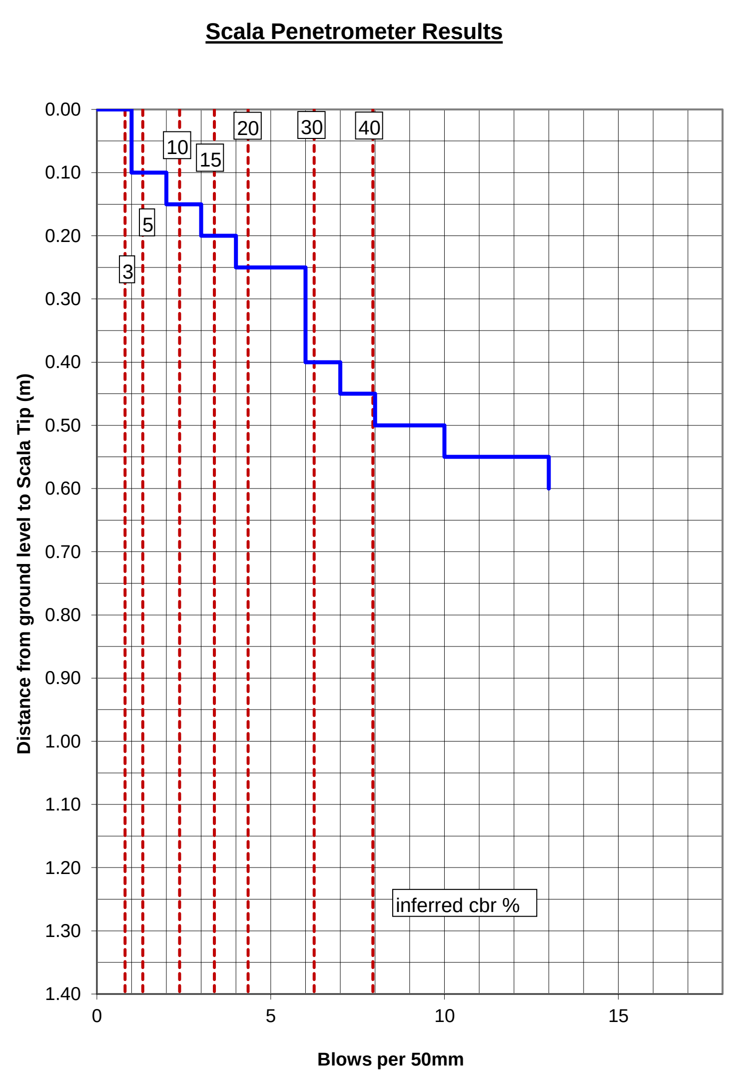
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP37
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	37 of 42
Start Depth (m):	0.00		

LWD (MPa): 57

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
3	6	18	7	0.20
4	8	24	11	0.25
6	12	36	17	0.30
6	12	36	23	0.35
6	12	36	29	0.40
7	14	42	36	0.45
8	16	48	44	0.50
10	20	60	54	0.55
13	26	78	67	0.60



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

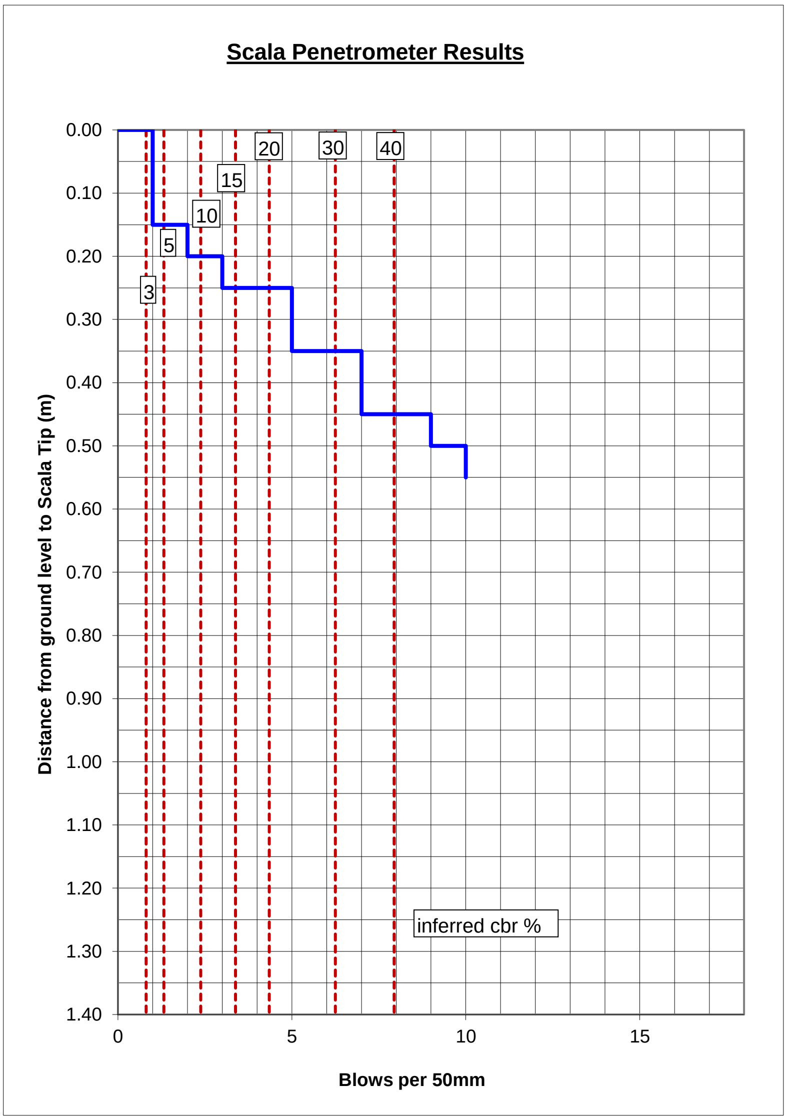
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP38
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	38 of 42
Start Depth (m):	0.00		

LWD (MPa): **50**

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
1	2	6	3	0.15
2	4	12	5	0.20
3	6	18	8	0.25
5	10	30	13	0.30
5	10	30	18	0.35
7	14	42	25	0.40
7	14	42	32	0.45
9	18	54	41	0.50
10	20	60	51	0.55



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

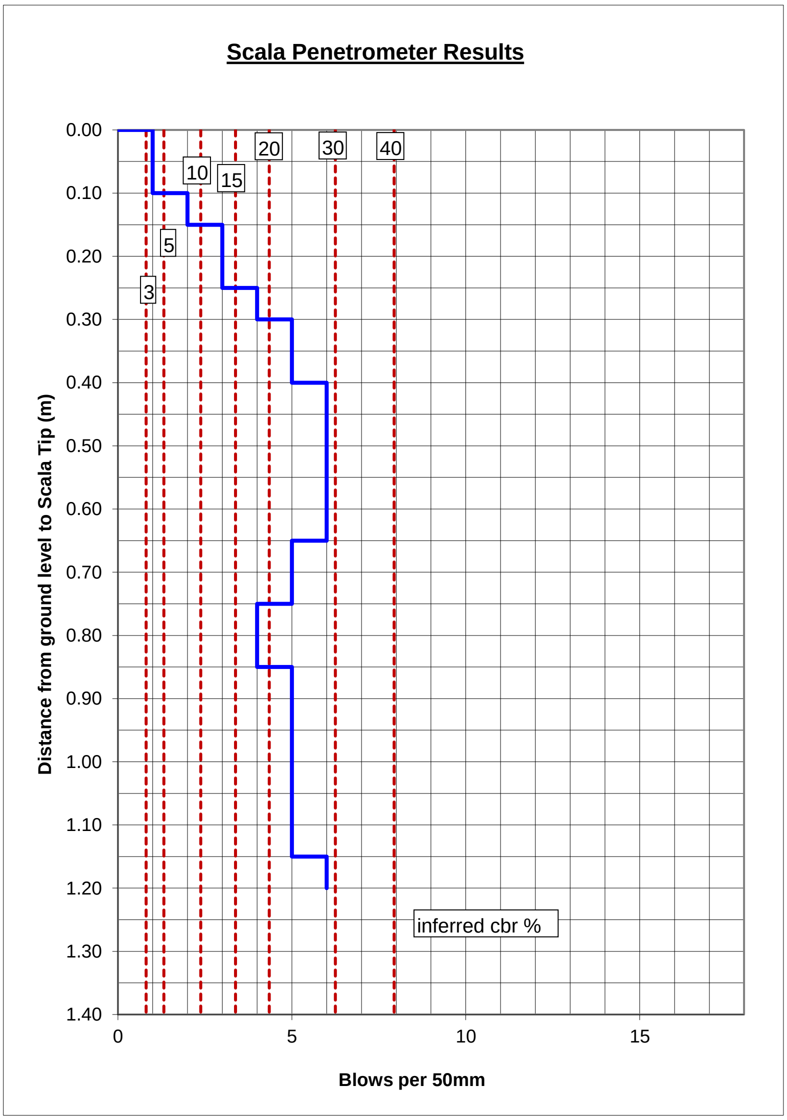
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP39
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	39 of 42
Start Depth (m):	0.00		

LWD (MPa): **61**

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
3	6	18	7	0.20
3	6	18	10	0.25
4	8	24	14	0.30
5	10	30	19	0.35
5	10	30	24	0.40
6	12	36	30	0.45
6	12	36	36	0.50
6	12	36	42	0.55
6	12	36	48	0.60
6	12	36	54	0.65
5	10	30	59	0.70
5	10	30	64	0.75
4	8	24	68	0.80
4	8	24	72	0.85
5	10	30	77	0.90
5	10	30	82	0.95
5	10	30	87	1.00
5	10	30	92	1.05
5	10	30	97	1.10
5	10	30	102	1.15
6	12	36	108	1.20



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: Cook Costello
Job: The Landing
Location: Stage 6-7, fill testing
Start Depth (m): 0.00

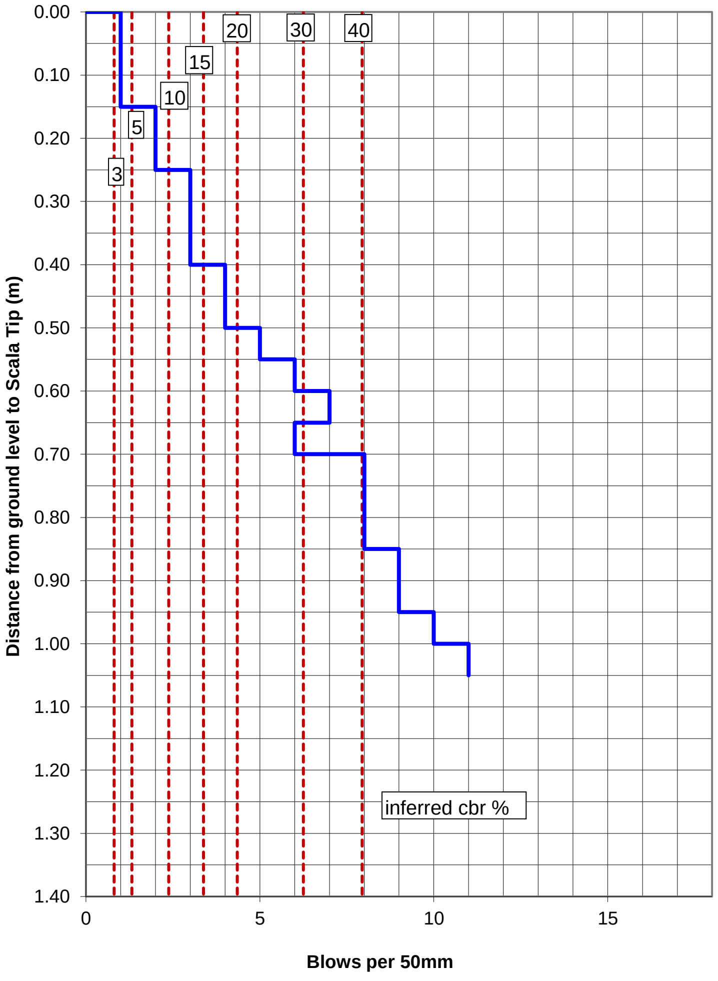
LWD (MPa): **38**

Scala No: SCP40
Ref : -
Report No: WRE8020-1727-R004
Page: 40 of 42

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
1	2	6	3	0.15
2	4	12	5	0.20
2	4	12	7	0.25
3	6	18	10	0.30
3	6	18	13	0.35
3	6	18	16	0.40
4	8	24	20	0.45
4	8	24	24	0.50
5	10	30	29	0.55
6	12	36	35	0.60
7	14	42	42	0.65
6	12	36	48	0.70
8	16	48	56	0.75
8	16	48	64	0.80
8	16	48	72	0.85
9	18	54	81	0.90
9	18	54	90	0.95
10	20	60	100	1.00
11	22	66	111	1.05

Scala Penetrometer Results



Recorded By: L.C / D.O
Date: 16/12/2021
Checked by: A.M
Date: 12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

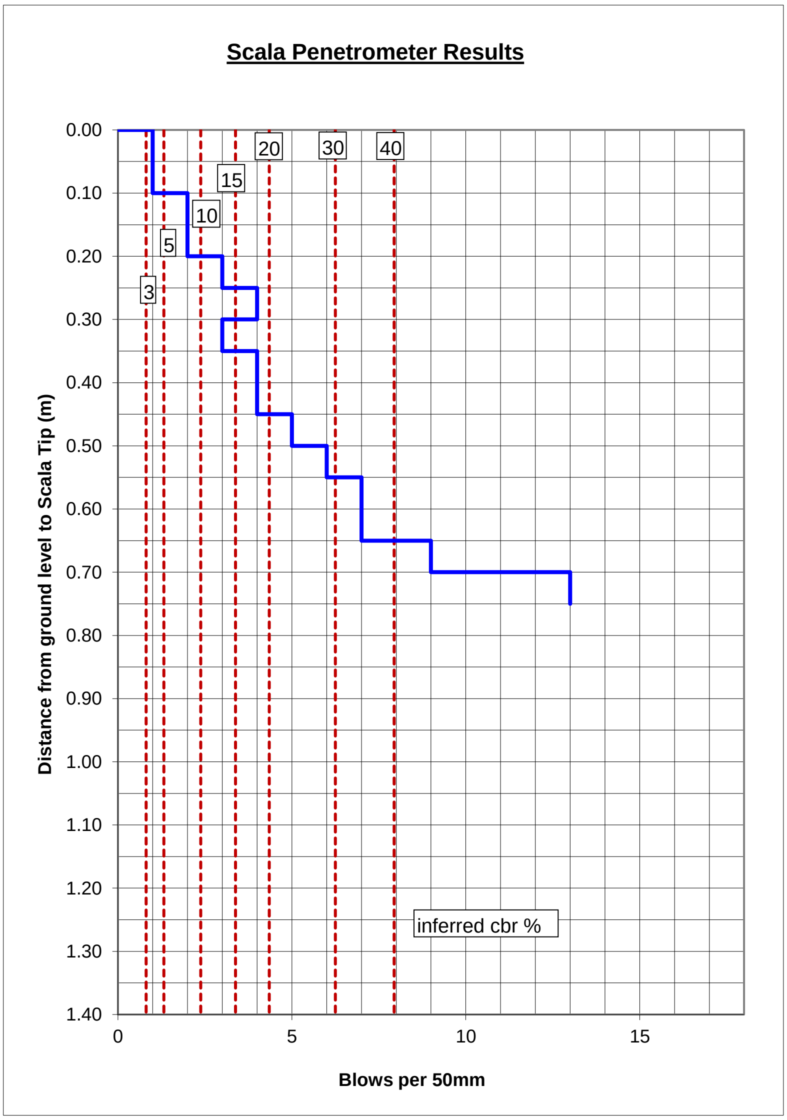
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP41
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	41 of 42
Start Depth (m):	0.00		

LWD (MPa): 59

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
1	2	6	2	0.10
2	4	12	4	0.15
2	4	12	6	0.20
3	6	18	9	0.25
4	8	24	13	0.30
3	6	18	16	0.35
4	8	24	20	0.40
4	8	24	24	0.45
5	10	30	29	0.50
6	12	36	35	0.55
7	14	42	42	0.60
7	14	42	49	0.65
9	18	54	58	0.70
13	26	78	71	0.75



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

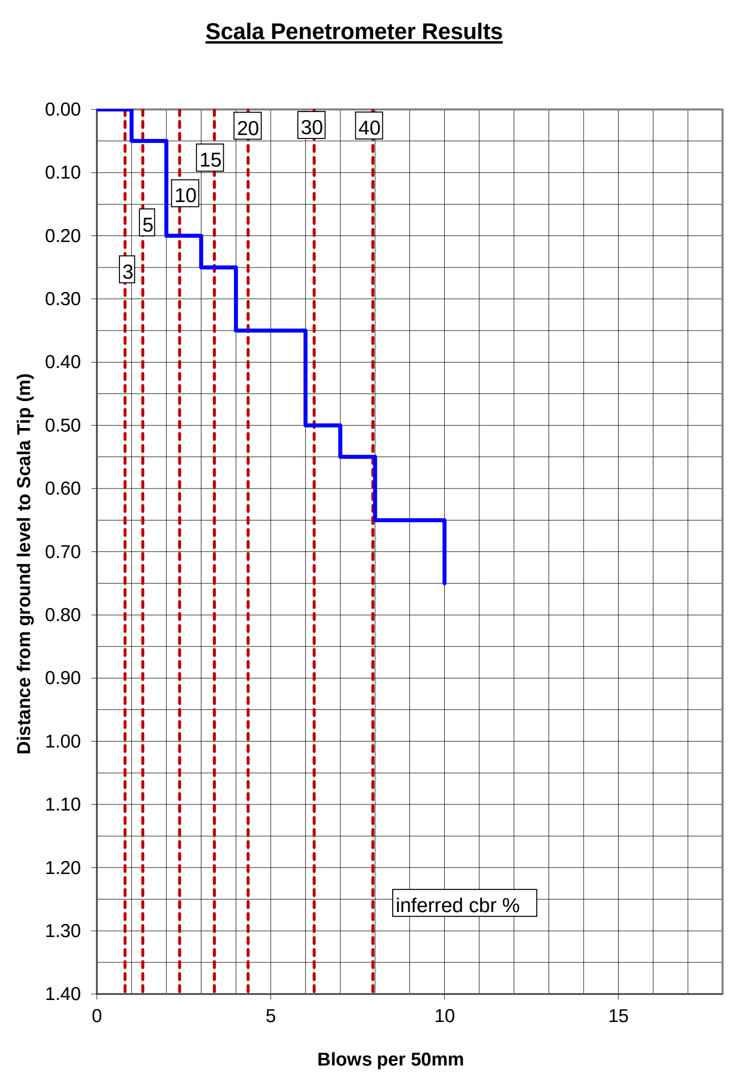
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP42
Client:	Cook Costello	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R004
Location:	Stage 6-7, fill testing	**Page:**	42 of 42
Start Depth (m):	0.00		

LWD (MPa): 37

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road
Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.00
1	2	6	1	0.05
2	4	12	3	0.10
2	4	12	5	0.15
2	4	12	7	0.20
3	6	18	10	0.25
4	8	24	14	0.30
4	8	24	18	0.35
6	12	36	24	0.40
6	12	36	30	0.45
6	12	36	36	0.50
7	14	42	43	0.55
8	16	48	51	0.60
8	16	48	59	0.65
10	20	60	69	0.70
10	20	60	79	0.75



Recorded By:	L.C / D.O
Date:	16/12/2021
Checked by:	A.M
Date:	12/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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E: martin@geocivil.co.nz

TEST REPORT

Lab Job No: 8020-1727

Your ref.: -

Date of Issue: 14/02/2022

Date of Re-Issue: -

Page: 1 of 17

Test Report No.
WRE8020-1727-R005

PROJECT: **The Landing - Stage 6/7 Scala and LWD Testing 13-14/01/22**

CLIENT:
Cook Costello
2 Norfolk Street,
Whangarei 0110

ATTENTION: Stefano Rotatori

TEST METHODS:
Light Weight Deflectometer (LWD) (Not accredited)
ASTM E2835-11 (Not accredited)
Determination of the penetration resistance using a dynamic cone (scala) Penetrometer
NZS 4402: 1988 Test 6.5.2

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

Alex Millar

A. Millar

Administrator

S. Kokich

Approved Signatory

ACCREDITED IANZ TESTING LABORATORY

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

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LIGHTWEIGHT DEFLECTOMETER READINGS

ASTM E2583-07 (2015)

Lab Job No.:	8020-1727	**Tested By:**	A.B
Client:	CCL	**Date:**	14/01/2022
Job:	The Landing Stage 6 - 7	**Checked By:**	A.M
Location:	Ruakaka	**Date:**	27/01/2022
Report No:	WRE8020-1727-R005	**Page:**	2 of 17
Ref:	-		

Date	Location	Evd (MPa)	Comments	Approximate Depth of Excavation (mm)
14/01/2022	SCB17	108.7	**Retest**	300
14/01/2022	SCB18	51.6	**Retest**	300

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

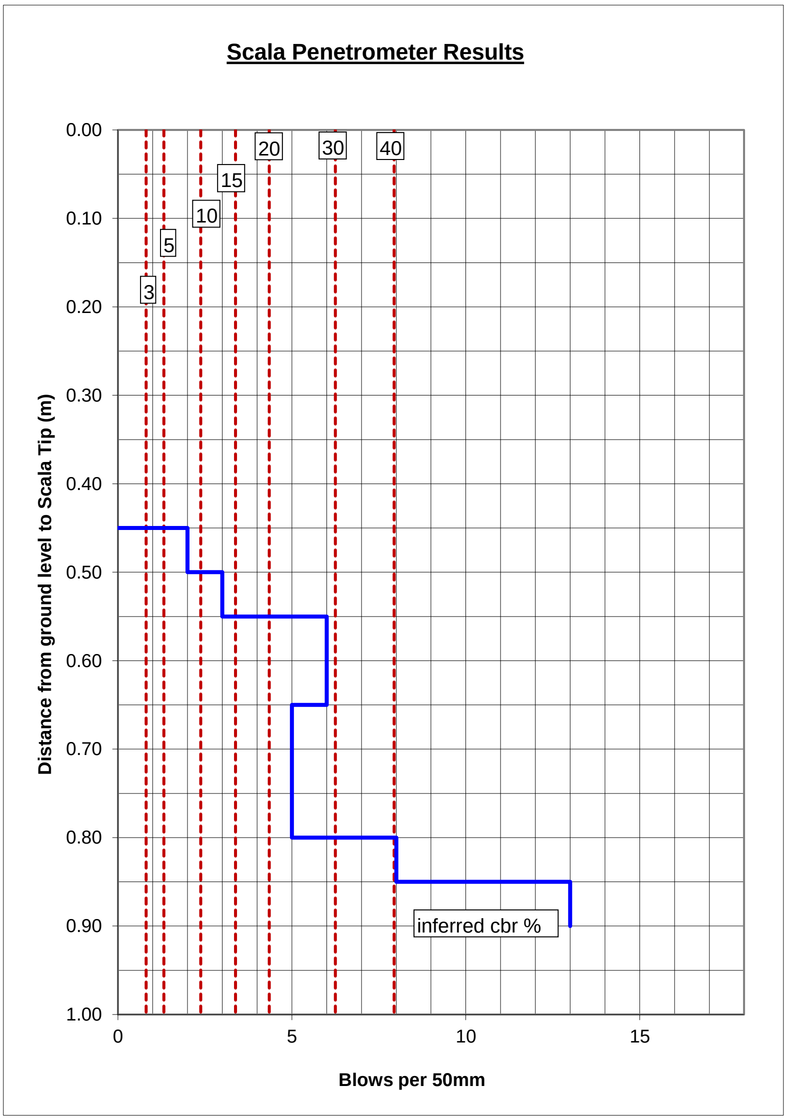
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.45

LWD (Mpa): **100.9**

Scala No: SCP 43
Ref : -
Report No: WRE8020-1727-R005
Page: 3 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.45
2	4	12	2	0.50
3	6	18	5	0.55
6	12	36	11	0.60
6	12	36	17	0.65
5	10	30	22	0.70
5	10	30	27	0.75
5	10	30	32	0.80
8	16	48	40	0.85
13	26	78	53	0.90



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

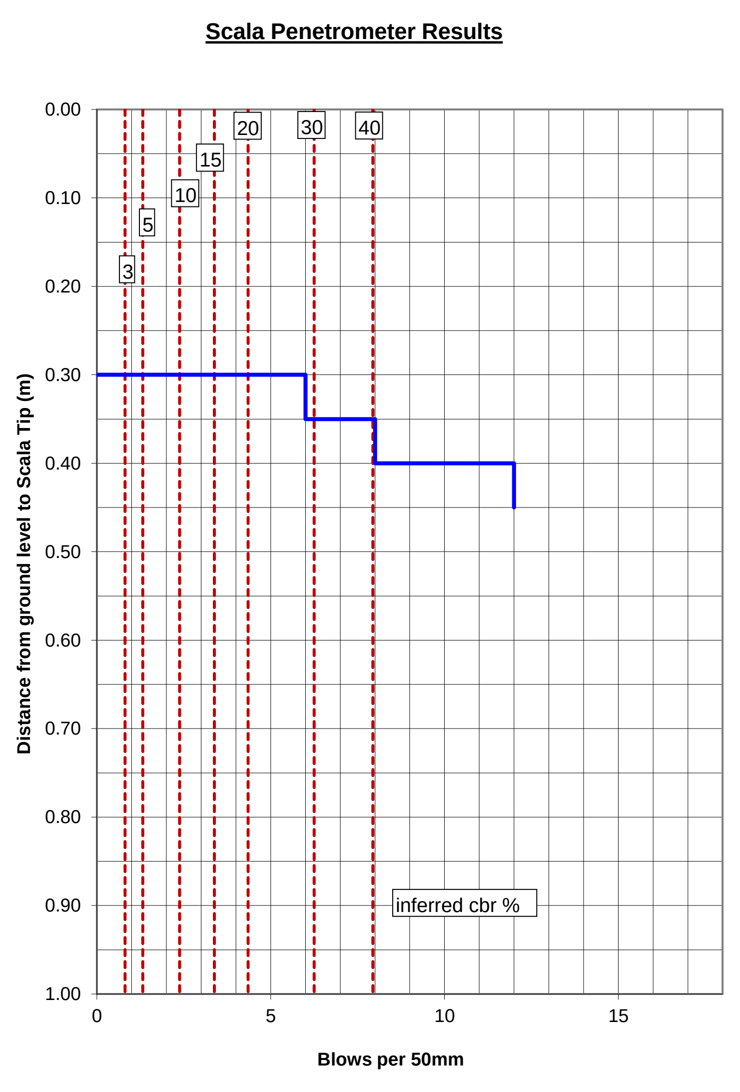
NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No:	8020-1727	**Scala No:**	SCP 44
Client:	CCL	**Ref :**	-
Job:	The Landing	**Report No:**	WRE8020-1727-R005
Location:	Stage 6 & 7	**Page:**	4 of 17
Start Depth (m):	0.3		

LWD (Mpa): **148**

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.30
6	12	36	6	0.35
8	16	48	14	0.40
12	24	72	26	0.45



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

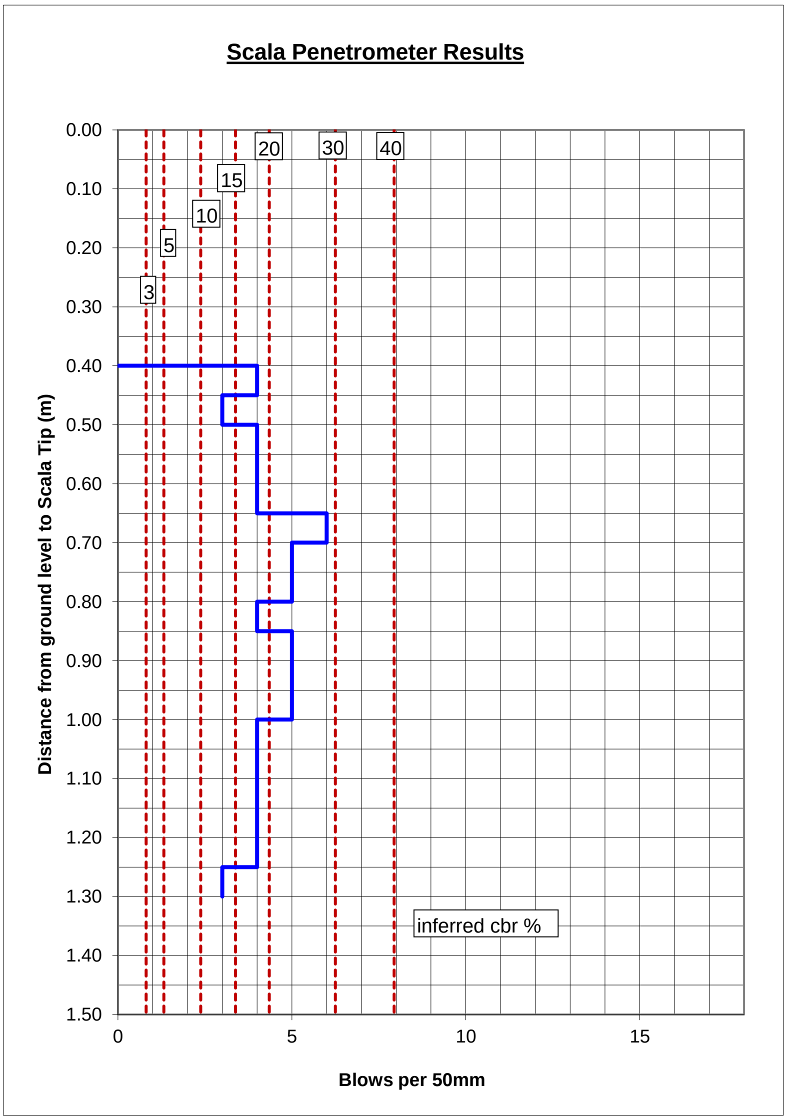
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.4

LWD (Mpa): **65.8**

Scala No: SCP 45
Ref : -
Report No: WRE8020-1727-R005
Page: 5 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.40
4	8	24	4	0.45
3	6	18	7	0.50
4	8	24	11	0.55
4	8	24	15	0.60
4	8	24	19	0.65
6	12	36	25	0.70
5	10	30	30	0.75
5	10	30	35	0.80
4	8	24	39	0.85
5	10	30	44	0.90
5	10	30	49	0.95
5	10	30	54	1.00
4	8	24	58	1.05
4	8	24	62	1.10
4	8	24	66	1.15
4	8	24	70	1.20
4	8	24	74	1.25
3	6	18	77	1.30



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

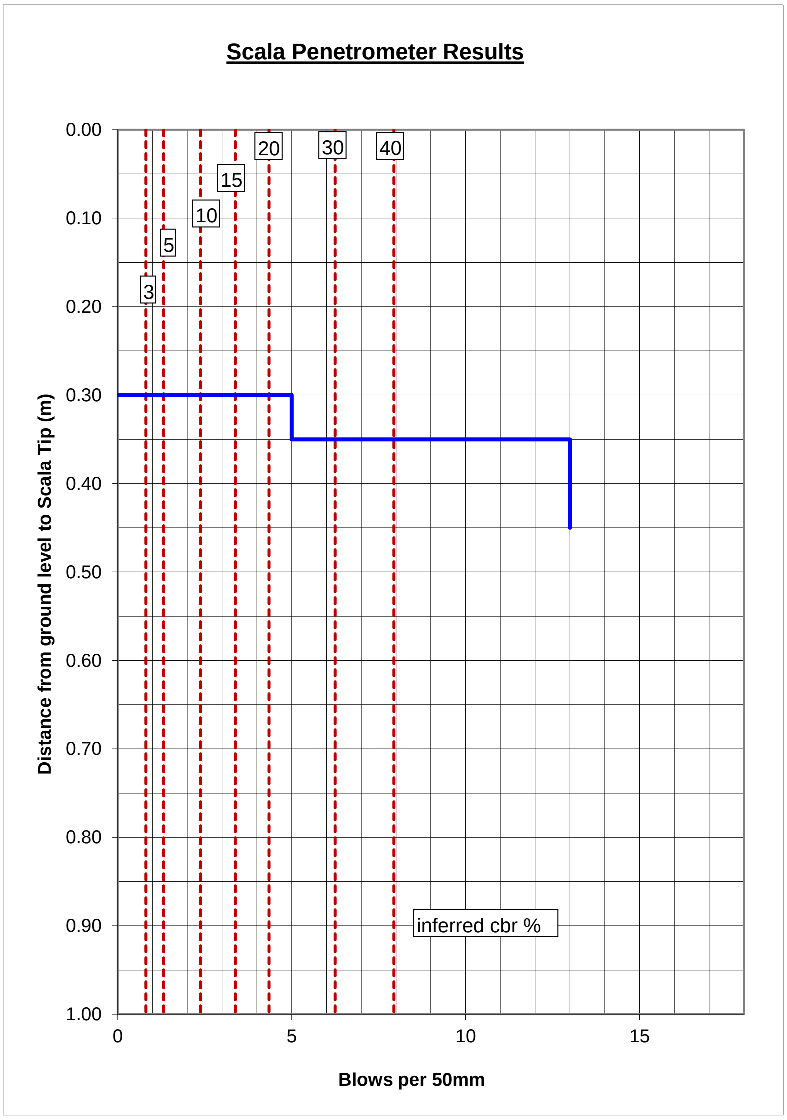
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.3

LWD (Mpa): **100.5**

Scala No: SCP 46
Ref : -
Report No: WRE8020-1727-R005
Page: 6 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.30
5	10	30	5	0.35
13	26	78	18	0.40
13	26	78	31	0.45



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

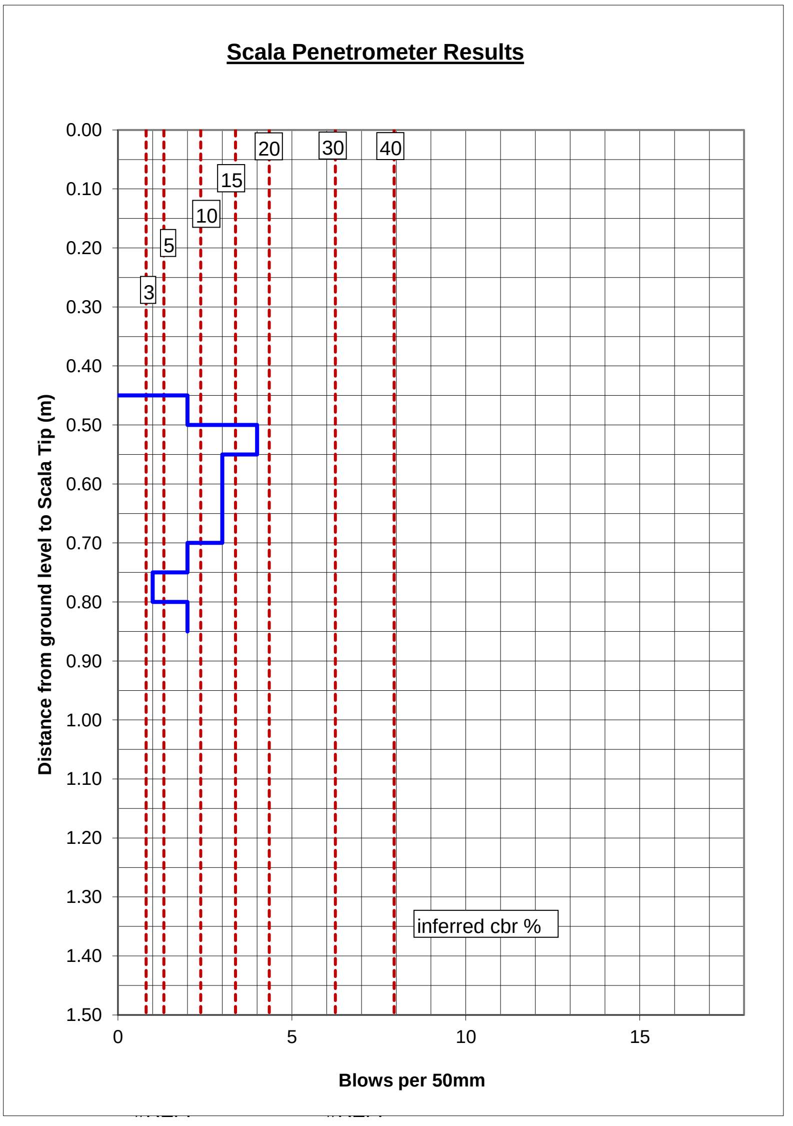
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.45

LWD (Mpa): **50.9**

Scala No: SCP 47
Ref : -
Report No: WRE8020-1727-R005
Page: 7 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.45
2	4	12	2	0.50
4	8	24	6	0.55
3	6	18	9	0.60
3	6	18	12	0.65
3	6	18	15	0.70
2	4	12	17	0.75
1	2	6	18	0.80
2	4	12	20	0.85
1	2	6	21	0.90
2	4	12	23	0.95
3	6	18	26	1.00
3	6	18	29	1.05
3	6	18	32	1.10
4	8	24	36	1.15
3	6	18	39	1.20
4	8	24	43	1.25
4	8	24	47	1.30
6	12	36	53	1.35



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.4

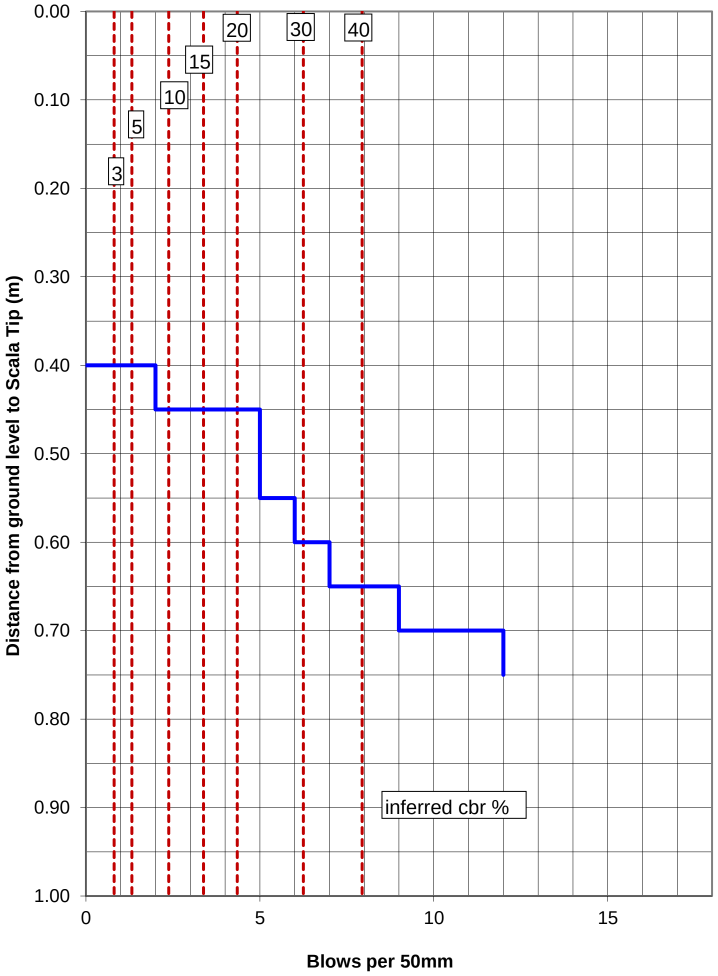
LWD (Mpa): **112.5**

Scala No: SCP 48
Ref : -
Report No: WRE8020-1727-R005
Page: 8 of 17

The line are the suggested correlation of CBR values based
on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR
AUSTROADS (2004) "Pavement Design - a guide to the design of road
Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.40
2	4	12	2	0.45
5	10	30	7	0.50
5	10	30	12	0.55
6	12	36	18	0.60
7	14	42	25	0.65
9	18	54	34	0.70
12	24	72	46	0.75

Scala Penetrometer Results



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

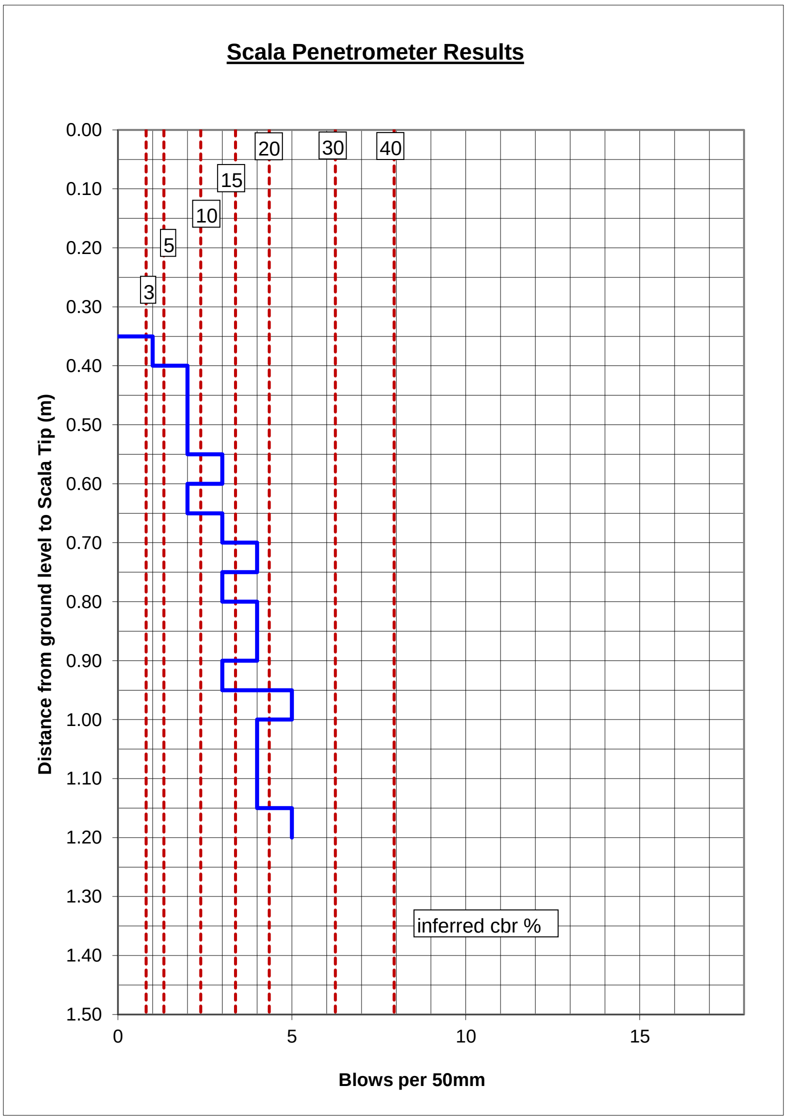
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.35

LWD (Mpa): **86.9**

Scala No: SCP 49
Ref : -
Report No: WRE8020-1727-R005
Page: 9 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.35
1	2	6	1	0.40
2	4	12	3	0.45
2	4	12	5	0.50
2	4	12	7	0.55
3	6	18	10	0.60
2	4	12	12	0.65
3	6	18	15	0.70
4	8	24	19	0.75
3	6	18	22	0.80
4	8	24	26	0.85
4	8	24	30	0.90
3	6	18	33	0.95
5	10	30	38	1.00
4	8	24	42	1.05
4	8	24	46	1.10
4	8	24	50	1.15
5	10	30	55	1.20



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

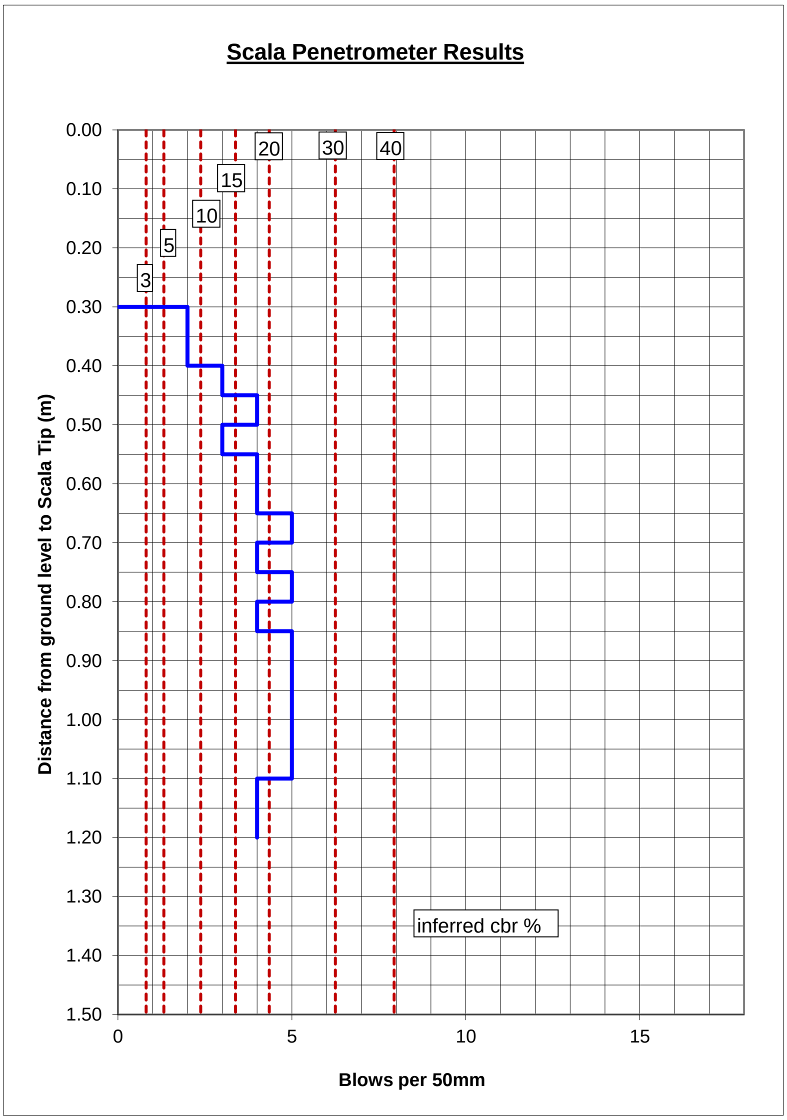
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.3

LWD (Mpa): **103.7**

Scala No: SCP 50
Ref : -
Report No: WRE8020-1727-R005
Page: 10 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.30
2	4	12	2	0.35
2	4	12	4	0.40
3	6	18	7	0.45
4	8	24	11	0.50
3	6	18	14	0.55
4	8	24	18	0.60
4	8	24	22	0.65
5	10	30	27	0.70
4	8	24	31	0.75
5	10	30	36	0.80
4	8	24	40	0.85
5	10	30	45	0.90
5	10	30	50	0.95
5	10	30	55	1.00
5	10	30	60	1.05
5	10	30	65	1.10
4	8	24	69	1.15
4	8	24	73	1.20



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

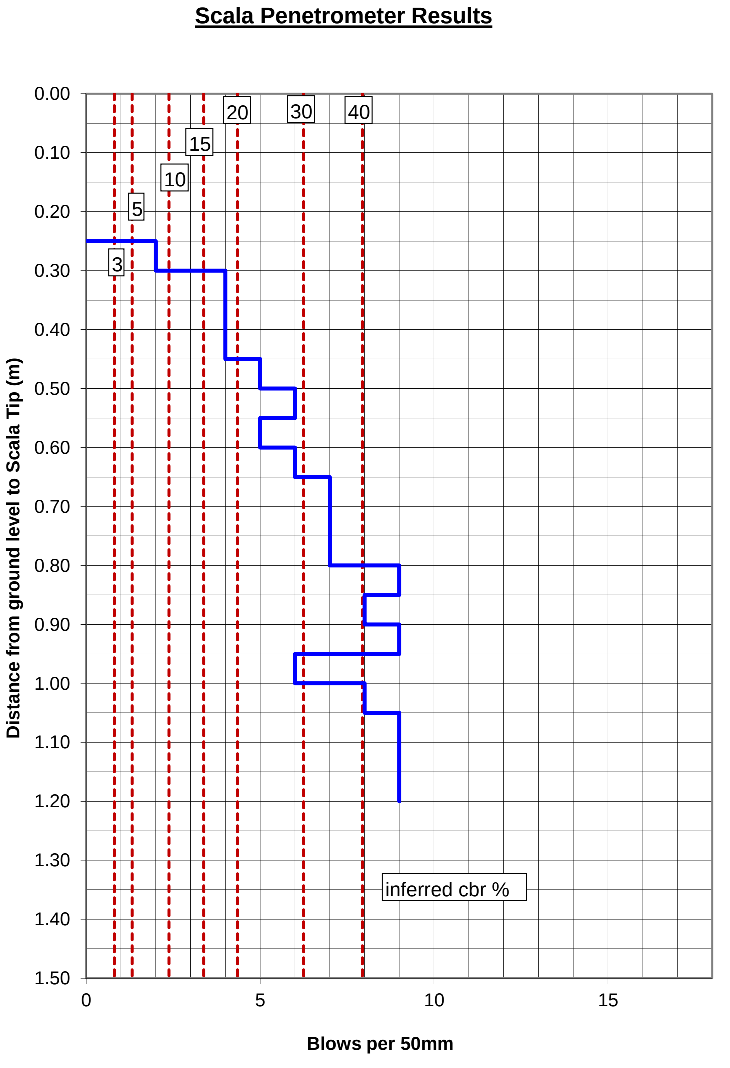
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.25

LWD (Mpa): **101.8**

Scala No: SCP 51
Ref : -
Report No: WRE8020-1727-R005
Page: 11 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.25
2	4	12	2	0.30
4	8	24	6	0.35
4	8	24	10	0.40
4	8	24	14	0.45
5	10	30	19	0.50
6	12	36	25	0.55
5	10	30	30	0.60
6	12	36	36	0.65
7	14	42	43	0.70
7	14	42	50	0.75
7	14	42	57	0.80
9	18	54	66	0.85
8	16	48	74	0.90
9	18	54	83	0.95
6	12	36	89	1.00
8	16	48	97	1.05
9	18	54	106	1.10
9	18	54	115	1.15
9	18	54	124	1.20



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

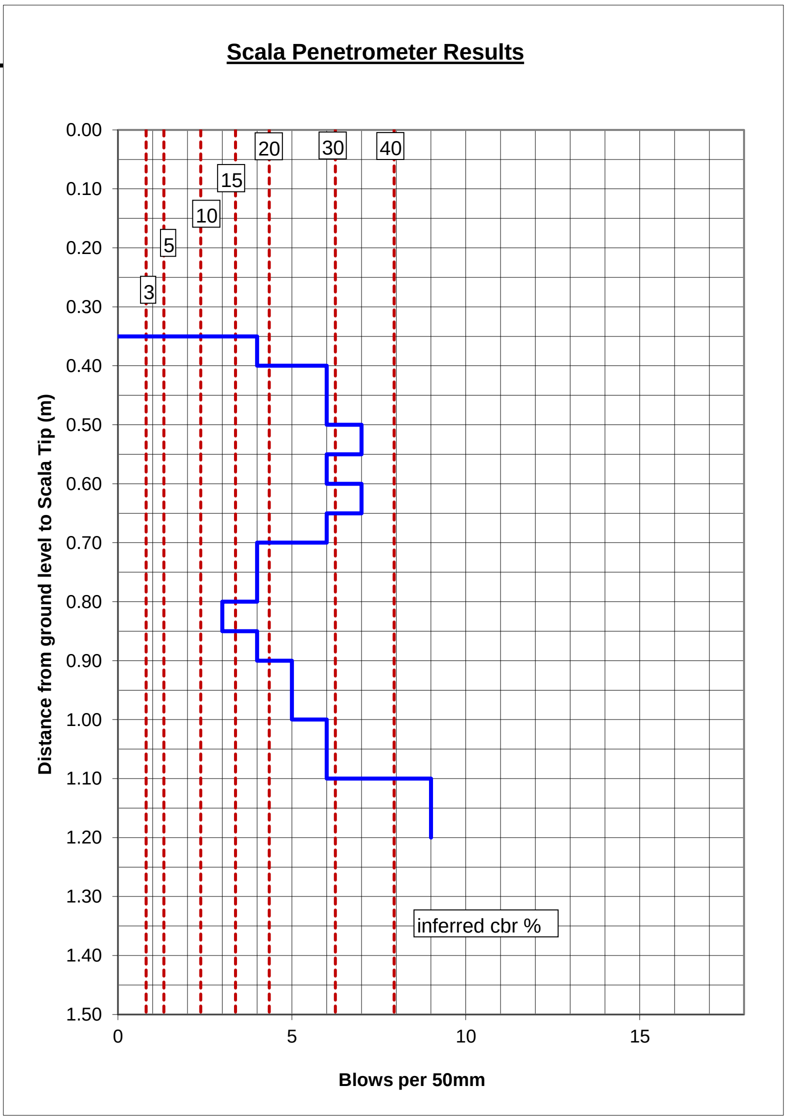
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.35

LWD (Mpa): **131.6**

Scala No: SCP 52
Ref : -
Report No: WRE8020-1727-R005
Page: 12 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.35
4	8	24	4	0.40
6	12	36	10	0.45
6	12	36	16	0.50
7	14	42	23	0.55
6	12	36	29	0.60
7	14	42	36	0.65
6	12	36	42	0.70
4	8	24	46	0.75
4	8	24	50	0.80
3	6	18	53	0.85
4	8	24	57	0.90
5	10	30	62	0.95
5	10	30	67	1.00
6	12	36	73	1.05
6	12	36	79	1.10
9	18	54	88	1.15
9	18	54	97	1.20



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

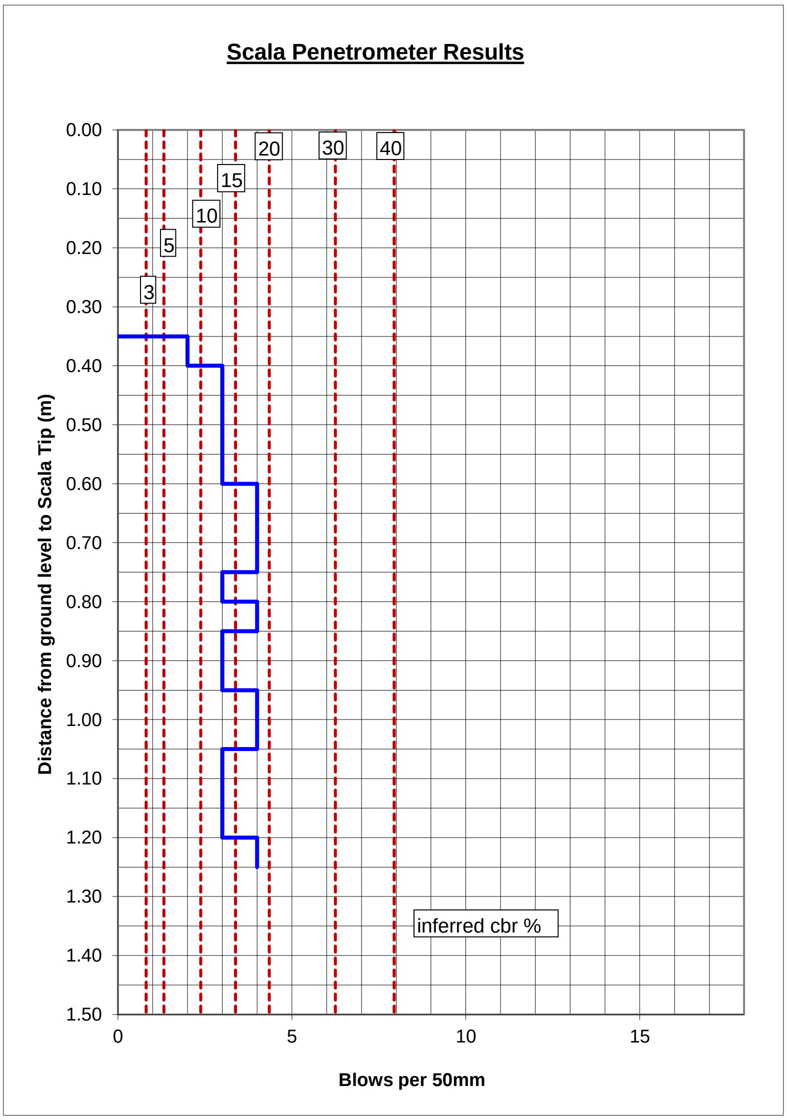
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.35

LWD (Mpa): **86.9**

Scala No: SCP 53
Ref : -
Report No: WRE8020-1727-R005
Page: 13 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.35
2	4	12	2	0.40
3	6	18	5	0.45
3	6	18	8	0.50
3	6	18	11	0.55
3	6	18	14	0.60
4	8	24	18	0.65
4	8	24	22	0.70
4	8	24	26	0.75
3	6	18	29	0.80
4	8	24	33	0.85
3	6	18	36	0.90
3	6	18	39	0.95
4	8	24	43	1.00
4	8	24	47	1.05
3	6	18	50	1.10
3	6	18	53	1.15
3	6	18	56	1.20
4	8	24	60	1.25



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

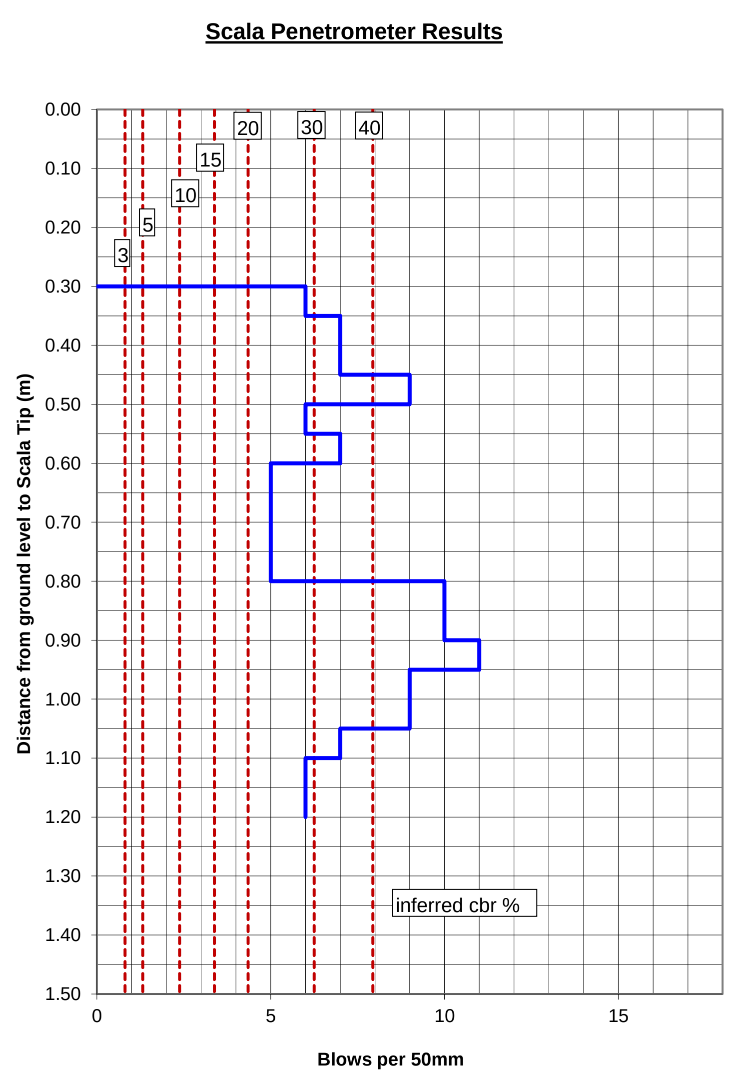
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.3

LWD (Mpa): **69.2**

Scala No: SCP 54
Ref : -
Report No: WRE8020-1727-R005
Page: 14 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.30
6	12	36	6	0.35
7	14	42	13	0.40
7	14	42	20	0.45
9	18	54	29	0.50
6	12	36	35	0.55
7	14	42	42	0.60
5	10	30	47	0.65
5	10	30	52	0.70
5	10	30	57	0.75
5	10	30	62	0.80
10	20	60	72	0.85
10	20	60	82	0.90
11	22	66	93	0.95
9	18	54	102	1.00
9	18	54	111	1.05
7	14	42	118	1.10
6	12	36	124	1.15
6	12	36	130	1.20



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

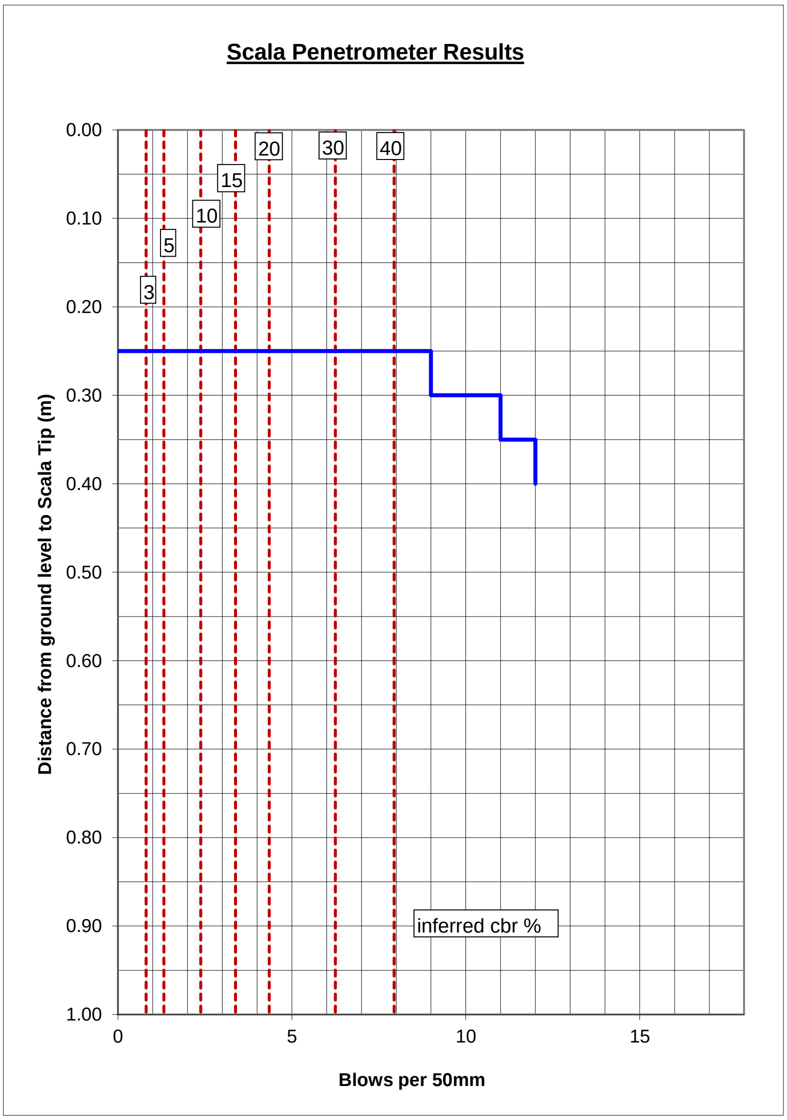
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.25

LWD (Mpa): **90.4**

Scala No: SCP 55
Ref : -
Report No: WRE8020-1727-R005
Page: 15 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.25
9	18	54	9	0.30
11	22	66	20	0.35
12	24	72	32	0.40



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

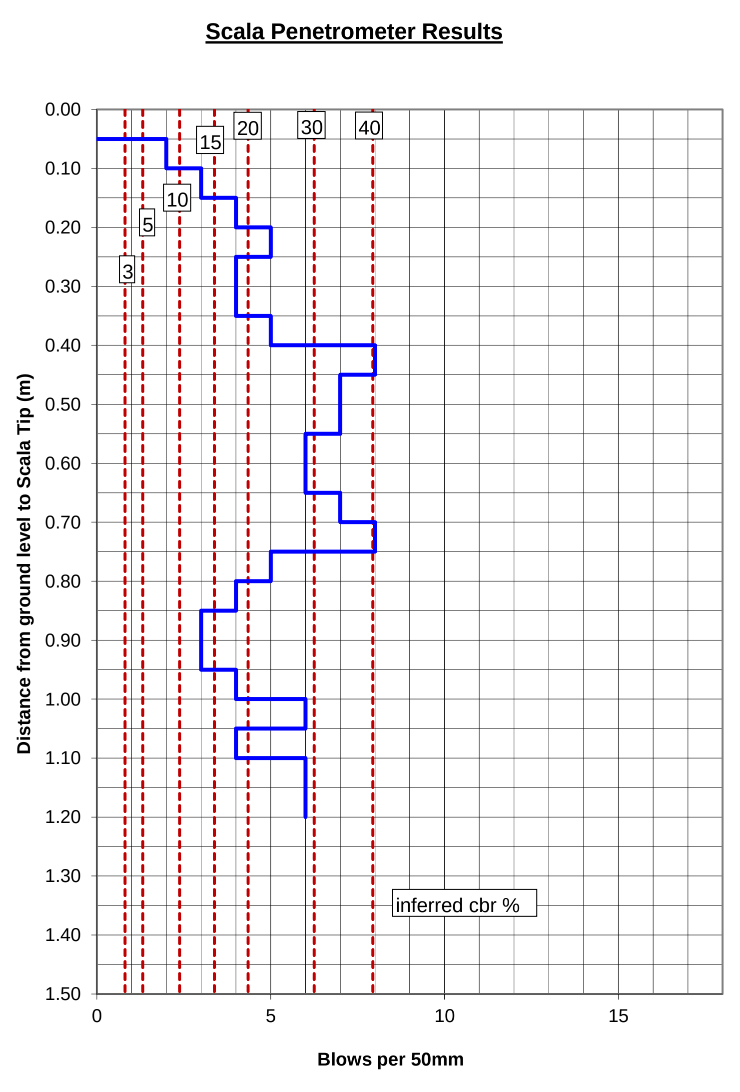
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.05

LWD (Mpa): **62.5**

Scala No: SCP 56
Ref : -
Report No: WRE8020-1727-R005
Page: 16 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
2	4	12	2	0.10
3	6	18	5	0.15
4	8	24	9	0.20
5	10	30	14	0.25
4	8	24	18	0.30
4	8	24	22	0.35
5	10	30	27	0.40
8	16	48	35	0.45
7	14	42	42	0.50
7	14	42	49	0.55
6	12	36	55	0.60
6	12	36	61	0.65
7	14	42	68	0.70
8	16	48	76	0.75
5	10	30	81	0.80
4	8	24	85	0.85
3	6	18	88	0.90
3	6	18	91	0.95
4	8	24	95	1.00
6	12	36	101	1.05
4	8	24	105	1.10
6	12	36	111	1.15
6	12	36	117	1.20



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
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DYNAMIC CONE (SCALA) PENETROMETER

NZS 4402 :1988 Test 6.5.2 Procedure 2

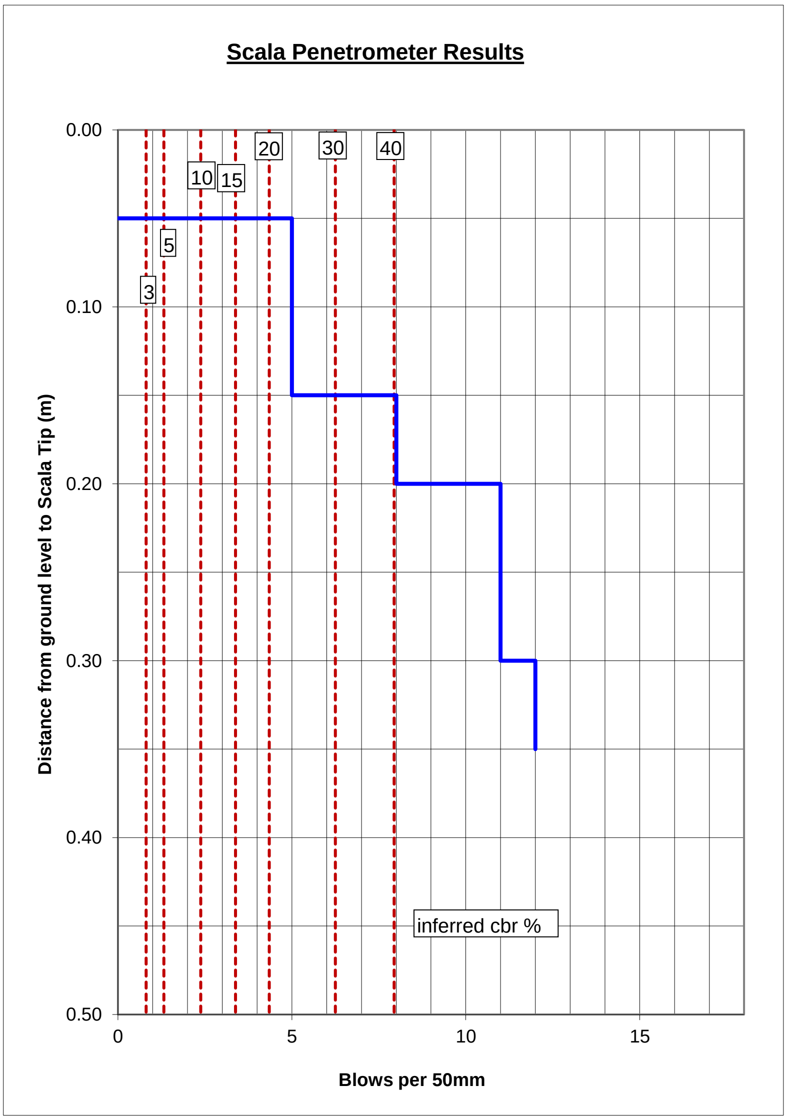
Lab Job No: 8020-1727
Client: CCL
Job: The Landing
Location: Stage 6 & 7
Start Depth (m): 0.05

LWD (Mpa): **71**

Scala No: SCP 57
Ref : -
Report No: WRE8020-1727-R005
Page: 17 of 17

The line are the suggested correlation of CBR values based on Figure 5.3, Correlation of Dynamic Cone Penetration and CBR AUSTROADS (2004) "Pavement Design - a guide to the design of road Pavements"
(This comment is excluded from endorsement)

Blows / 50mm	Blows / 100mm	Blows / 300mm	Total Blows	depth (m)
0	0	0	0	0.05
5	10	30	5	0.10
5	10	30	10	0.15
8	16	48	18	0.20
11	22	66	29	0.25
11	22	66	40	0.30
12	24	72	52	0.35



Recorded By: A.B
Date: 13/01/2022
Checked by: A.M
Date: 27/01/2022

Note: All readings taken below 1.5m from start depth are outside the scope of this test

S. Kokich
Approved Signatory

Whangarei Laboratory
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Whangarei
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E: martin@geocivil.co.nz

TEST REPORT

Lab Job No:	8020-1727
Your ref.:	-
Date of Issue:	15/02/2022
Date of Re-Issue:	-
Page:	1 of 2

Test Report No.
WRE8020-1727-R006

PROJECT: **The Landing - LWD Testing 21/01/2022**

CLIENT:
Cook Costello
2 Norfolk Street,
Whangarei 0110

ATTENTION: Stefano Rotatori

TEST METHODS:
Light Weight Deflectometer (LWD)
ASTM E2835-11

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

A. Brooke
Laboratory Technician

S. Kokich
Senior Technician

Whangarei Laboratory
166 Bank Street
Whangarei
P: 09 438 4417
E: info@geocivil.co.nz

LIGHTWEIGHT DEFLECTOMETER READINGS

ASTM E2583-07 (2015)

Lab Job No.:	8020-1727	**Tested By:**	D.O
Client:	CCL	**Date:**	21/01/2022
Job:	The Landing Stage 6 - 7	**Checked By:**	A.B
Location:	Ruakaka	**Date:**	9/02/2022
Report No:	WRE8020-1727-R006	**Page:**	2 of 2
Ref:	-		

Date	Location	Evd (MPa)	Comments	Approximate Depth of Excavation (mm)
21/01/2022	SCB22	126.4	**Retest**	300
21/01/2022	SCB23	86.2	**Retest**	300
21/01/2022	SCB24	85.9	**Retest**	300
21/01/2022	SCB25	89.3	**Retest**	300
21/01/2022	SCB26	82.4	**Retest**	300
21/01/2022	SCB21	115.4	**Retest**	300

S. Kokich
Approved Signatory

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Whangarei
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E: martin@geocivil.co.nz

TEST REPORT

Lab Job No:	8020-1727
Your ref.:	-
Date of Issue:	12/05/2022
Date of Re-Issue:	-
Page:	1 of 35

Test Report No.
WRE8020-1727-R007

PROJECT:	**The Landing - Plate Load Testing**
CLIENT:	Cook Costello 2 Norfolk Street, Whangarei 0110
ATTENTION:	Stefano Rotatori
TEST METHODS:	Static Plate Load Test DIN 18134:2012-04
SAMPLING METHOD:	N/A
TEST RESULTS:	As per attached sheets

A. Brooke

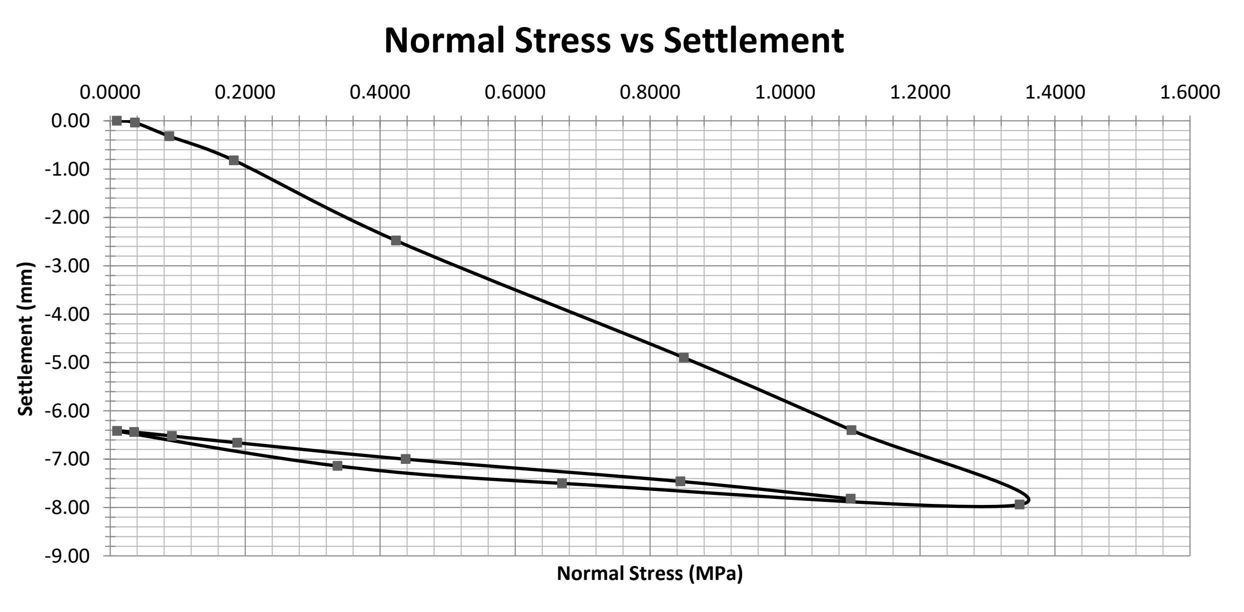
Laboratory Technician

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	14/01/2022
Site:	The Landing	**Tested by:**	D.O, A.B
Job No:	8020-1727	**Test No.:**	**PLT R 01**
Report No:	WRE8020-1727-R007	**Page:**	2 of 35
Client Reference:	-	**Checked by:**	M.A
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0369	-0.04	
3	0.0880	0.0877	-0.32	
4	0.1870	0.1835	-0.82	
5	0.4240	0.4237	-2.48	
6	0.8480	0.8500	-4.90	
7	1.0980	1.0984	-6.40	
8	1.3480	1.3479	-7.94	
9	0.6740	0.6698	-7.50	Unloaded
10	0.3370	0.3369	-7.14	
11	0.0100	0.0105	-6.42	
12	0.0310	0.0354	-6.44	Secondary load
13	0.0880	0.0917	-6.52	
14	0.1870	0.1882	-6.66	
15	0.4240	0.4380	-7.00	
16	0.8480	0.8452	-7.46	
17	1.0980	1.0975	-7.82	



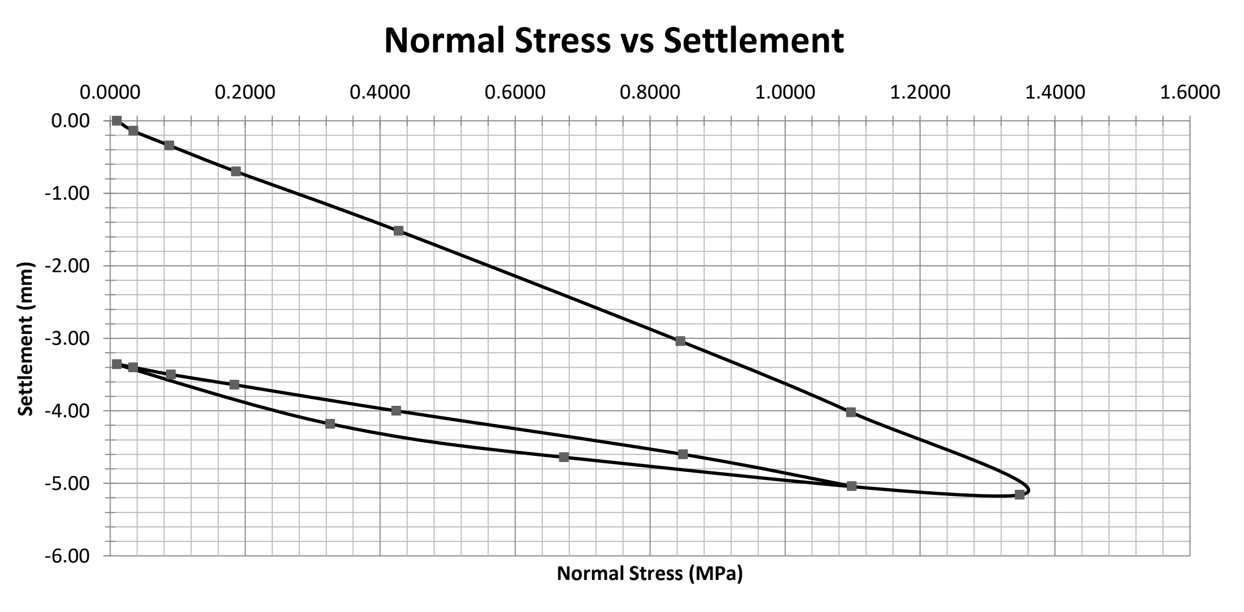
Ev1 (MPa)	**37.32**	**Ev2 (MPa)**	**178.06**
Ev2/Ev1=4.77			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	14/01/2022
Site:	The Landing	**Tested by:**	D.O, A.B
Job No:	8020-1727	**Test No.:**	**PLT R 02**
Report No:	WRE8020-1727-R007	**Page:**	3 of 35
Client Reference:	-	**Checked by:**	M.A
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0343	-0.14	
3	0.0880	0.0876	-0.34	
4	0.1870	0.1863	-0.70	
5	0.4240	0.4275	-1.52	
6	0.8480	0.8450	-3.04	
7	1.0980	1.0978	-4.02	
8	1.3480	1.3478	-5.16	
9	0.6740	0.6723	-4.64	Unloade d
10	0.3370	0.3259	-4.18	
11	0.0100	0.0098	-3.36	
12	0.0310	0.0342	-3.40	Secondary load
13	0.0880	0.0901	-3.50	
14	0.1870	0.1841	-3.64	
15	0.4240	0.4238	-4.00	
16	0.8480	0.8488	-4.60	
17	1.0980	1.0989	-5.04	



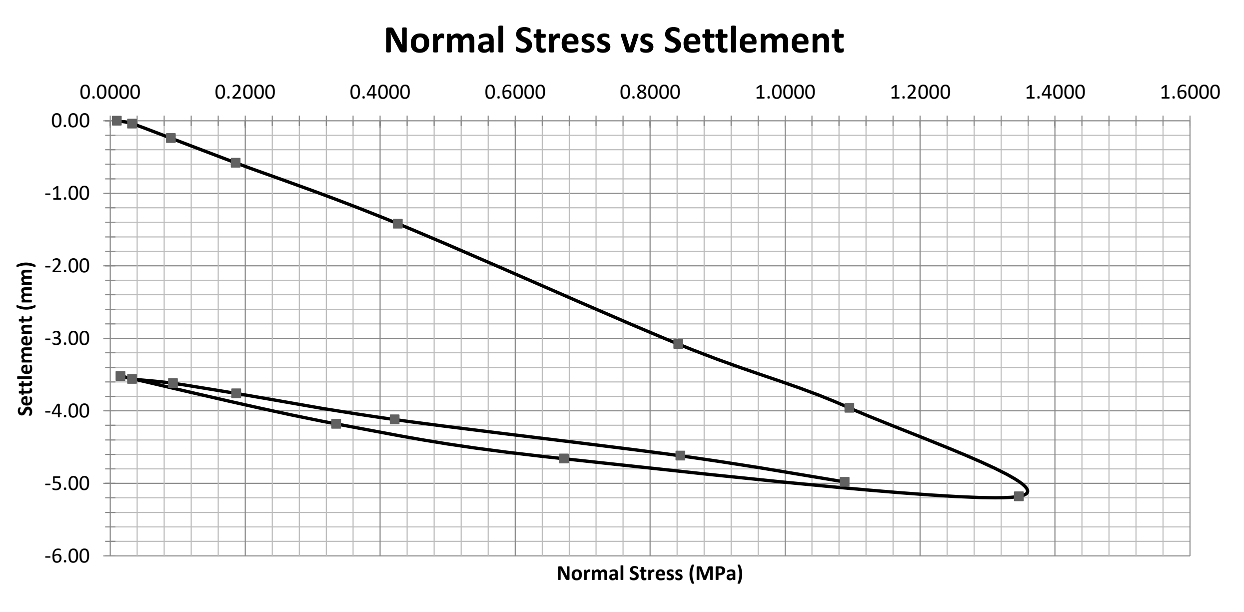
Ev1 (MPa)	**59.87**	**Ev2 (MPa)**	**147.16**
Ev2/Ev1=2.46			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	13/01/2022
Site:	The Landing	**Tested by:**	A.B / D.O
Job No:	8020-1727	**Test No.:**	**PLT R 03**
Report No:	WRE8020-1727-R007	**Page:**	4 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0324	-0.04	
3	0.0880	0.0900	-0.24	
4	0.1870	0.1860	-0.58	
5	0.4240	0.4265	-1.42	
6	0.8480	0.8419	-3.08	
7	1.0980	1.0954	-3.96	
8	1.3480	1.3465	-5.18	
9	0.6740	0.6723	-4.66	Unloaded
10	0.3370	0.3350	-4.18	
11	0.0100	0.0155	-3.52	
12	0.0310	0.0325	-3.56	Secondary load
13	0.0880	0.0932	-3.62	
14	0.1870	0.1870	-3.76	
15	0.4240	0.4216	-4.12	
16	0.8480	0.8449	-4.62	
17	1.0980	1.0883	-4.98	



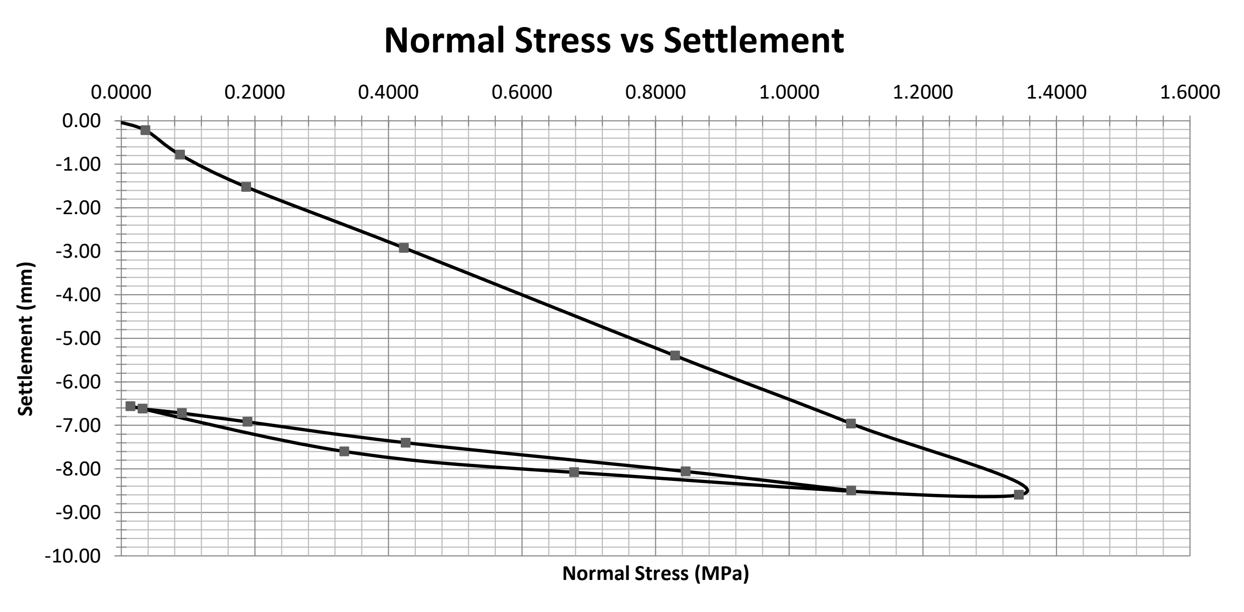
Ev1 (MPa)	**58.27**	**Ev2 (MPa)**	**169.78**
Ev2/Ev1=2.91			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	13/01/2022
Site:	The Landing	**Tested by:**	A.B / D.O
Job No:	8020-1727	**Test No.:**	**PLT R 04**
Report No:	WRE8020-1727-R007	**Page:**	5 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	-0.0100	0.00	Primary load
2	0.0310	0.0361	-0.22	
3	0.0880	0.0880	-0.78	
4	0.1870	0.1870	-1.52	
5	0.4240	0.4231	-2.92	
6	0.8480	0.8292	-5.40	
7	1.0980	1.0927	-6.96	
8	1.3480	1.3441	-8.60	
9	0.6740	0.6782	-8.08	Unloaded
10	0.3370	0.3340	-7.60	
11	0.0100	0.0139	-6.56	
12	0.0310	0.0318	-6.62	Secondary load
13	0.0880	0.0910	-6.72	
14	0.1870	0.1890	-6.92	
15	0.4240	0.4260	-7.40	
16	0.8480	0.8450	-8.06	
17	1.0980	1.0929	-8.50	



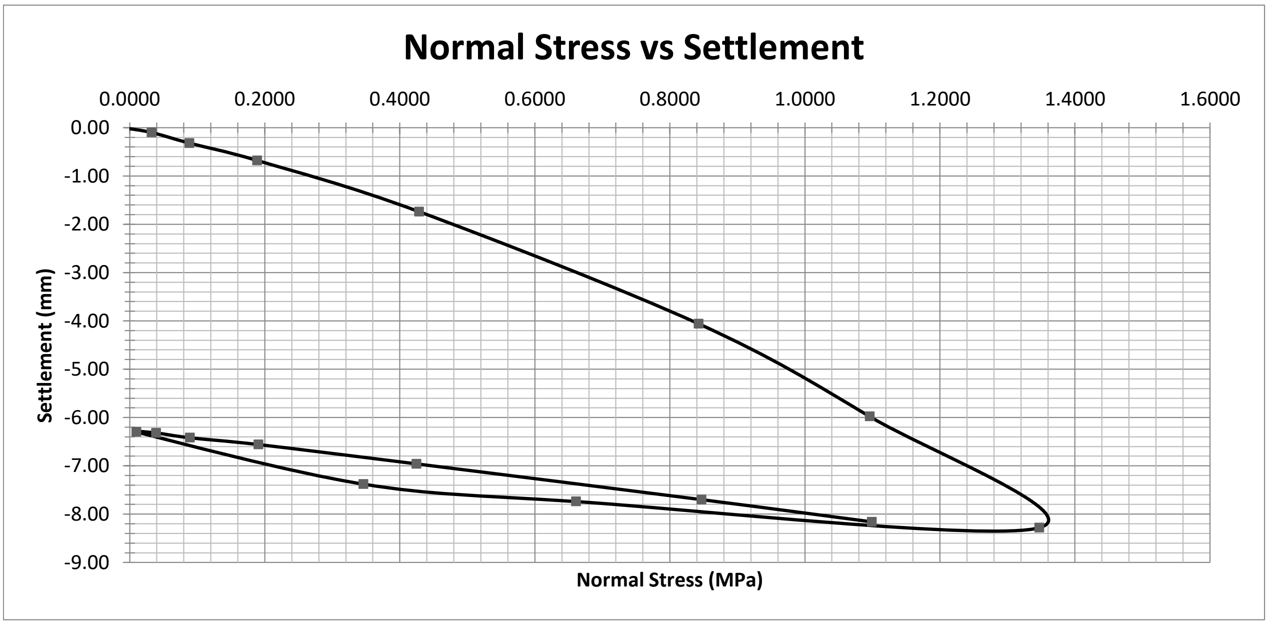
Ev1 (MPa)	**36.05**	**Ev2 (MPa)**	**131.45**
Ev2/Ev1=3.65			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	13/01/2022
Site:	The Landing	**Tested by:**	A.B / D.O
Job No:	8020-1727	**Test No.:**	**PLT R 05**
Report No:	WRE8020-1727-R007	**Page:**	6 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	-0.0100	0.00	Primary load
2	0.0310	0.0323	-0.10	
3	0.0880	0.0884	-0.32	
4	0.1870	0.1889	-0.68	
5	0.4240	0.4288	-1.74	
6	0.8480	0.8426	-4.06	
7	1.0980	1.0960	-5.98	
8	1.3480	1.3475	-8.28	
9	0.6740	0.6610	-7.74	Unloaded
10	0.3370	0.3463	-7.38	
11	0.0100	0.0099	-6.30	
12	0.0310	0.0390	-6.32	Secondary load
13	0.0880	0.0891	-6.42	
14	0.1870	0.1906	-6.56	
15	0.4240	0.4247	-6.96	
16	0.8480	0.8470	-7.70	
17	1.0980	1.0991	-8.16	



Ev1 (MPa)	**37.05**	**Ev2 (MPa)**	**127.87**
Ev2/Ev1=3.45			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

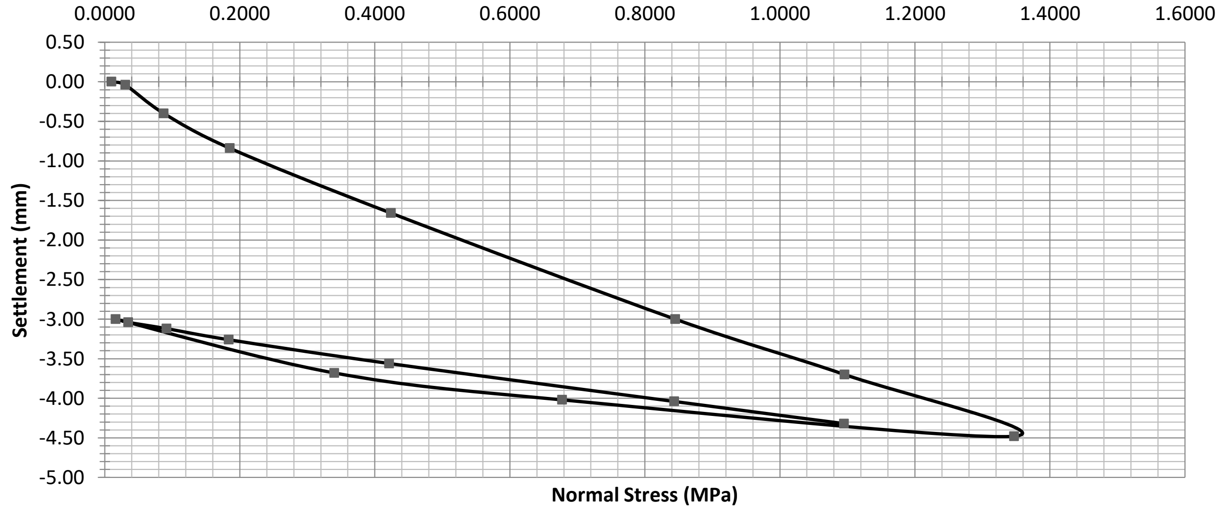
STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	14/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 06**
Report No:	WRE8020-1727-R007	**Page:**	7 of 35
Client Reference:	-	**Checked by:**	M.A
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0304	-0.04	
3	0.0880	0.0874	-0.40	
4	0.1870	0.1853	-0.84	
5	0.4240	0.4240	-1.66	
6	0.8480	0.8449	-3.00	
7	1.0980	1.0957	-3.70	
8	1.3480	1.3468	-4.48	
9	0.6740	0.6776	-4.02	Unloaded
10	0.3370	0.3400	-3.68	
11	0.0100	0.0160	-3.00	
12	0.0310	0.0349	-3.04	Secondary load
13	0.0880	0.0917	-3.12	
14	0.1870	0.1838	-3.26	
15	0.4240	0.4212	-3.56	
16	0.8480	0.8433	-4.04	
17	1.0980	1.0951	-4.32	

Normal Stress vs Settlement



Ev1 (MPa)	**68.73**	**Ev2 (MPa)**	**194.64**

Ev2/Ev1=2.83

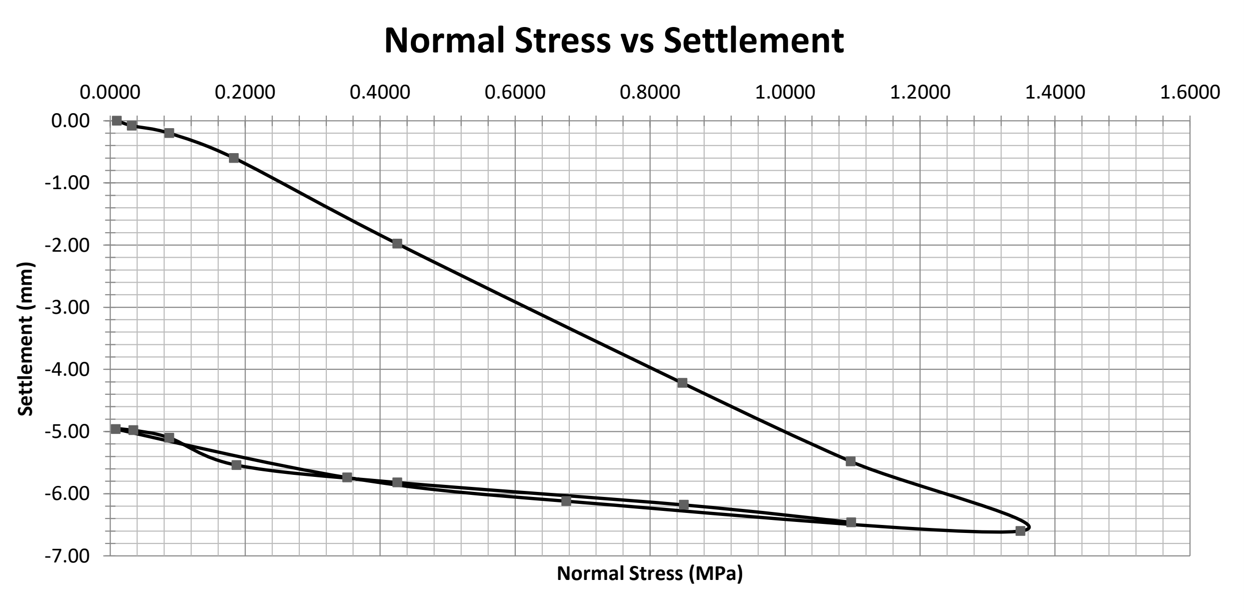
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	21/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 07**
Report No:	WRE8020-1727-R007	**Page:**	8 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0322	-0.08	
3	0.0880	0.0876	-0.20	
4	0.1870	0.1835	-0.60	
5	0.4240	0.4257	-1.98	
6	0.8480	0.8480	-4.22	
7	1.0980	1.0972	-5.48	
8	1.3480	1.3489	-6.60	
9	0.6740	0.6758	-6.12	Unloaded
10	0.3370	0.3511	-5.74	
11	0.0100	0.0085	-4.96	
12	0.0310	0.0344	-4.98	Secondary load
13	0.0880	0.0876	-5.10	
14	0.1870	0.1871	-5.54	
15	0.4240	0.4256	-5.82	
16	0.8480	0.8499	-6.18	
17	1.0980	1.0981	-6.46	



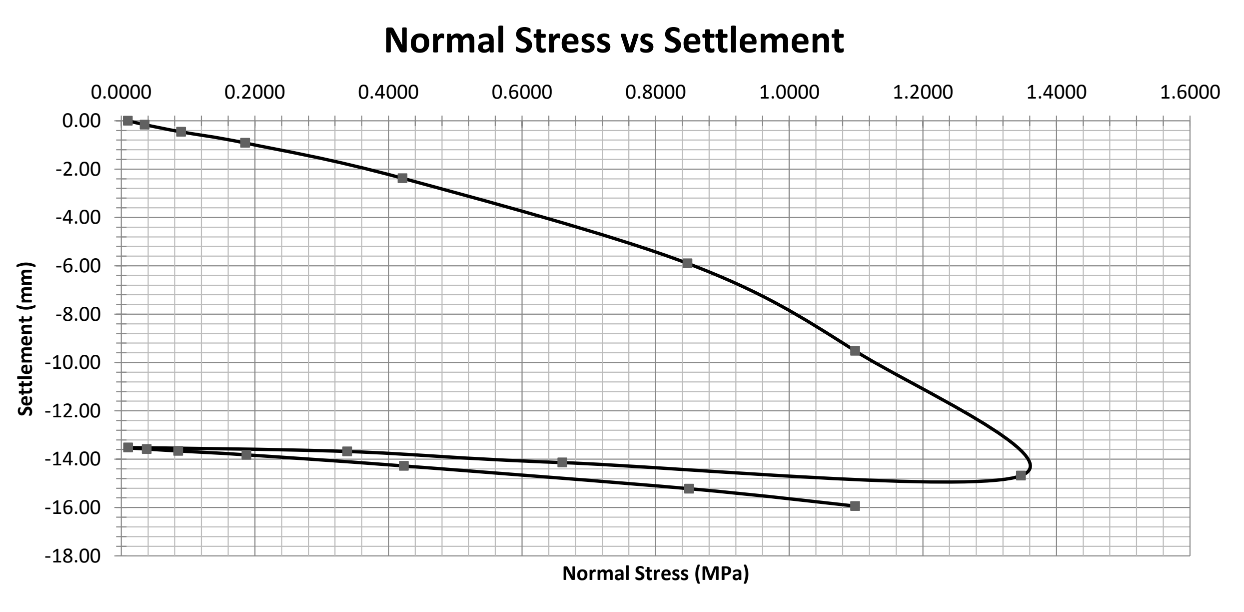
Ev1 (MPa)	**44.05**	**Ev2 (MPa)**	**212.79**
Ev2/Ev1=4.83			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	20/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 09**
Report No:	WRE8020-1727-R007	**Page:**	9 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0349	-0.16	
3	0.0880	0.0896	-0.46	
4	0.1870	0.1856	-0.92	
5	0.4240	0.4214	-2.38	
6	0.8480	0.8478	-5.90	
7	1.0980	1.0987	-9.52	
8	1.3480	1.3472	-14.68	
9	0.6740	0.6604	-14.14	Unloaded
10	0.3370	0.3382	-13.68	
11	0.0100	0.0104	-13.52	
12	0.0310	0.0382	-13.58	Secondary load
13	0.0880	0.0855	-13.66	
14	0.1870	0.1873	-13.82	
15	0.4240	0.4232	-14.28	
16	0.8480	0.8502	-15.22	
17	1.0980	1.0990	-15.94	



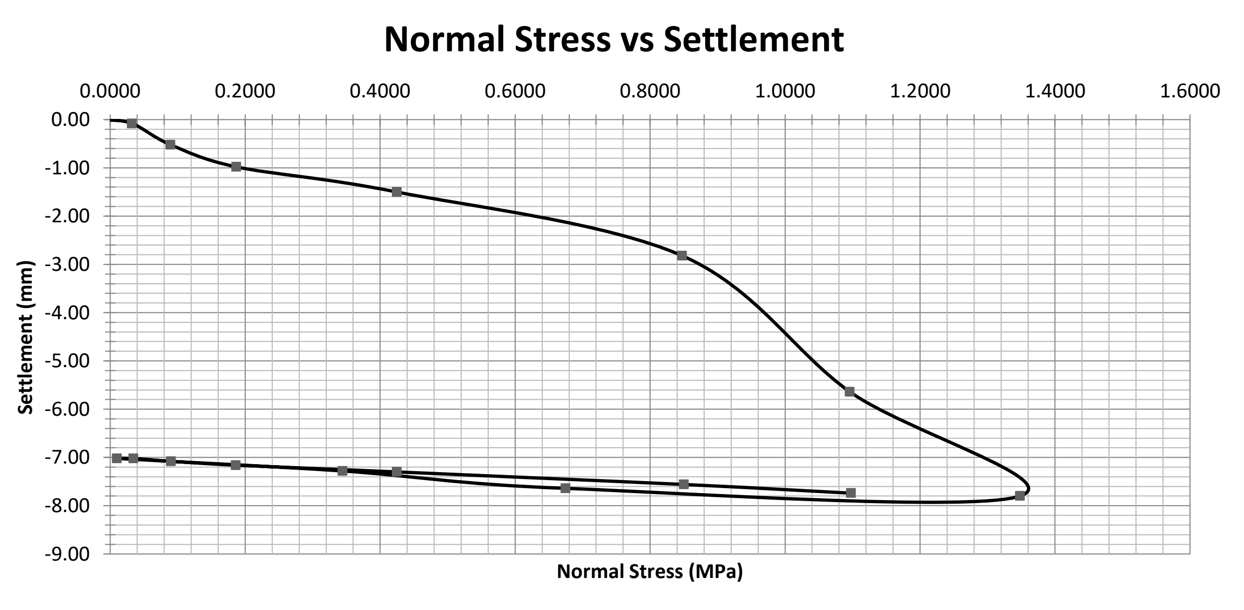
Ev1 (MPa)	**21.61**	**Ev2 (MPa)**	**95.75**
Ev2/Ev1=4.43			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	20/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 13**
Report No:	WRE8020-1727-R007	**Page:**	10 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	-0.0100	0.00	Primary load
2	0.0310	0.0322	-0.08	
3	0.0880	0.0893	-0.52	
4	0.1870	0.1869	-0.98	
5	0.4240	0.4247	-1.50	
6	0.8480	0.8474	-2.82	
7	1.0980	1.0959	-5.64	
8	1.3480	1.3481	-7.80	
9	0.6740	0.6747	-7.64	Unloaded
10	0.3370	0.3441	-7.28	
11	0.0100	0.0098	-7.02	
12	0.0310	0.0344	-7.02	Secondary load
13	0.0880	0.0900	-7.08	
14	0.1870	0.1862	-7.16	
15	0.4240	0.4248	-7.30	
16	0.8480	0.8501	-7.56	
17	1.0980	1.0978	-7.74	



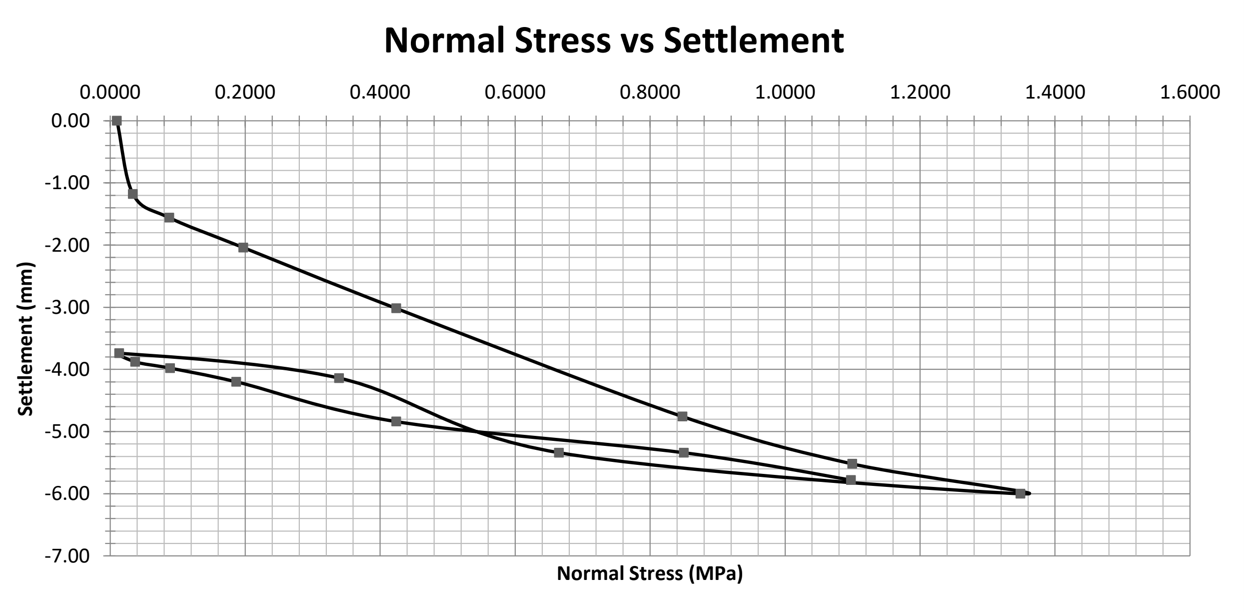
Ev1 (MPa)	**41.24**	**Ev2 (MPa)**	**348.02**
Ev2/Ev1=8.44			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	24/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 14**
Report No:	WRE8020-1727-R007	**Page:**	11 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0338	-1.18	
3	0.0880	0.0876	-1.56	
4	0.1870	0.1972	-2.04	
5	0.4240	0.4241	-3.02	
6	0.8480	0.8483	-4.76	
7	1.0980	1.0995	-5.52	
8	1.3480	1.3488	-6.00	
9	0.6740	0.6652	-5.34	Unloaded
10	0.3370	0.3392	-4.14	
11	0.0100	0.0134	-3.74	
12	0.0310	0.0371	-3.88	Secondary load
13	0.0880	0.0889	-3.98	
14	0.1870	0.1870	-4.20	
15	0.4240	0.4239	-4.84	
16	0.8480	0.8499	-5.34	
17	1.0980	1.0978	-5.78	


Normal Stress vs Settlement

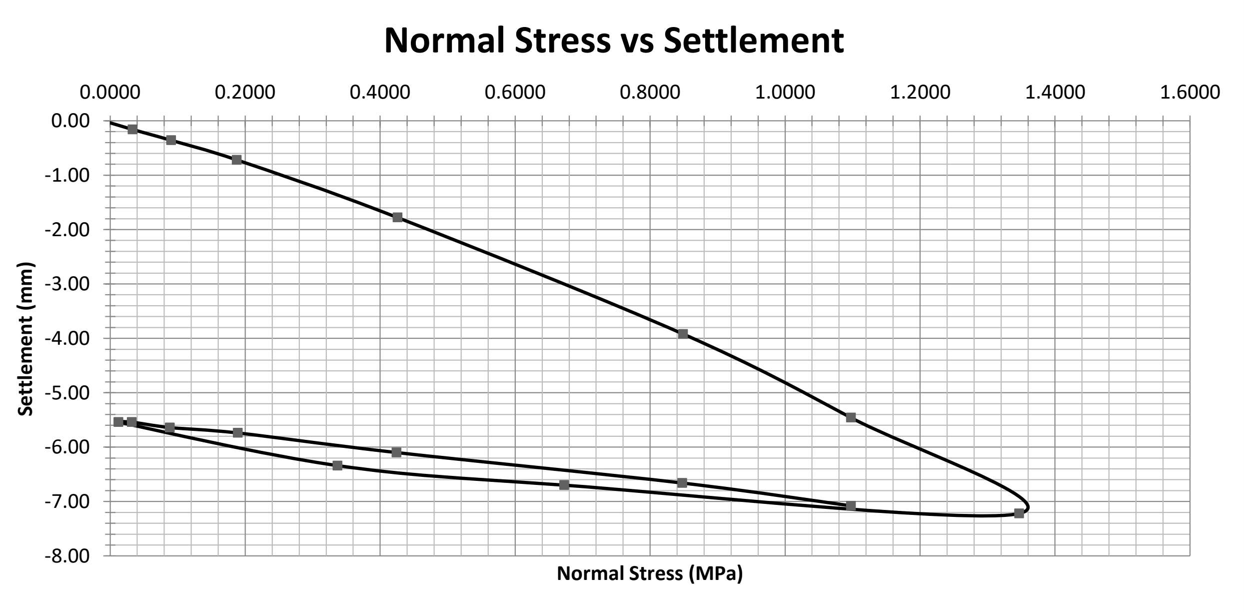
Ev1 (MPa)	**60.45**	**Ev2 (MPa)**	**140.86**
Ev2/Ev1=2.33			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	20/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 15**
Report No:	WRE8020-1727-R007	**Page:**	12 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	-0.0100	0.00	Primary load
2	0.0310	0.0332	-0.16	
3	0.0880	0.0904	-0.36	
4	0.1870	0.1876	-0.72	
5	0.4240	0.4258	-1.78	
6	0.8480	0.8488	-3.92	
7	1.0980	1.0978	-5.46	
8	1.3480	1.3470	-7.22	
9	0.6740	0.6728	-6.70	Unloade d
10	0.3370	0.3370	-6.34	
11	0.0100	0.0124	-5.54	
12	0.0310	0.0320	-5.54	Secondary load
13	0.0880	0.0884	-5.64	
14	0.1870	0.1893	-5.74	
15	0.4240	0.4244	-6.10	
16	0.8480	0.8476	-6.66	
17	1.0980	1.0979	-7.08	



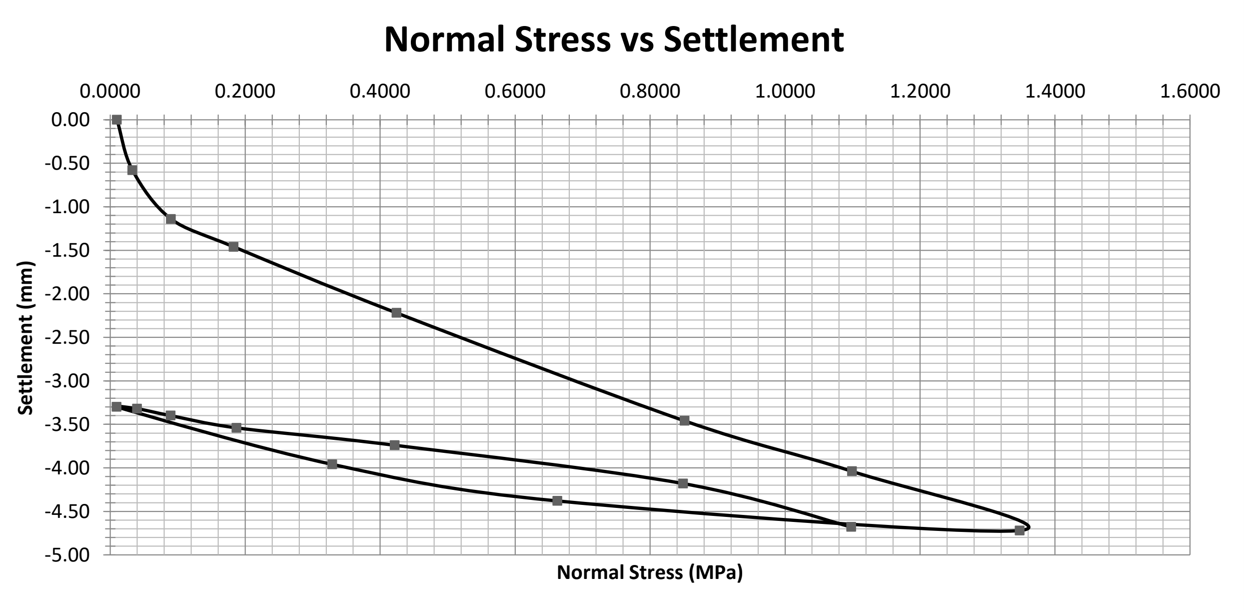
Ev1 (MPa)	**42.38**	**Ev2 (MPa)**	**154.96**
Ev2/Ev1=3.66			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	20/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 19**
Report No:	WRE8020-1727-R007	**Page:**	13 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0330	-0.58	
3	0.0880	0.0901	-1.14	
4	0.1870	0.1831	-1.46	
5	0.4240	0.4245	-2.22	
6	0.8480	0.8511	-3.46	
7	1.0980	1.0992	-4.04	
8	1.3480	1.3476	-4.72	
9	0.6740	0.6628	-4.38	Unloaded
10	0.3370	0.3292	-3.96	
11	0.0100	0.0097	-3.30	
12	0.0310	0.0400	-3.32	Secondary load
13	0.0880	0.0898	-3.40	
14	0.1870	0.1871	-3.54	
15	0.4240	0.4218	-3.74	
16	0.8480	0.8489	-4.18	
17	1.0980	1.0983	-4.68	



Ev1 (MPa)	**75.76**	**Ev2 (MPa)**	**173.40**
Ev2/Ev1=2.29			

Begin Time: **End Time**

Coordinates: NZTM Format

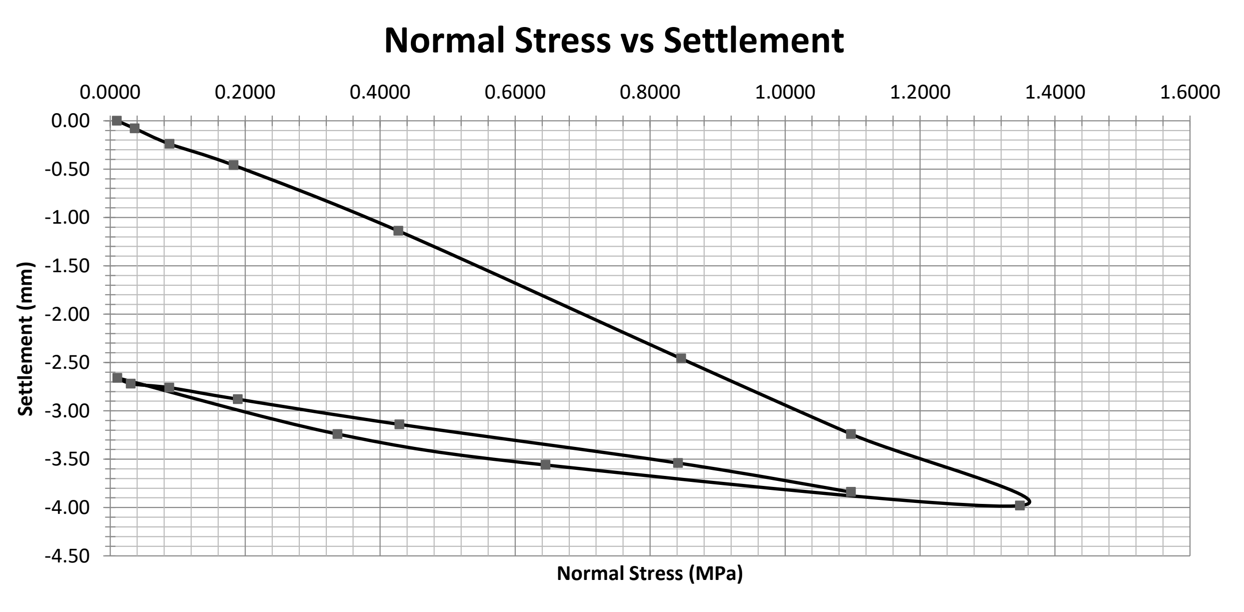
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	20/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 20**
Report No:	WRE8020-1727-R007	**Page:**	14 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0364	-0.08	
3	0.0880	0.0882	-0.24	
4	0.1870	0.1829	-0.46	
5	0.4240	0.4272	-1.14	
6	0.8480	0.8461	-2.46	
7	1.0980	1.0978	-3.24	
8	1.3480	1.3480	-3.98	
9	0.6740	0.6452	-3.56	Unloaded
10	0.3370	0.3369	-3.24	
11	0.0100	0.0108	-2.66	
12	0.0310	0.0305	-2.72	Secondary load
13	0.0880	0.0875	-2.76	
14	0.1870	0.1893	-2.88	
15	0.4240	0.4288	-3.14	
16	0.8480	0.8416	-3.54	
17	1.0980	1.0977	-3.84	



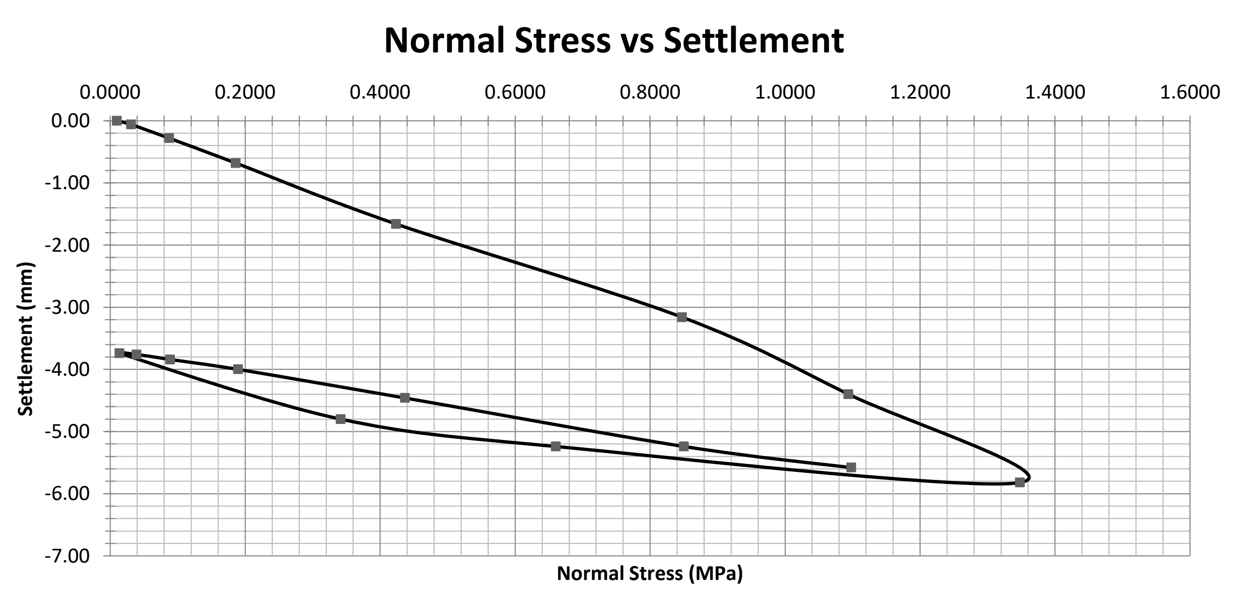
Ev1 (MPa)	**75.14**	**Ev2 (MPa)**	**213.93**
Ev2/Ev1=2.85			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	20/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 21**
Report No:	WRE8020-1727-R007	**Page:**	15 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0308	-0.06	
3	0.0880	0.0873	-0.28	
4	0.1870	0.1860	-0.68	
5	0.4240	0.4234	-1.66	
6	0.8480	0.8473	-3.16	
7	1.0980	1.0940	-4.40	
8	1.3480	1.3483	-5.82	
9	0.6740	0.6605	-5.24	Unloaded
10	0.3370	0.3416	-4.80	
11	0.0100	0.0138	-3.74	
12	0.0310	0.0392	-3.76	Secondary load
13	0.0880	0.0888	-3.84	
14	0.1870	0.1894	-4.00	
15	0.4240	0.4370	-4.46	
16	0.8480	0.8501	-5.24	
17	1.0980	1.0982	-5.58	



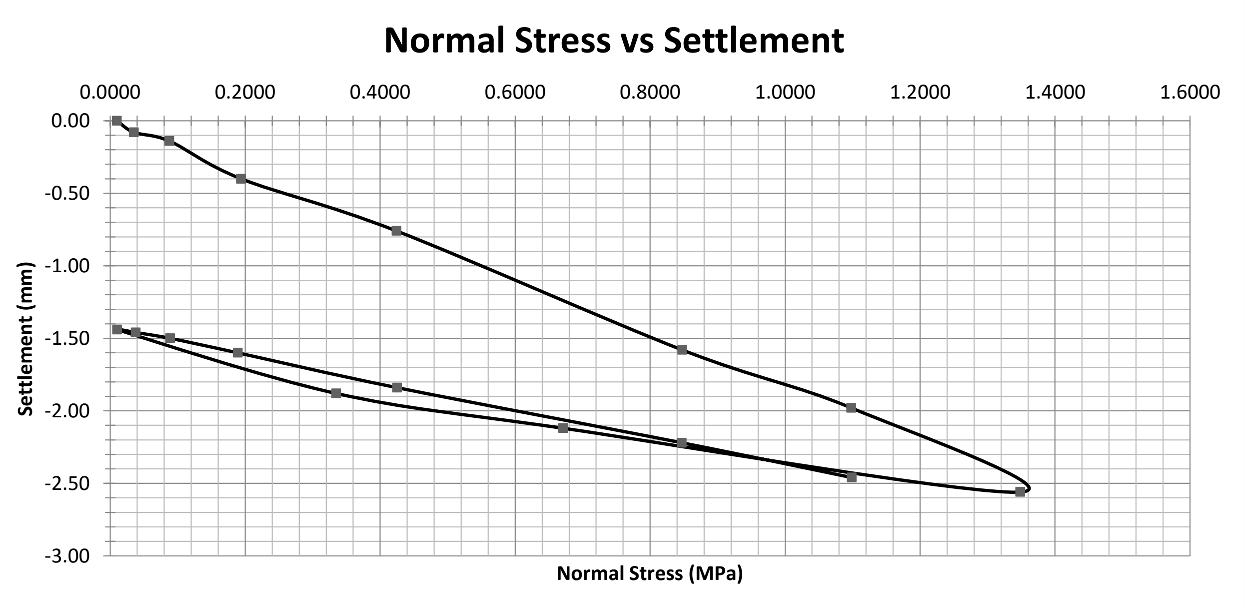
Ev1 (MPa)	**52.94**	**Ev2 (MPa)**	**130.36**
Ev2/Ev1=2.46			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	21/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 22**
Report No:	WRE8020-1727-R007	**Page:**	16 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0353	-0.08	
3	0.0880	0.0878	-0.14	
4	0.1870	0.1940	-0.40	
5	0.4240	0.4244	-0.76	
6	0.8480	0.8476	-1.58	
7	1.0980	1.0982	-1.98	
8	1.3480	1.3486	-2.56	
9	0.6740	0.6714	-2.12	Unloaded
10	0.3370	0.3349	-1.88	
11	0.0100	0.0102	-1.44	
12	0.0310	0.0380	-1.46	Secondary load
13	0.0880	0.0889	-1.50	
14	0.1870	0.1891	-1.60	
15	0.4240	0.4250	-1.84	
16	0.8480	0.8470	-2.22	
17	1.0980	1.0990	-2.46	



Ev1 (MPa)	**120.77**	**Ev2 (MPa)**	**240.47**

Ev2/Ev1=1.99

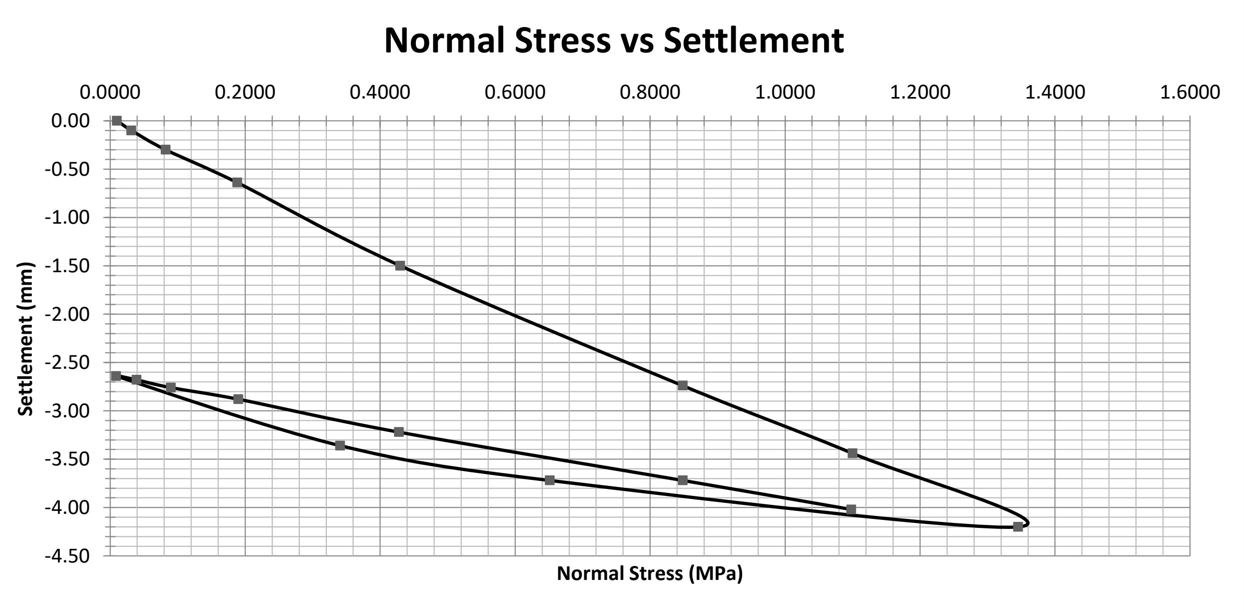
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	21/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 23**
Report No:	WRE8020-1727-R007	**Page:**	17 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0315	-0.10	
3	0.0880	0.0821	-0.30	
4	0.1870	0.1884	-0.64	
5	0.4240	0.4299	-1.50	
6	0.8480	0.8484	-2.74	
7	1.0980	1.1000	-3.44	
8	1.3480	1.3455	-4.20	
9	0.6740	0.6516	-3.72	Unloaded
10	0.3370	0.3409	-3.36	
11	0.0100	0.0088	-2.64	
12	0.0310	0.0392	-2.68	Secondary load
13	0.0880	0.0899	-2.76	
14	0.1870	0.1900	-2.88	
15	0.4240	0.4277	-3.22	
16	0.8480	0.8487	-3.72	
17	1.0980	1.0983	-4.02	



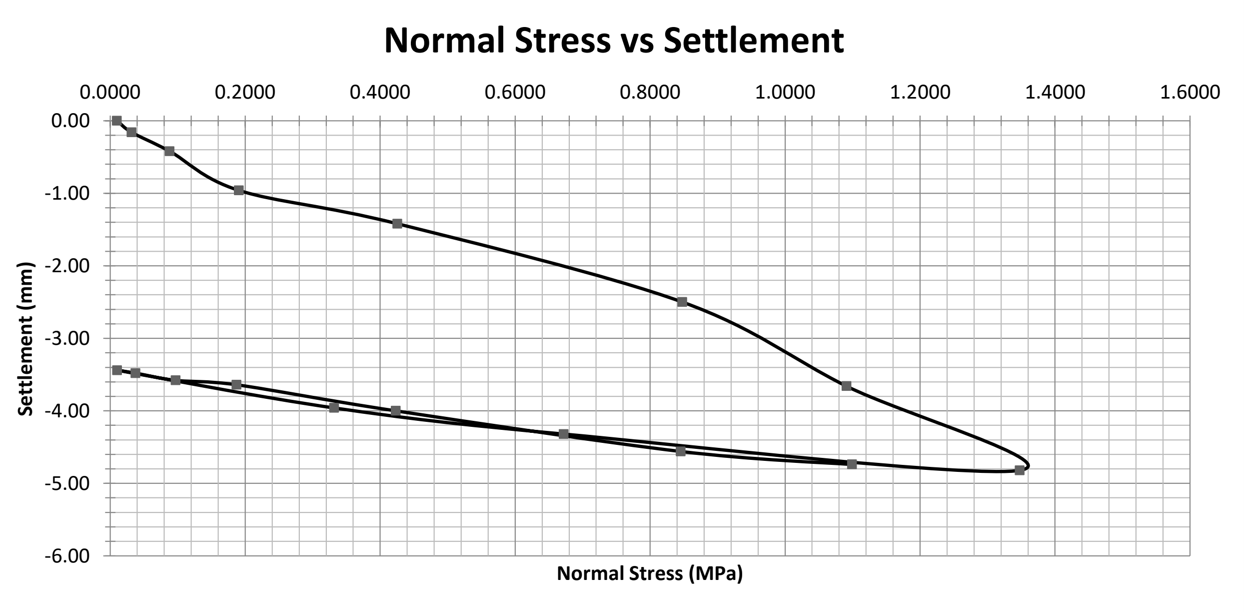
Ev1 (MPa)	**72.77**	**Ev2 (MPa)**	**182.94**
Ev2/Ev1=2.51			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	21/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 24**
Report No:	WRE8020-1727-R007	**Page:**	18 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0318	-0.16	
3	0.0880	0.0881	-0.42	
4	0.1870	0.1907	-0.96	
5	0.4240	0.4257	-1.42	
6	0.8480	0.8479	-2.50	
7	1.0980	1.0910	-3.66	
8	1.3480	1.3479	-4.82	
9	0.6740	0.6721	-4.32	**Unloaded**
10	0.3370	0.3320	-3.96	
11	0.0100	0.0104	-3.44	
12	0.0310	0.0377	-3.48	Secondary load
13	0.0880	0.0972	-3.58	
14	0.1870	0.1871	-3.64	
15	0.4240	0.4232	-4.00	
16	0.8480	0.8453	-4.56	
17	1.0980	1.0994	-4.74	



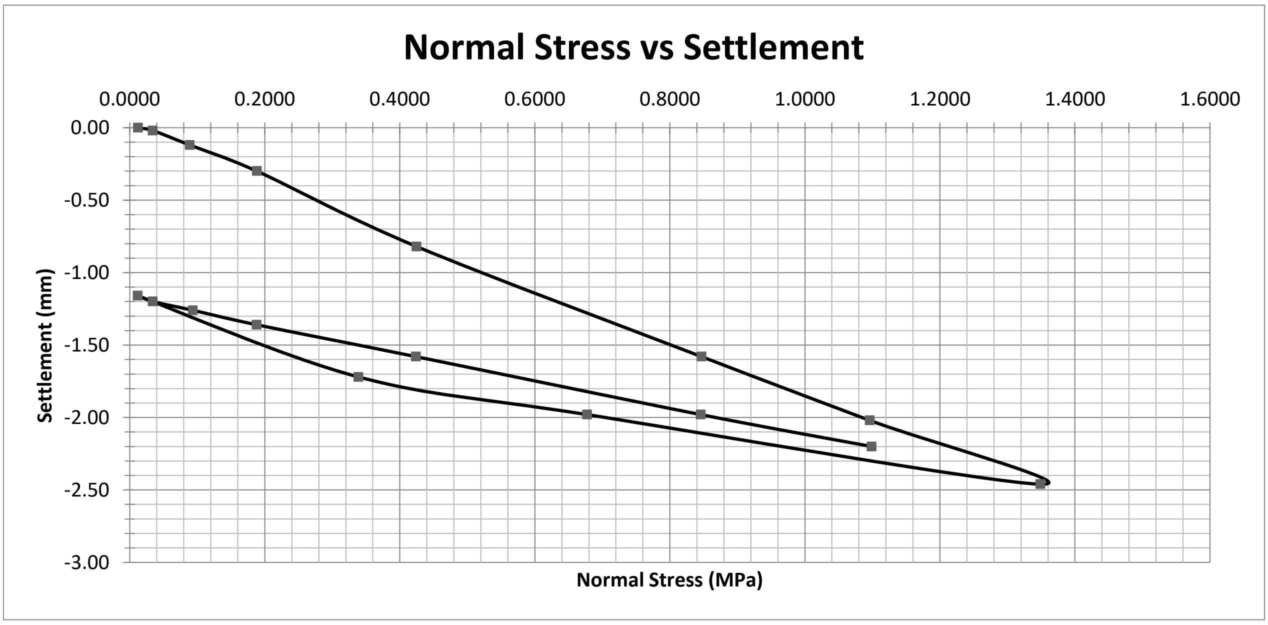
Ev1 (MPa)	**67.53**	**Ev2 (MPa)**	**194.06**
Ev2/Ev1=2.87			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	18/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 25**
Report No:	WRE8020-1727-R007	**Page:**	19 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0122	0.00	Primary load
2	0.0310	0.0341	-0.02	
3	0.0880	0.0890	-0.12	
4	0.1870	0.1883	-0.30	
5	0.4240	0.4247	-0.82	
6	0.8480	0.8470	-1.58	
7	1.0980	1.0961	-2.02	
8	1.3480	1.3488	-2.46	
9	0.6740	0.6775	-1.98	Unloaded
10	0.3370	0.3387	-1.72	
11	0.0100	0.0117	-1.16	
12	0.0310	0.0342	-1.20	Secondary load
13	0.0880	0.0934	-1.26	
14	0.1870	0.1880	-1.36	
15	0.4240	0.4240	-1.58	
16	0.8480	0.8459	-1.98	
17	1.0980	1.0988	-2.20	



Ev1 (MPa)	**120.64**	**Ev2 (MPa)**	**243.38**

Ev2/Ev1=2.02

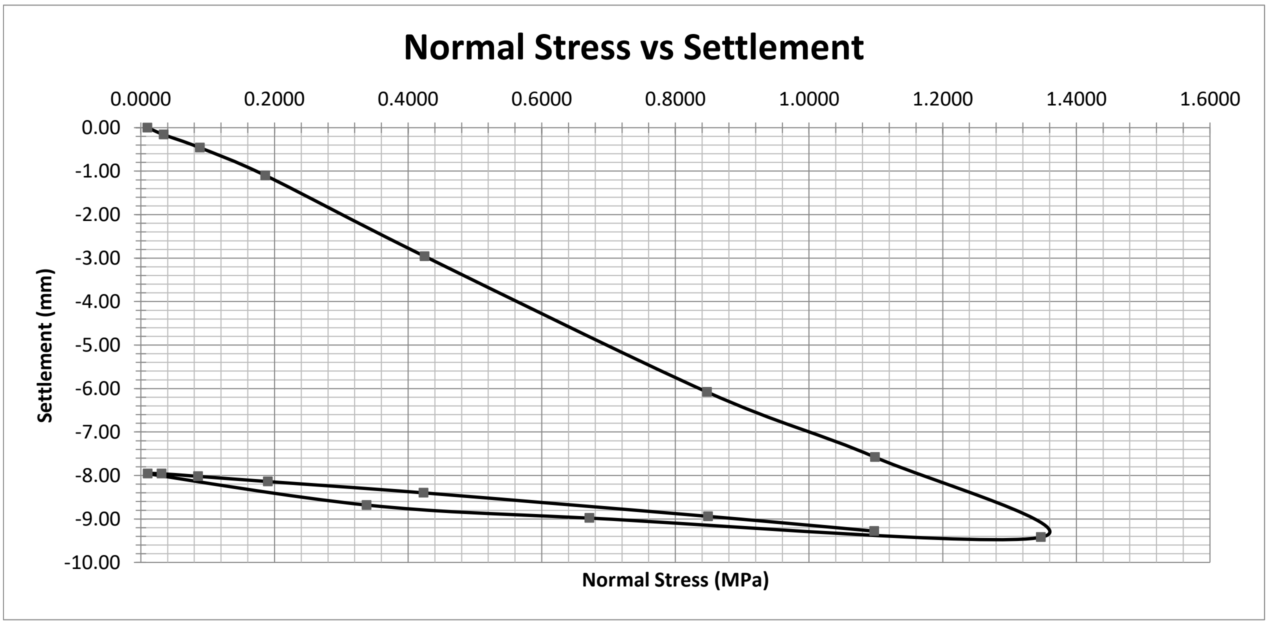
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	19/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 26**
Report No:	WRE8020-1727-R007	**Page:**	20 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	**Preferred Normal Stress (MPa)**	**Actual Normal Stress (MPa)**	**Settlement of Loading Plate (mm)**	**Load Cycle**
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0342	-0.16	
3	0.0880	0.0883	-0.46	
4	0.1870	0.1865	-1.10	
5	0.4240	0.4249	-2.96	
6	0.8480	0.8473	-6.08	
7	1.0980	1.0988	-7.58	
8	1.3480	1.3472	-9.42	
9	0.6740	0.6713	-8.98	**Unloaded**
10	0.3370	0.3380	-8.68	
11	0.0100	0.0105	-7.96	
12	0.0310	0.0310	-7.96	Secondary load
13	0.0880	0.0859	-8.02	
14	0.1870	0.1901	-8.14	
15	0.4240	0.4233	-8.40	
16	0.8480	0.8488	-8.94	
17	1.0980	1.0978	-9.28	



Ev1 (MPa)	**31.69**	**Ev2 (MPa)**	**176.91**

Ev2/Ev1=5.58

Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

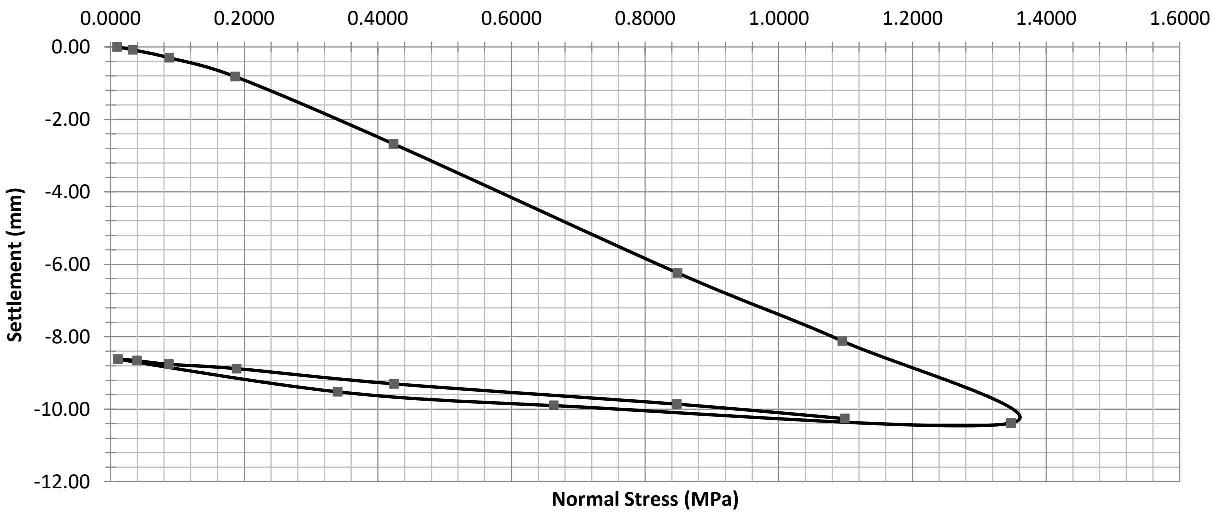
STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	19/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 34**
Report No:	WRE8020-1727-R007	**Page:**	22 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0330	-0.08	
3	0.0880	0.0881	-0.30	
4	0.1870	0.1866	-0.82	
5	0.4240	0.4237	-2.68	
6	0.8480	0.8487	-6.24	
7	1.0980	1.0953	-8.12	
8	1.3480	1.3478	-10.38	
9	0.6740	0.6632	-9.90	Unloaded
10	0.3370	0.3397	-9.52	
11	0.0100	0.0112	-8.62	
12	0.0310	0.0394	-8.66	Secondary load
13	0.0880	0.0872	-8.76	
14	0.1870	0.1887	-8.88	
15	0.4240	0.4242	-9.30	
16	0.8480	0.8473	-9.86	
17	1.0980	1.0988	-10.26	

Normal Stress vs Settlement



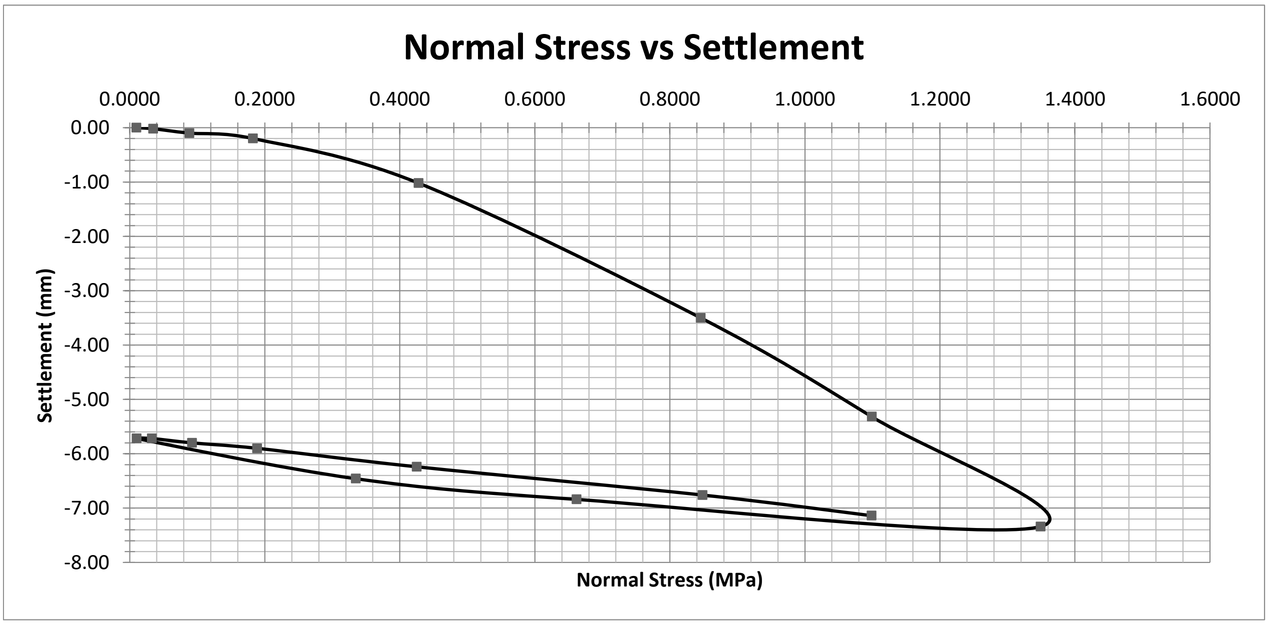
Ev1 (MPa)	**28.34**	**Ev2 (MPa)**	**153.17**
Ev2/Ev1=5.41			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	19/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 35**
Report No:	WRE8020-1727-R007	**Page:**	23 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0348	-0.02	
3	0.0880	0.0886	-0.10	
4	0.1870	0.1826	-0.20	
5	0.4240	0.4277	-1.02	
6	0.8480	0.8457	-3.50	
7	1.0980	1.0992	-5.32	
8	1.3480	1.3492	-7.34	
9	0.6740	0.6620	-6.84	Unloaded
10	0.3370	0.3350	-6.46	
11	0.0100	0.0104	-5.72	
12	0.0310	0.0328	-5.72	Secondary load
13	0.0880	0.0925	-5.80	
14	0.1870	0.1887	-5.90	
15	0.4240	0.4250	-6.24	
16	0.8480	0.8487	-6.76	
17	1.0980	1.0988	-7.14	



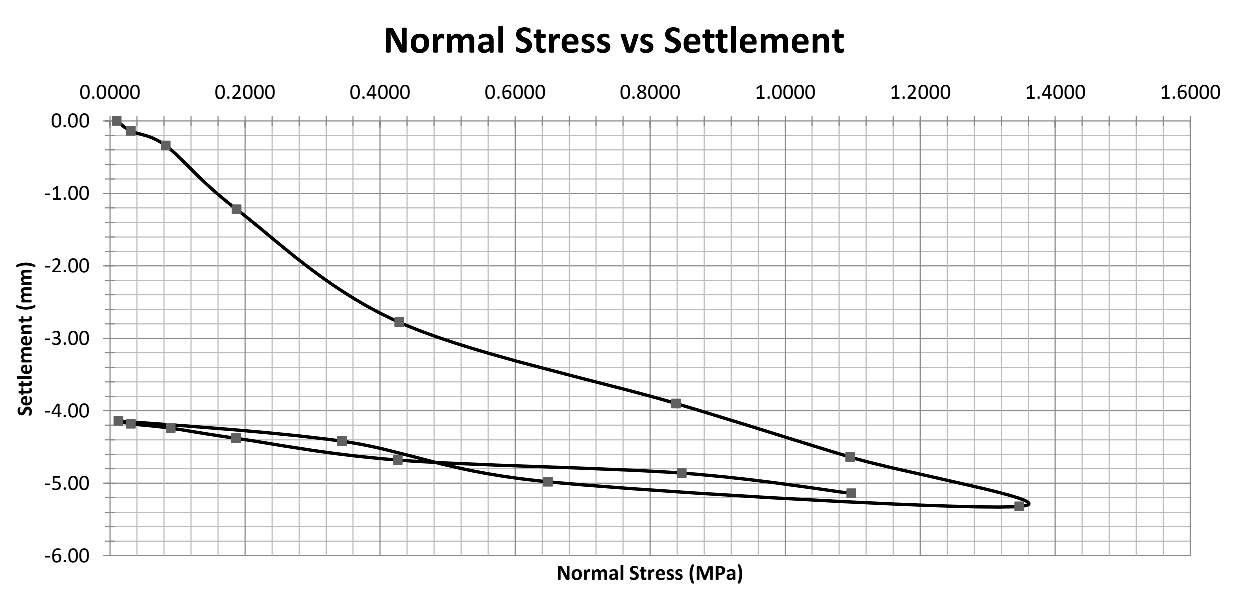
Ev1 (MPa)	**40.25**	**Ev2 (MPa)**	**167.74**
Ev2/Ev1=4.17			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	19/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 36**
Report No:	WRE8020-1727-R007	**Page:**	24 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0310	-0.14	
3	0.0880	0.0826	-0.34	
4	0.1870	0.1875	-1.22	
5	0.4240	0.4287	-2.78	
6	0.8480	0.8385	-3.90	
7	1.0980	1.0967	-4.64	
8	1.3480	1.3469	-5.32	
9	0.6740	0.6488	-4.98	Unloaded
10	0.3370	0.3439	-4.42	
11	0.0100	0.0126	-4.14	
12	0.0310	0.0311	-4.18	Secondary load
13	0.0880	0.0900	-4.24	
14	0.1870	0.1868	-4.38	
15	0.4240	0.4263	-4.68	
16	0.8480	0.8469	-4.86	
17	1.0980	1.0982	-5.14	


Normal Stress vs Settlement

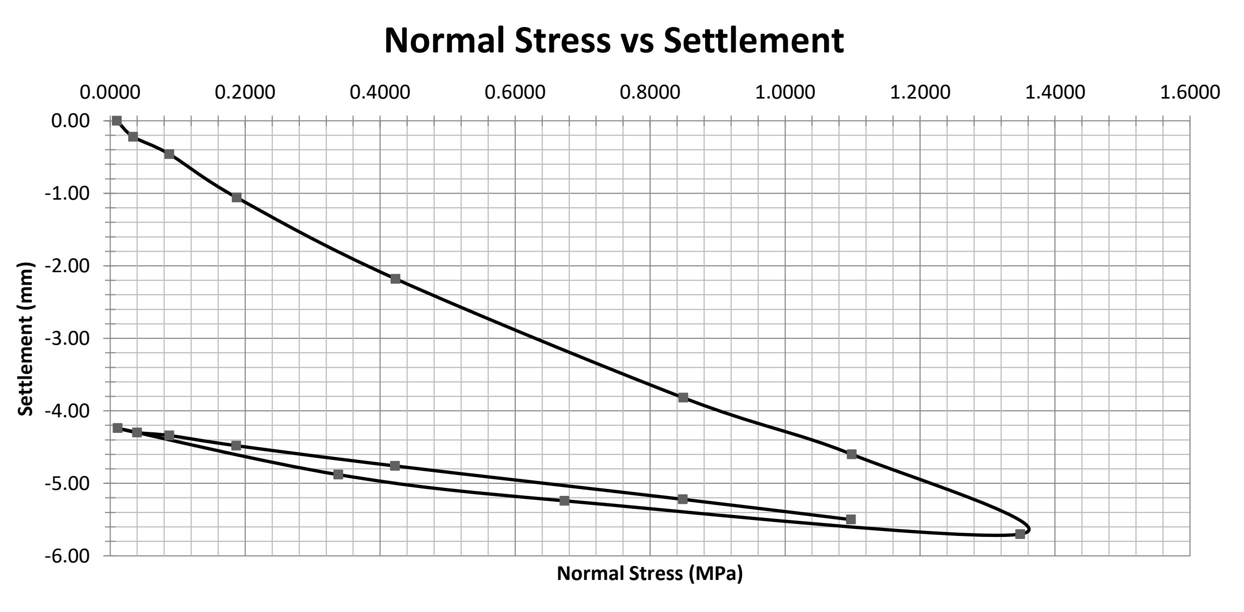
Ev1 (MPa)	**58.13**	**Ev2 (MPa)**	**289.04**
Ev2/Ev1=4.97			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	19/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 37**
Report No:	WRE8020-1727-R007	**Page:**	25 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0342	-0.22	
3	0.0880	0.0876	-0.46	
4	0.1870	0.1877	-1.06	
5	0.4240	0.4229	-2.18	
6	0.8480	0.8494	-3.82	
7	1.0980	1.0990	-4.60	
8	1.3480	1.3484	-5.70	
9	0.6740	0.6730	-5.24	Unloaded
10	0.3370	0.3382	-4.88	
11	0.0100	0.0109	-4.24	
12	0.0310	0.0400	-4.30	Secondary load
13	0.0880	0.0876	-4.34	
14	0.1870	0.1868	-4.48	
15	0.4240	0.4222	-4.76	
16	0.8480	0.8484	-5.22	
17	1.0980	1.0978	-5.50	



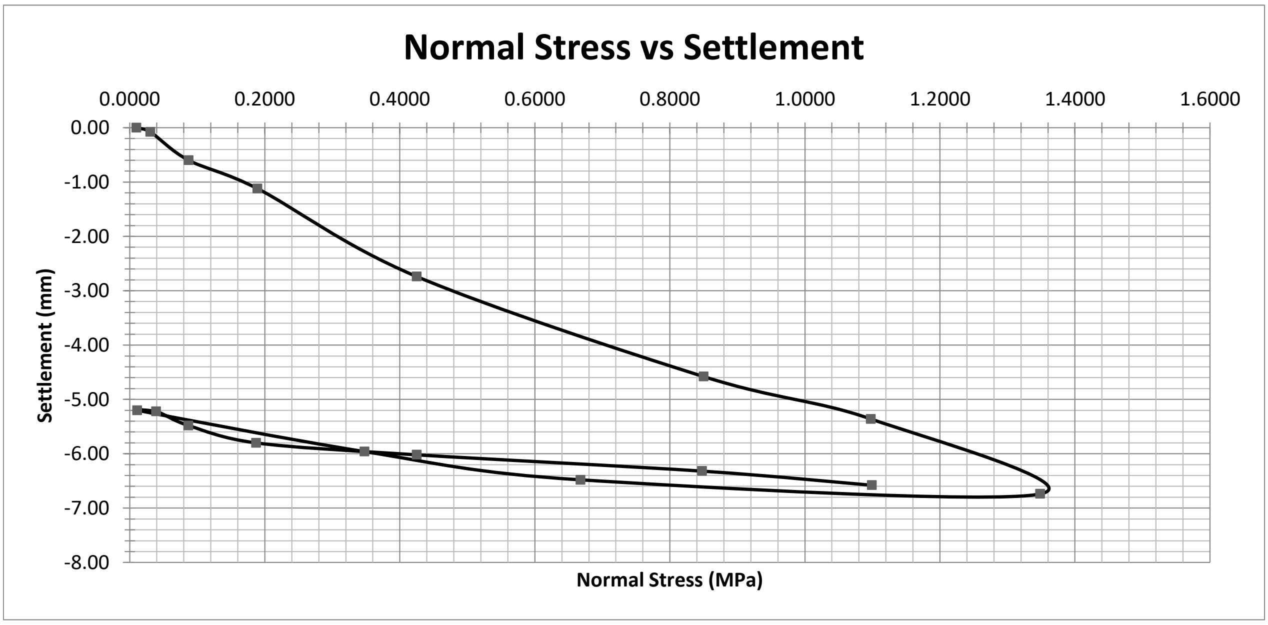
Ev1 (MPa)	**55.06**	**Ev2 (MPa)**	**201.92**
Ev2/Ev1=3.67			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	19/01/2022
Site:	The Landing	**Tested by:**	D.O
Job No:	8020-1727	**Test No.:**	**PLT R 27**
Report No:	WRE8020-1727-R007	**Page:**	21 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0306	-0.08	
3	0.0880	0.0871	-0.60	
4	0.1870	0.1890	-1.12	
5	0.4240	0.4252	-2.74	
6	0.8480	0.8500	-4.58	
7	1.0980	1.0976	-5.36	
8	1.3480	1.3484	-6.74	
9	0.6740	0.6679	-6.48	Unloaded
10	0.3370	0.3476	-5.96	
11	0.0100	0.0110	-5.20	
12	0.0310	0.0391	-5.22	Secondary load
13	0.0880	0.0869	-5.48	
14	0.1870	0.1871	-5.80	
15	0.4240	0.4253	-6.02	
16	0.8480	0.8479	-6.32	
17	1.0980	1.0994	-6.58	



Ev1 (MPa)	**46.24**	**Ev2 (MPa)**	**249.97**

Ev2/Ev1=5.41

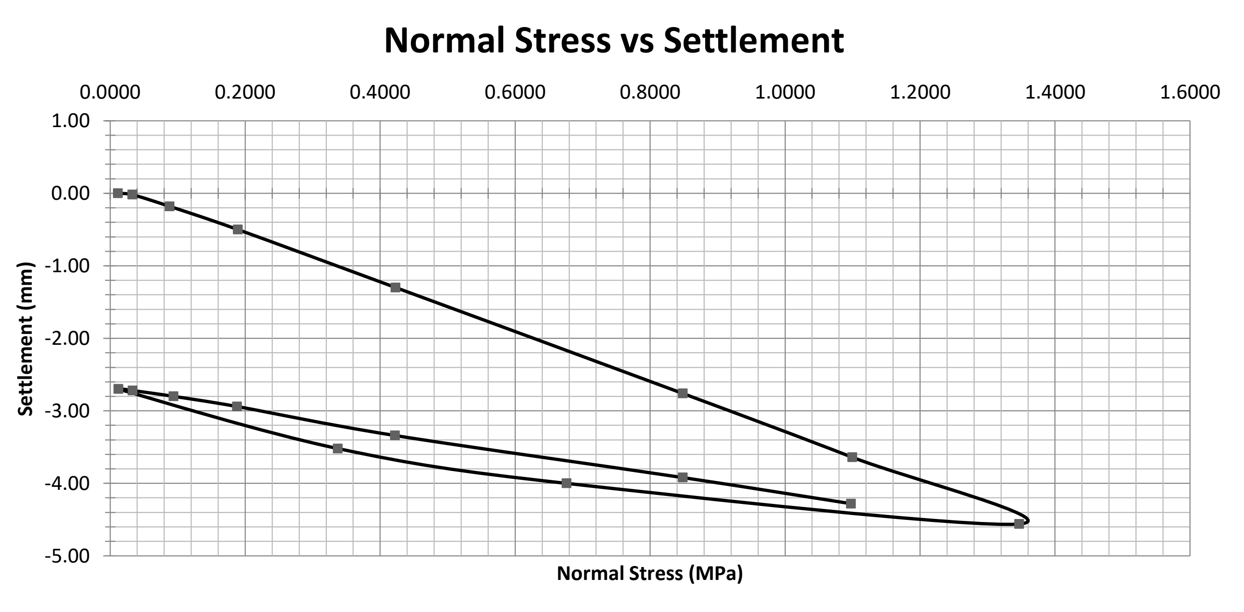
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	18/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 38**
Report No:	WRE8020-1727-R007	**Page:**	26 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0116	0.00	Primary load
2	0.0310	0.0330	-0.02	
3	0.0880	0.0880	-0.18	
4	0.1870	0.1891	-0.50	
5	0.4240	0.4230	-1.30	
6	0.8480	0.8484	-2.76	
7	1.0980	1.0995	-3.64	
8	1.3480	1.3471	-4.56	
9	0.6740	0.6764	-4.00	Unloaded
10	0.3370	0.3373	-3.52	
11	0.0100	0.0123	-2.70	
12	0.0310	0.0332	-2.72	Secondary load
13	0.0880	0.0938	-2.80	
14	0.1870	0.1879	-2.94	
15	0.4240	0.4220	-3.34	
16	0.8480	0.8484	-3.92	
17	1.0980	1.0978	-4.28	



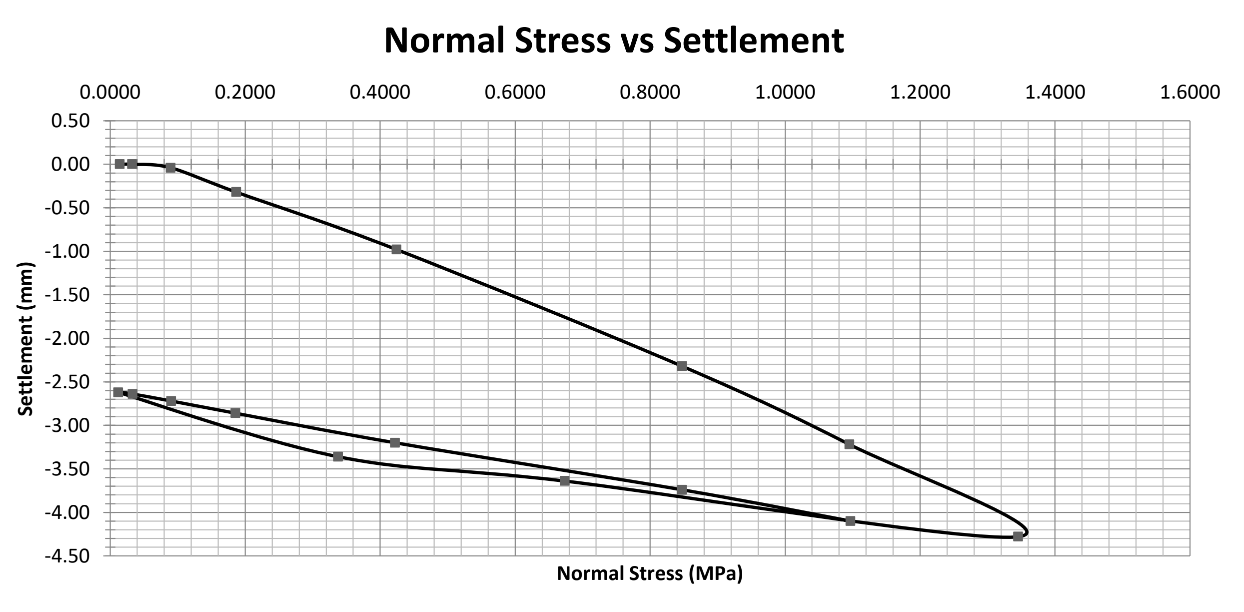
Ev1 (MPa)	**65.13**	**Ev2 (MPa)**	**156.32**
Ev2/Ev1=2.4			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	18/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 39**
Report No:	WRE8020-1727-R007	**Page:**	27 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0142	0.00	Primary load
2	0.0310	0.0323	0.00	
3	0.0880	0.0896	-0.04	
4	0.1870	0.1867	-0.32	
5	0.4240	0.4244	-0.98	
6	0.8480	0.8473	-2.32	
7	1.0980	1.0955	-3.22	
8	1.3480	1.3455	-4.28	
9	0.6740	0.6737	-3.64	Unloaded
10	0.3370	0.3375	-3.36	
11	0.0100	0.0120	-2.62	
12	0.0310	0.0332	-2.64	Secondary load
13	0.0880	0.0903	-2.72	
14	0.1870	0.1855	-2.86	
15	0.4240	0.4221	-3.20	
16	0.8480	0.8474	-3.74	
17	1.0980	1.0971	-4.10	


Normal Stress vs Settlement

Ev1 (MPa)	**69.07**	**Ev2 (MPa)**	**166.72**
Ev2/Ev1=2.41			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

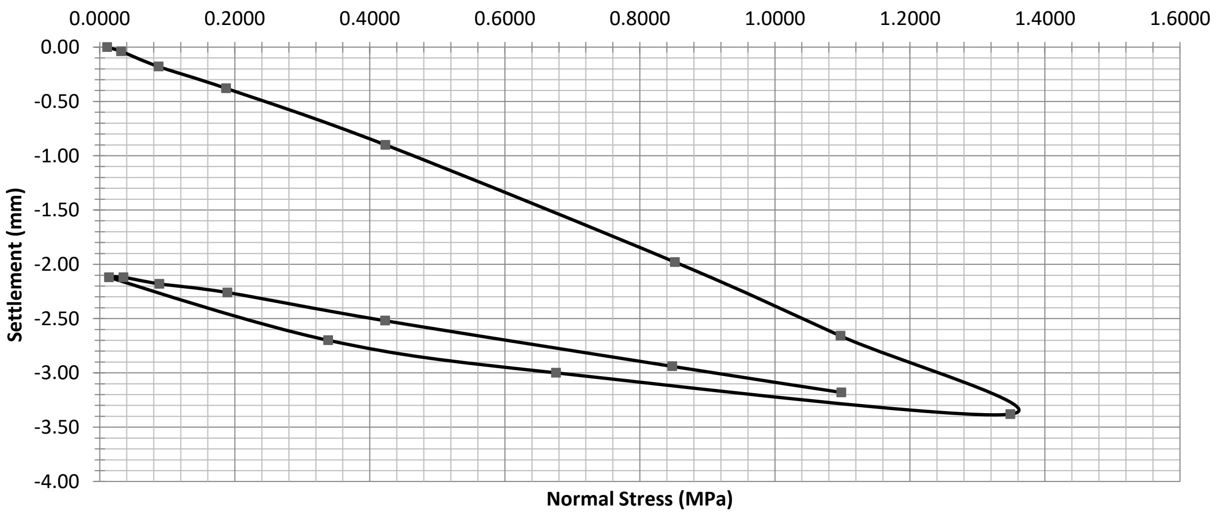
STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	18/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 40**
Report No:	WRE8020-1727-R007	**Page:**	28 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0109	0.00	Primary load
2	0.0310	0.0318	-0.04	
3	0.0880	0.0874	-0.18	
4	0.1870	0.1873	-0.38	
5	0.4240	0.4231	-0.90	
6	0.8480	0.8521	-1.98	
7	1.0980	1.0972	-2.66	
8	1.3480	1.3488	-3.38	
9	0.6740	0.6761	-3.00	Unloaded
10	0.3370	0.3385	-2.70	
11	0.0100	0.0137	-2.12	
12	0.0310	0.0351	-2.12	Secondary load
13	0.0880	0.0884	-2.18	
14	0.1870	0.1891	-2.26	
15	0.4240	0.4228	-2.52	
16	0.8480	0.8480	-2.94	
17	1.0980	1.0984	-3.18	

Normal Stress vs Settlement



Ev1 (MPa)	**89.26**	**Ev2 (MPa)**	**226.34**

Ev2/Ev1=2.54

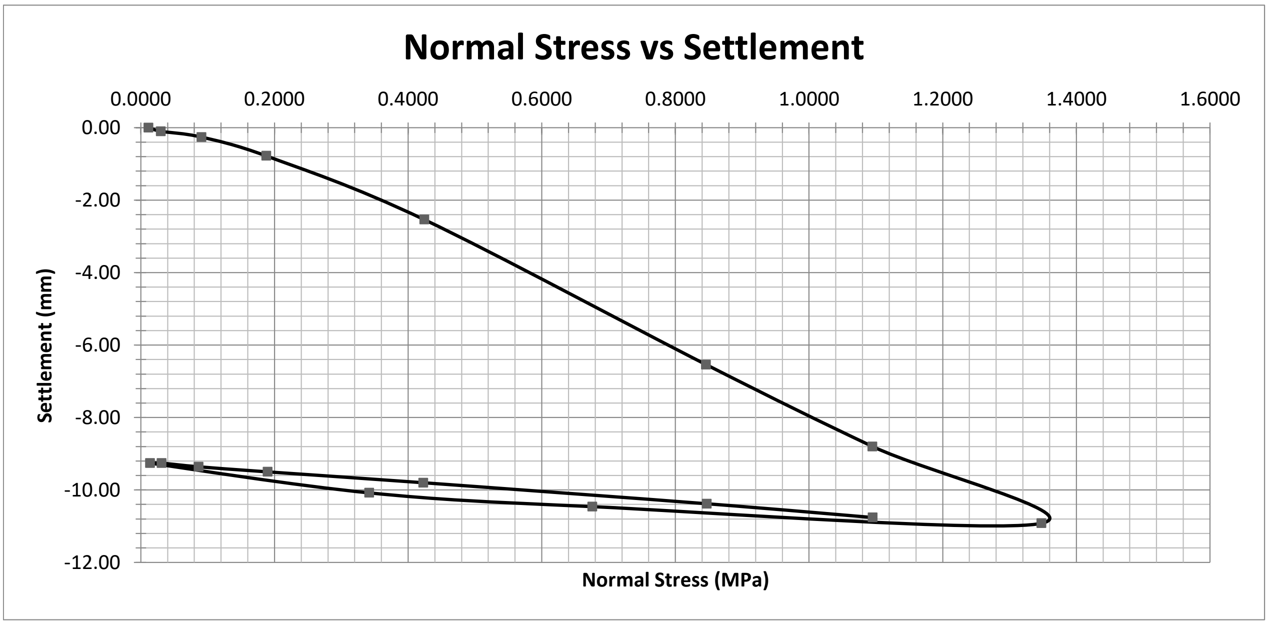
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	17/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 41**
Report No:	WRE8020-1727-R007	**Page:**	29 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0116	0.00	Primary load
2	0.0310	0.0300	-0.10	
3	0.0880	0.0908	-0.26	
4	0.1870	0.1877	-0.78	
5	0.4240	0.4244	-2.54	
6	0.8480	0.8460	-6.54	
7	1.0980	1.0950	-8.80	
8	1.3480	1.3477	-10.92	
9	0.6740	0.6757	-10.46	Unloaded
10	0.3370	0.3417	-10.08	
11	0.0100	0.0140	-9.26	
12	0.0310	0.0313	-9.26	Secondary load
13	0.0880	0.0866	-9.36	
14	0.1870	0.1897	-9.50	
15	0.4240	0.4229	-9.80	
16	0.8480	0.8471	-10.38	
17	1.0980	1.0954	-10.76	



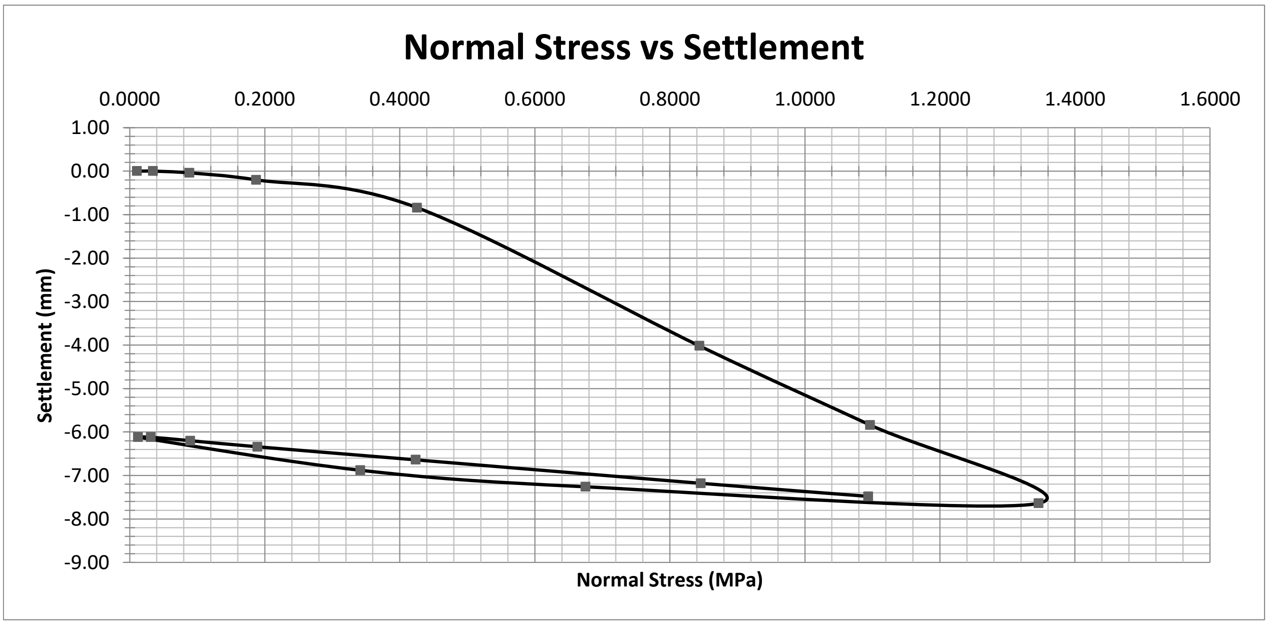
Ev1 (MPa)	**26.47**	**Ev2 (MPa)**	**160.30**
Ev2/Ev1=6.05			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	17/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 42**
Report No:	WRE8020-1727-R007	**Page:**	30 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0108	0.00	Primary load
2	0.0310	0.0344	0.00	
3	0.0880	0.0884	-0.04	
4	0.1870	0.1874	-0.20	
5	0.4240	0.4257	-0.84	
6	0.8480	0.8439	-4.02	
7	1.0980	1.0967	-5.84	
8	1.3480	1.3461	-7.64	
9	0.6740	0.6751	-7.26	Unloaded
10	0.3370	0.3417	-6.88	
11	0.0100	0.0123	-6.12	
12	0.0310	0.0313	-6.12	Secondary load
13	0.0880	0.0898	-6.20	
14	0.1870	0.1893	-6.34	
15	0.4240	0.4234	-6.64	
16	0.8480	0.8460	-7.18	
17	1.0980	1.0940	-7.48	



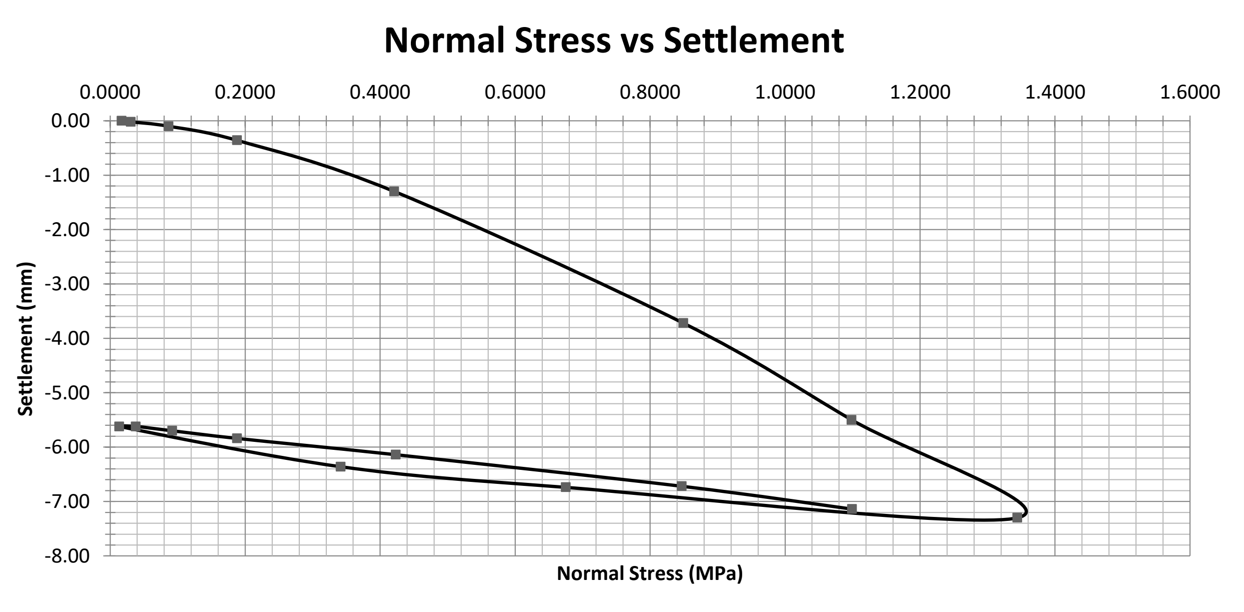
Ev1 (MPa)	**37.30**	**Ev2 (MPa)**	**178.31**
Ev2/Ev1=4.78			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	17/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 43**
Report No:	WRE8020-1727-R007	**Page:**	31 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0169	0.00	Primary load
2	0.0310	0.0306	-0.02	
3	0.0880	0.0864	-0.10	
4	0.1870	0.1880	-0.36	
5	0.4240	0.4210	-1.30	
6	0.8480	0.8492	-3.72	
7	1.0980	1.0987	-5.50	
8	1.3480	1.3443	-7.30	
9	0.6740	0.6751	-6.74	Unloaded
10	0.3370	0.3414	-6.36	
11	0.0100	0.0133	-5.62	
12	0.0310	0.0380	-5.62	Secondary load
13	0.0880	0.0921	-5.70	
14	0.1870	0.1879	-5.84	
15	0.4240	0.4233	-6.14	
16	0.8480	0.8471	-6.72	
17	1.0980	1.0994	-7.14	



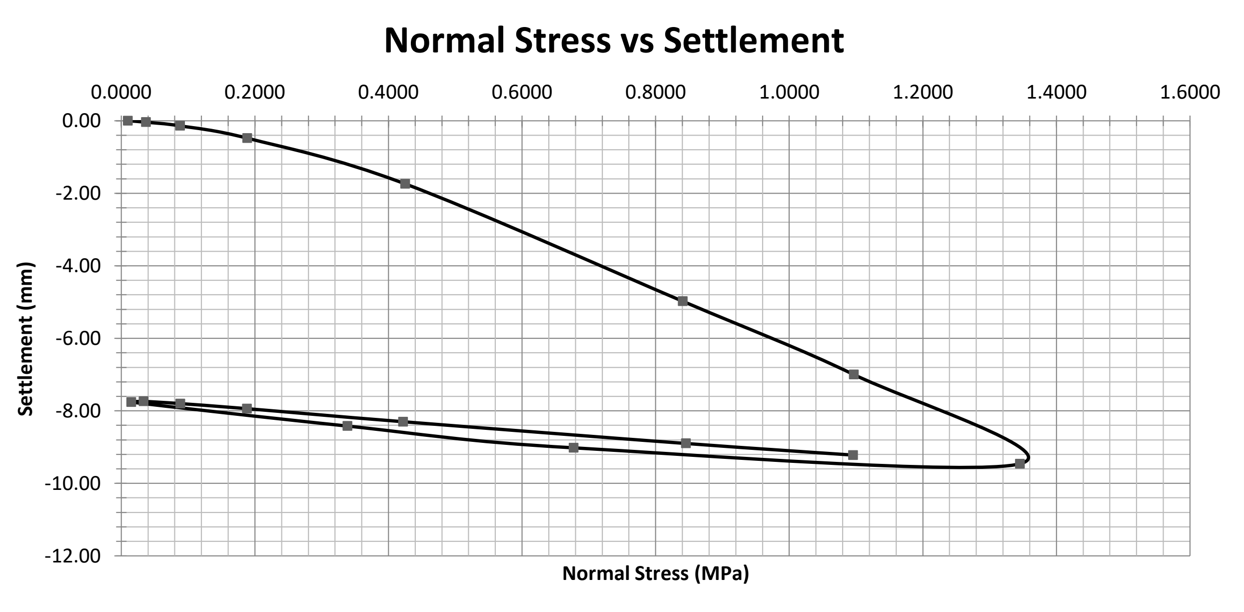
Ev1 (MPa)	**40.27**	**Ev2 (MPa)**	**155.82**
Ev2/Ev1=3.87			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	17/01/2022
Site:	The Landing	**Tested by:**	A.B
Job No:	8020-1727	**Test No.:**	**PLT R 44**
Report No:	WRE8020-1727-R007	**Page:**	32 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0372	-0.04	
3	0.0880	0.0880	-0.14	
4	0.1870	0.1887	-0.48	
5	0.4240	0.4250	-1.74	
6	0.8480	0.8408	-4.98	
7	1.0980	1.0967	-7.00	
8	1.3480	1.3454	-9.46	
9	0.6740	0.6775	-9.02	Unloaded
10	0.3370	0.3388	-8.42	
11	0.0100	0.0151	-7.76	
12	0.0310	0.0335	-7.74	Secondary load
13	0.0880	0.0886	-7.80	
14	0.1870	0.1884	-7.94	
15	0.4240	0.4221	-8.30	
16	0.8480	0.8454	-8.90	
17	1.0980	1.0958	-9.22	



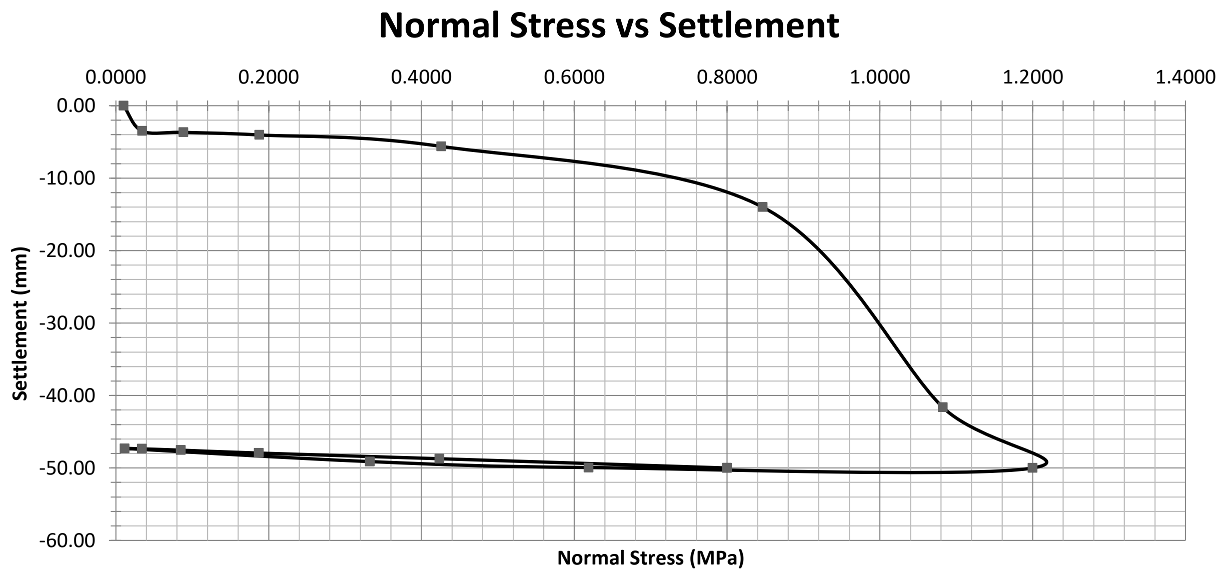
Ev1 (MPa)	**31.11**	**Ev2 (MPa)**	**161.33**
Ev2/Ev1=5.18			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	14/01/2022
Site:	The Landing	**Tested by:**	A.B / D.O
Job No:	8020-1727	**Test No.:**	**PLT R 45**
Report No:	WRE8020-1727-R007	**Page:**	33 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0344	-3.50	
3	0.0880	0.0886	-3.68	
4	0.1870	0.1877	-4.04	
5	0.4240	0.4261	-5.62	
6	0.8480	0.8466	-14.00	
7	1.0980	1.0825	-41.64	
8	1.3480	1.2000	-50.00	
9	0.6740	0.6187	-49.94	Unloade d
10	0.3370	0.3326	-49.12	
11	0.0100	0.0113	-47.30	
12	0.0310	0.0341	-47.36	Secondary load
13	0.0880	0.0850	-47.54	
14	0.1870	0.1870	-47.94	
15	0.4240	0.4234	-48.72	
16	0.8480	0.8000	-50.00	
17	1.0980	0.8000	-50.00	


Normal Stress vs Settlement

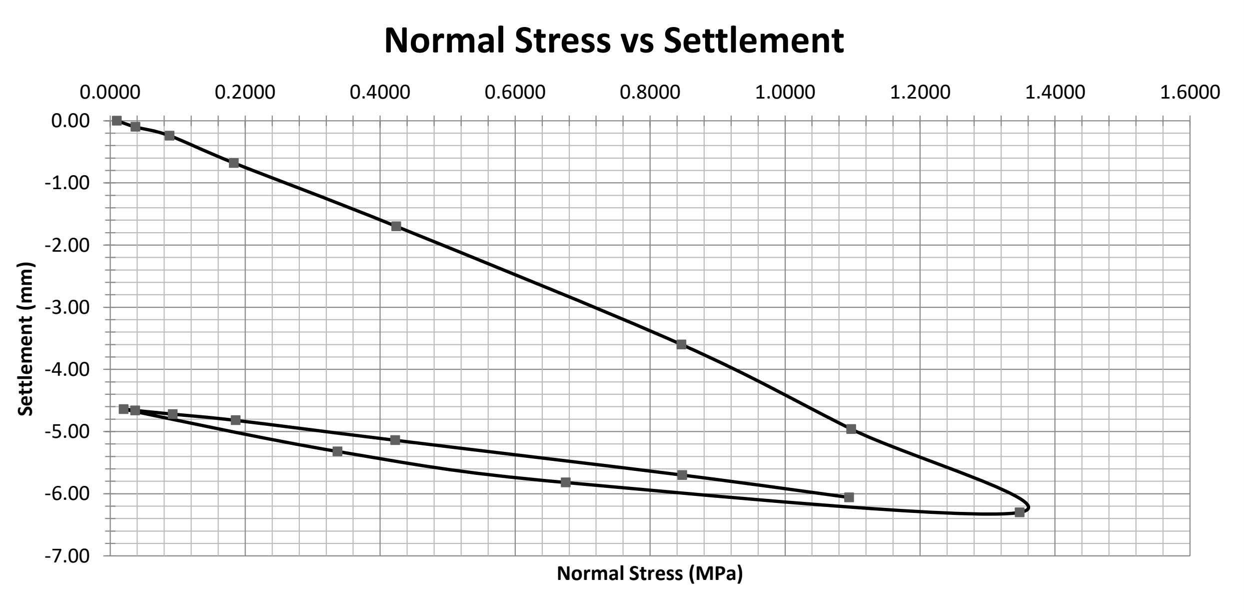
Ev1 (MPa)	**6.19**	**Ev2 (MPa)**	**66.85**
Ev2/Ev1=10.8			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	Max Pressure not achieved

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	14/01/2022
Site:	The Landing	**Tested by:**	A.B / D.O
Job No:	8020-1727	**Test No.:**	**PLT R 46**
Report No:	WRE8020-1727-R007	**Page:**	34 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0375	-0.10	
3	0.0880	0.0880	-0.24	
4	0.1870	0.1835	-0.68	
5	0.4240	0.4241	-1.70	
6	0.8480	0.8466	-3.60	
7	1.0980	1.0981	-4.96	
8	1.3480	1.3478	-6.30	
9	0.6740	0.6752	-5.82	Unloaded
10	0.3370	0.3368	-5.32	
11	0.0100	0.0202	-4.64	
12	0.0310	0.0370	-4.66	Secondary load
13	0.0880	0.0929	-4.72	
14	0.1870	0.1859	-4.82	
15	0.4240	0.4224	-5.14	
16	0.8480	0.8477	-5.70	
17	1.0980	1.0951	-6.06	



Ev1 (MPa)	**47.68**	**Ev2 (MPa)**	**165.75**

Ev2/Ev1=3.48

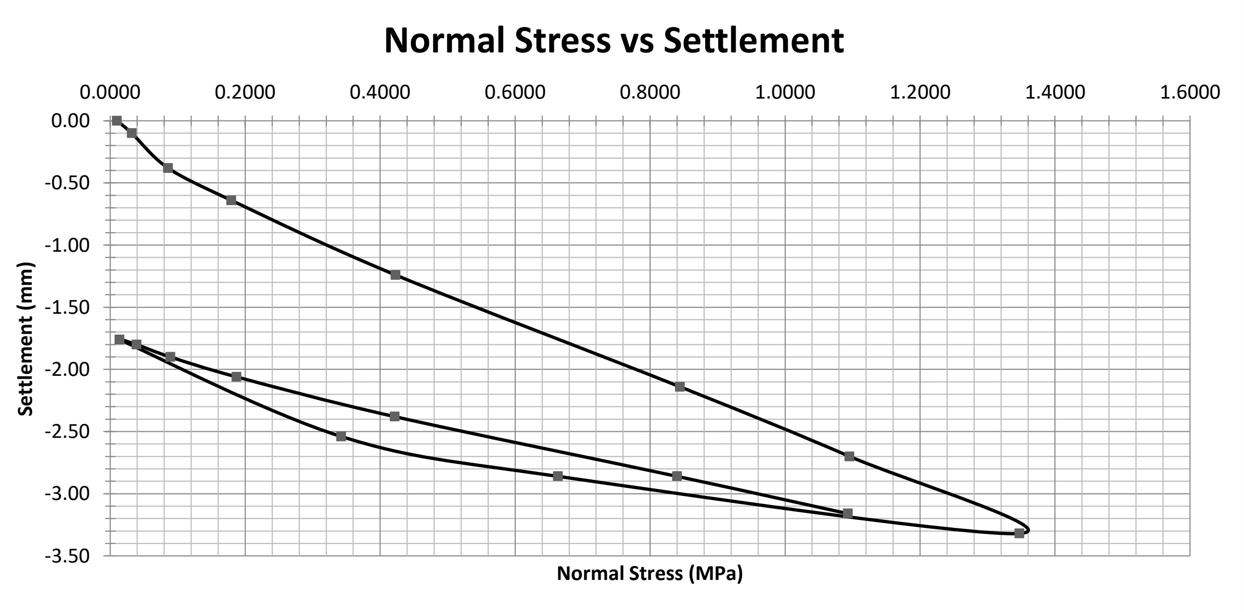
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

STATIC PLATE LOAD TEST

DIN 18134:2012-04

Client:	Cook Costello	**Date:**	12/01/2022
Site:	The Landing	**Tested by:**	S.K / D.O
Job No:	8020-1727	**Test No.:**	**PLT R 47**
Report No:	WRE8020-1727-R007	**Page:**	35 of 35
Client Reference:	-	**Checked by:**	A.B
		Date:	9/02/2022

Loading Stage	Preferred Normal Stress (MPa)	Actual Normal Stress (MPa)	Settlement of Loading Plate (mm)	Load Cycle
1	0.0100	0.0100	0.00	Primary load
2	0.0310	0.0320	-0.10	
3	0.0880	0.0856	-0.38	
4	0.1870	0.1794	-0.64	
5	0.4240	0.4227	-1.24	
6	0.8480	0.8444	-2.14	
7	1.0980	1.0955	-2.70	
8	1.3480	1.3472	-3.32	
9	0.6740	0.6634	-2.86	Unloade d
10	0.3370	0.3425	-2.54	
11	0.0100	0.0139	-1.76	
12	0.0310	0.0390	-1.80	Secondary load
13	0.0880	0.0891	-1.90	
14	0.1870	0.1872	-2.06	
15	0.4240	0.4217	-2.38	
16	0.8480	0.8399	-2.86	
17	1.0980	1.0930	-3.16	



Ev1 (MPa)	**95.86**	**Ev2 (MPa)**	**187.27**
Ev2/Ev1=1.95			
Begin Time:		**End Time**	
Coordinates:			NZTM Format
Device:	HMP PDG pro (0799)	**Weather/Temp:**	Sunny, with Breeze
Plate Size:	300mm	**Bedding Assistance:**	Fine to Medium Sand
Soil:	Sand	**Remarks:**	

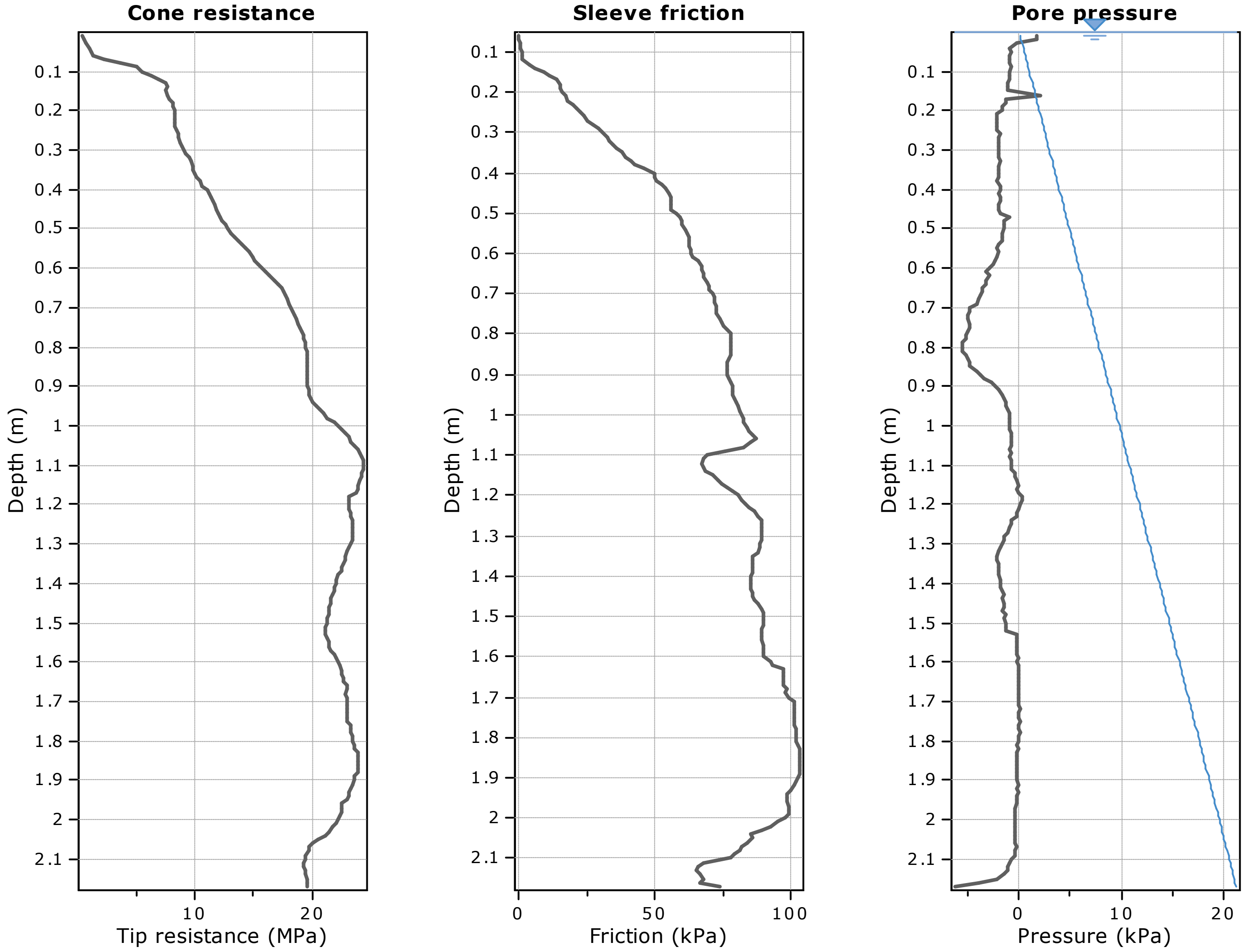
Cook Costello

http://www.geologismiki.gr

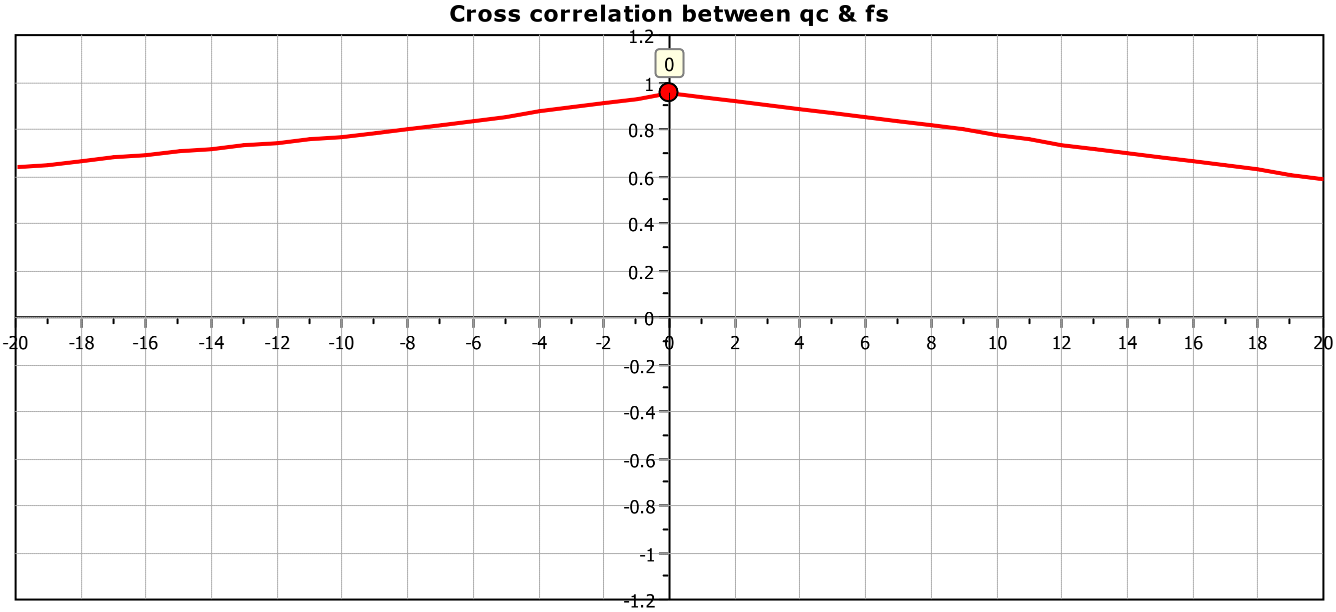
CPT: cpt01

Total depth: 2.17 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



Cook Costello

http://www.geologismiki.gr

CPT: cpt01

Total depth: 2.17 m, Date: 17/03/2022

Surface Elevation: 0.00 m

Coords: X:0.00, Y:0.00

Cone Type:

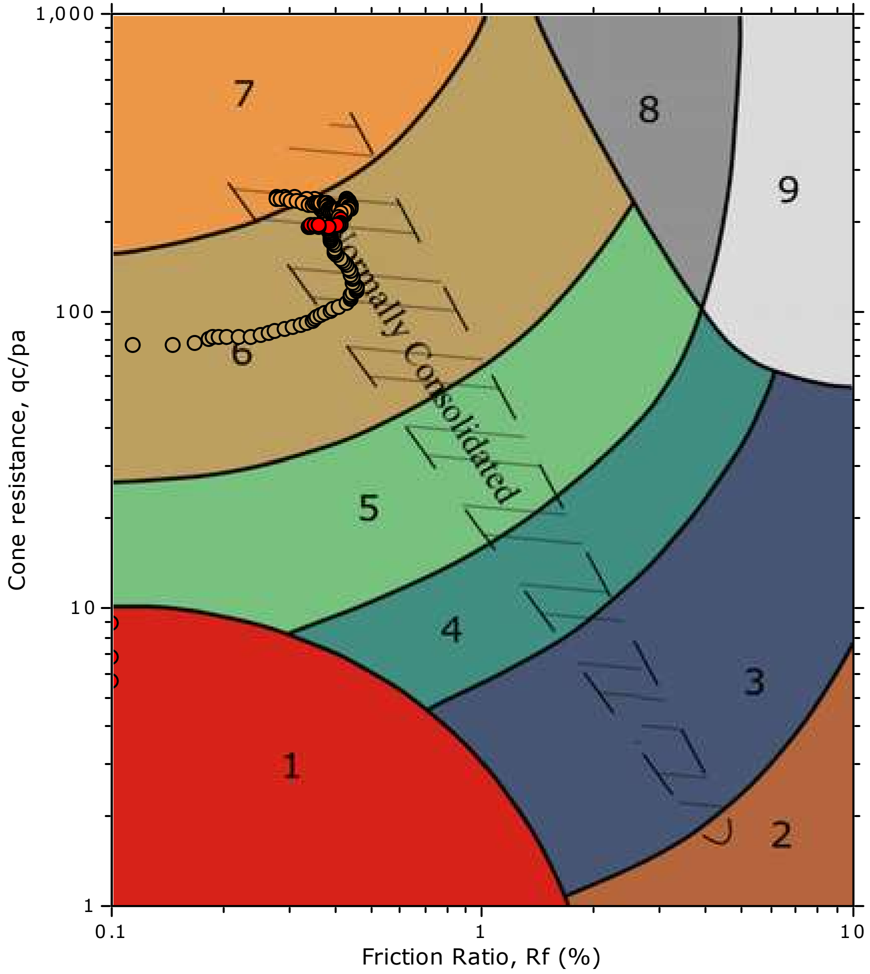
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

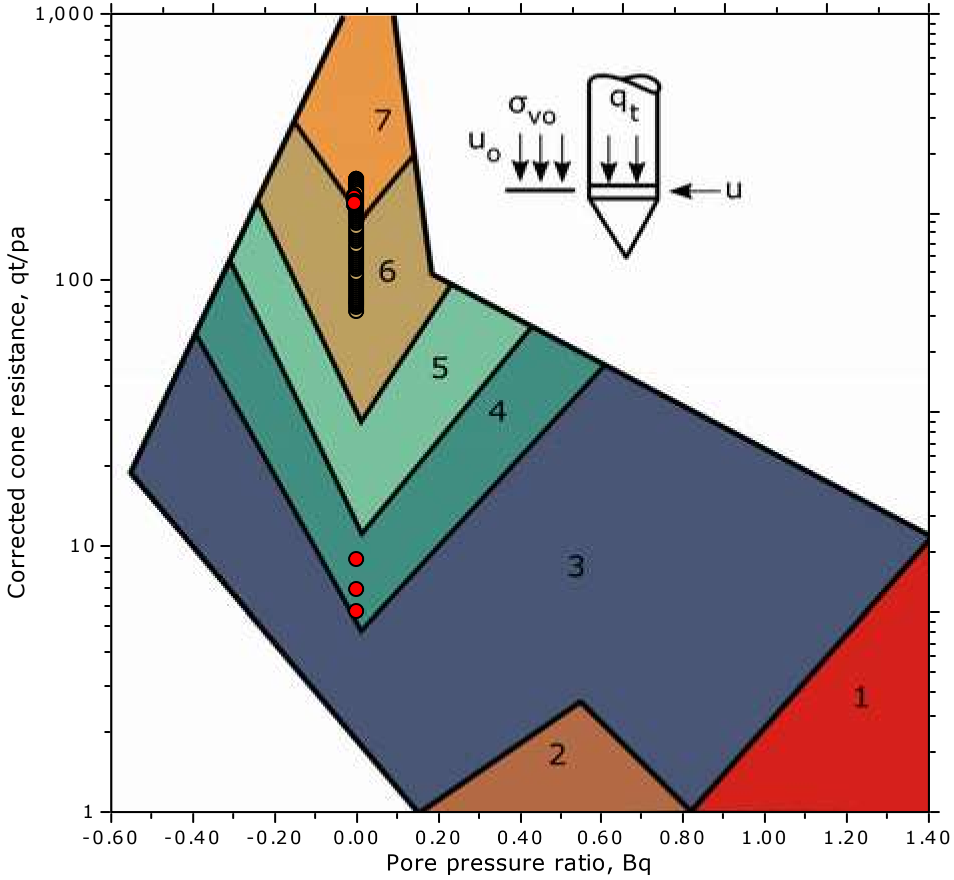
Location: **OTP The Landings Stage 6 & 7 Subdivision**

SBT - Bq plots

SBT plot



Bq plot



SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravelly sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

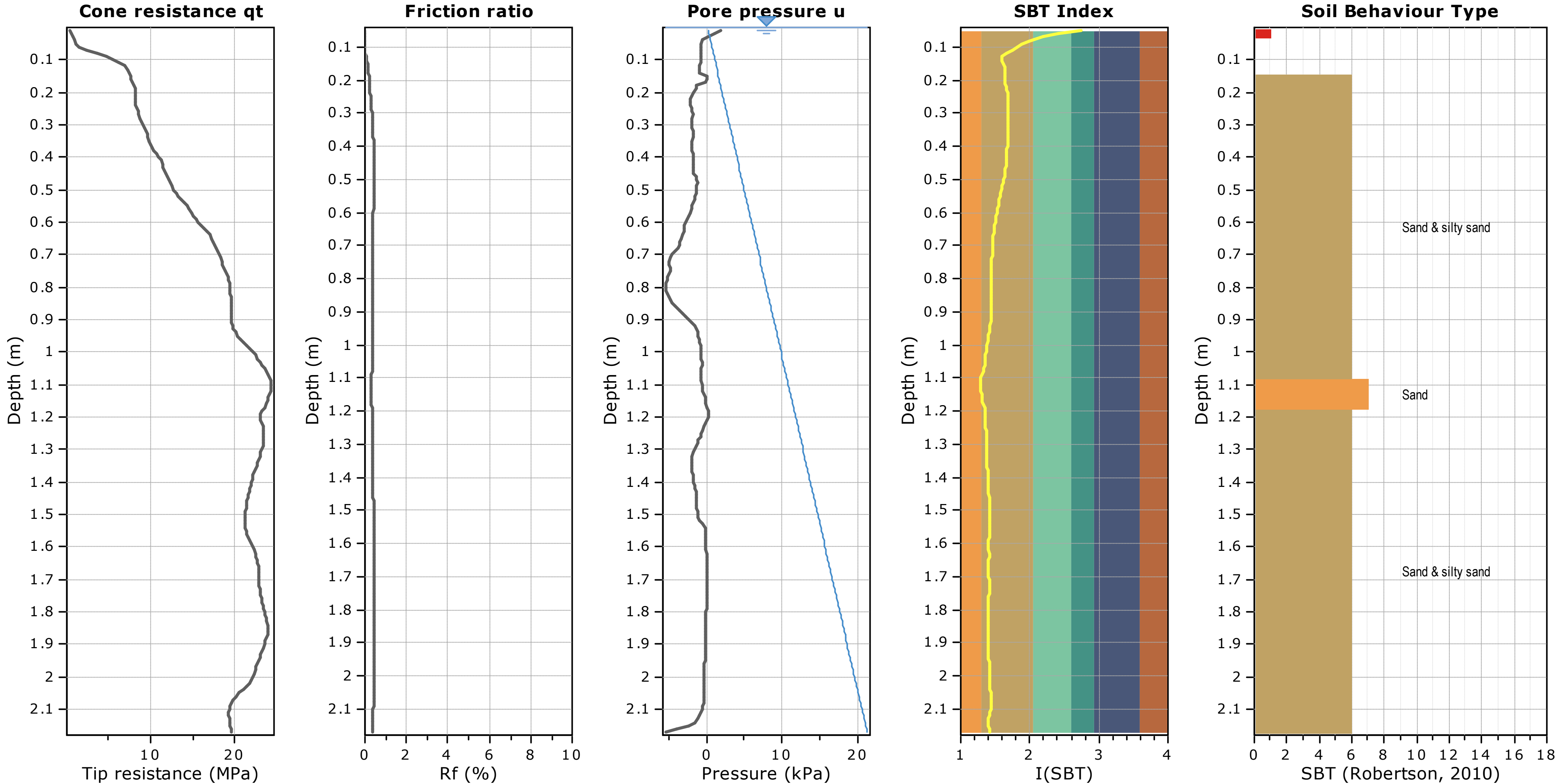
Cook Costello

http://www.geologismiki.gr

CPT: cpt01

Total depth: 2.17 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



SBT legend

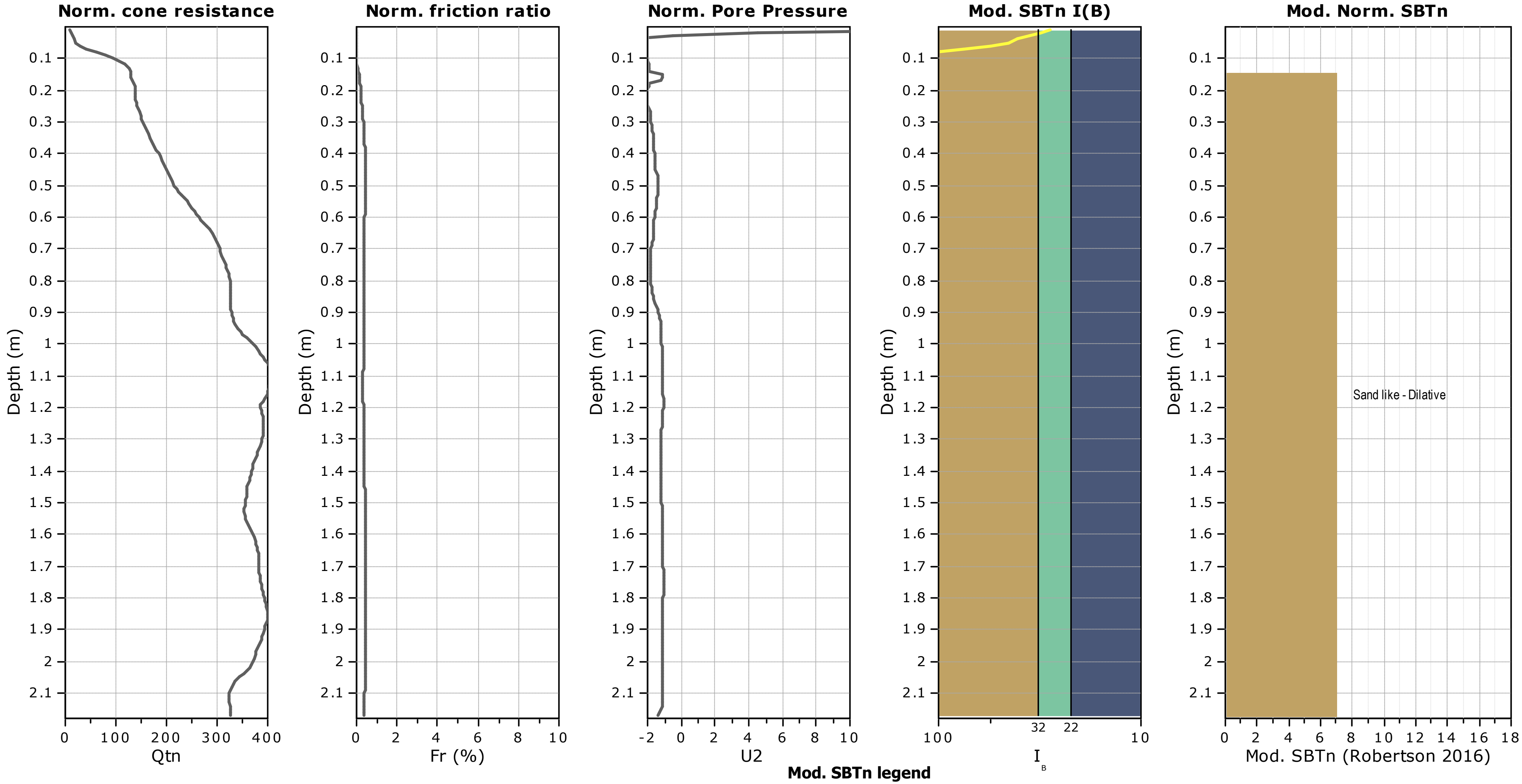
🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬜ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

Cook Costello

http://www.geologismiki.gr

CPT: cpt01
Total depth: 2.17 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Mod. SBTn legend

🟥 1. CCS: ClayLike - Contractive, Sensitive
🟦 2. CC: Clay-like - Contractive
🟦 3. CD: Clay-Like: Dilative
🟩 4. TC: Transitional - Contractive
🟩 5. TD: Transitional - Dilative
🟧 6. SC: Sand-like - Contractive
🟫 7. SD: Sand-like - Dilative

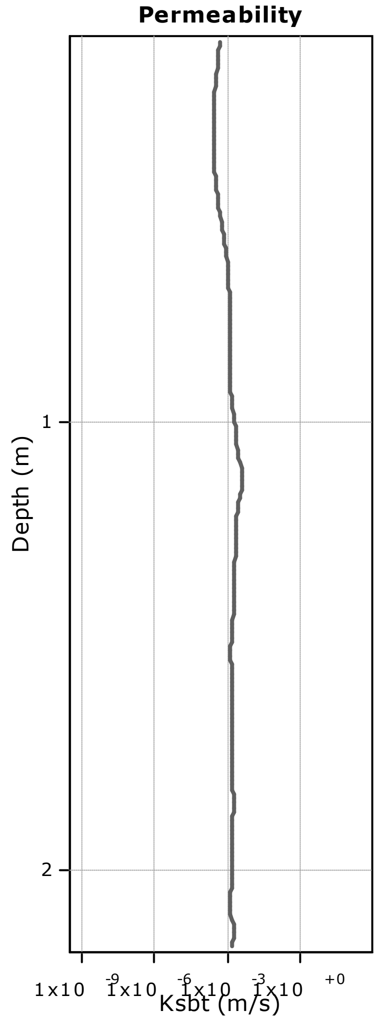
Cook Costello

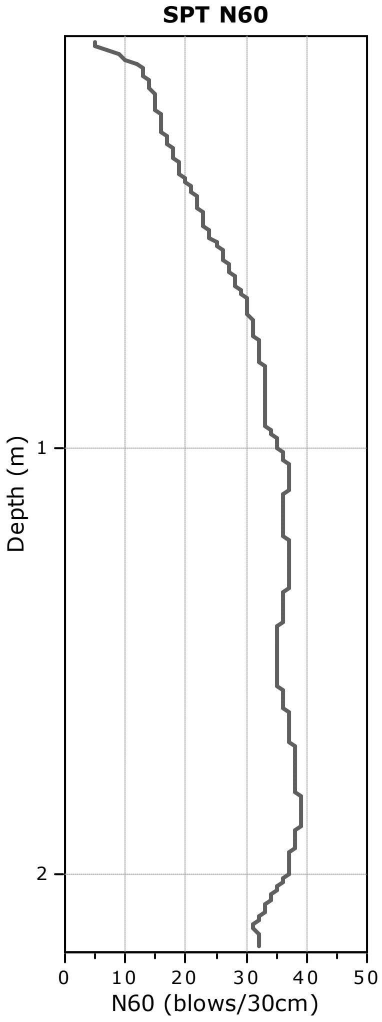
http://www.geologismiki.gr

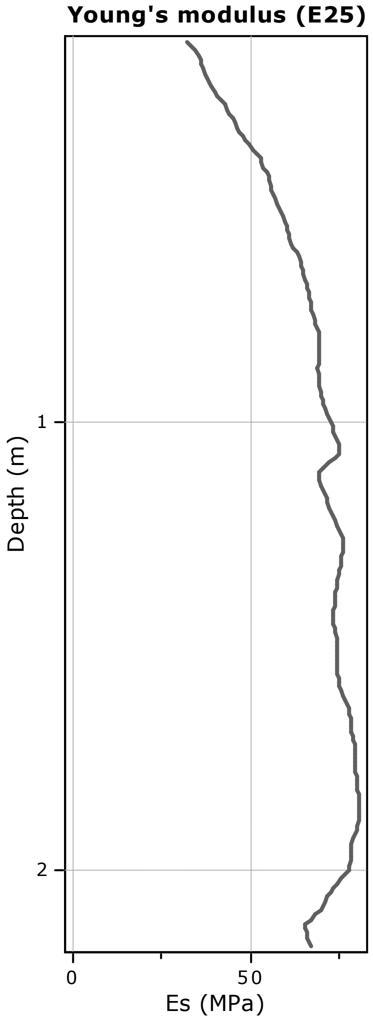
CPT: cpt01

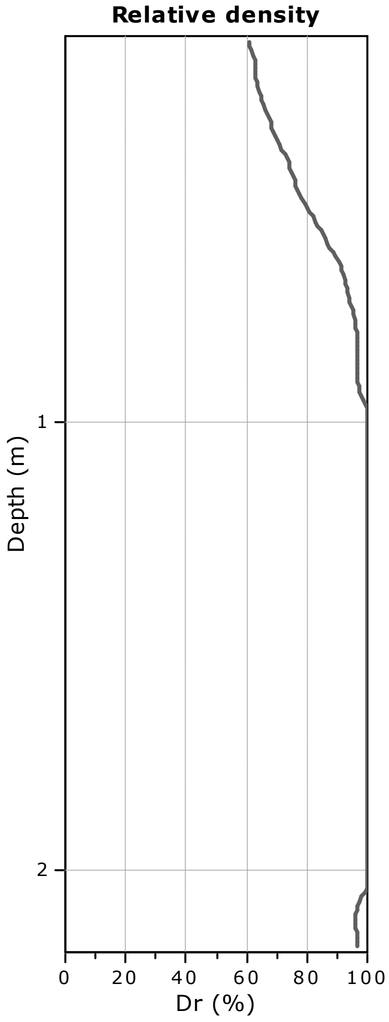
Total depth: 2.17 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

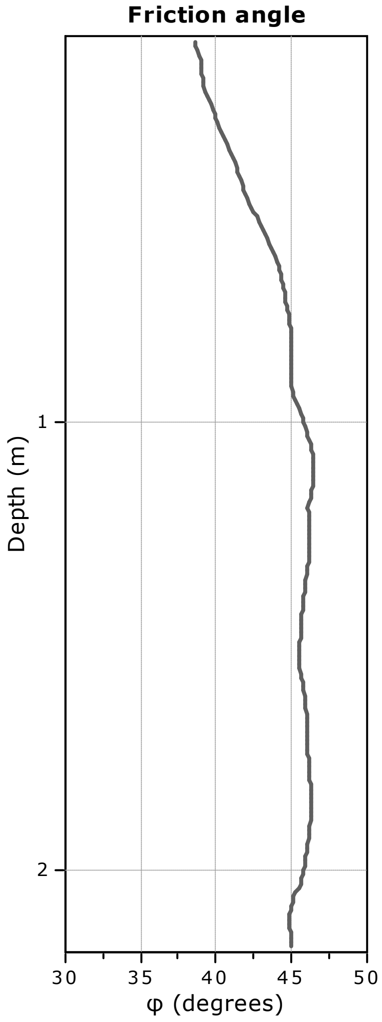
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**











Calculation parameters

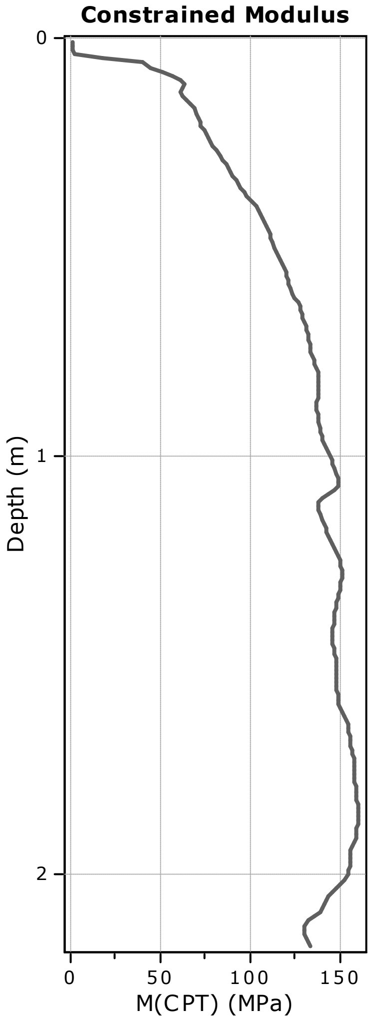
Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

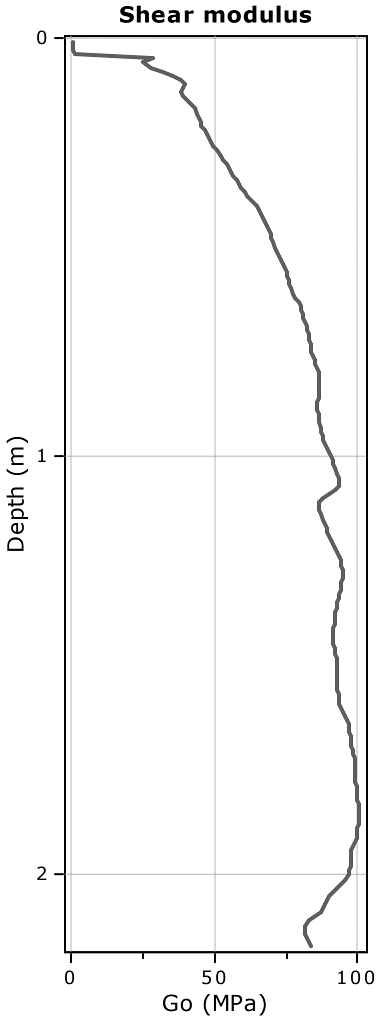
Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
● User defined estimation data

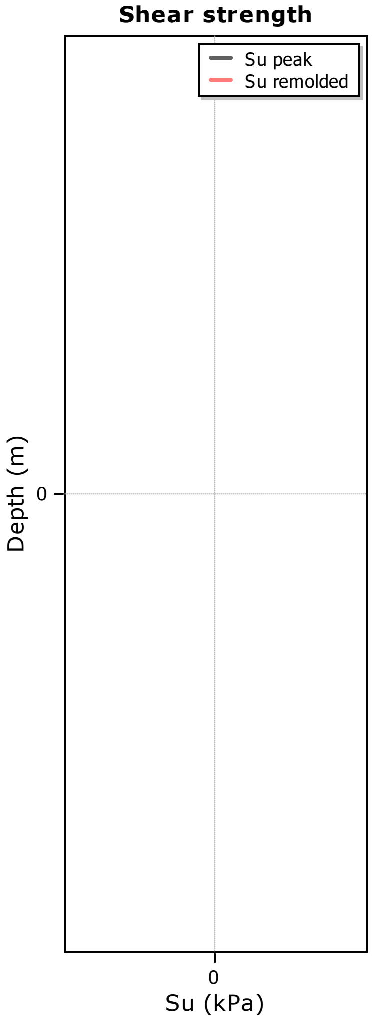
CPT: cpt01

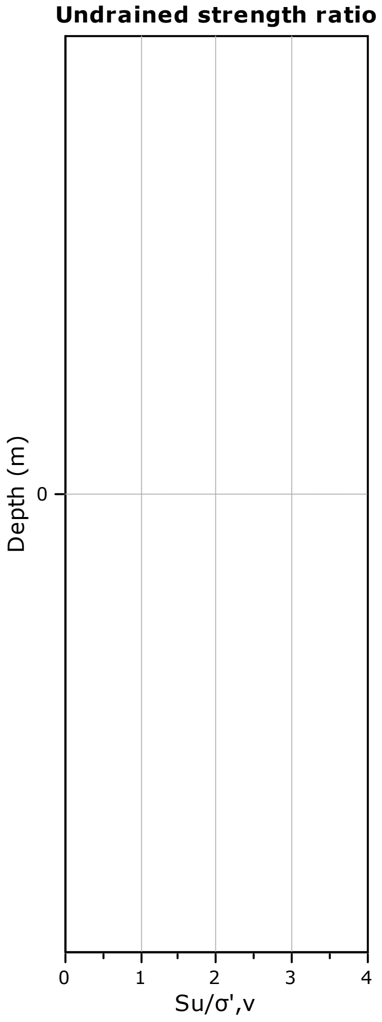
Total depth: 2.17 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

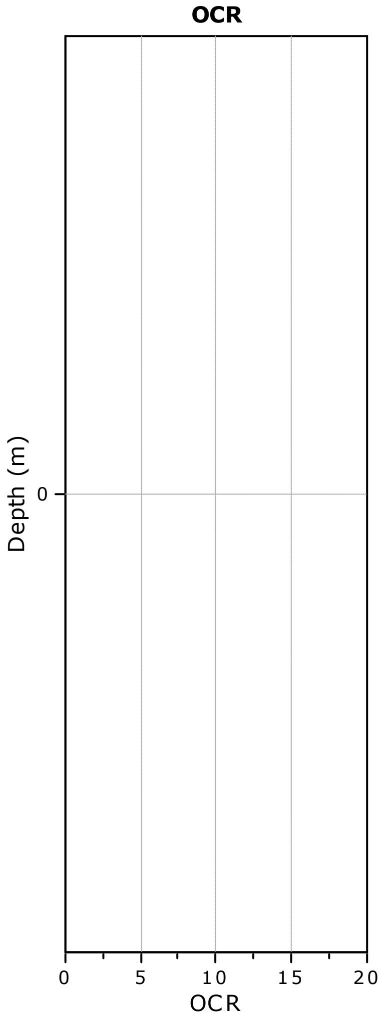
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**


Constrained Modulus


Shear modulus

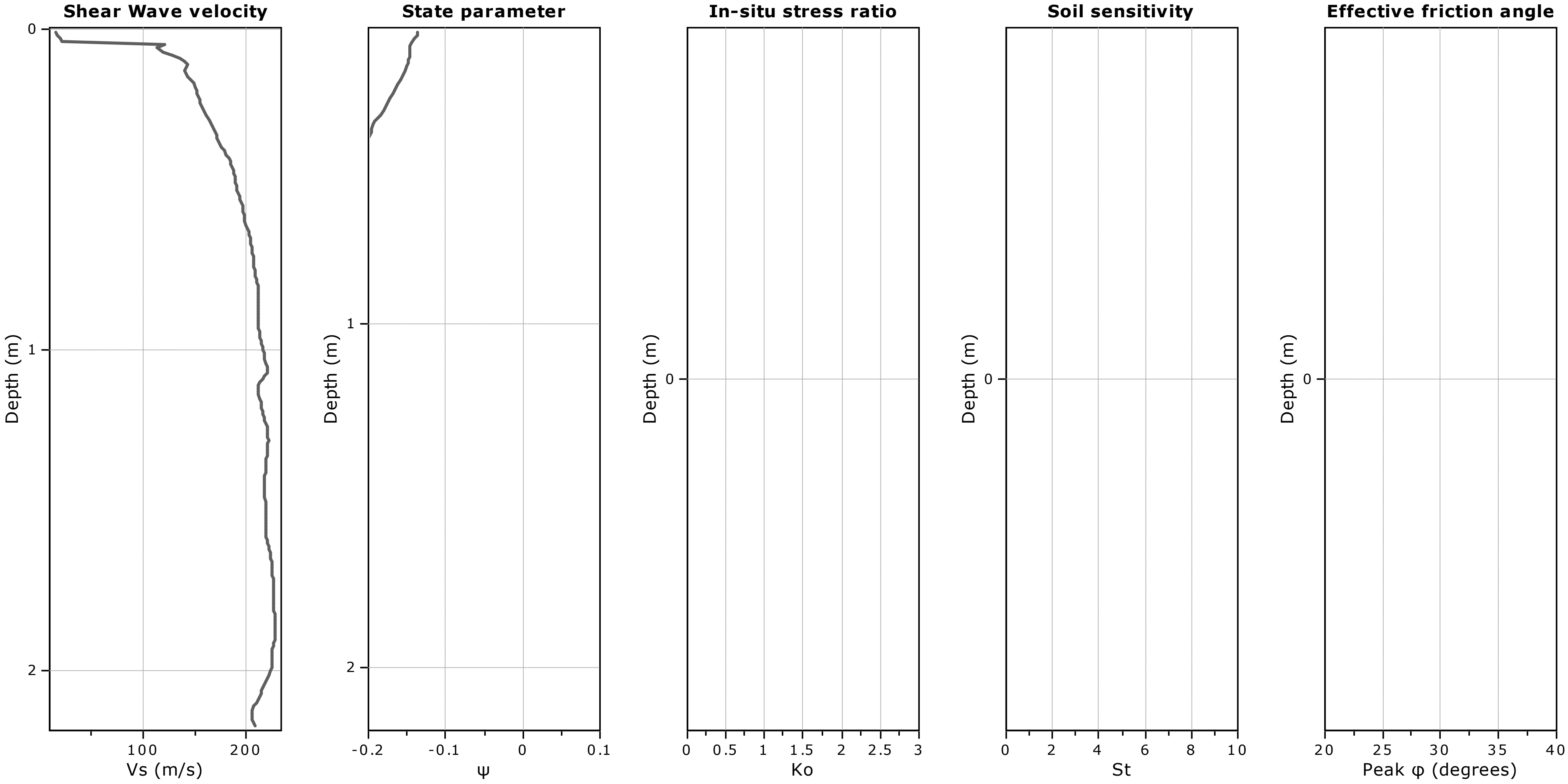

Shear strength


Undrained strength ratio


OCR

Calculation parameters
Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

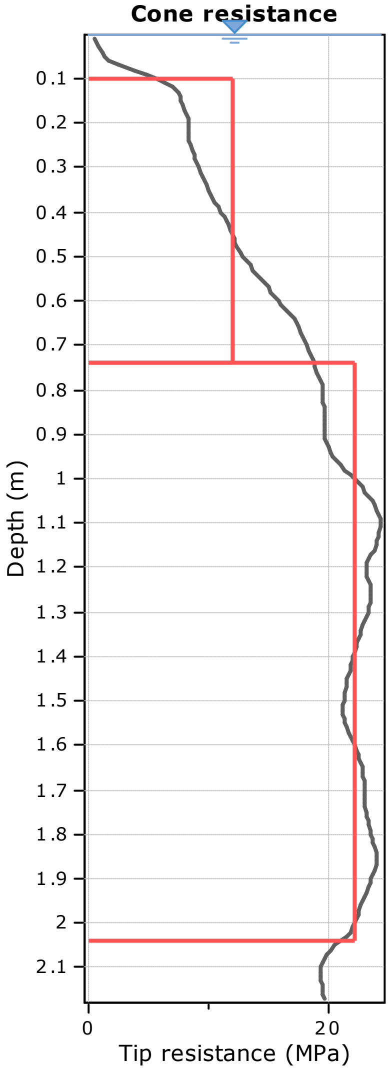


Calculation parameters

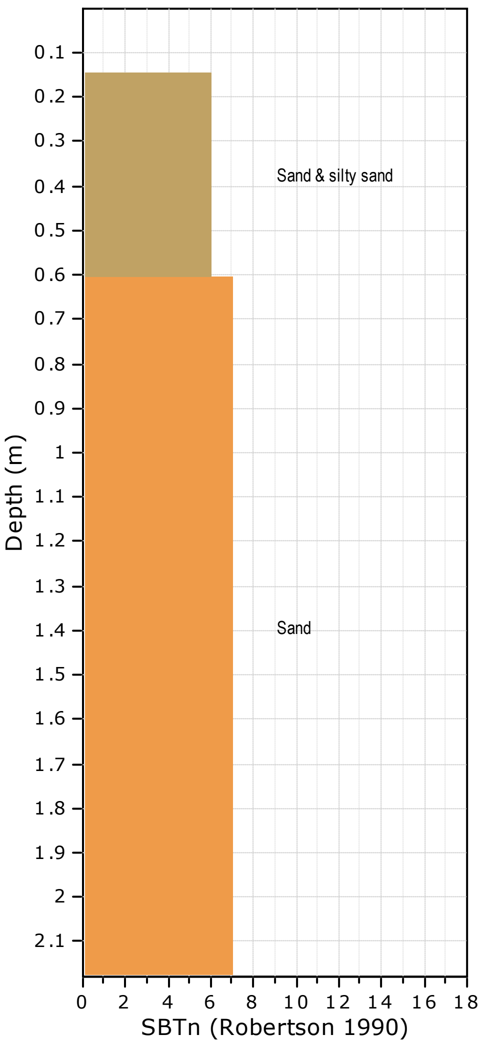
Soil Sensitivity factor, N_S: 7.00

● User defined estimation data

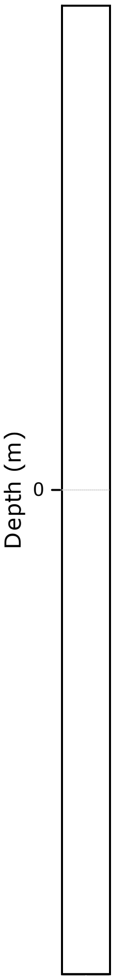
Cone resistance



Norm. Soil Behaviour Type



Typical Geotech. Section



Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.10 (m), **End depth:** 0.74 (m)

Description: Sand & silty sand

Basic results

Total cone resistance: 12.00 ±3.77 MPa

Sleeve friction: 43.91 ±22.49 kPa

Ic: 1.41 ±0.08

SBT_n: 6

SBTn description: Sand & silty sand

Estimation results

Permeability: 5.49E-04 ±3.25E-04 m/s

N_{60}: 21.83 ±5.88 blows

Es: 52.02 ±10.66 MPa

Dr (%): 76.39 ±11.08

φ (degrees): 41.57 ±1.99 °

Unit weight: 19.00 ±0.00 kN/m³

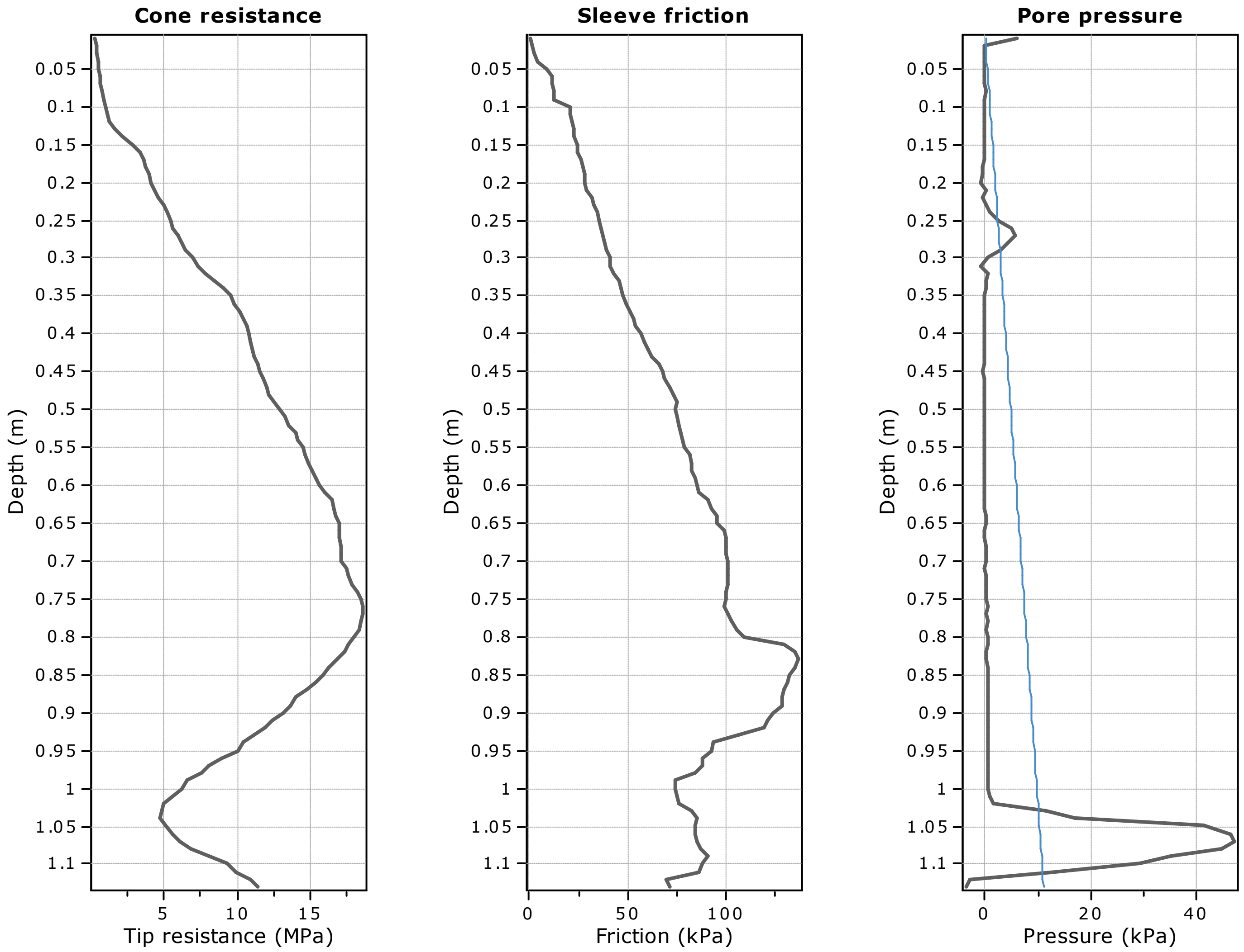
Constrained Mod.: 100.80 ±23.39 MPa

Go: 63.17 ±14.66 MPa

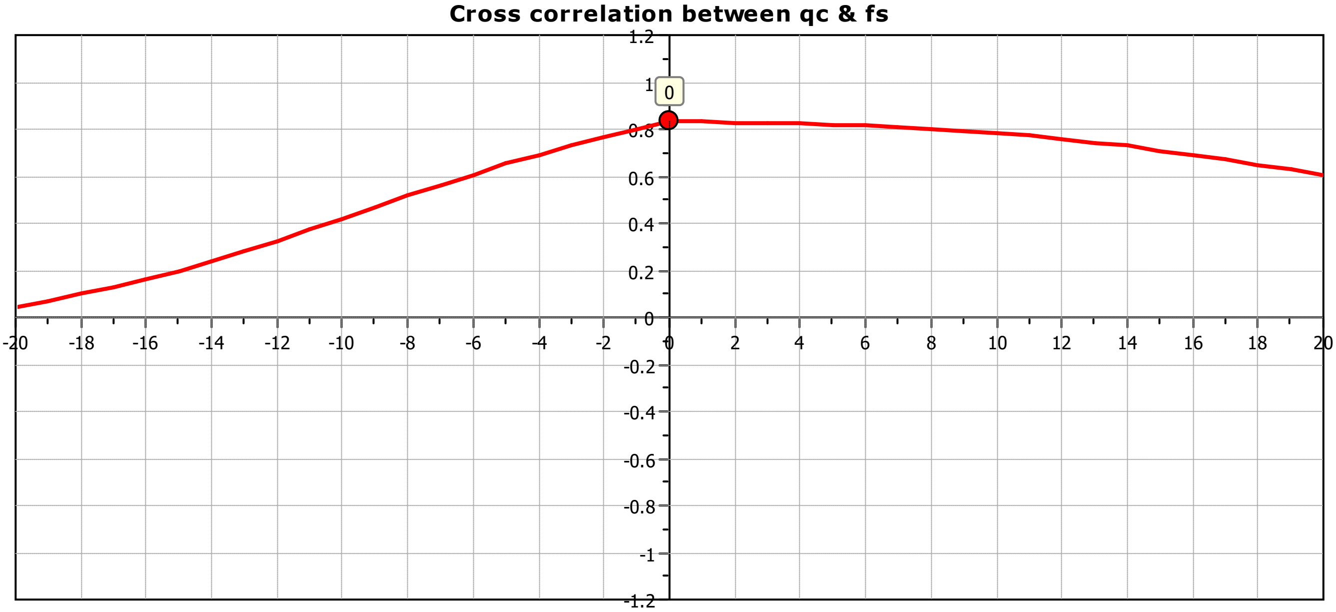
Su: 0.00 ±0.00 kPa

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00



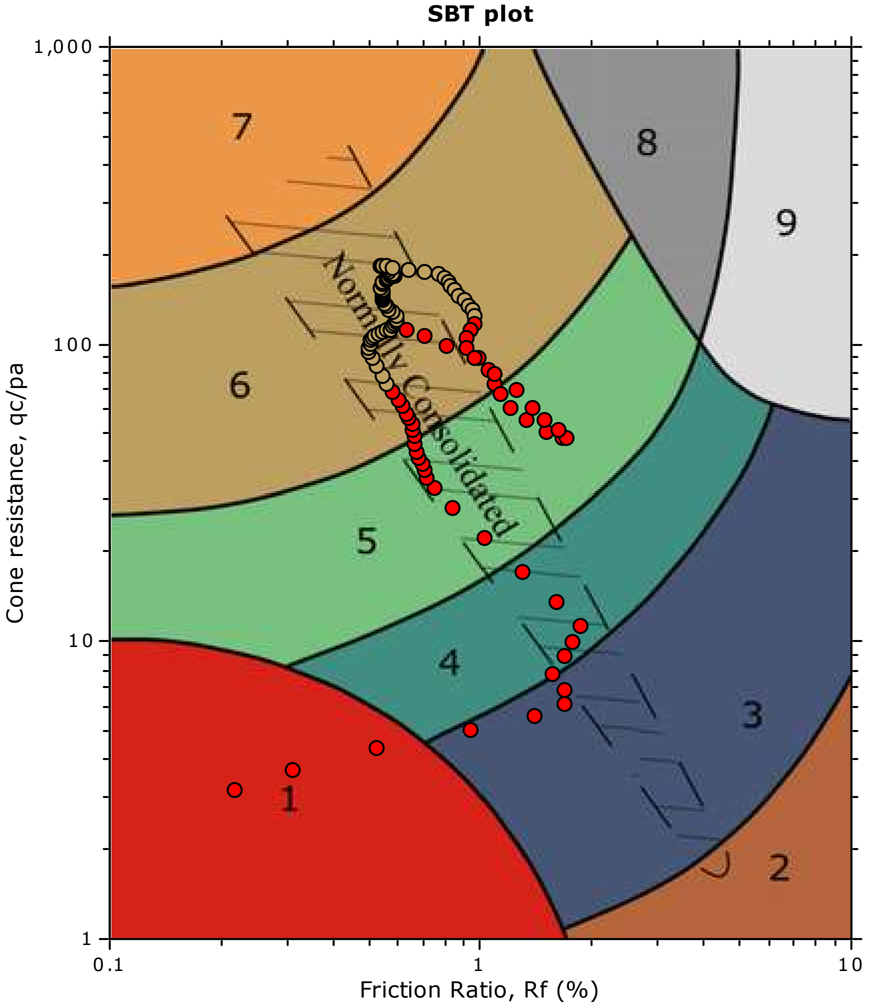
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

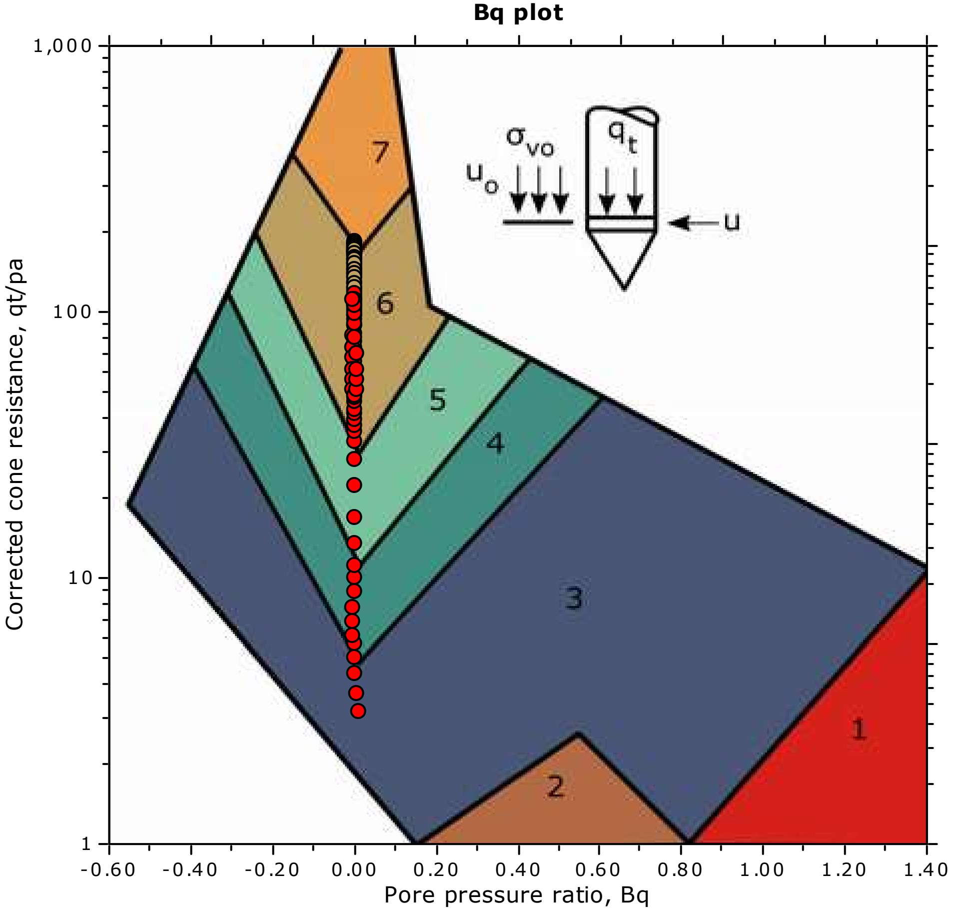


Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**

SBT - Bq plots





SBT legend

🟥 1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravelly sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

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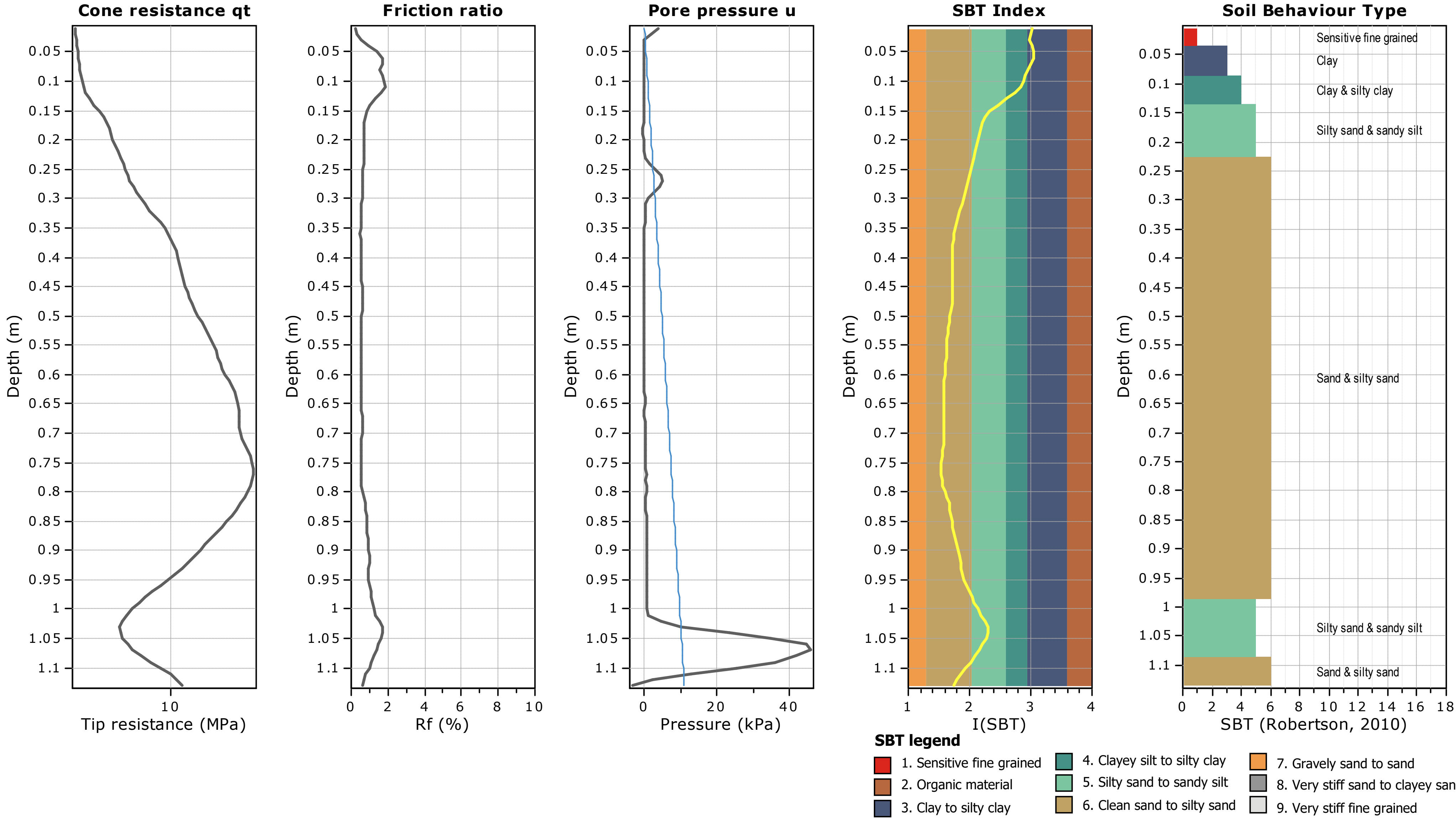
CPT: cpt02

Total depth: 1.13 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



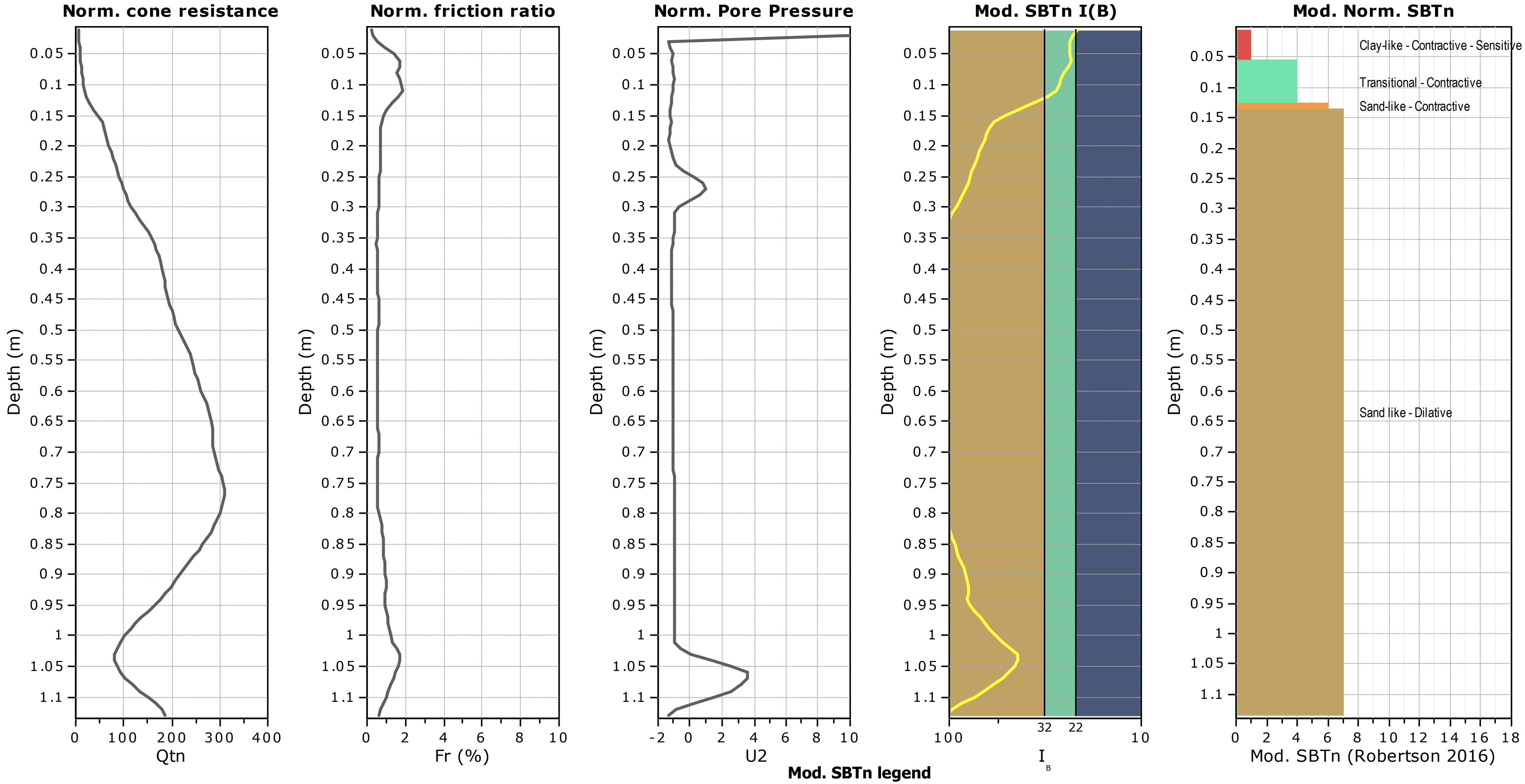
Cook Costello

http://www.geologismiki.gr

CPT: cpt02

Total depth: 1.13 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Norm. cone resistance · **Norm. friction ratio** · **Norm. Pore Pressure** · **Mod. SBTn I(B)** · **Mod. Norm. SBTn**

Mod. SBTn legend

- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- 🟦 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative

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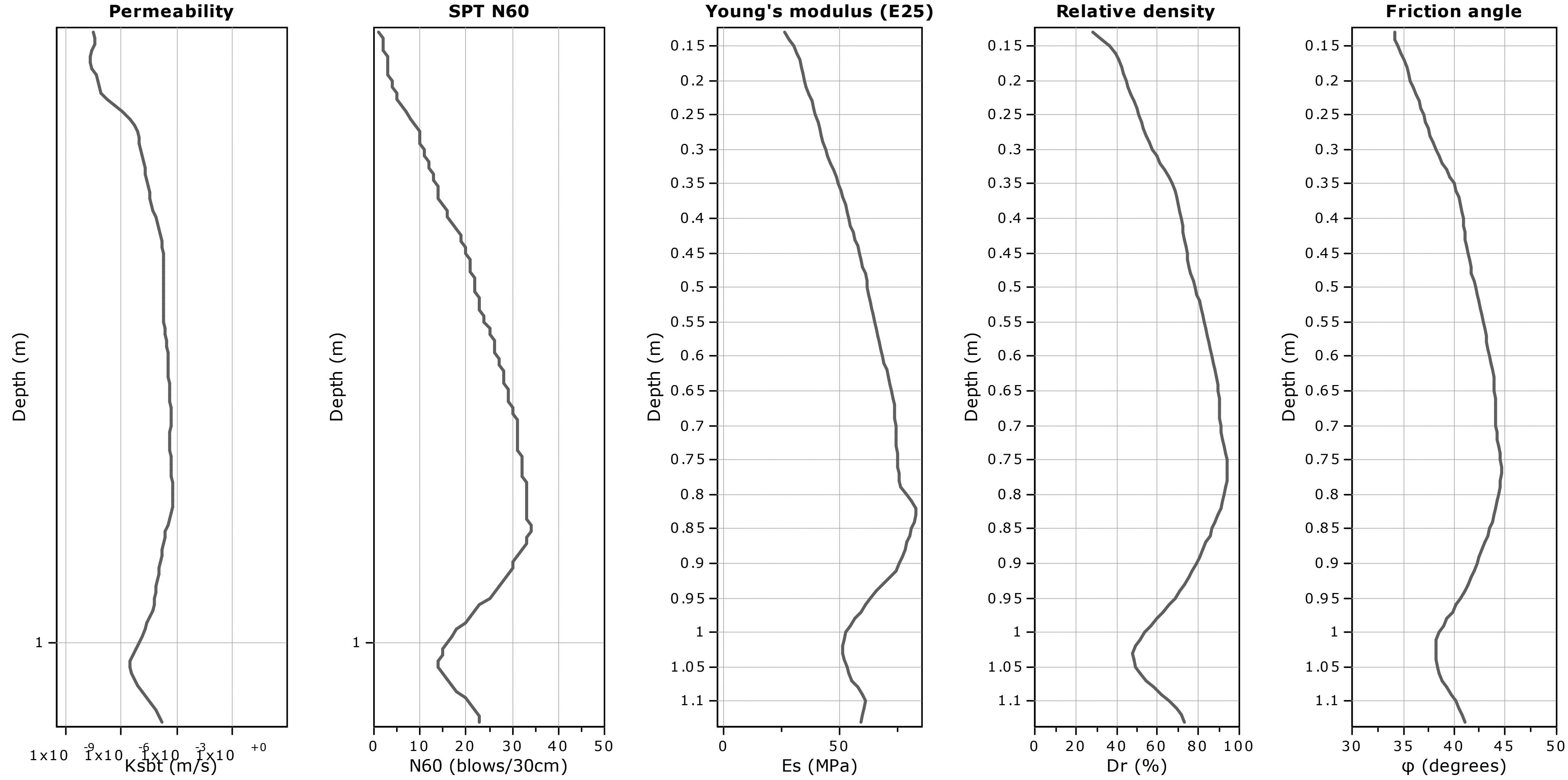
CPT: cpt02

Total depth: 1.13 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
● User defined estimation data

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CPT: cpt02

Total depth: 1.13 m, Date: 17/03/2022

Surface Elevation: 0.00 m

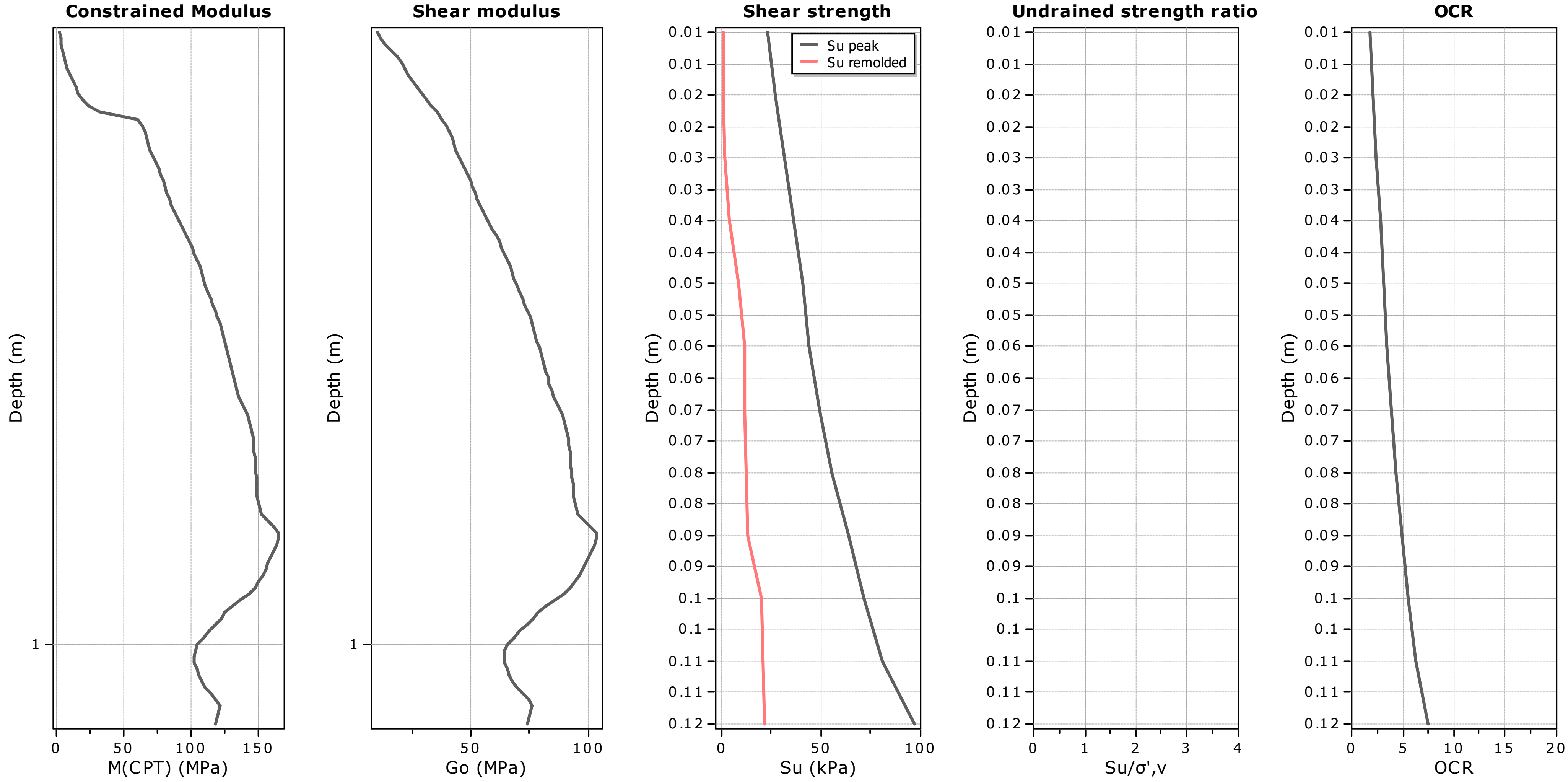
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable *alpha* using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33

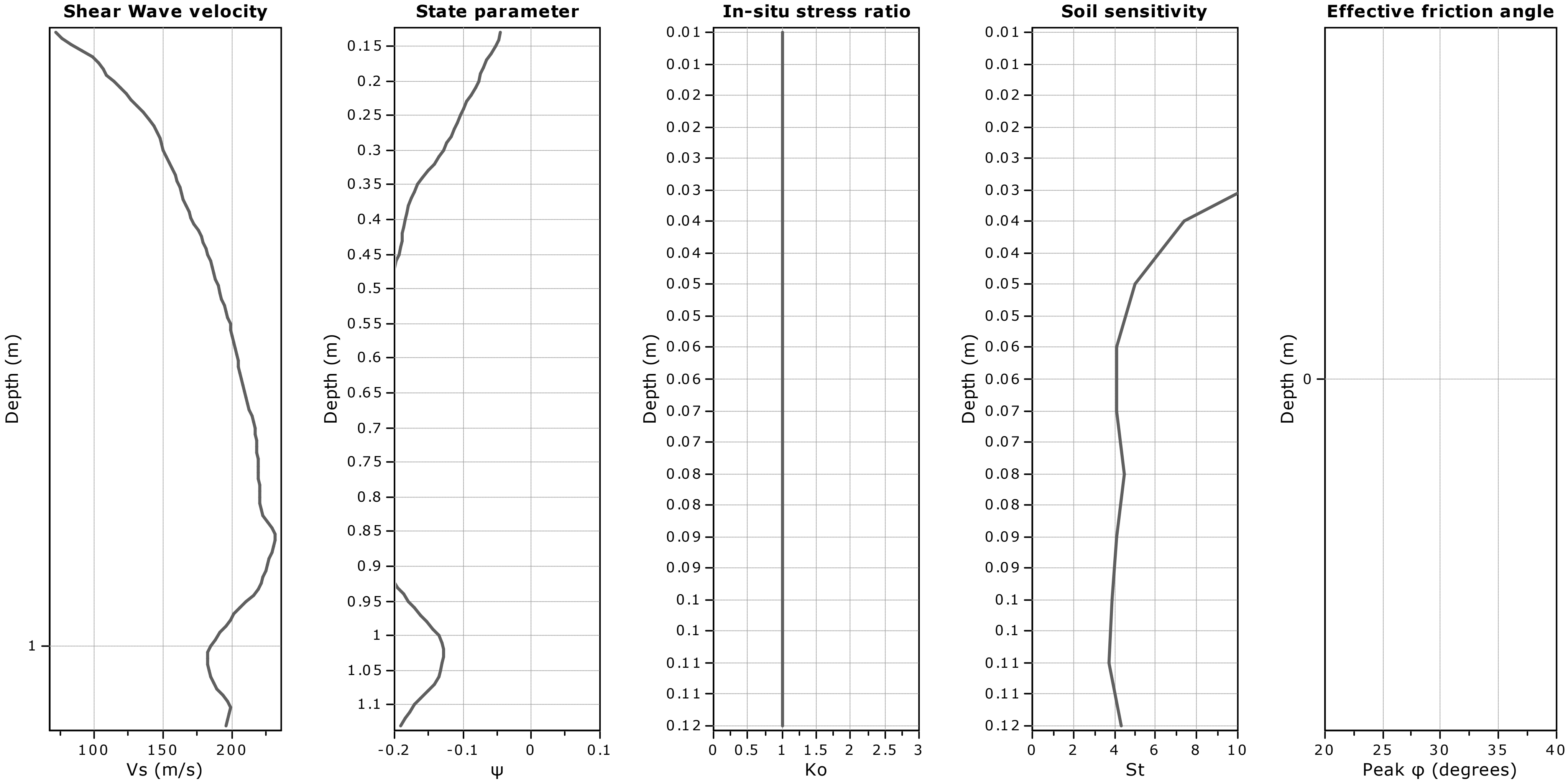
—●— User defined estimation data

—●— Flat Dilatometer Test data

CPT: cpt02

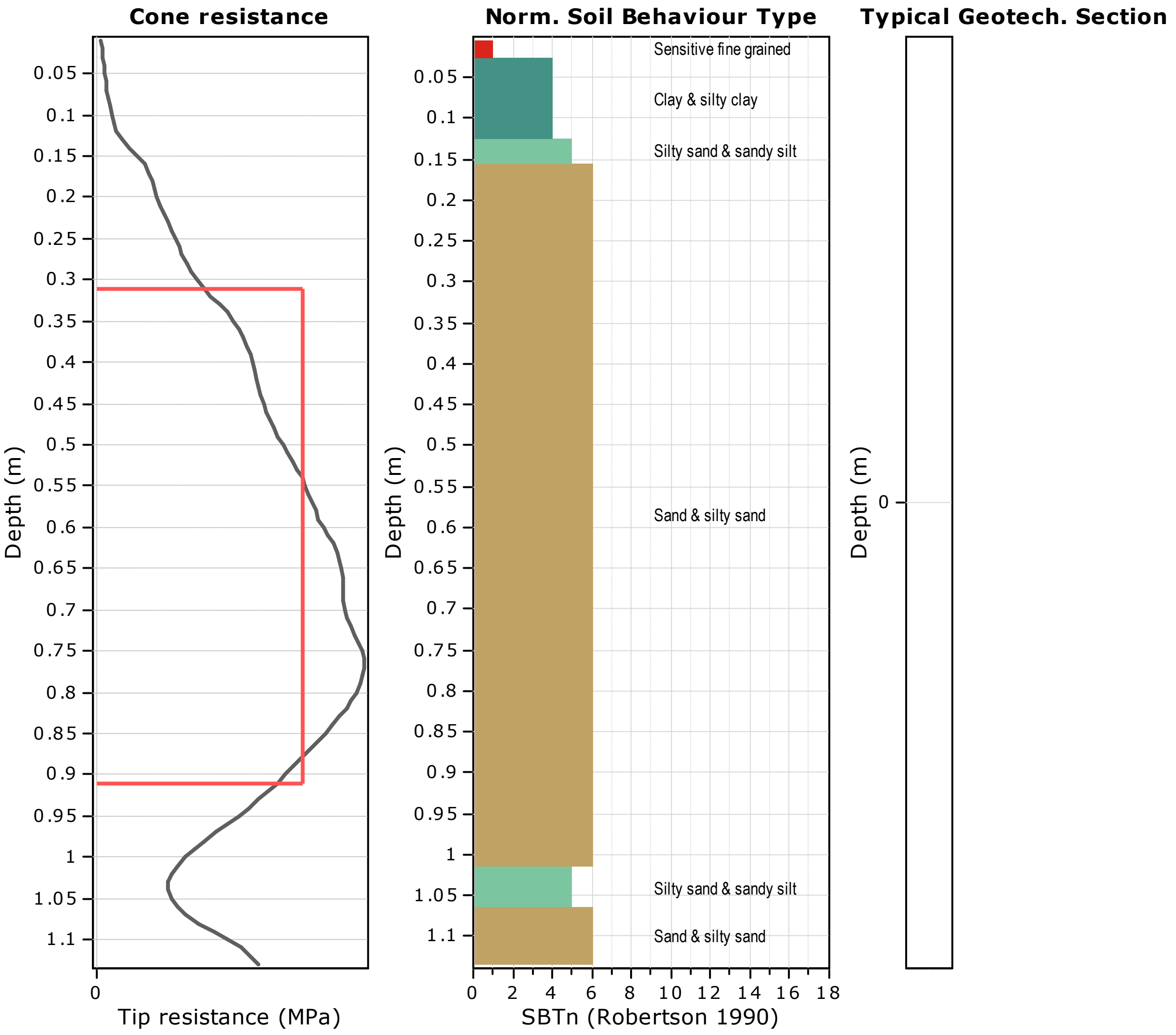
Total depth: 1.13 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Soil Sensitivity factor, N_S: 7.00
●— User defined estimation data



Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.31 (m), **End depth:** 0.91 (m)

Description: Sand & silty sand

Basic results

Total cone resistance: 14.26 ±3.09 MPa

Sleeve friction: 87.93 ±26.84 kPa

Ic: 1.49 ±0.08

SBT$_n$: 6

SBTn description: Sand & silty sand

Estimation results

Permeability: 3.06E-04 ±1.60E-04 m/s

N$_{60}$: 27.44 ±4.99 blows

Es: 66.80 ±10.47 MPa

Dr (%): 82.14 ±9.31

φ (degrees): 42.62 ±1.62 °

Unit weight: 19.00 ±0.00 kN/m³

Constrained Mod.: 133.59 ±20.94 MPa

Go: 83.72 ±13.12 MPa

Su: 0.00 ±0.00 kPa

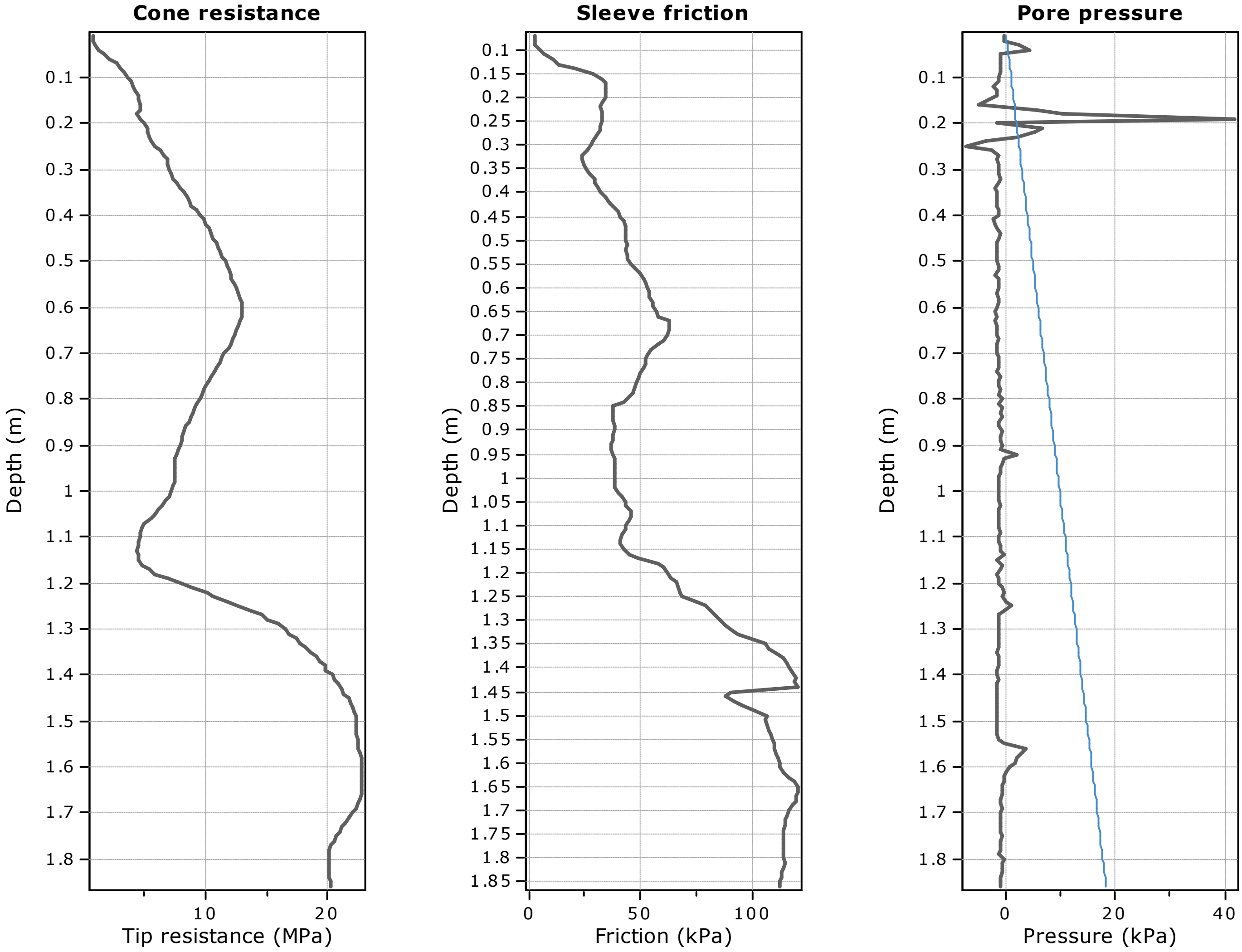
Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

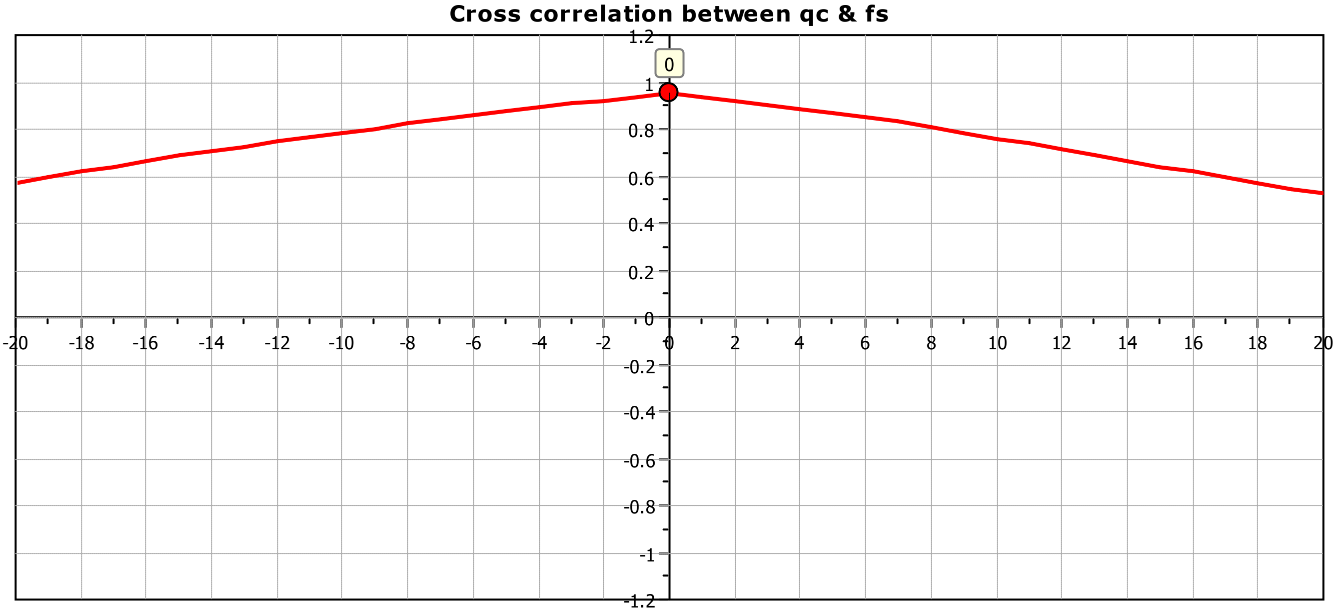
CPT: cpt03

Total depth: 1.86 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



CPT: cpt03

Total depth: 1.86 m, Date: 17/03/2022

Surface Elevation: 0.00 m

Coords: X:0.00, Y:0.00

Cone Type:

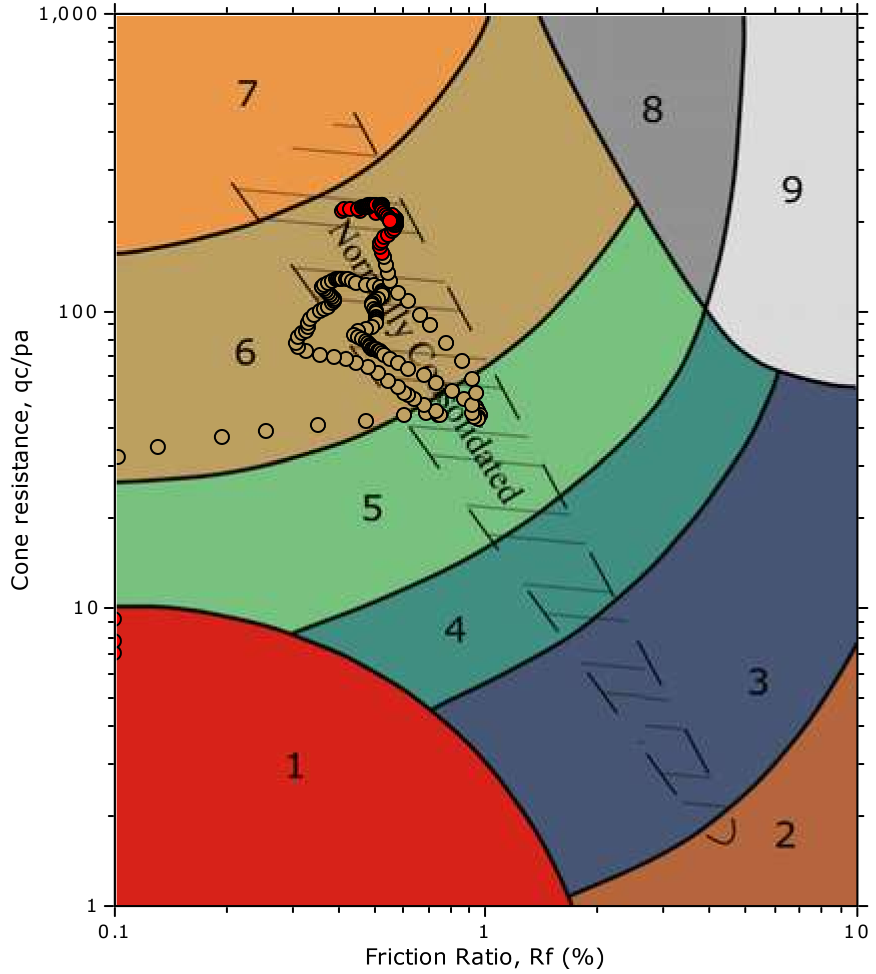
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

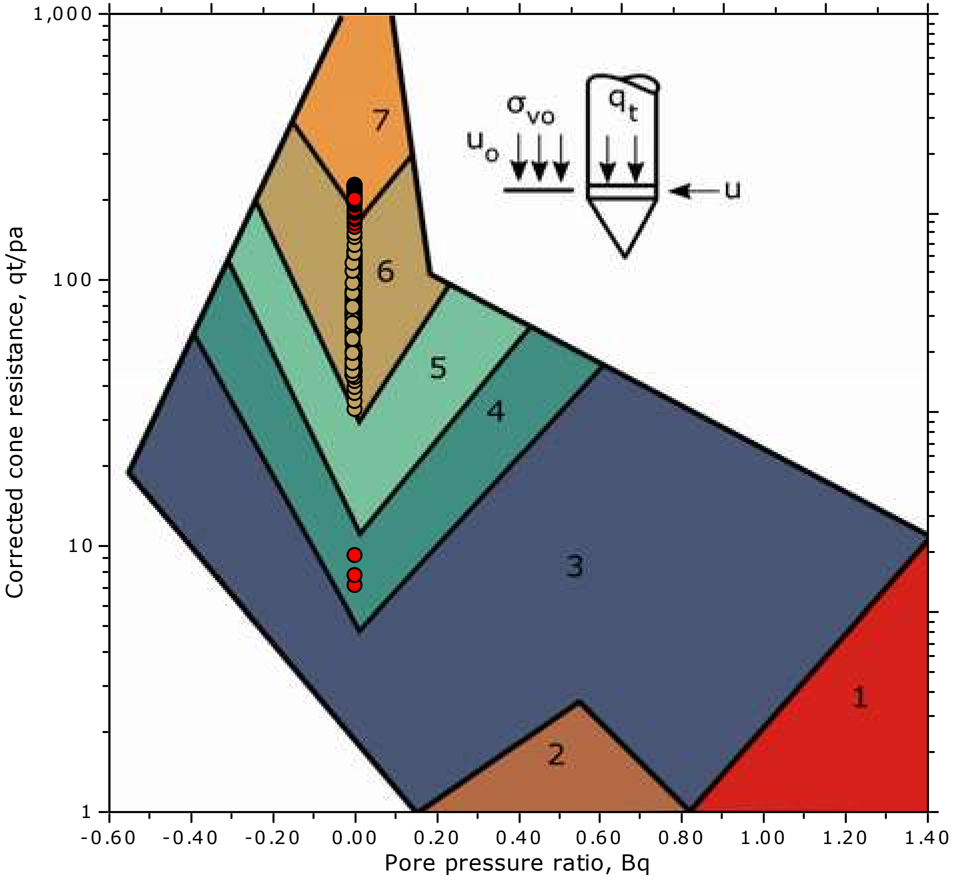
Location: **OTP The Landings Stage 6 & 7 Subdivision**

SBT - Bq plots

SBT plot



Bq plot



SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟨 6. Clean sand to silty sand
- 🟧 7. Gravelly sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

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CPT: cpt03

Total depth: 1.86 m, Date: 17/03/2022

Surface Elevation: 0.00 m

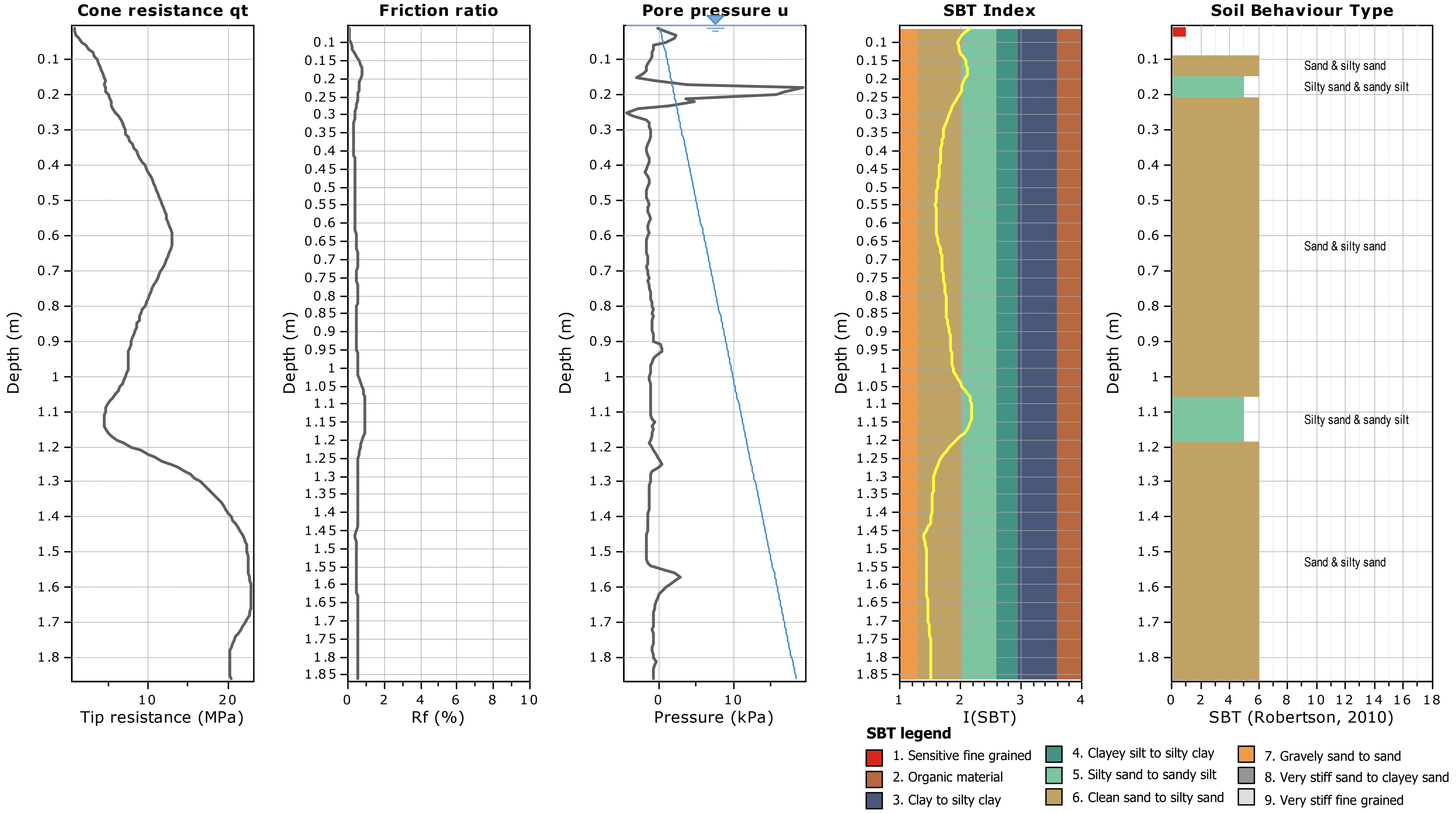
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

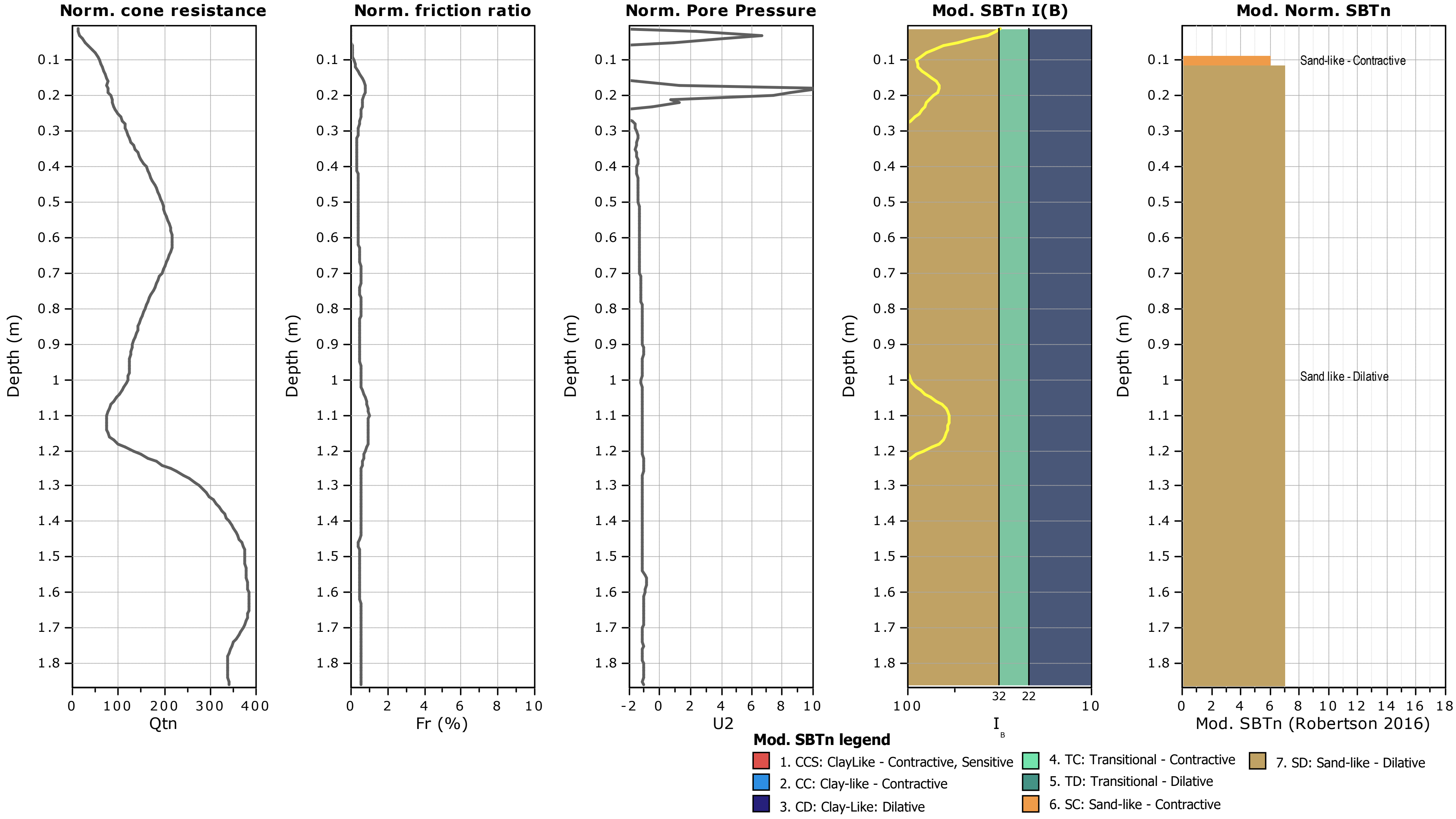
Location: **OTP The Landings Stage 6 & 7 Subdivision**



CPT: cpt03

Total depth: 1.86 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Cook Costello

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CPT: cpt03

Total depth: 1.86 m, Date: 17/03/2022

Surface Elevation: 0.00 m

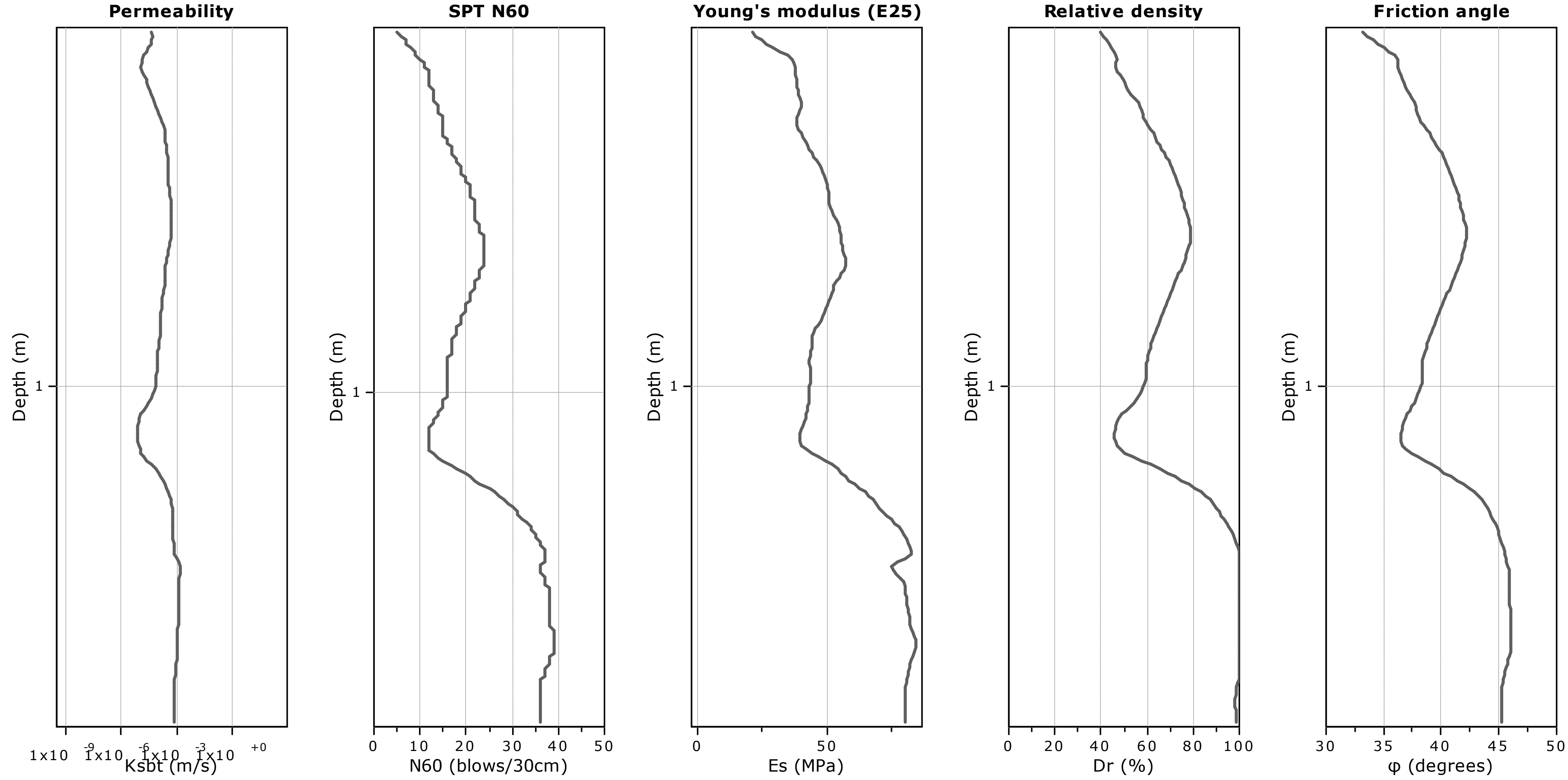
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Permeability: Based on SBT_n

SPT N_{60}: Based on I_c and q_t

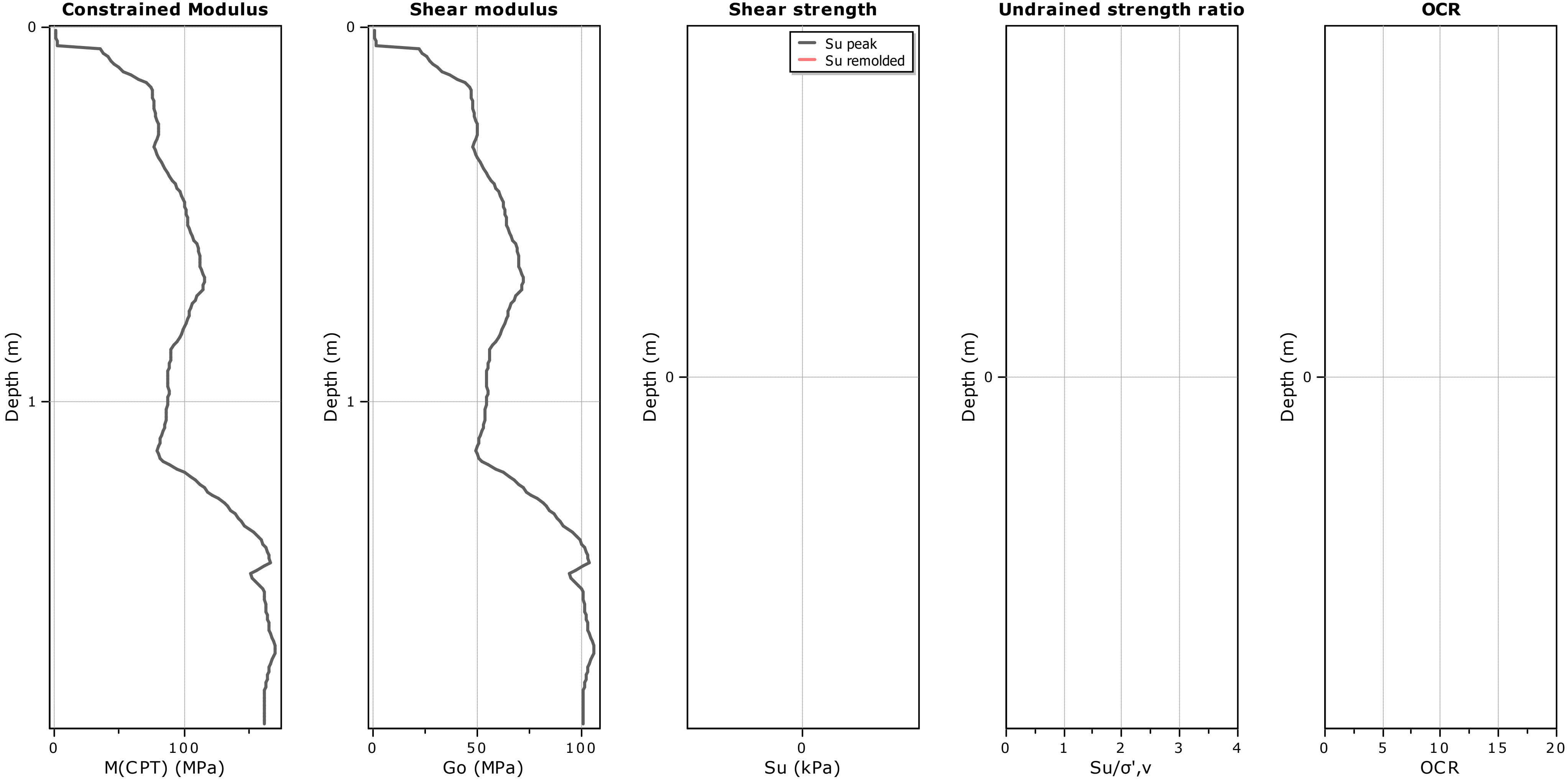
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data

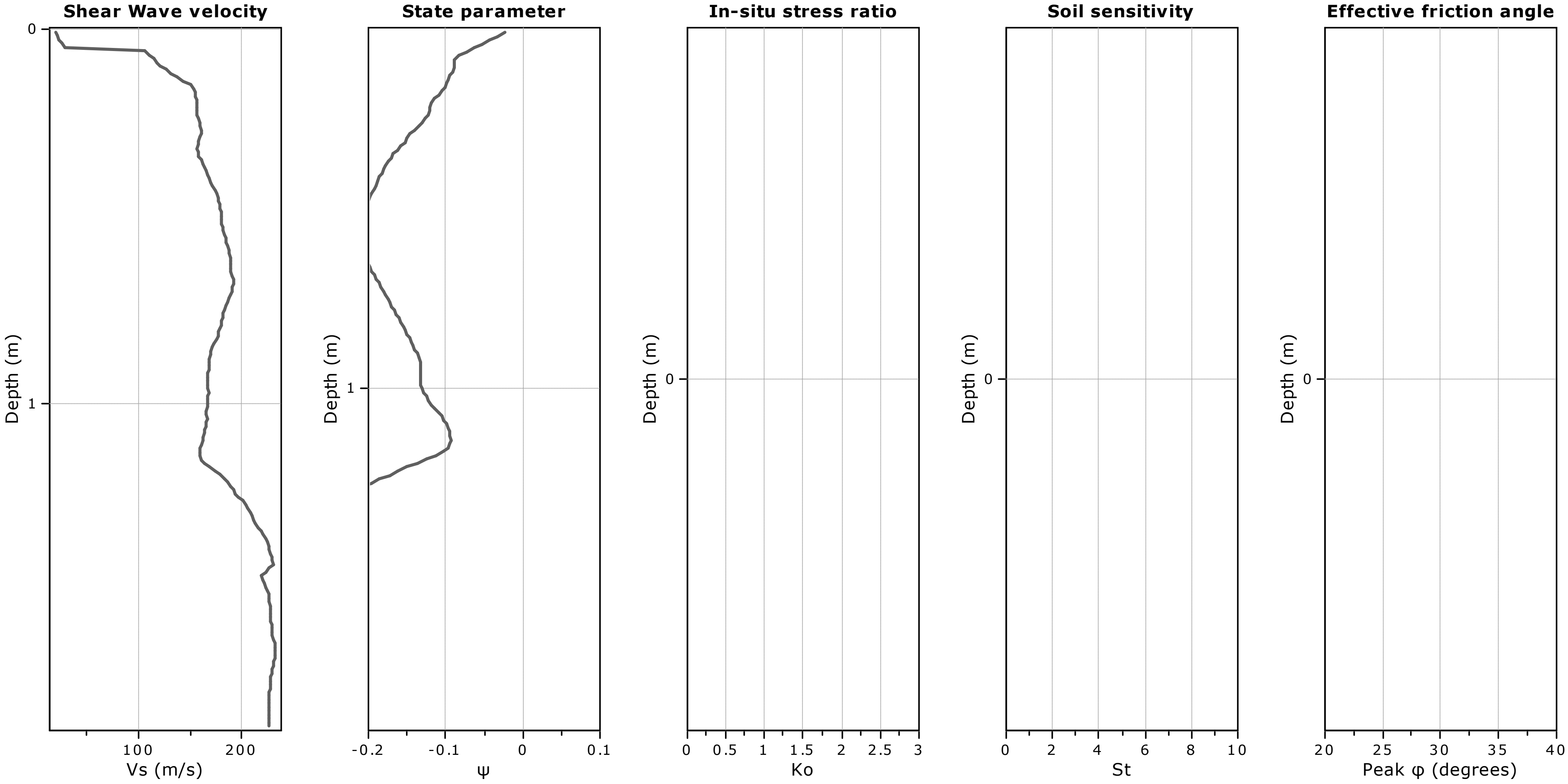
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

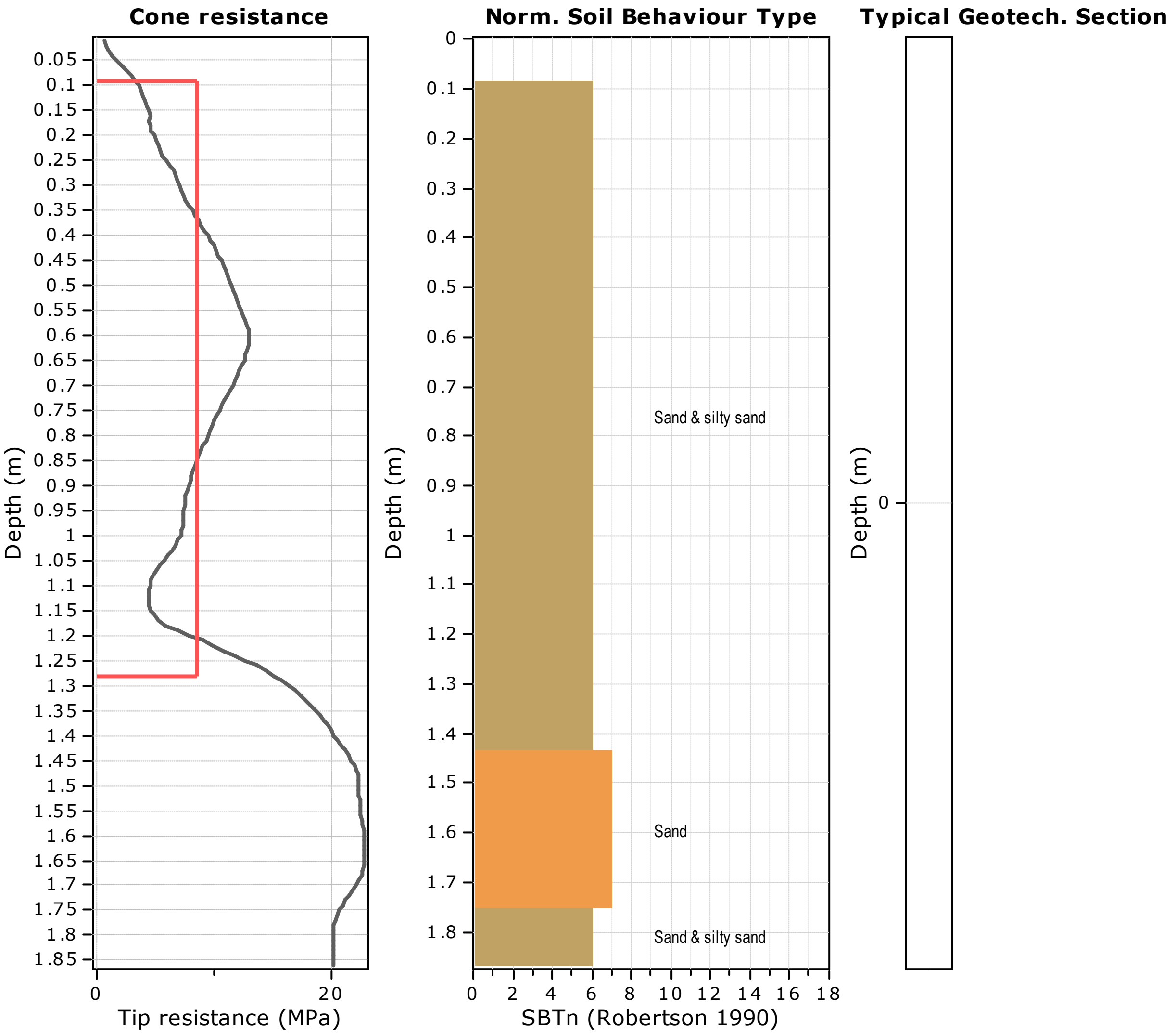
OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data



Calculation parameters

Soil Sensitivity factor, N_S: 7.00

● User defined estimation data



Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.09 (m), **End depth:** 1.28 (m)

Description: Sand & silty sand

Basic results

Total cone resistance: 8.51 ±2.98 MPa

Sleeve friction: 42.44 ±14.10 kPa

Ic: 1.63 ±0.18

SBT_n: 6

SBTn description: Sand & silty sand

Estimation results

Permeability: 1.76E-04 ±1.55E-04 m/s

N_{60}: 17.57 ±4.52 blows

Es: 45.88 ±8.21 MPa

Dr (%): 62.80 ±11.45

φ (degrees): 39.12 ±2.20 °

Unit weight: 19.00 ±0.00 kN/m³

Constrained Mod.: 91.76 ±16.42 MPa

Go: 57.50 ±10.29 MPa

Su: 0.00 ±0.00 kPa

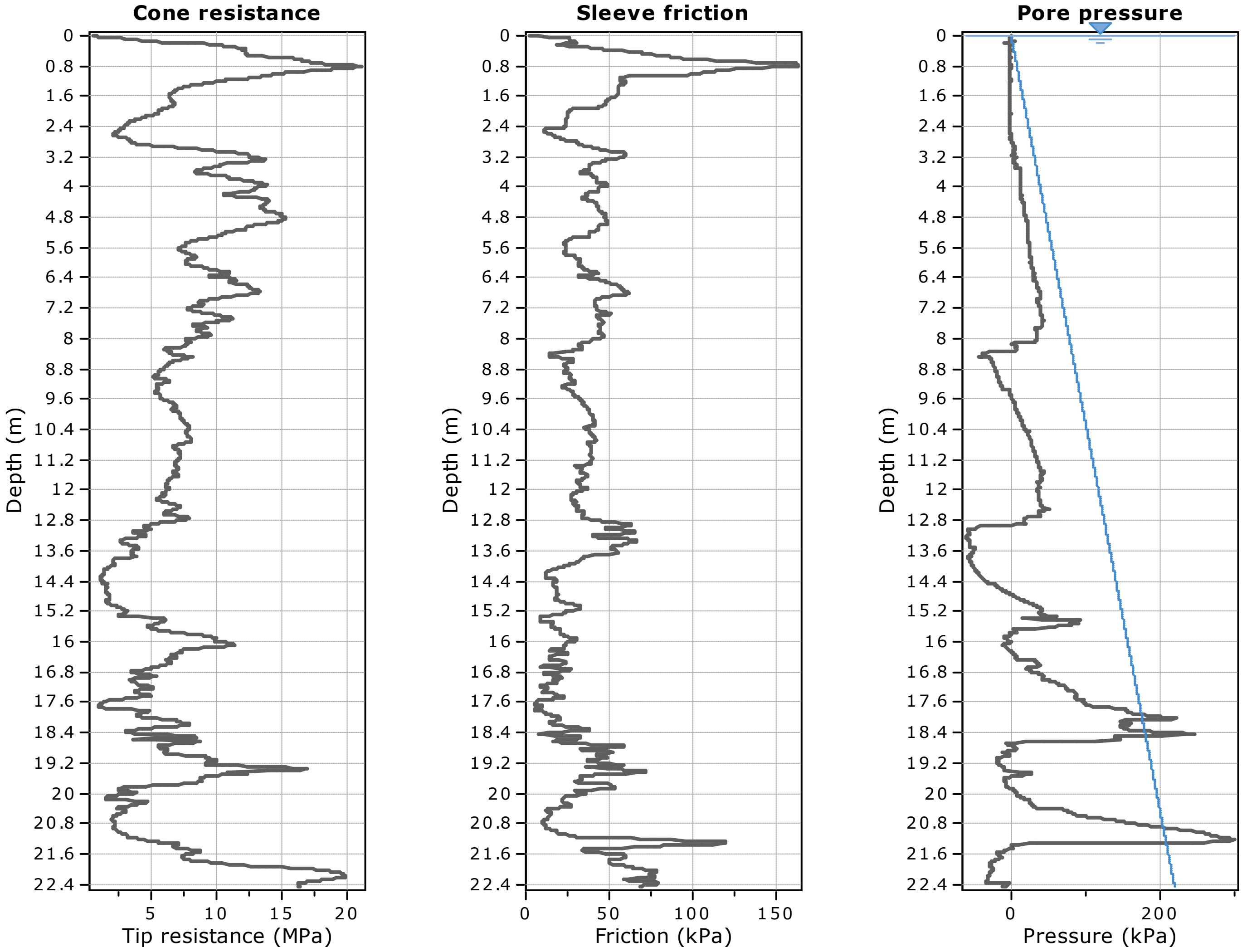
Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

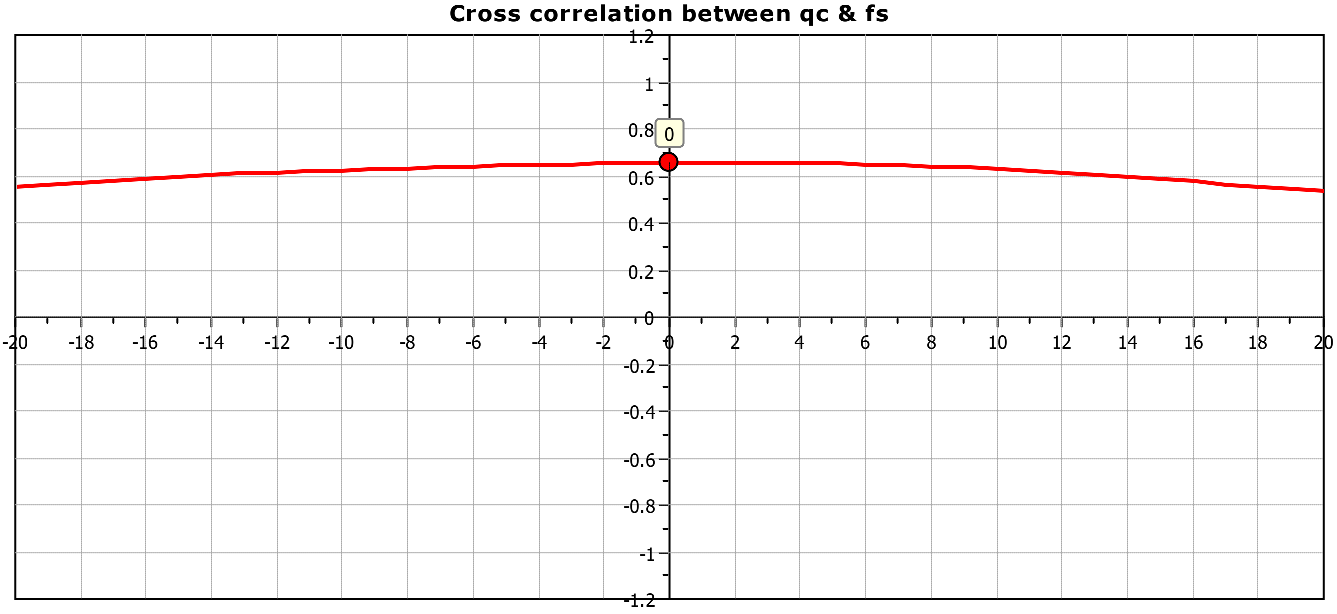
CPT: cpt04

Total depth: 22.46 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



CPT: cpt04

Total depth: 22.46 m, Date: 17/03/2022

Surface Elevation: 0.00 m

Coords: X:0.00, Y:0.00

Cone Type:

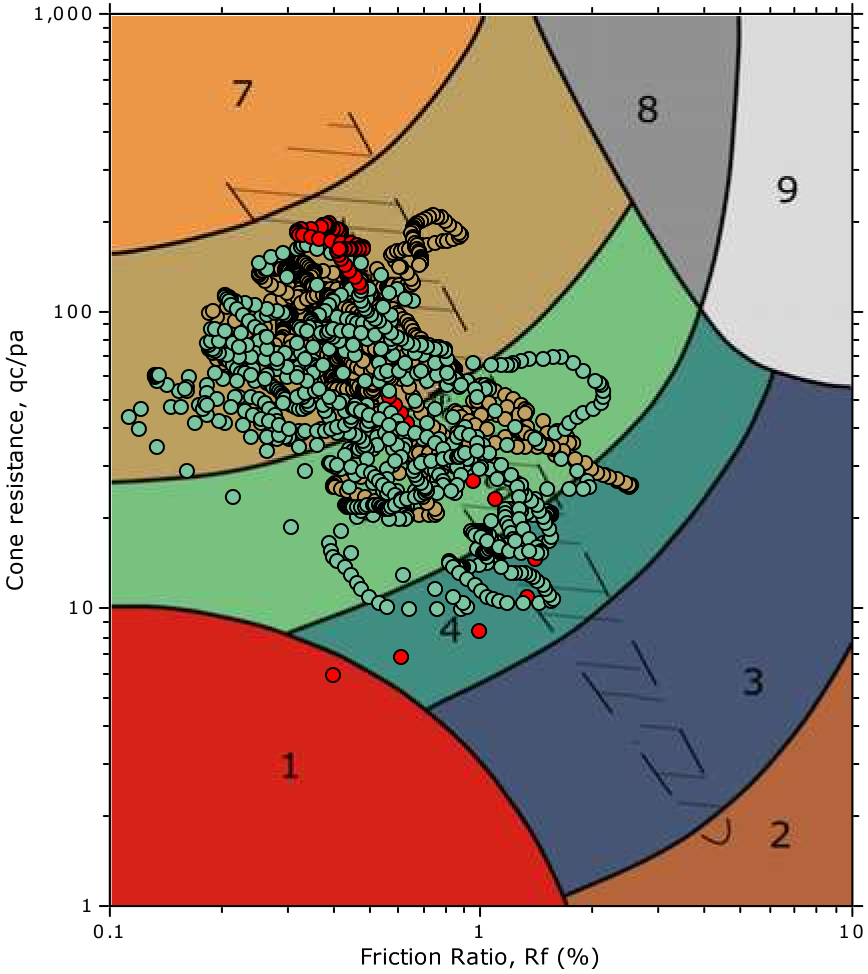
Cone Operator:

Project: Stage 6 Landings Fill Testing CPTs

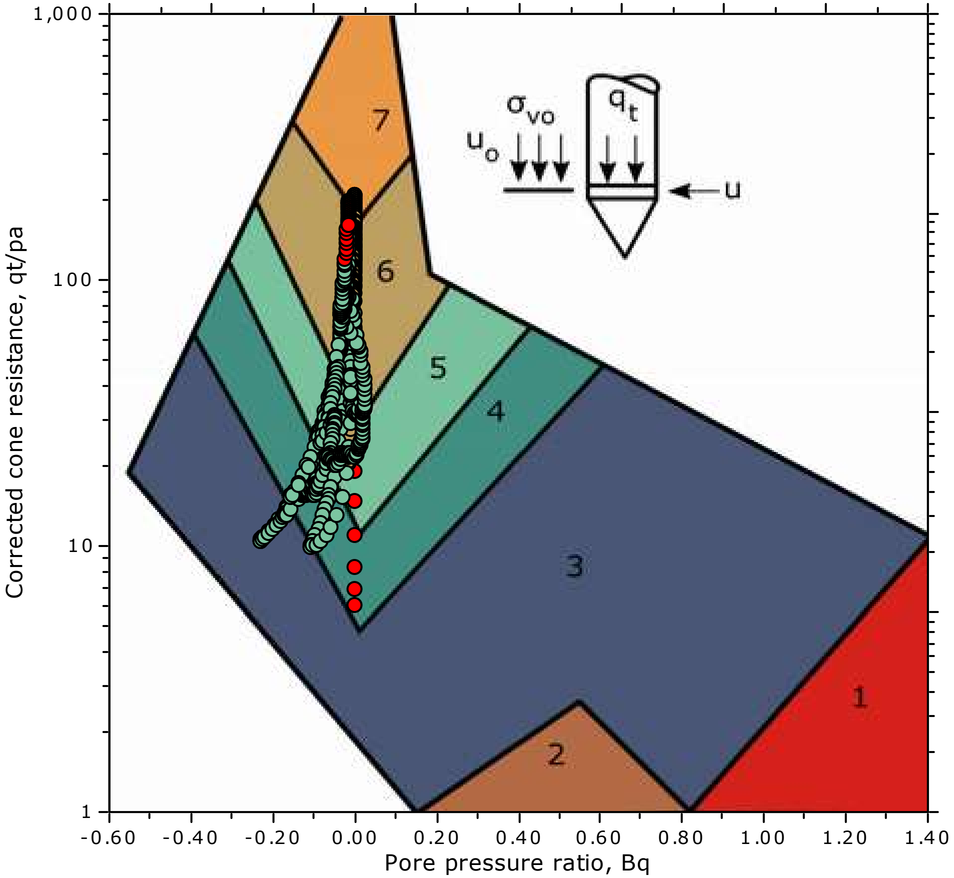
Location: OTP The Landings Stage 6 & 7 Subdivision

SBT - Bq plots

SBT plot



Bq plot



SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravelly sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

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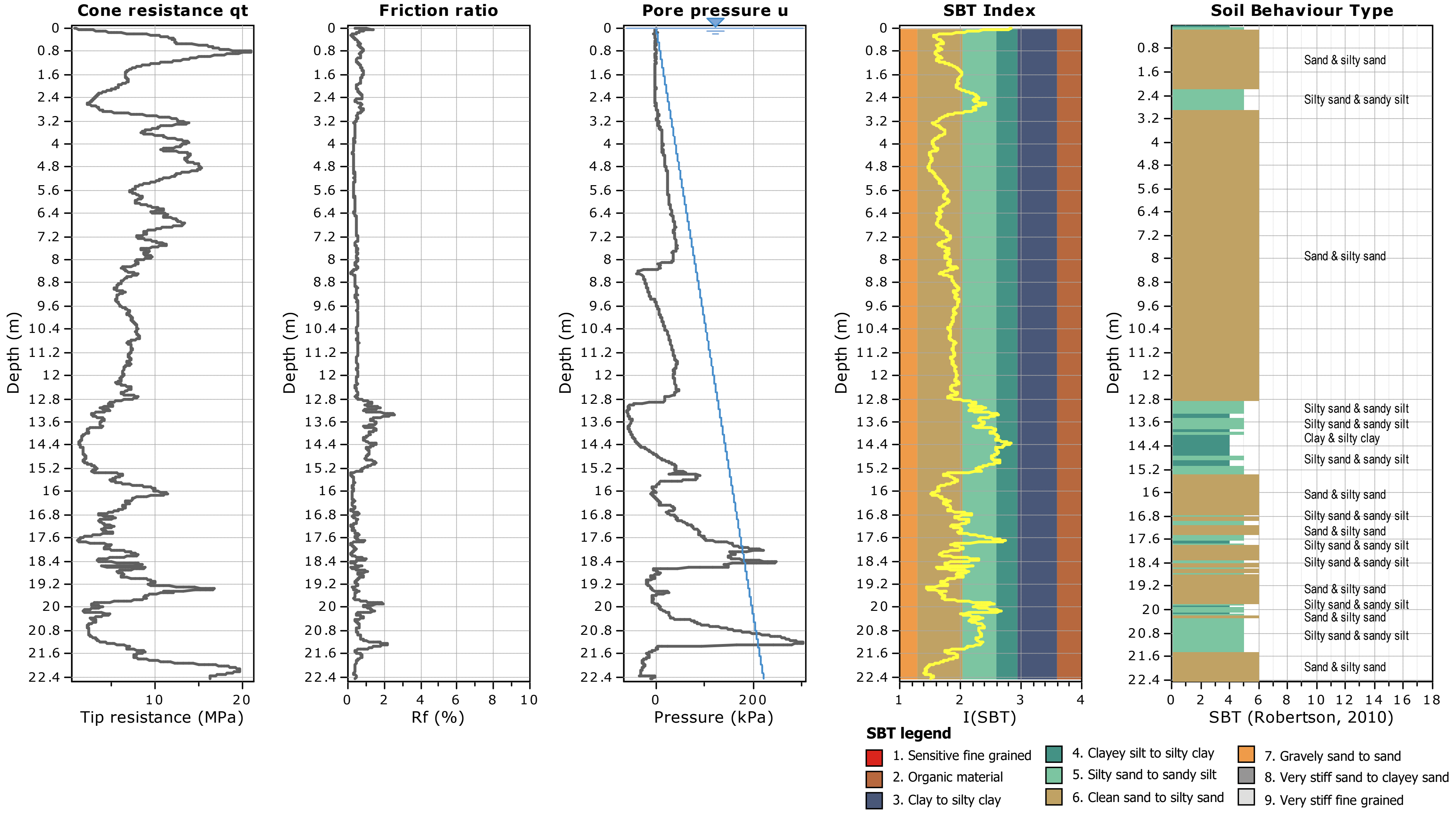
CPT: cpt04

Total depth: 22.46 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Cook Costello

http://www.geologismiki.gr

CPT: cpt04

Total depth: 22.46 m, Date: 17/03/2022

Surface Elevation: 0.00 m

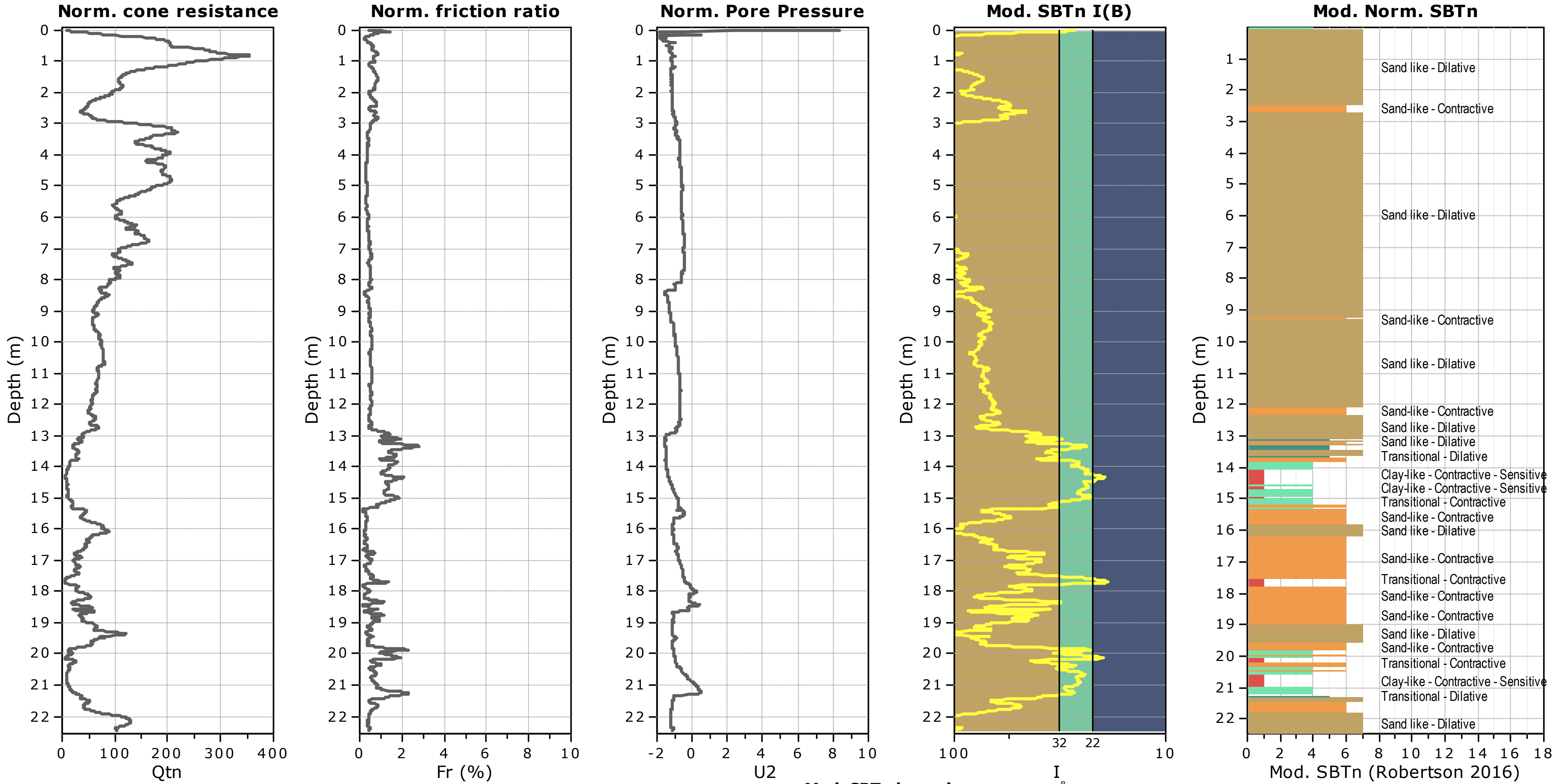
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



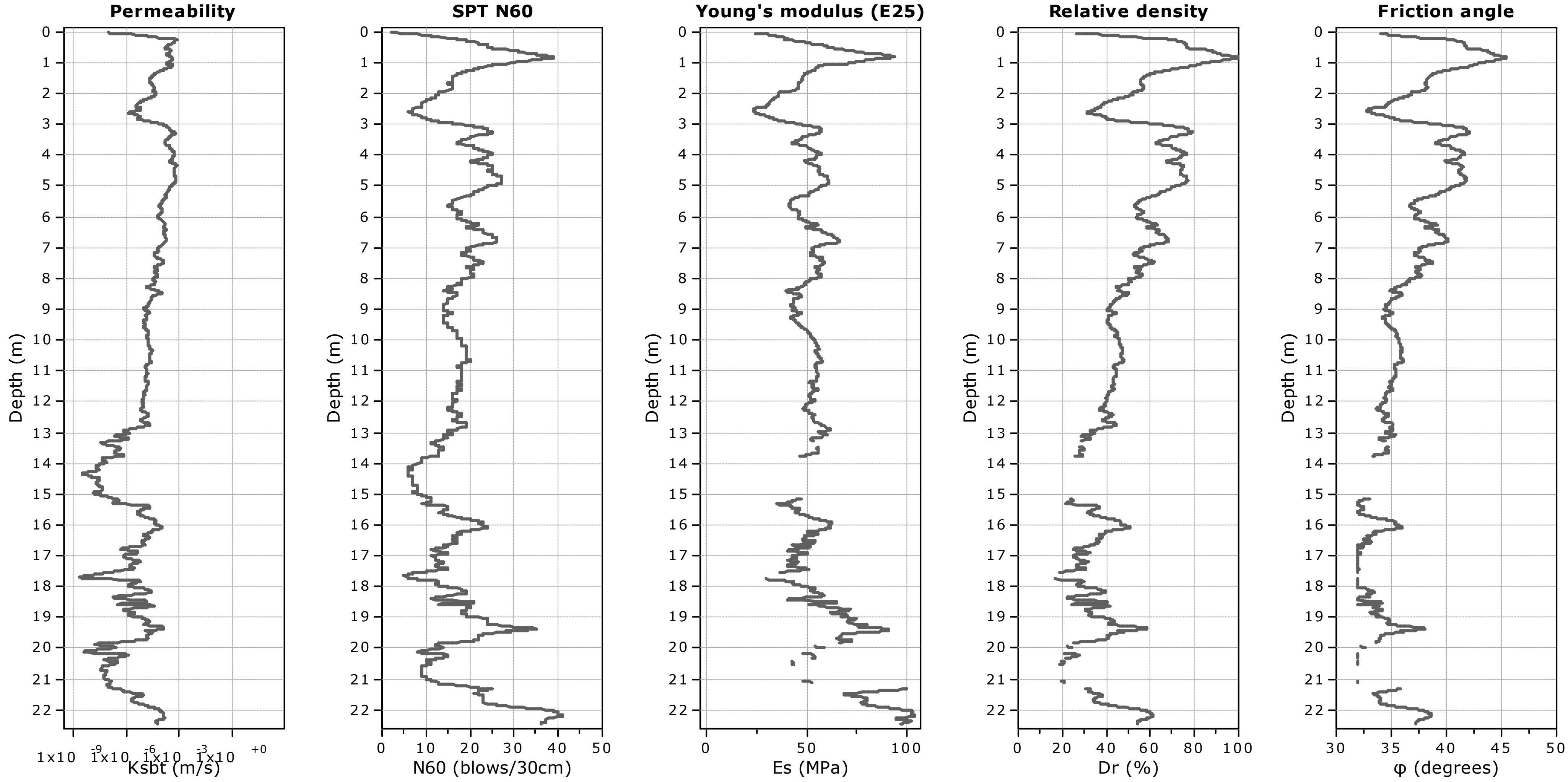
Mod. SBTn legend

- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- 🟦 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative

CPT: cpt04

Total depth: 22.46 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

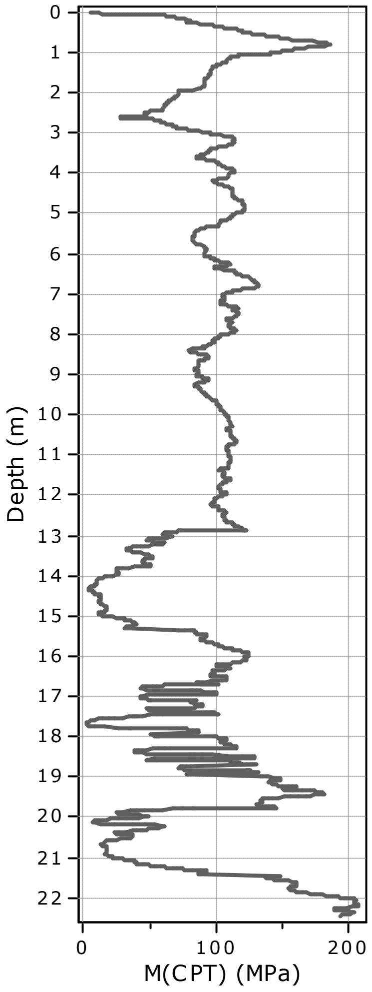


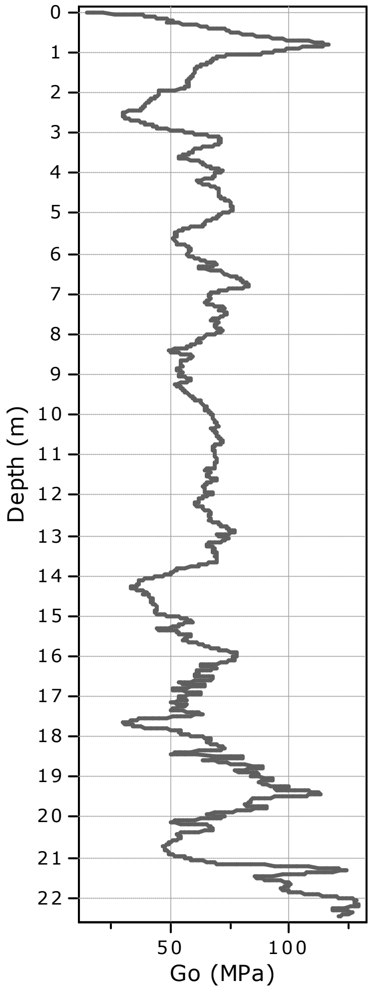
Calculation parameters

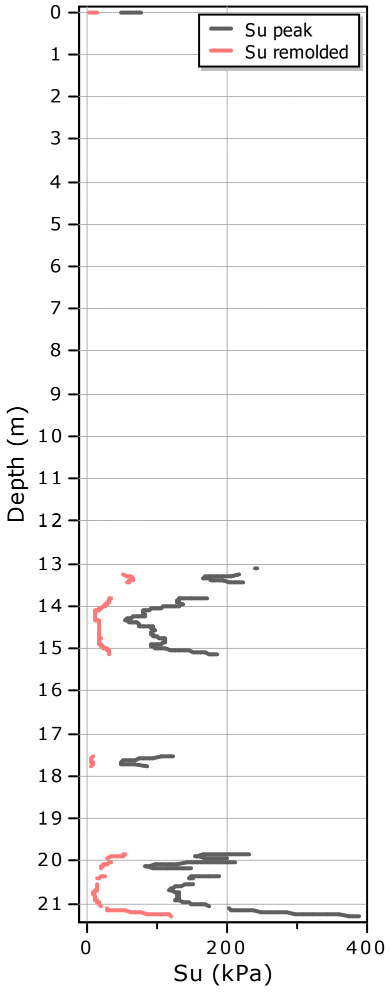
Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

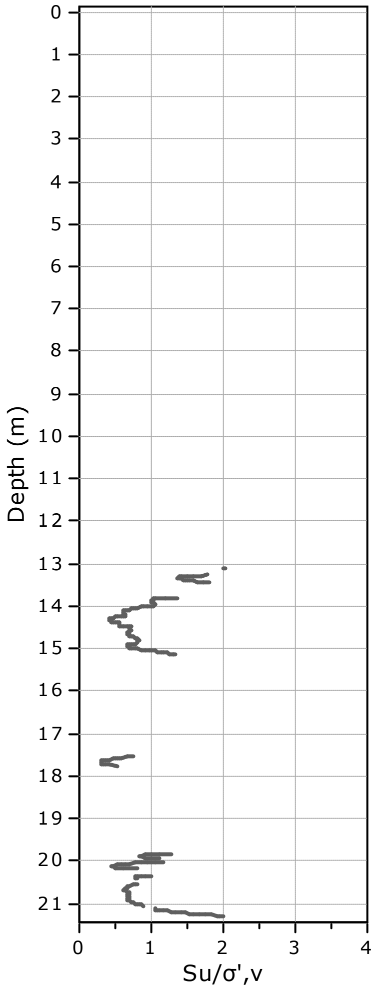
Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
—●— User defined estimation data

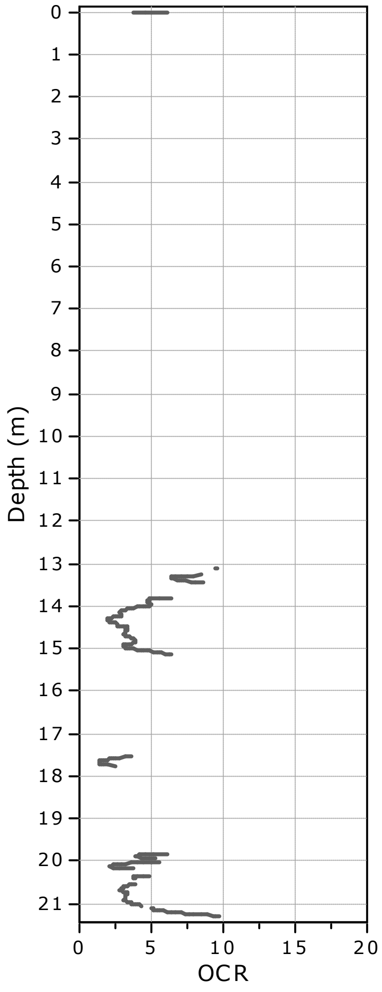
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**


Constrained Modulus


Shear modulus


Shear strength


Undrained strength ratio


OCR

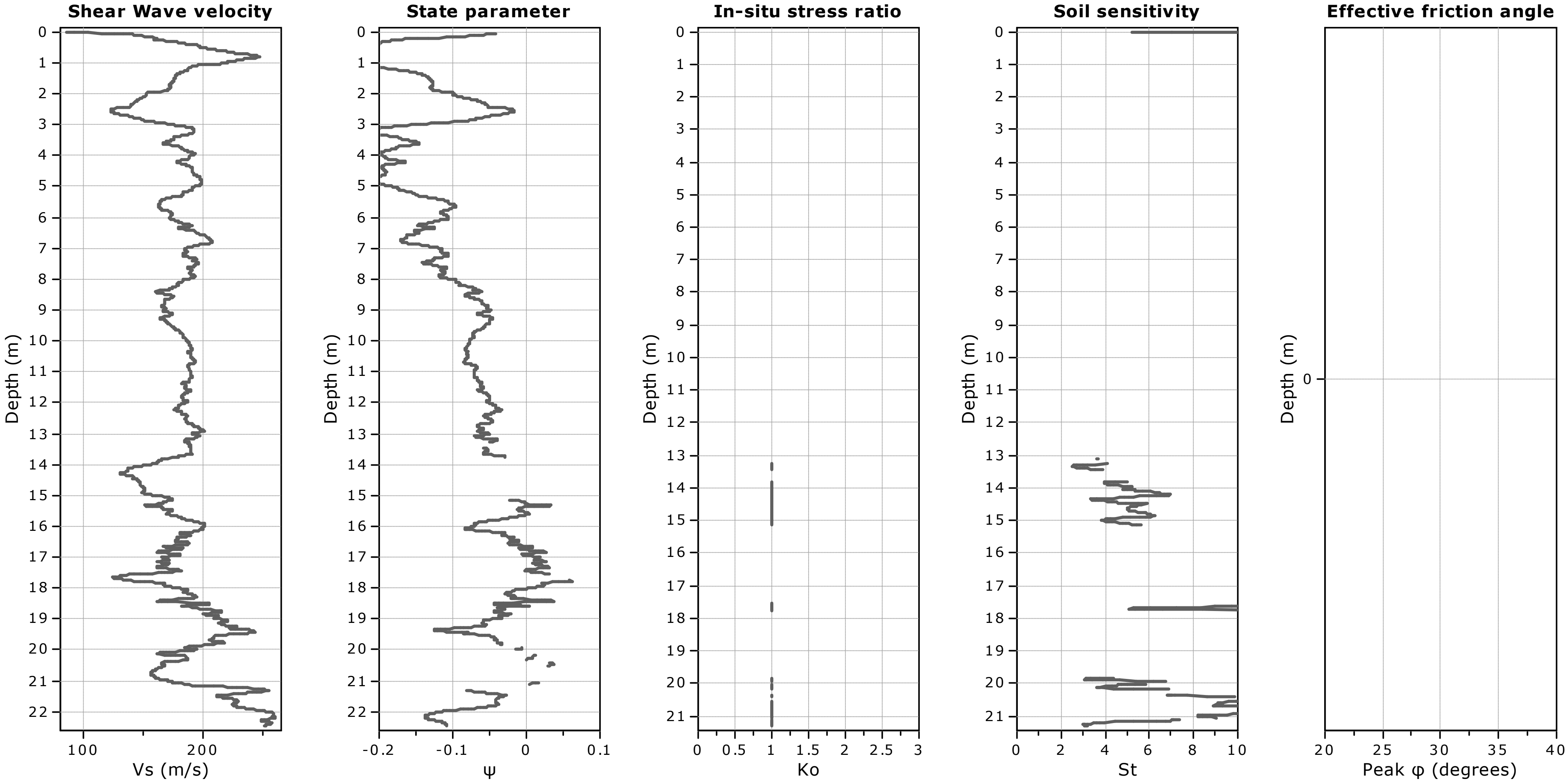
Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

Total depth: 22.46 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

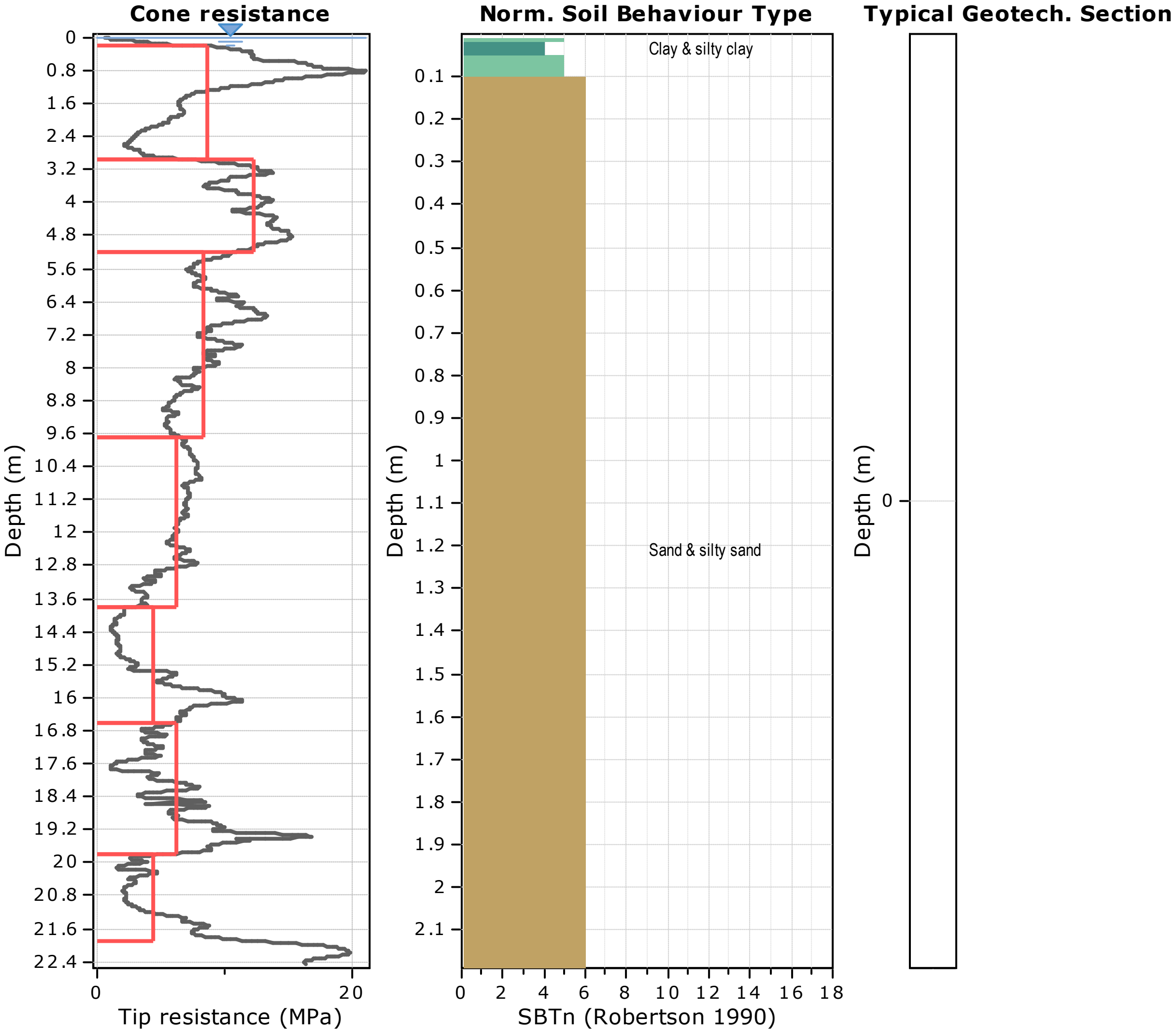
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Soil Sensitivity factor, N_S: 7.00

—●— User defined estimation data



Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.20 (m), **End depth:** 2.97 (m)

Description: Sand & silty sand

Basic results

Total cone resistance: 8.56 ±5.14 MPa

Sleeve friction: 53.80 ±37.23 kPa

Ic: 1.73 ±0.24

SBT_n: 6

SBTn description: Sand & silty sand

Estimation results

Permeability: 1.43E-04 ±1.75E-04 m/s

N_{60}: 18.06 ±8.65 blows

Es: 48.40 ±17.81 MPa

Dr (%): 61.06 ±19.05

φ (degrees): 38.76 ±3.54 °

Unit weight: 19.00 ±0.00 kN/m³

Constrained Mod.: 96.43 ±36.21 MPa

Go: 60.66 ±22.32 MPa

Su: 0.00 ±0.00 kPa

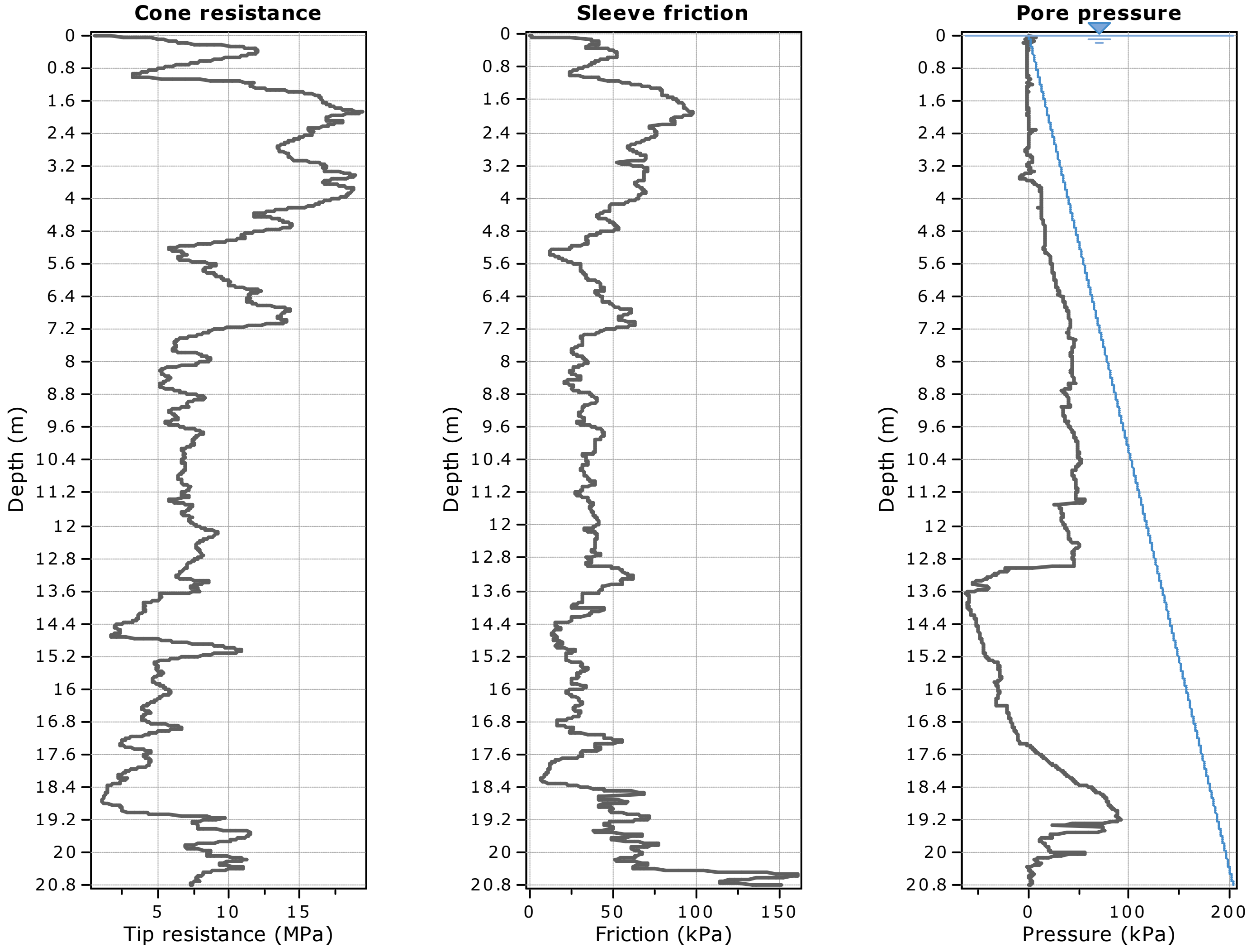
Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

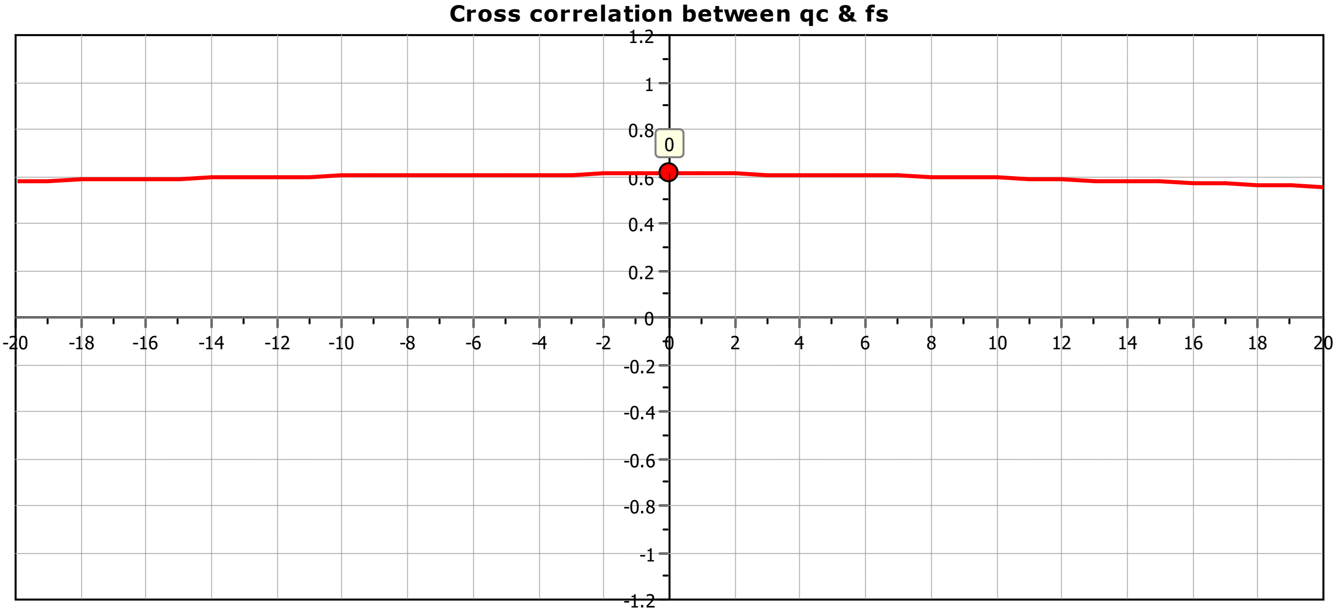
CPT: cpt05

Total depth: 20.79 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

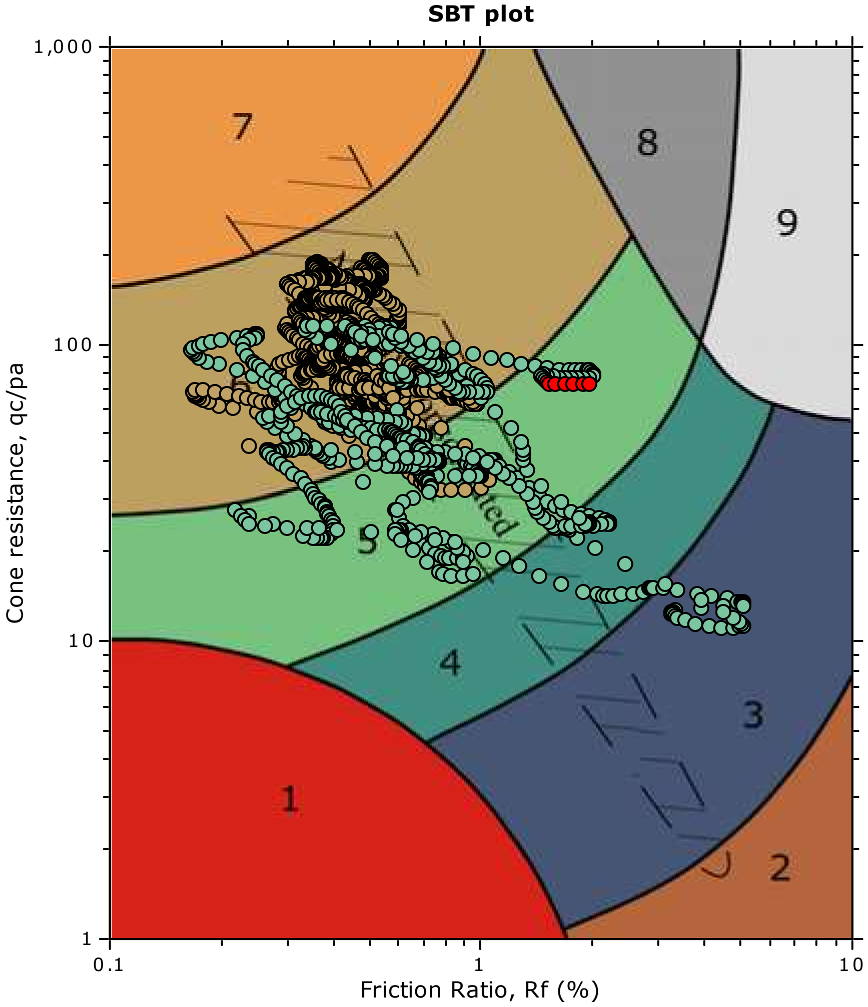
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

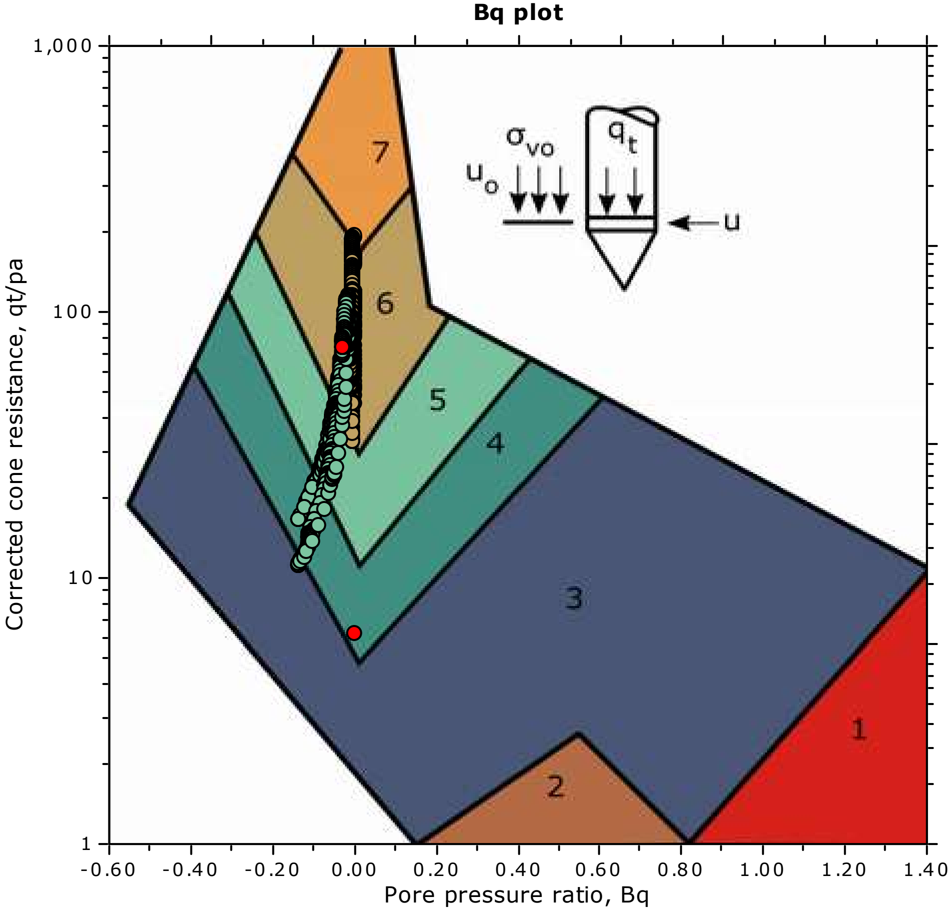


The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



SBT - Bq plots





SBT legend

🟥 1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravelly sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

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CPT: cpt05

Total depth: 20.79 m, Date: 17/03/2022

Surface Elevation: 0.00 m

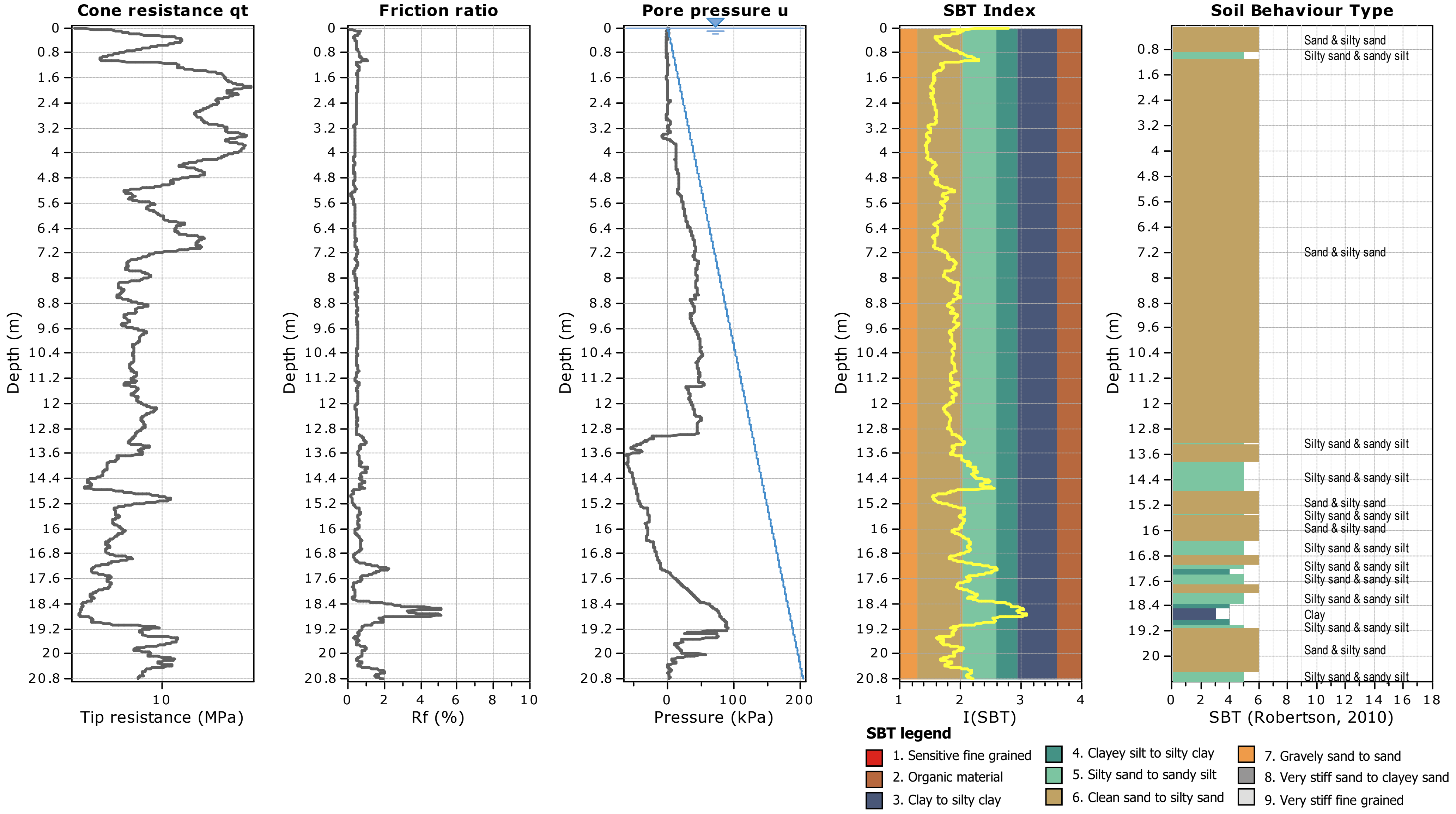
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



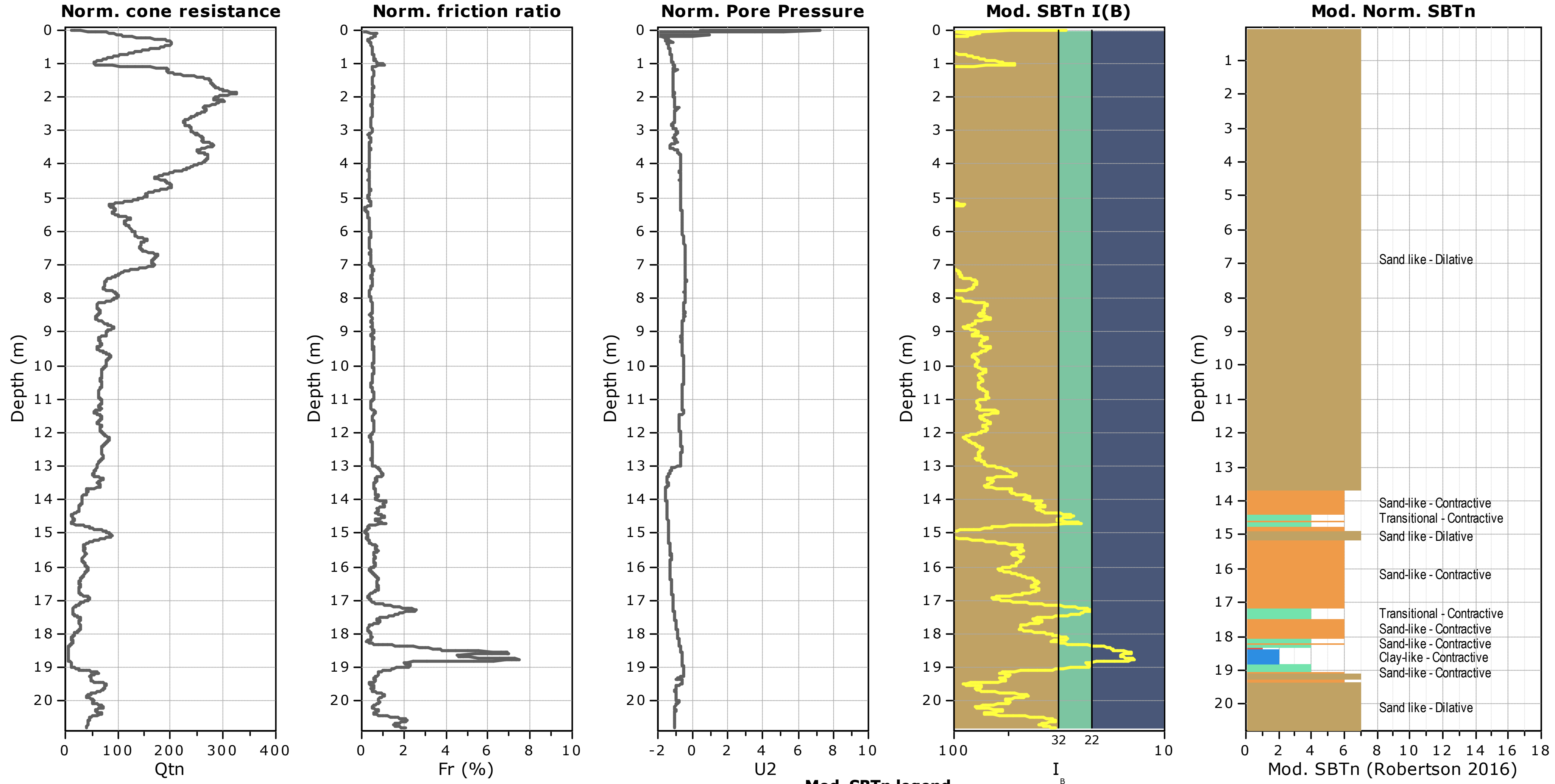
Cook Costello

http://www.geologismiki.gr

CPT: cpt05

Total depth: 20.79 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Mod. SBTn legend

- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- 🟦 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative

Cook Costello

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CPT: cpt05

Total depth: 20.79 m, Date: 17/03/2022

Surface Elevation: 0.00 m

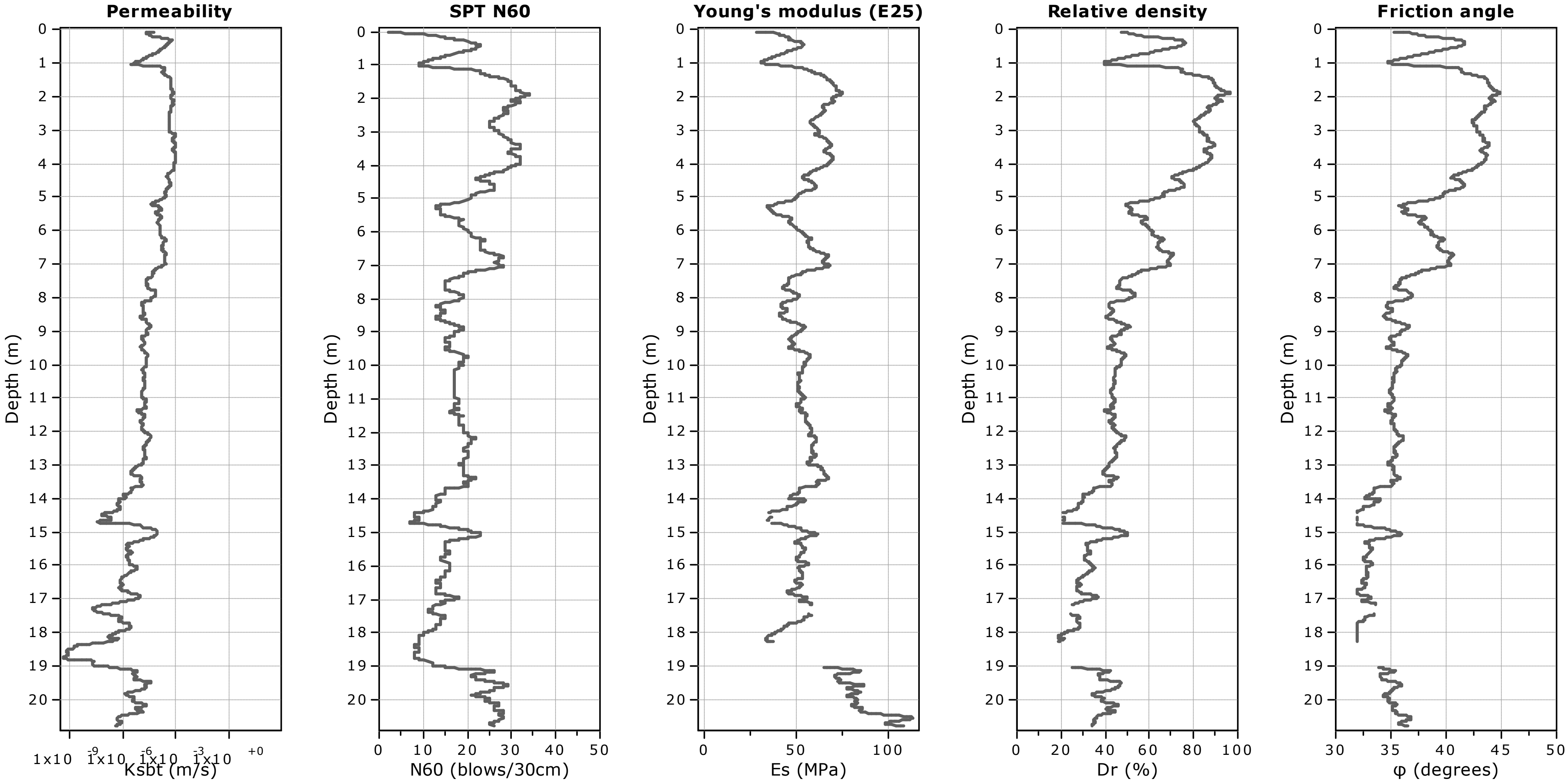
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Permeability: Based on SBT$_n$

SPT N$_{60}$: Based on I$_c$ and q$_t$

Young's modulus: Based on variable alpha using I$_c$ (Robertson, 2009)

Relative density constant, C$_{Dr}$: 350.0

Phi: Based on Kulhawy & Mayne (1990)

● User defined estimation data

Cook Costello

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CPT: cpt05

Total depth: 20.79 m, Date: 17/03/2022

Surface Elevation: 0.00 m

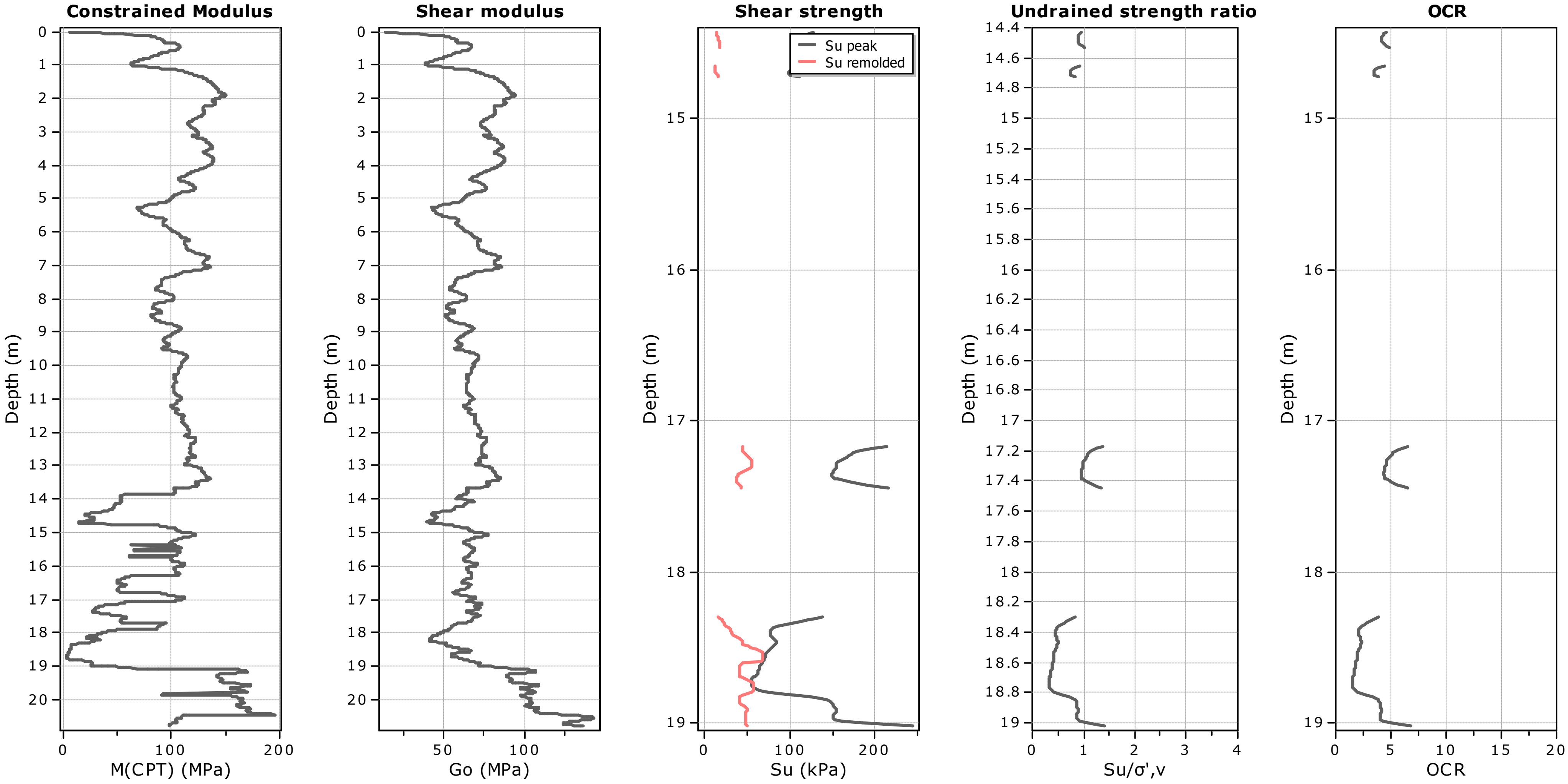
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable *alpha* using I_c (Robertson, 2009)

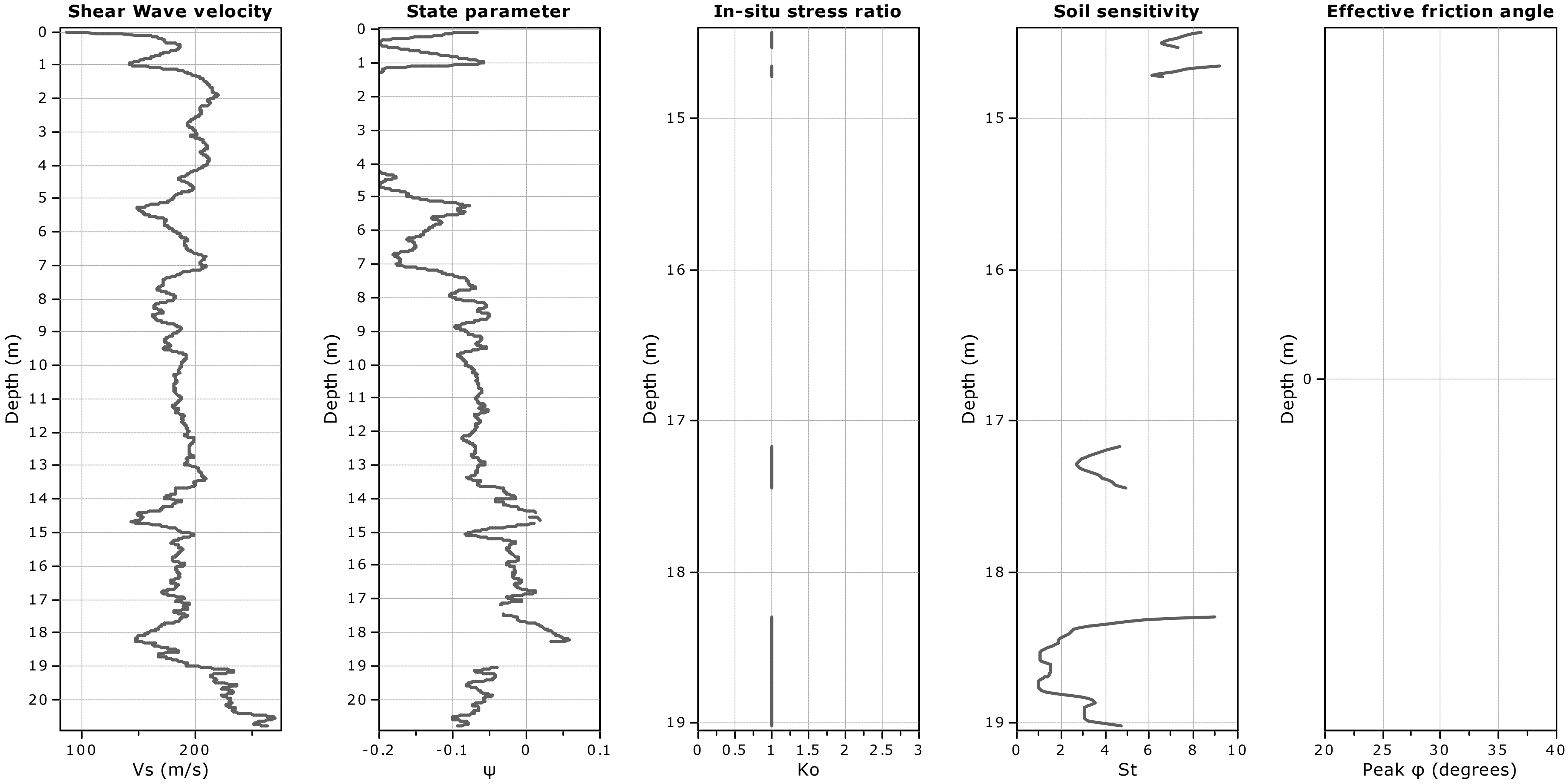
Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33

● User defined estimation data

● Flat Dilatometer Test data

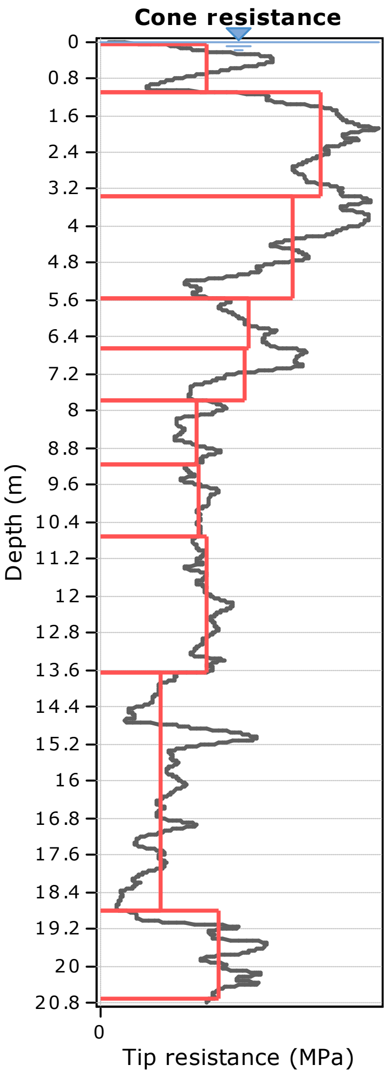
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

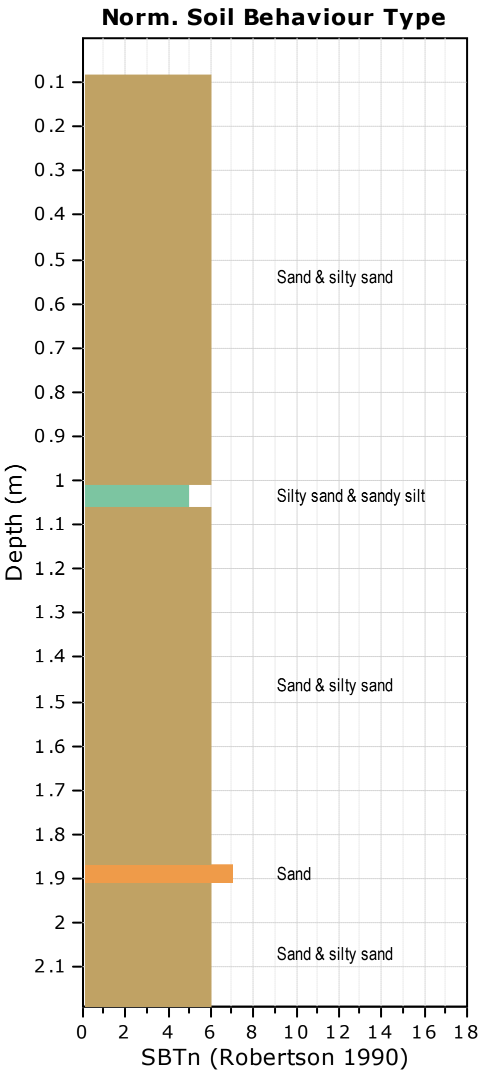


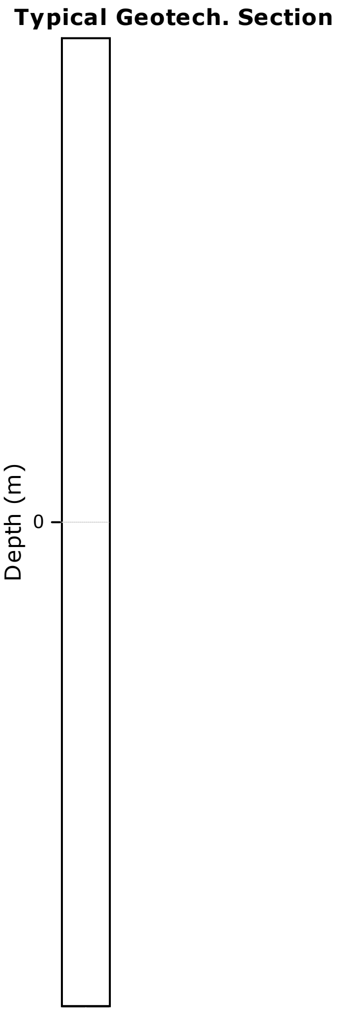
Calculation parameters

Soil Sensitivity factor, N_S: 7.00

● User defined estimation data







Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.05 (m), **End depth:** 1.09 (m)

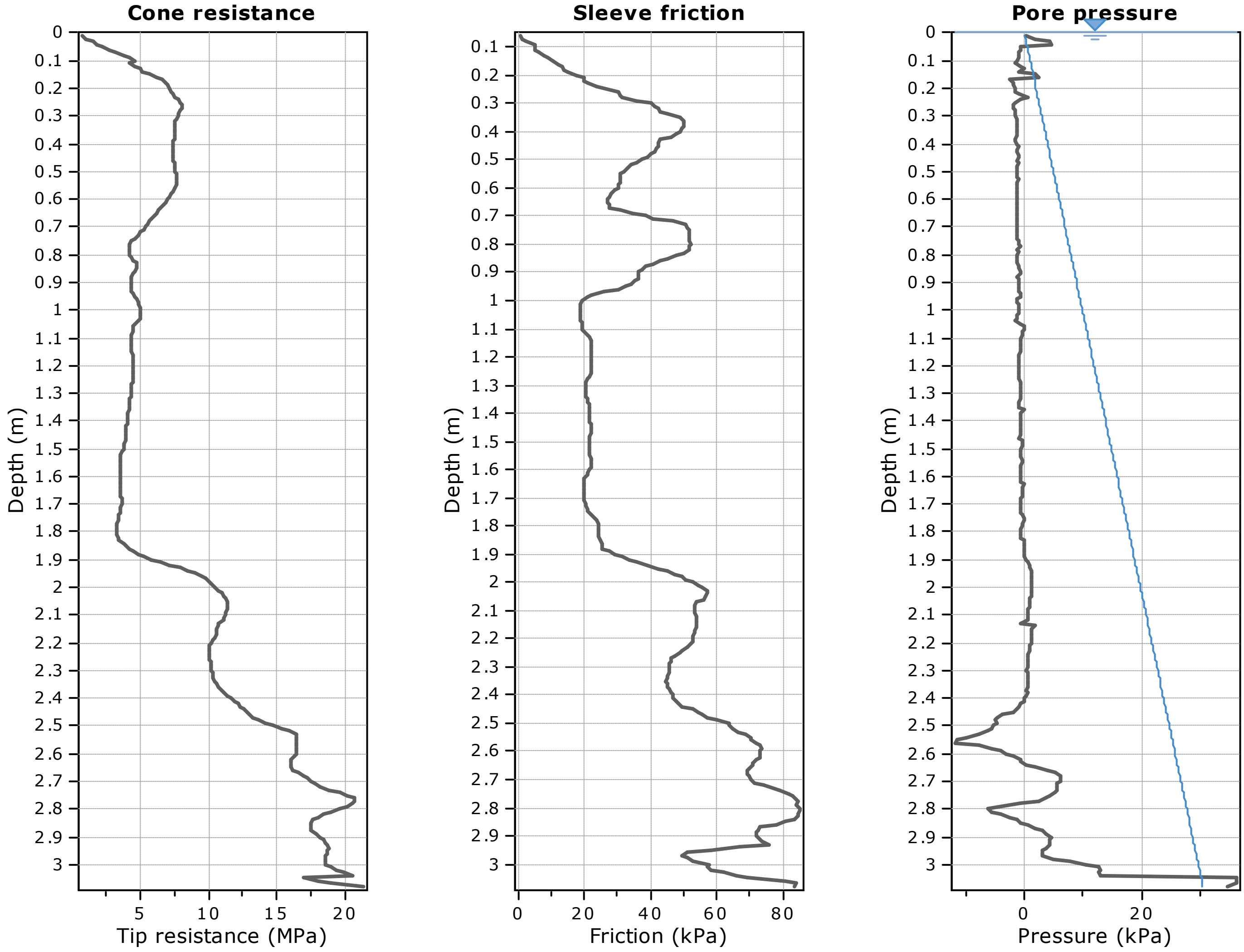
Description: Sand & silty sand

Basic results	**Estimation results**	
Total cone resistance: 7.45 ±3.02 MPa	Permeability: 1.45E-04 ±1.63E-04 m/s	Constrained Mod.: 85.19 ±15.91 MPa
Sleeve friction: 37.17 ±11.11 kPa	N_{60}: 15.80 ±4.66 blows	Go: 53.39 ±9.97 MPa
Ic: 1.69 ±0.21	Es: 43.22 ±7.18 MPa	Su: 0.00 ±0.00 kPa
SBT_n: 6	Dr (%): 58.98 ±12.13	Su ratio: 0.00 ±0.00
SBTn description: Sand & silty sand	φ (degrees): 38.42 ±2.27 °	O.C.R.: 0.00 ±0.00
	Unit weight: 19.00 ±0.00 kN/m³	

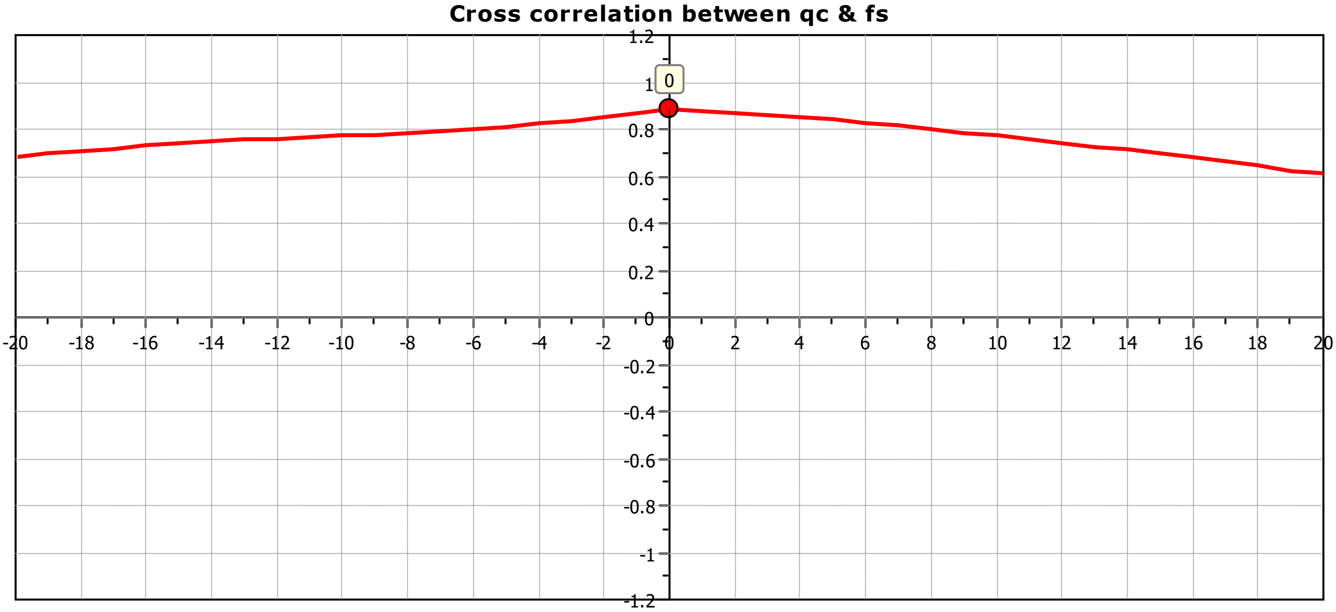
CPT: cpt06

Total depth: 3.08 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

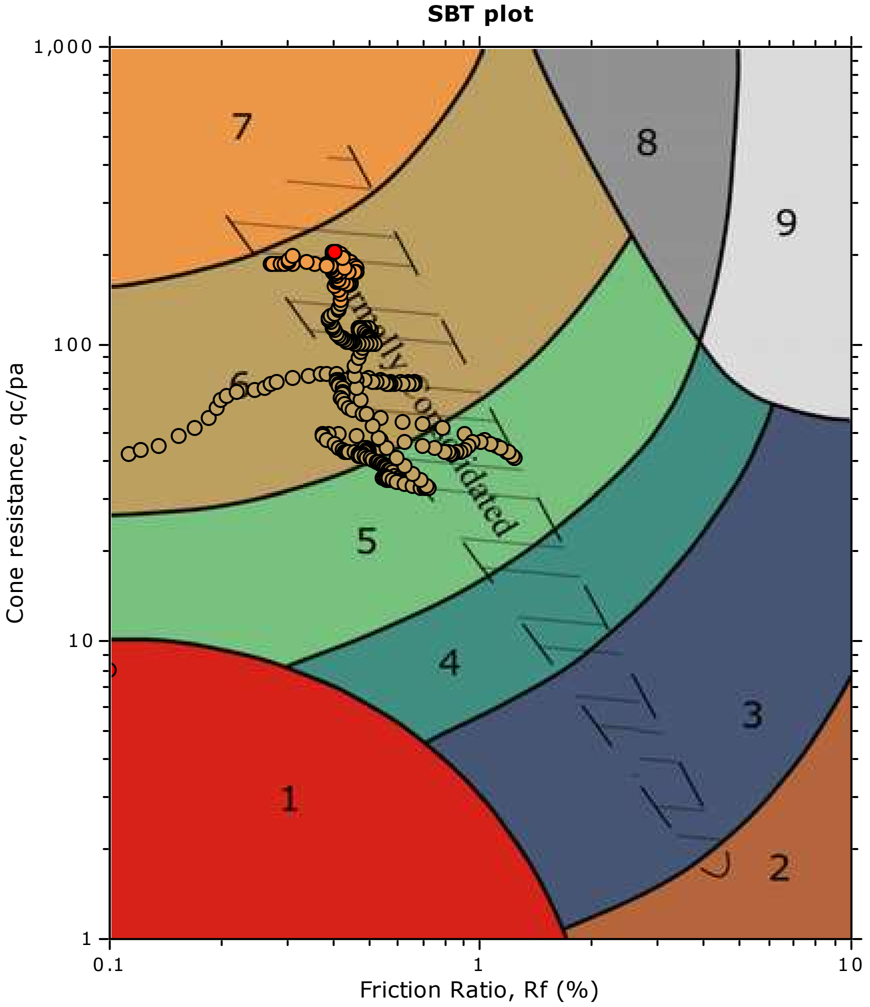


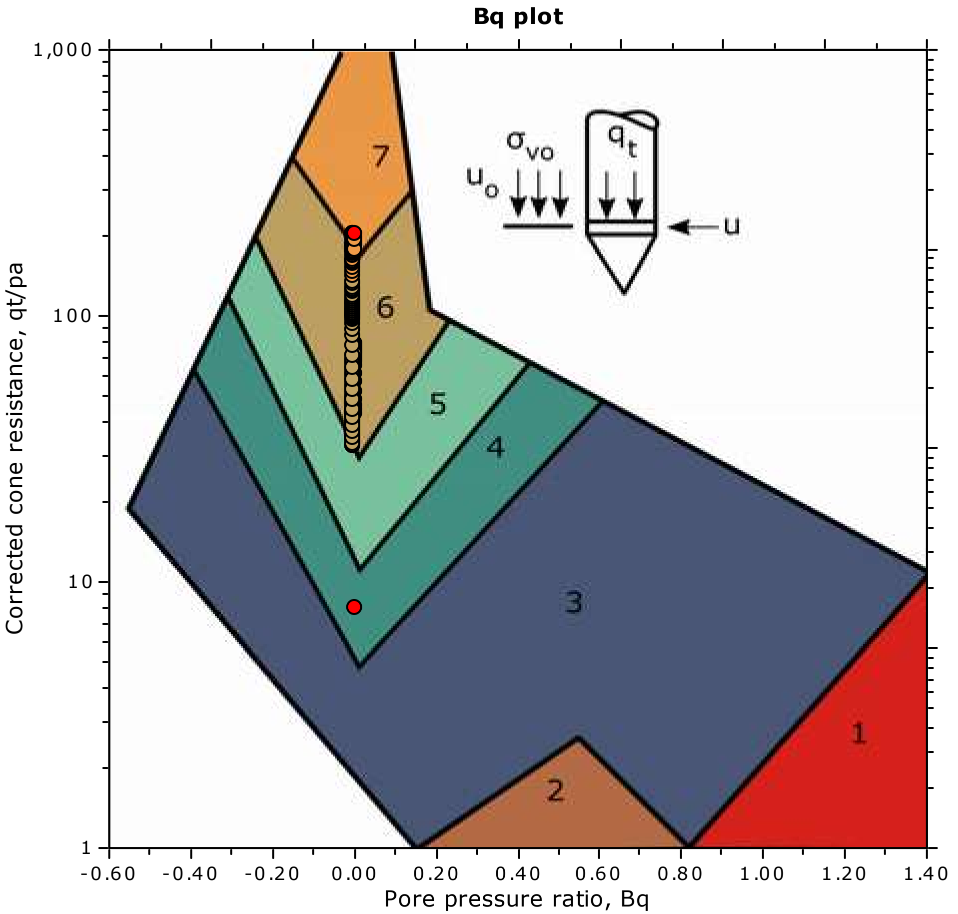
CPT: cpt06

Total depth: 3.08 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

SBT - Bq plots





SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty clay	🟧 7. Gravelly sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬜ 8. Very stiff sand to clayey sand
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

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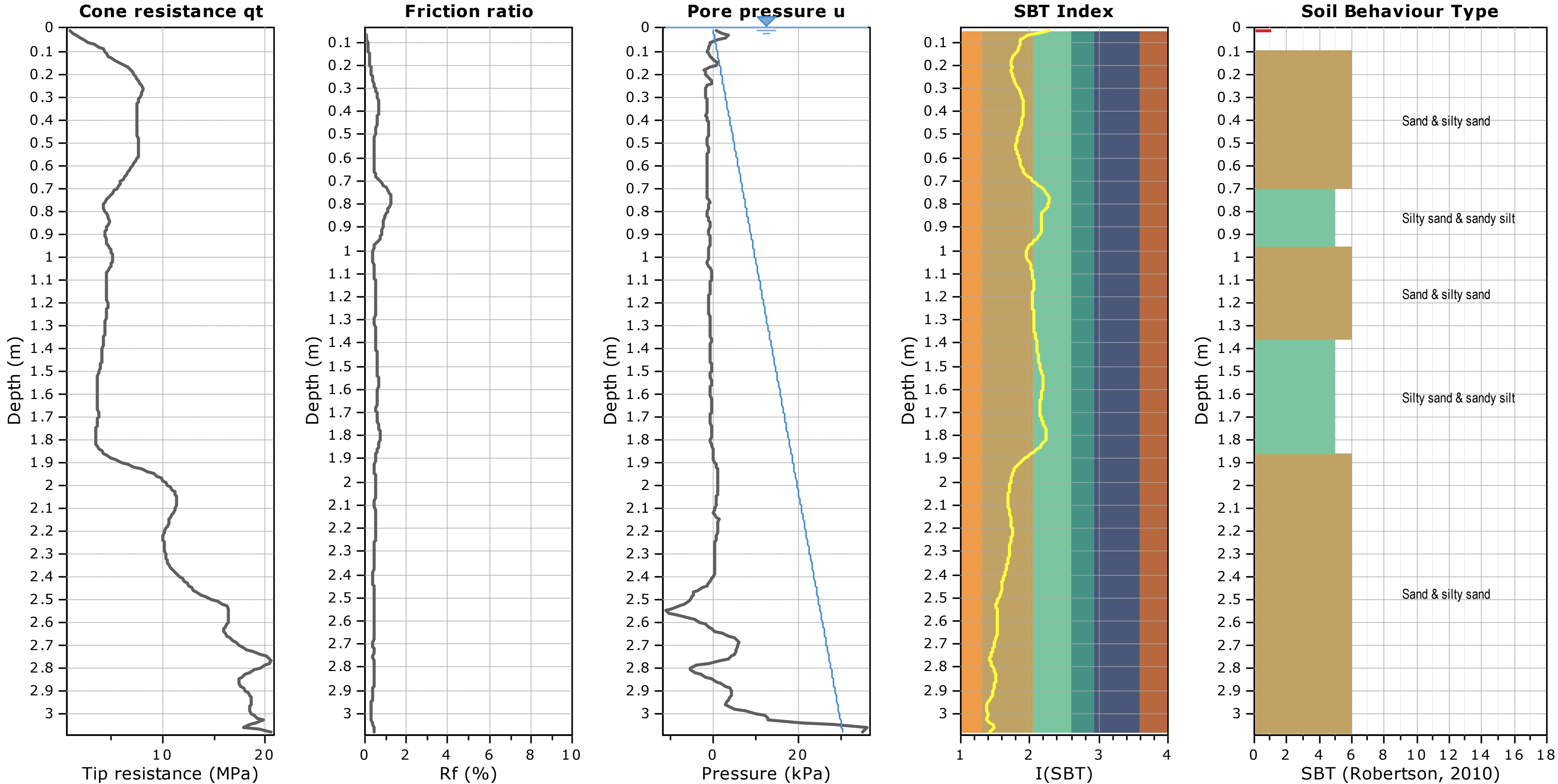
CPT: cpt06

Total depth: 3.08 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty clay	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬜ 8. Very stiff sand to clayey sand
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

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CPT: cpt06

Total depth: 3.08 m, Date: 17/03/2022

Surface Elevation: 0.00 m

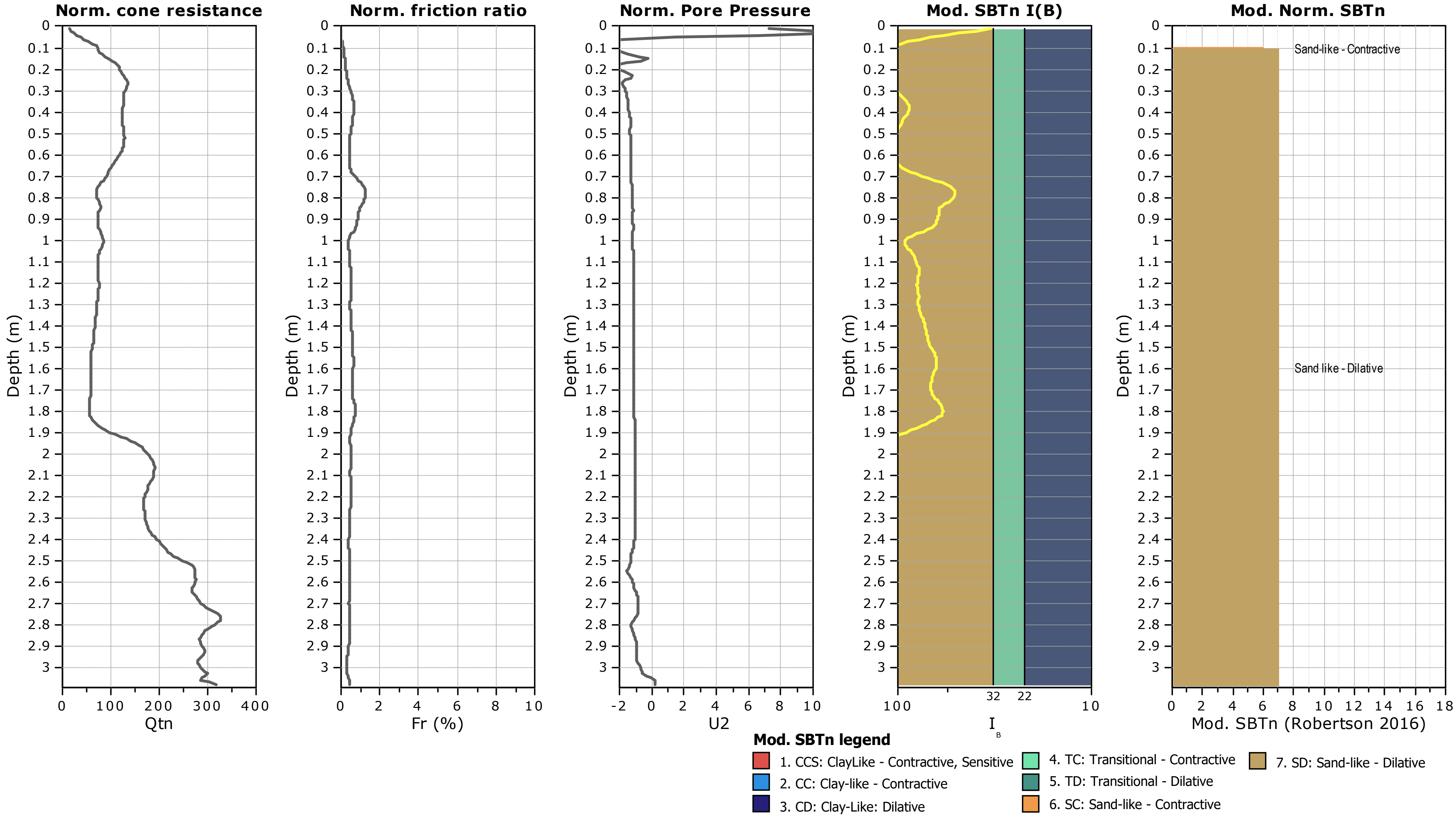
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



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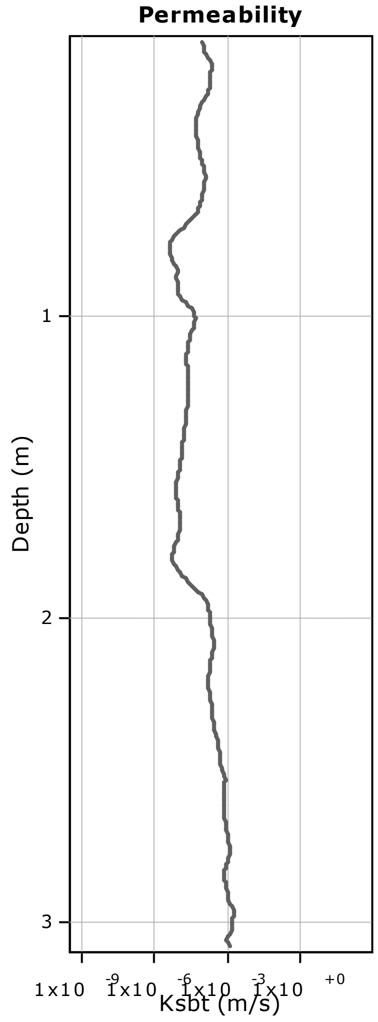
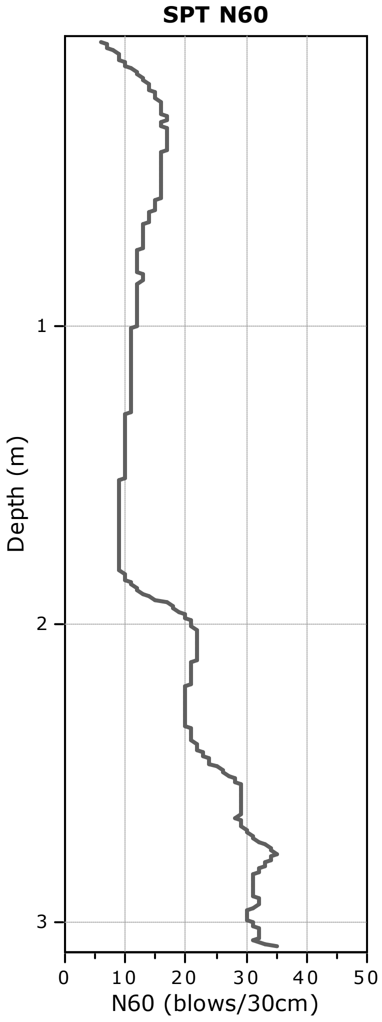
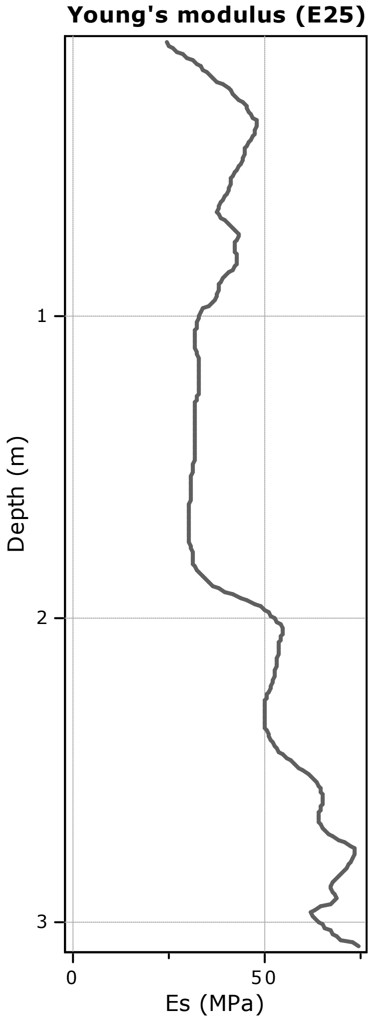
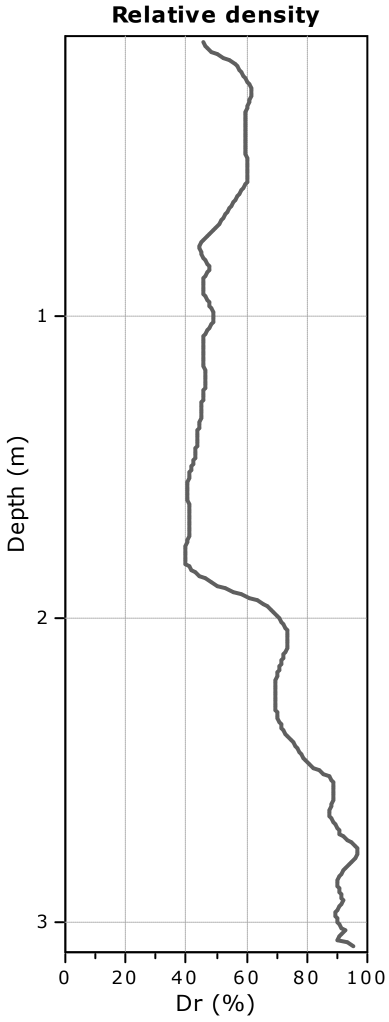
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

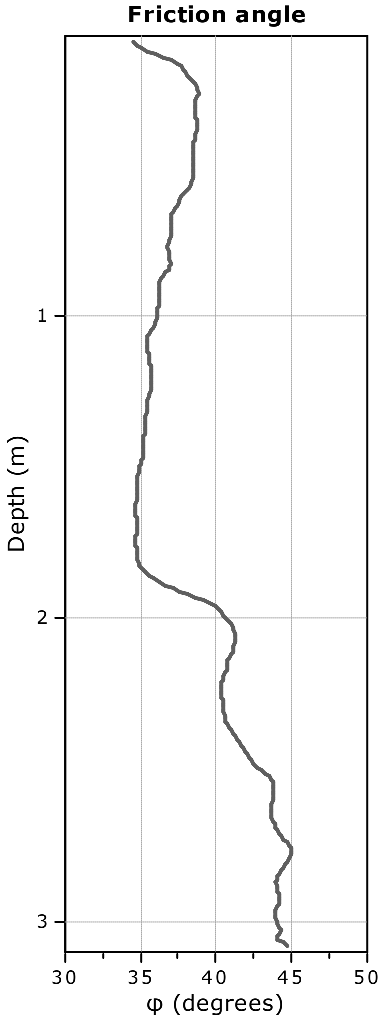
CPT: cpt06
Total depth: 3.08 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:











Calculation parameters

Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
●— User defined estimation data

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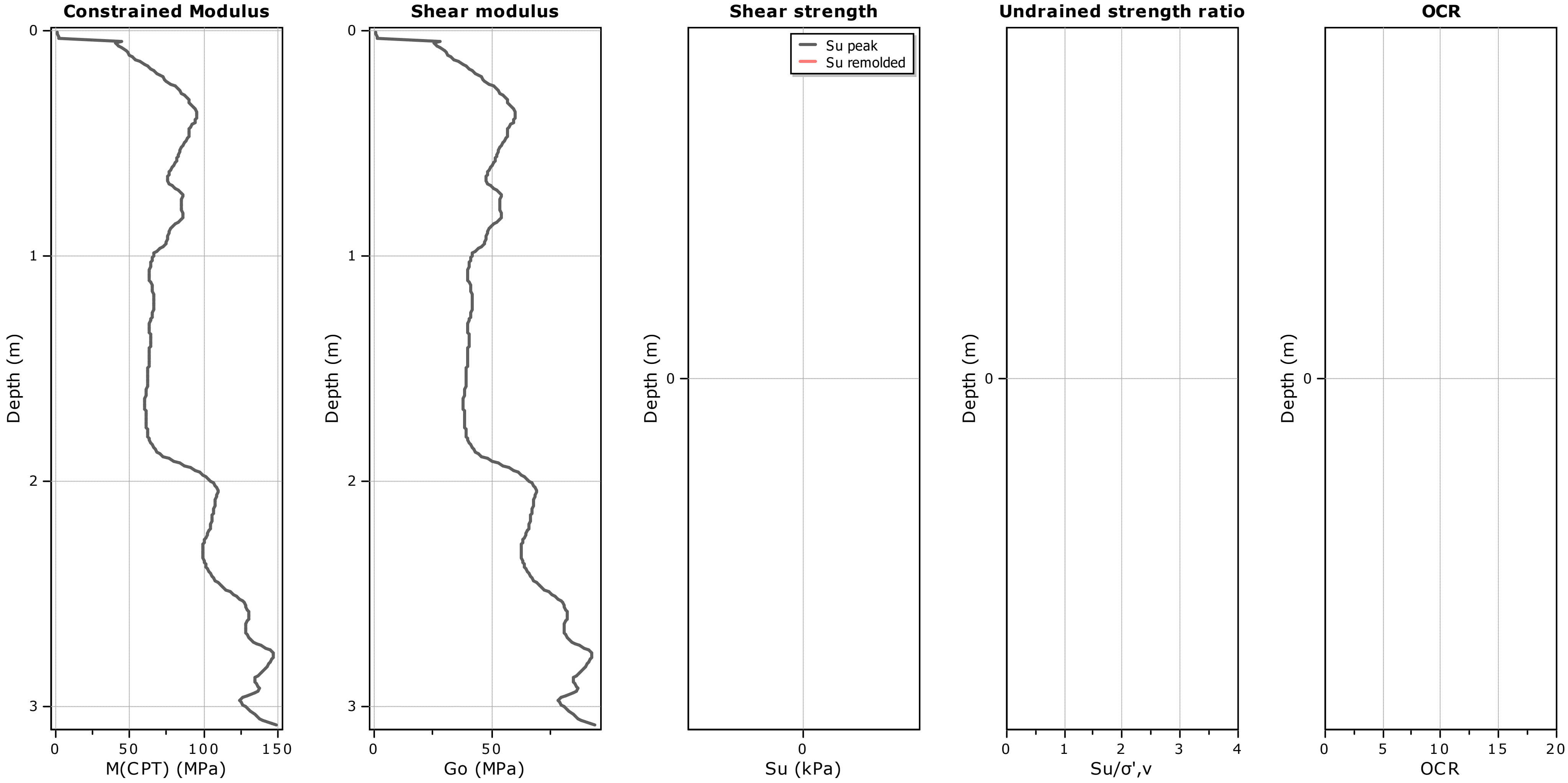
CPT: cpt06

Total depth: 3.08 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

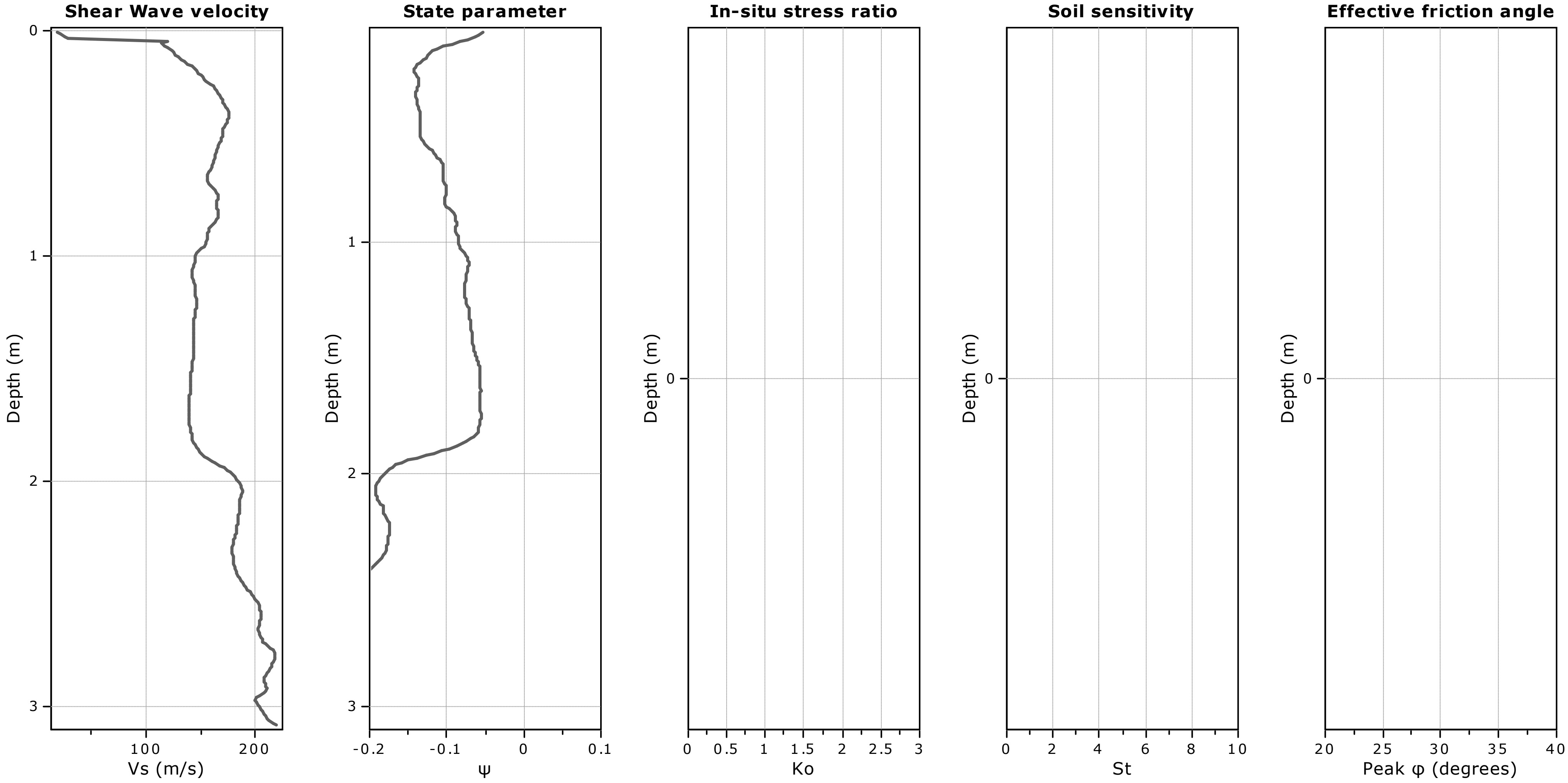
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

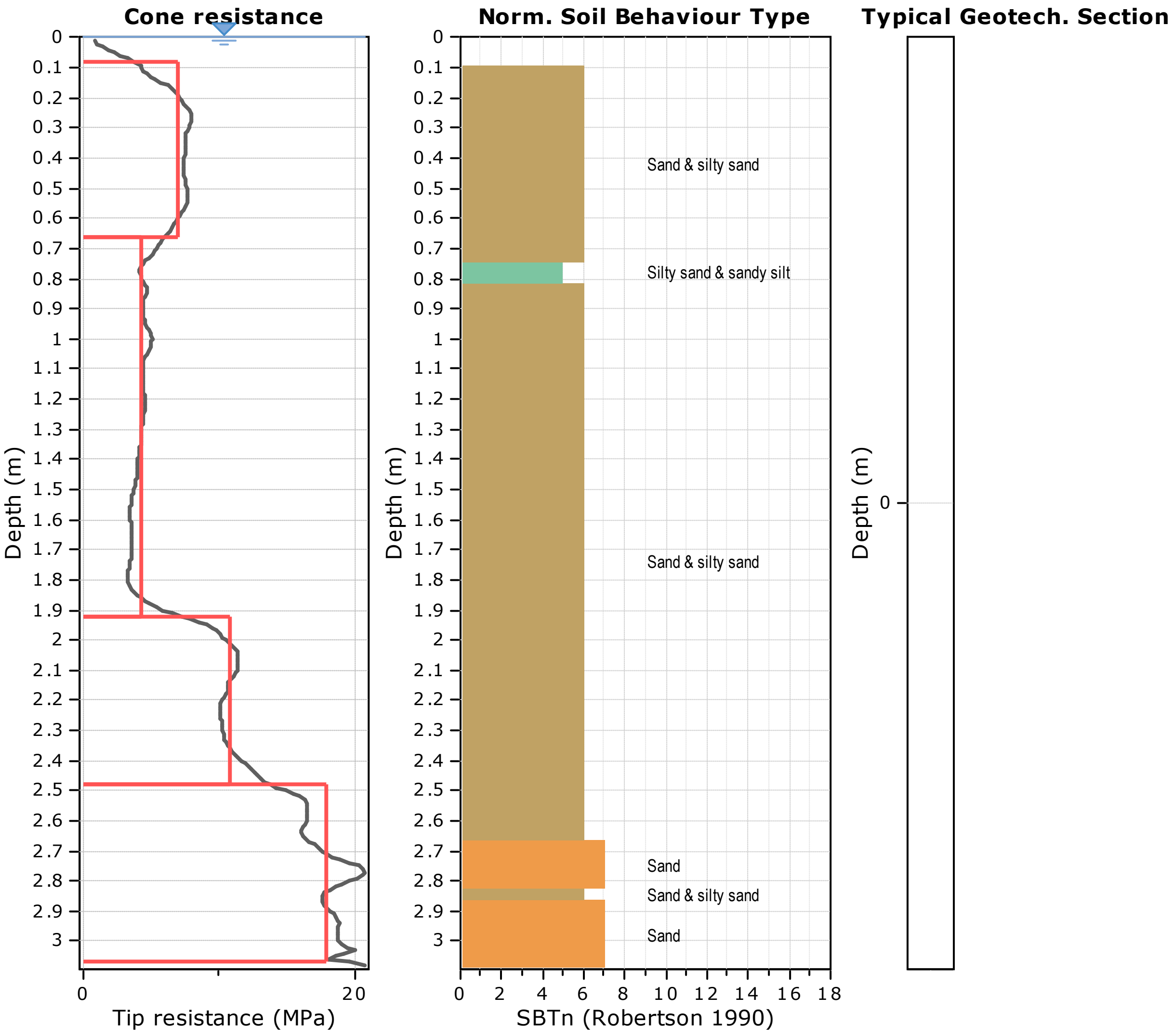
OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data



Calculation parameters

Soil Sensitivity factor, N_S: 7.00

● User defined estimation data



Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.08 (m), **End depth:** 0.66 (m)

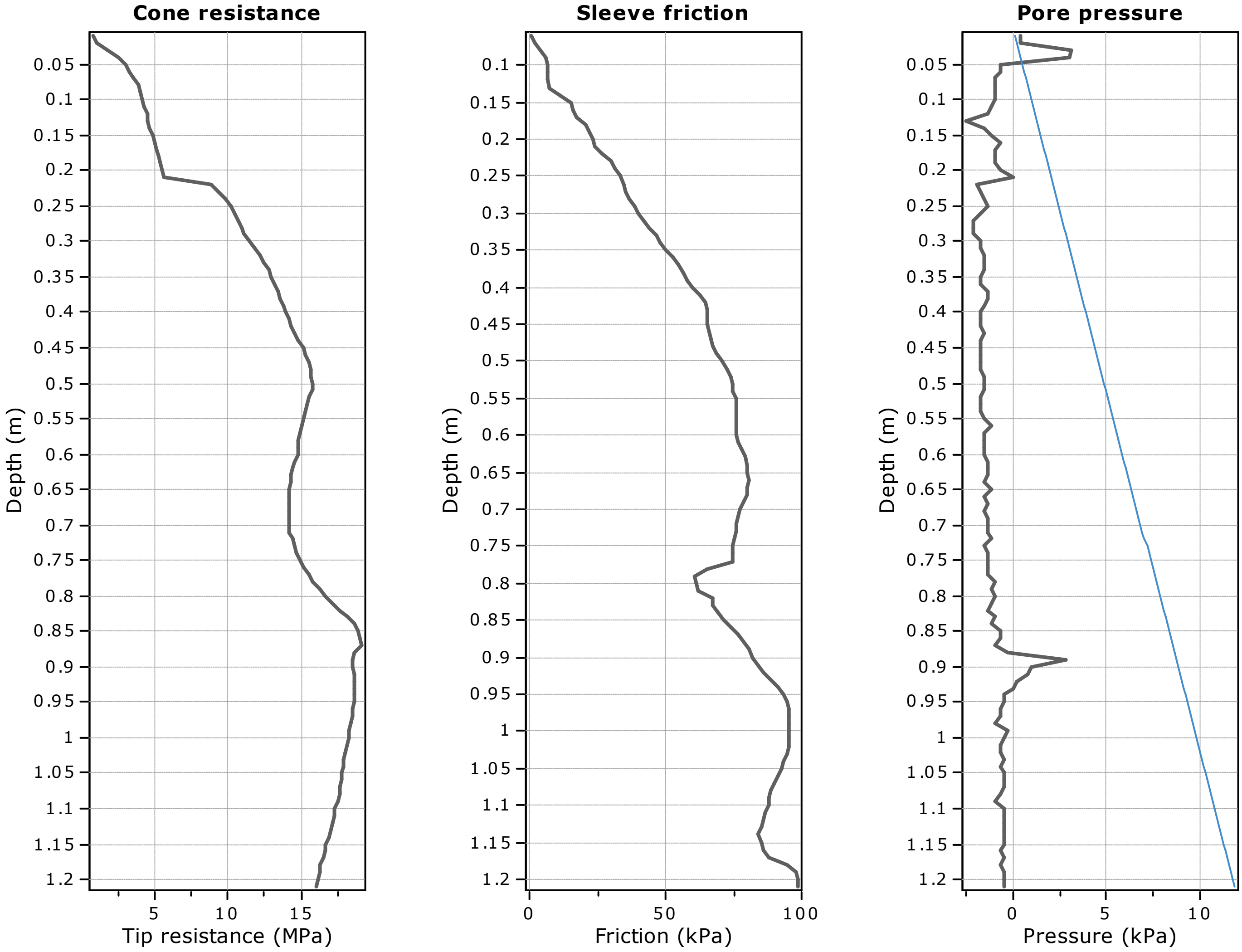
Description: Sand & silty sand

Basic results	**Estimation results**	
Total cone resistance: 6.95 ±1.05 MPa	Permeability: 1.09E-04 ±5.23E-05 m/s	Constrained Mod.: 79.09 ±13.67 MPa
Sleeve friction: 30.11 ±13.66 kPa	N_{60}: 14.75 ±2.35 blows	Go: 49.57 ±8.56 MPa
Ic: 1.63 ±0.06	Es: 40.12 ±6.19 MPa	Su: 0.00 ±0.00 kPa
SBT_n: 6	Dr (%): 58.01 ±3.92	Su ratio: 0.00 ±0.00
SBTn description: Sand & silty sand	φ (degrees): 37.99 ±1.03 °	O.C.R.: 0.00 ±0.00
	Unit weight: 19.00 ±0.00 kN/m³	

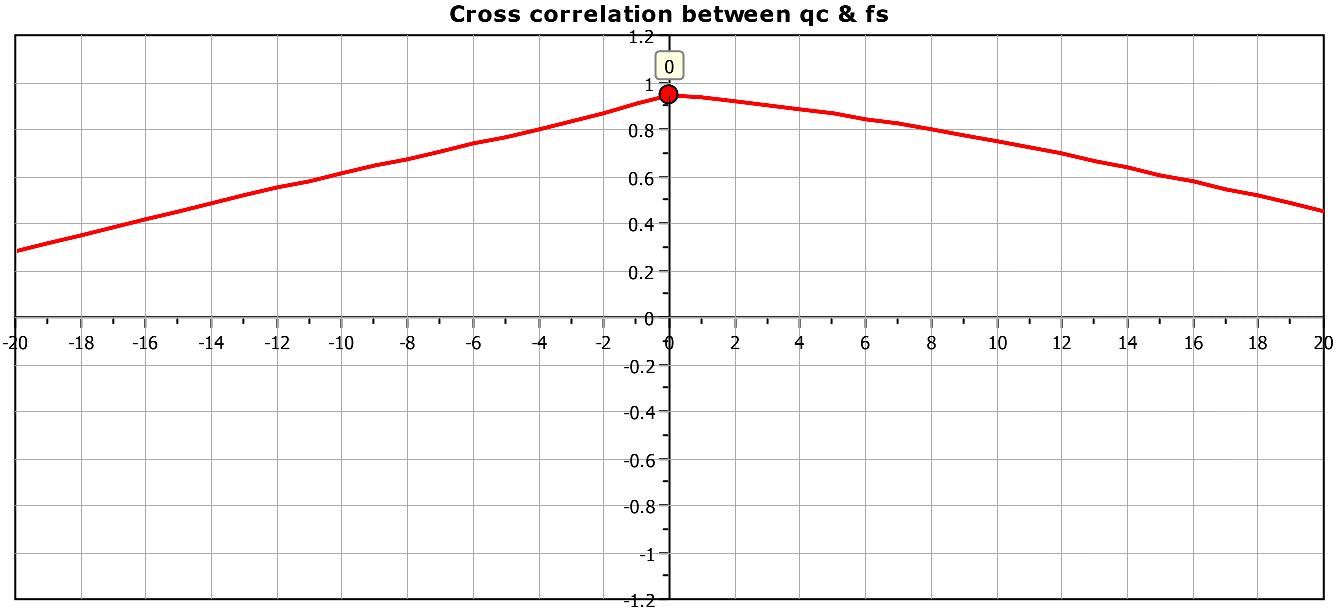
CPT: cpt07

Total depth: 1.21 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

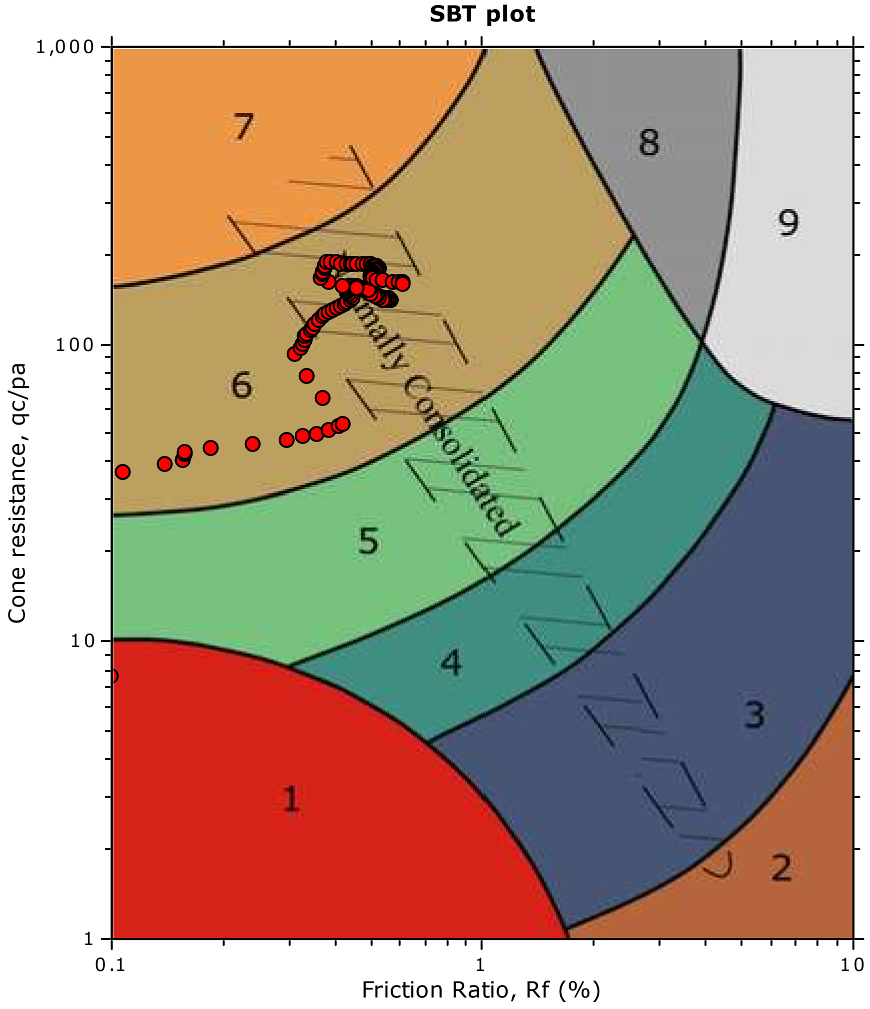


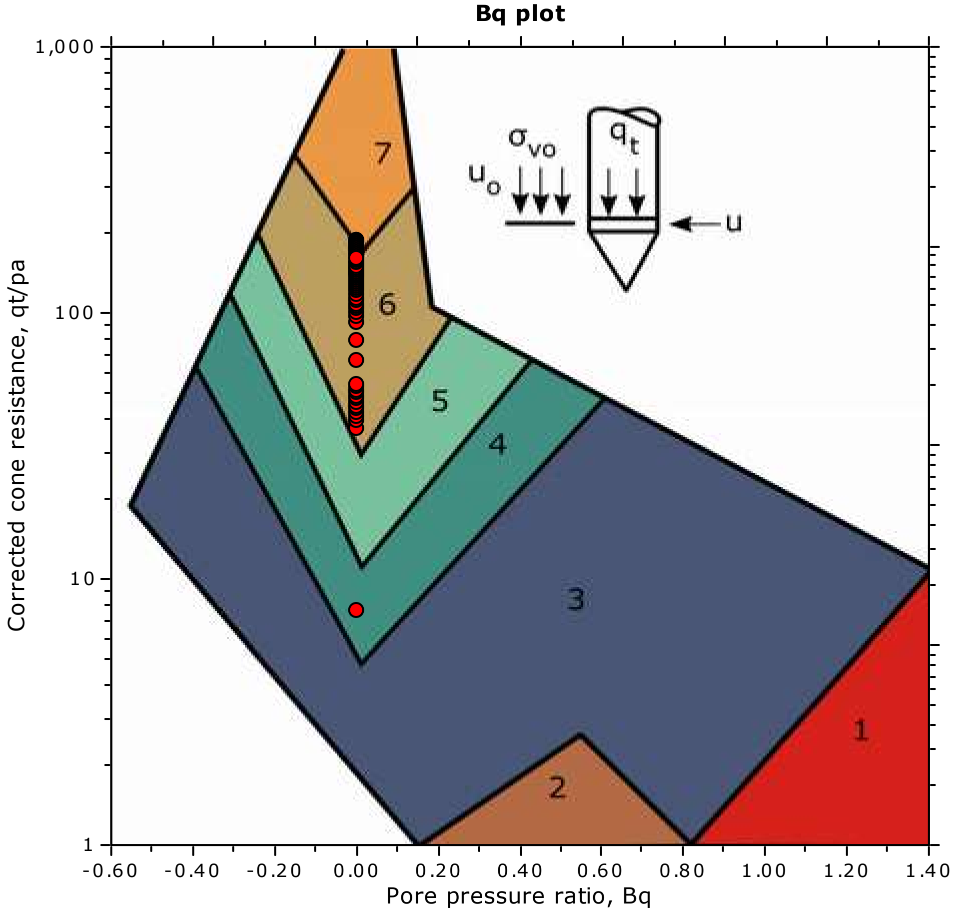
CPT: cpt07

Total depth: 1.21 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

SBT - Bq plots





SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravelly sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

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CPT: cpt07

Total depth: 1.21 m, Date: 17/03/2022

Surface Elevation: 0.00 m

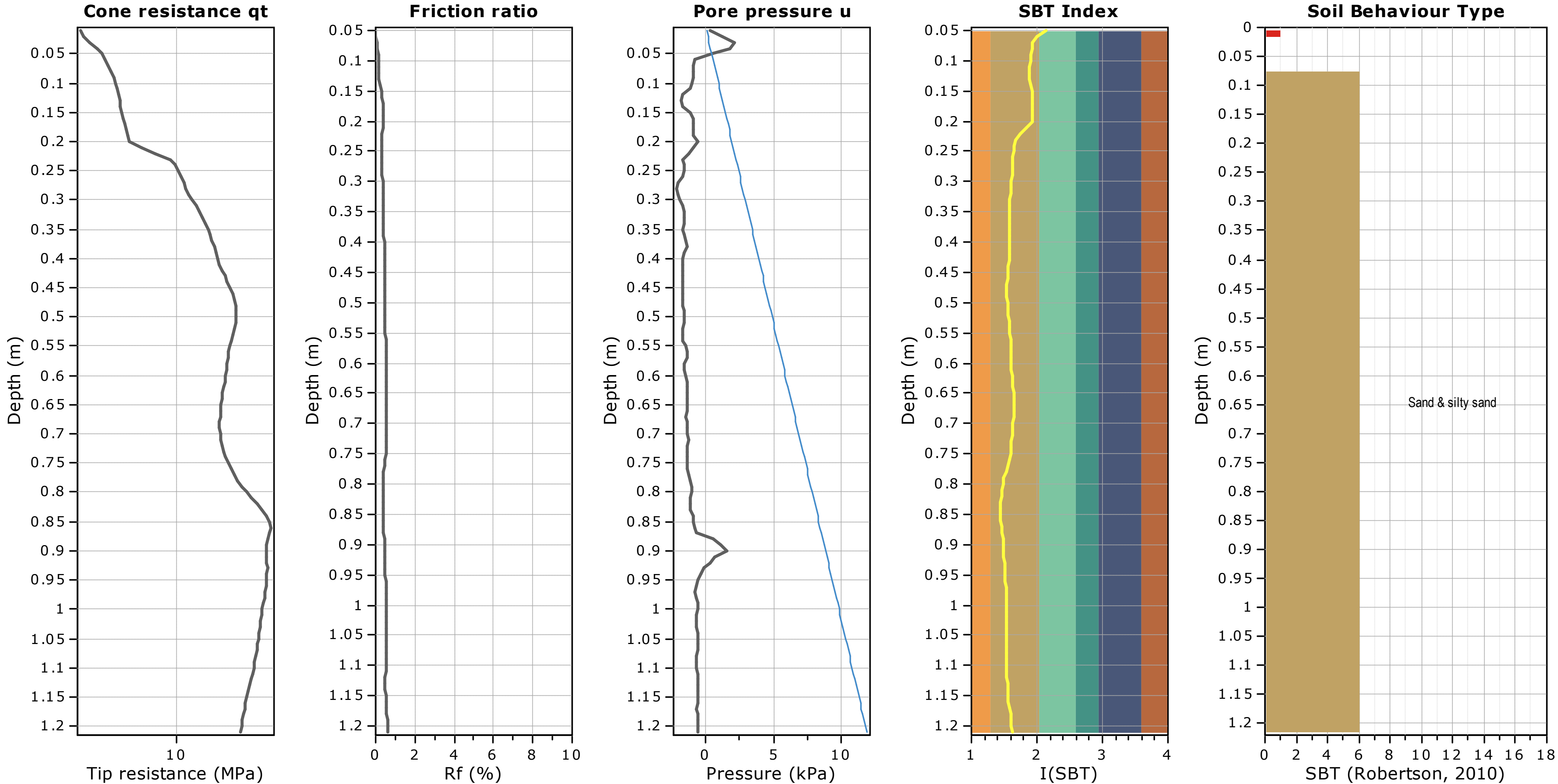
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟨 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬜ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

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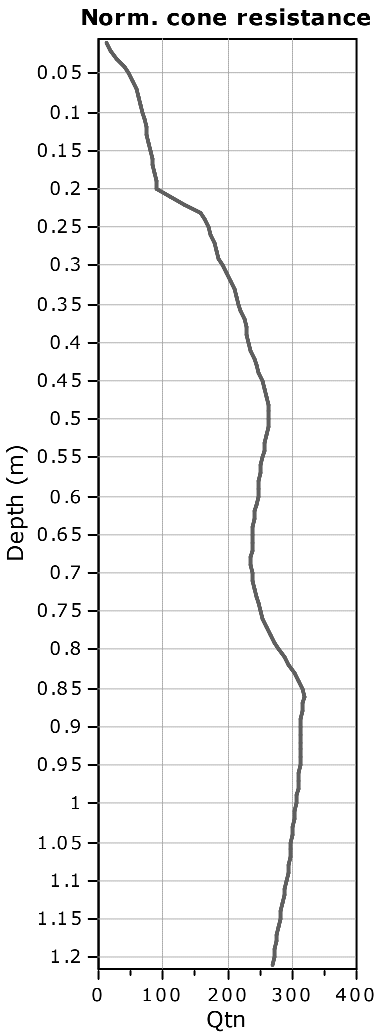
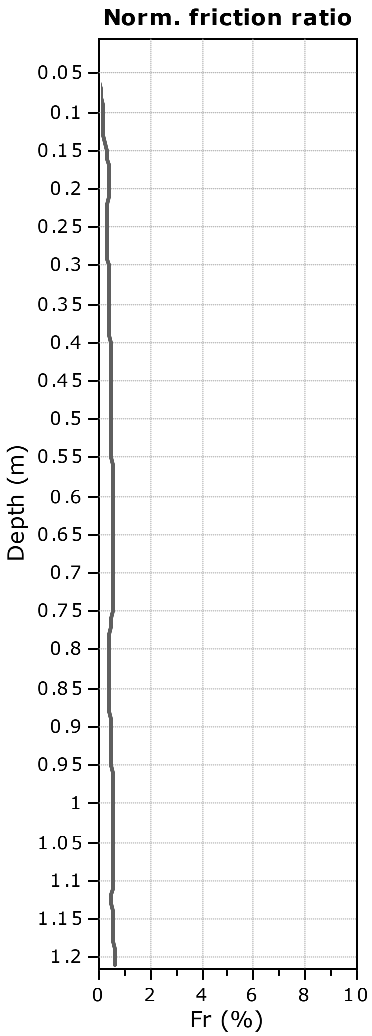
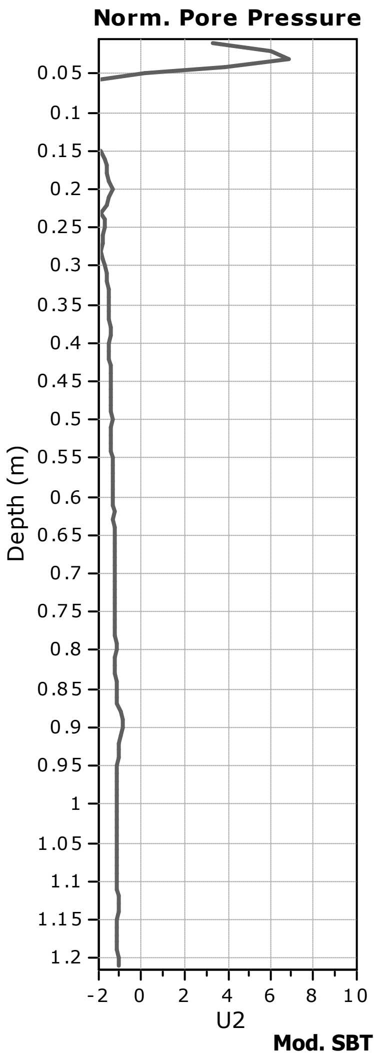
CPT: cpt07

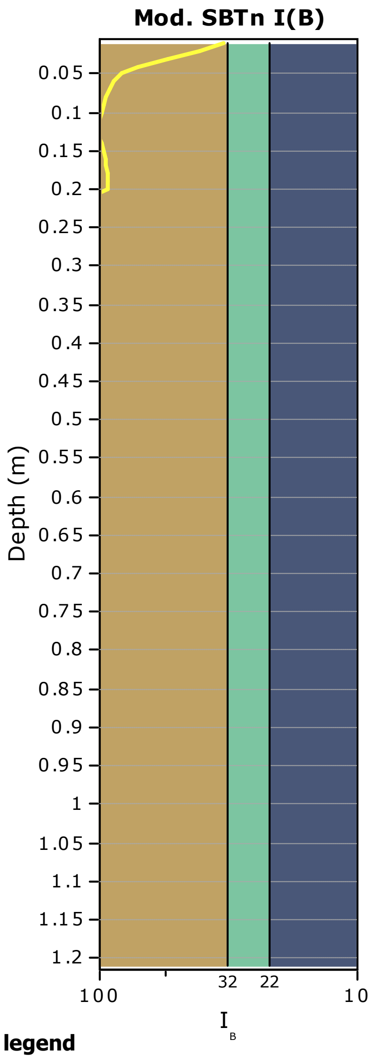
Total depth: 1.21 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

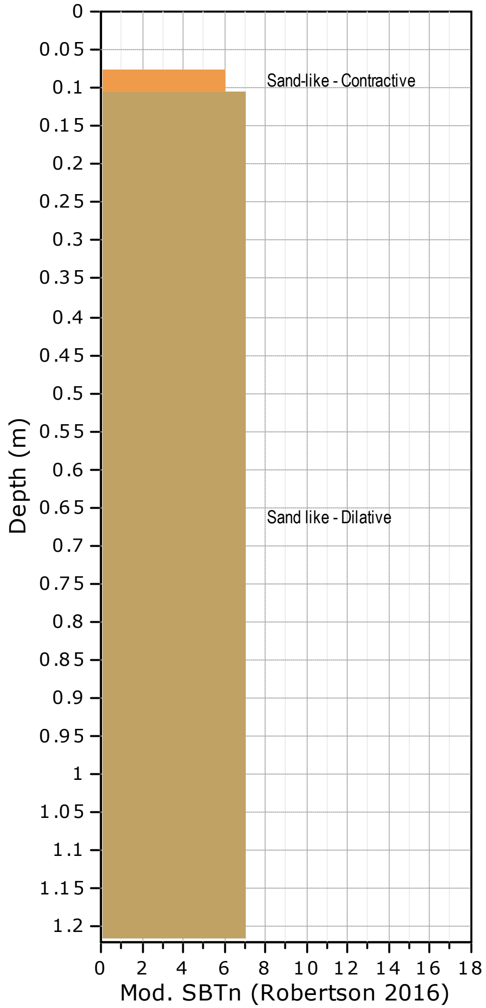
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**











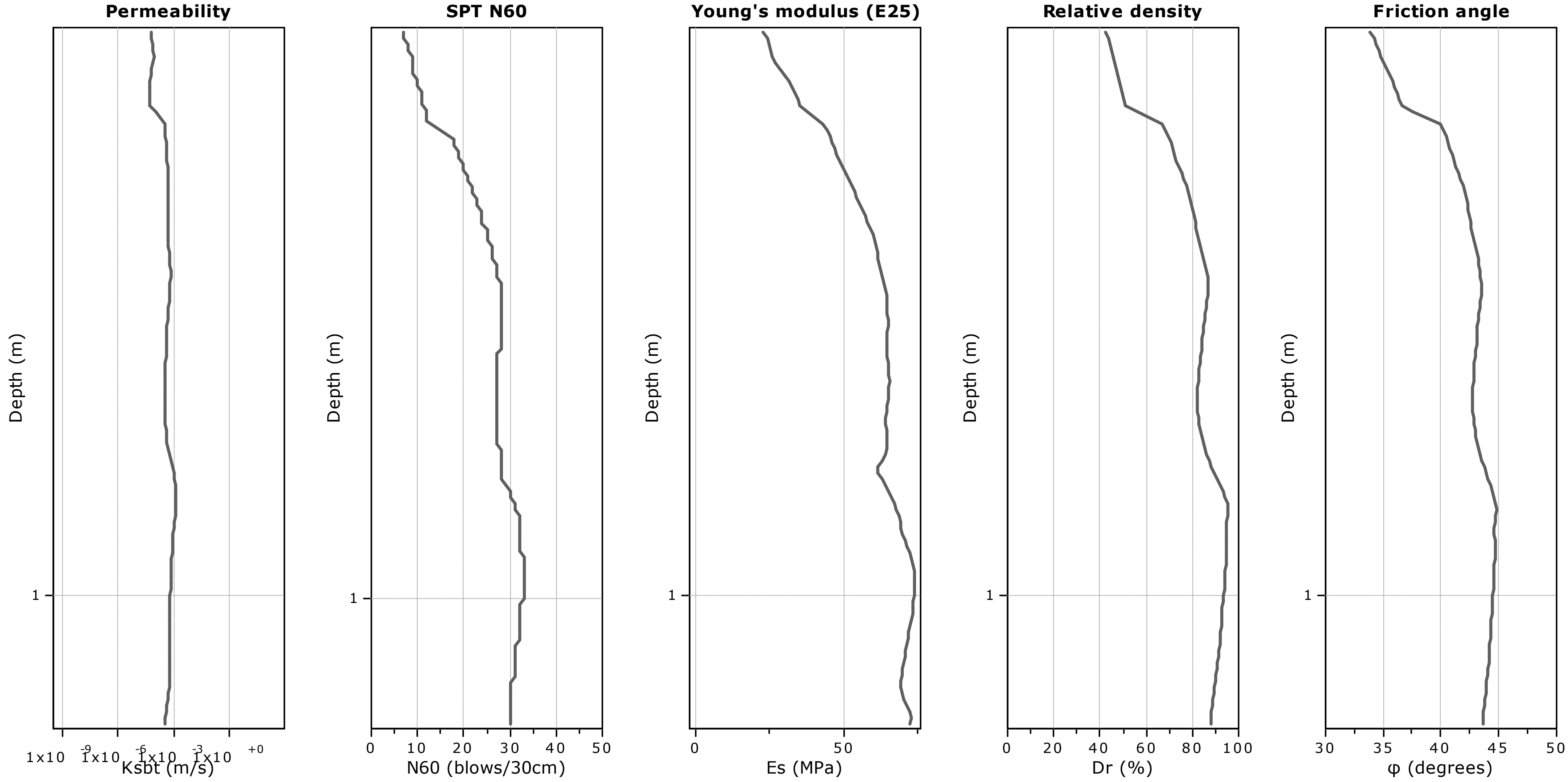
Mod. SBTn legend

🟥 1. CCS: ClayLike - Contractive, Sensitive
🟦 2. CC: Clay-like - Contractive
🟦 3. CD: Clay-Like: Dilative
🟩 4. TC: Transitional - Contractive
🟩 5. TD: Transitional - Dilative
🟧 6. SC: Sand-like - Contractive
🟫 7. SD: Sand-like - Dilative

CPT: cpt07

Total depth: 1.21 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)
● User defined estimation data

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CPT: cpt07

Total depth: 1.21 m, Date: 17/03/2022

Surface Elevation: 0.00 m

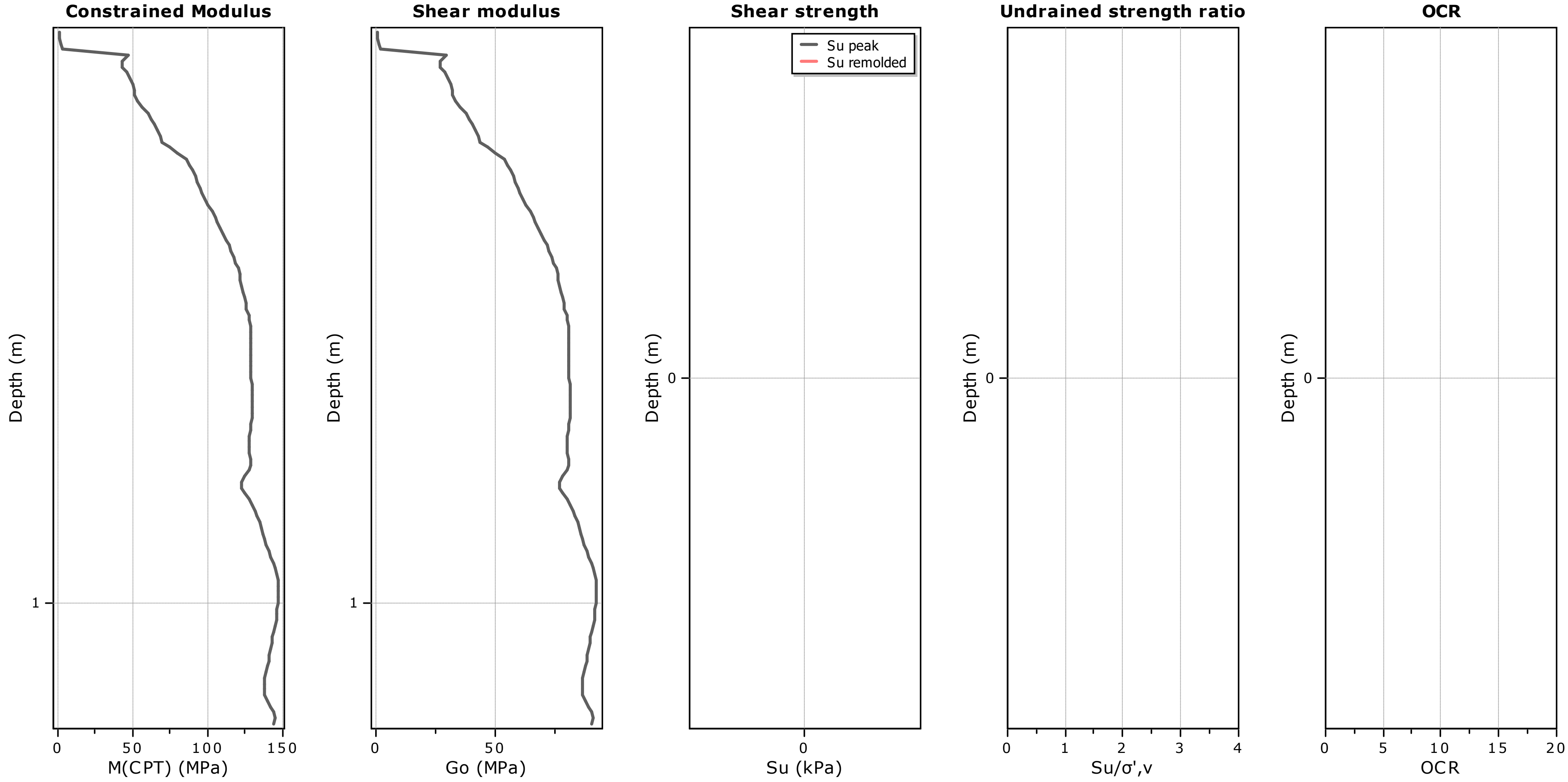
Coords: X:0.00, Y:0.00

Cone Type:

Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**

Location: **OTP The Landings Stage 6 & 7 Subdivision**



Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable *alpha* using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt}: 14

OCR factor for clays, N_{kt}: 0.33

● User defined estimation data

● Flat Dilatometer Test data

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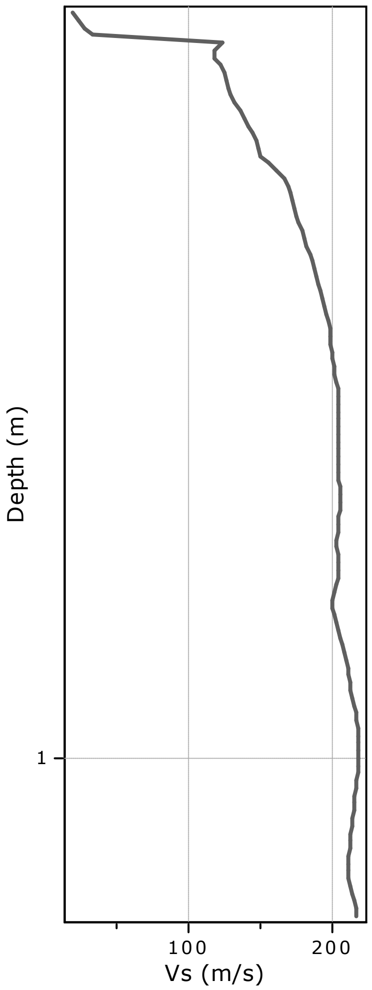
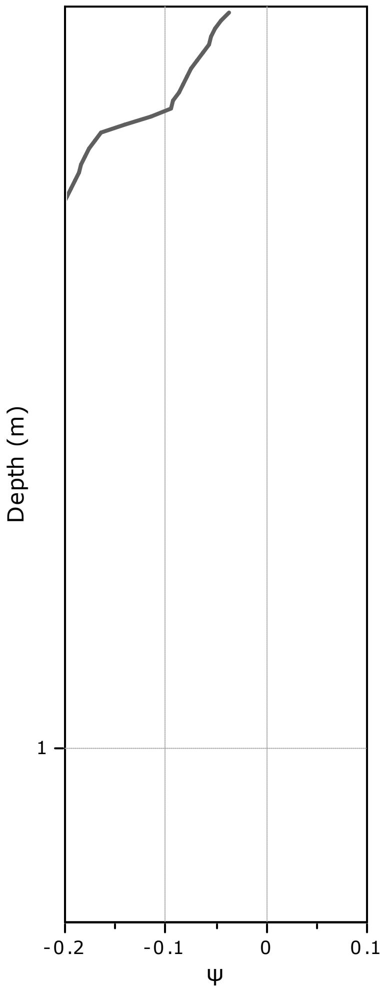
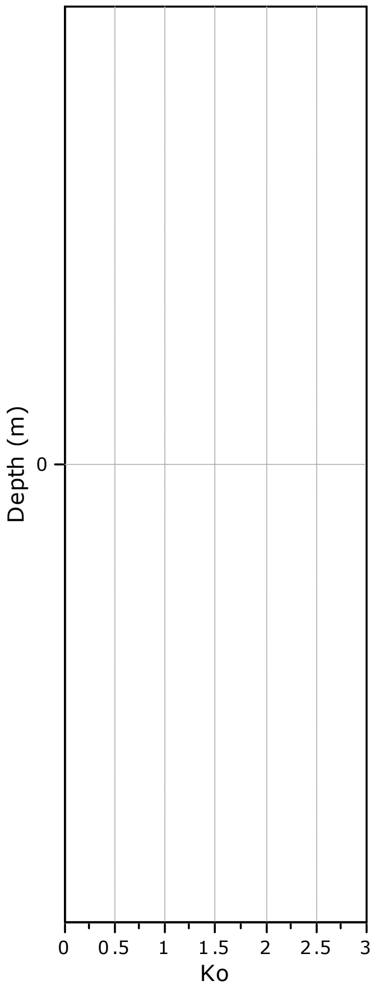
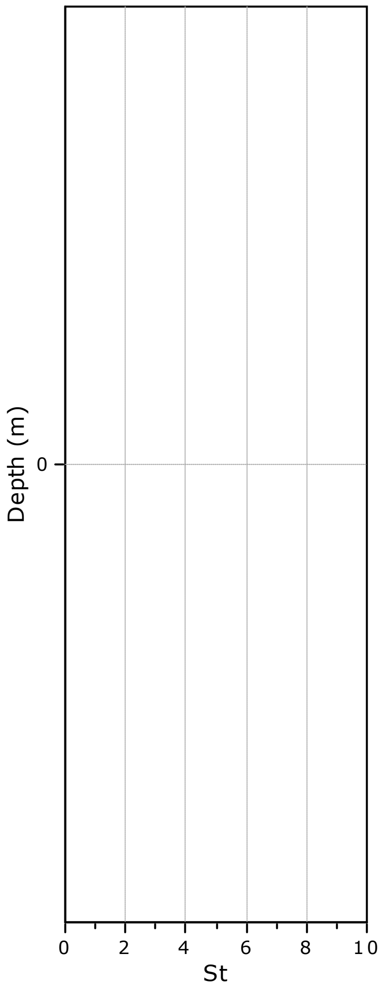
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

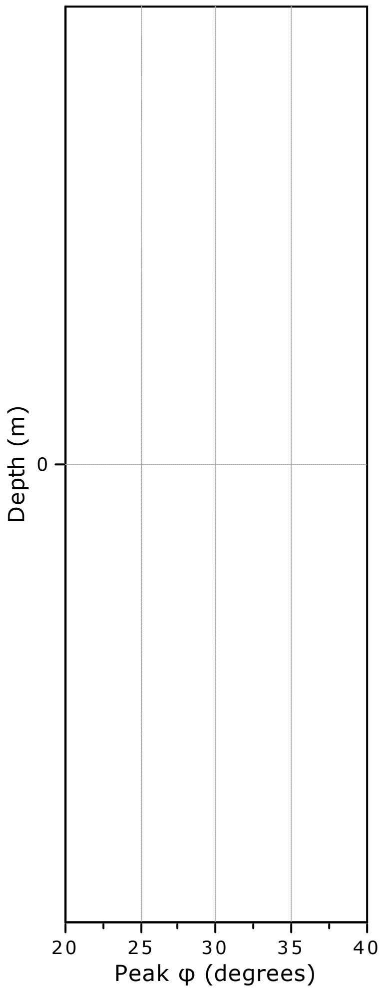
CPT: cpt07
Total depth: 1.21 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:


Shear Wave velocity


State parameter

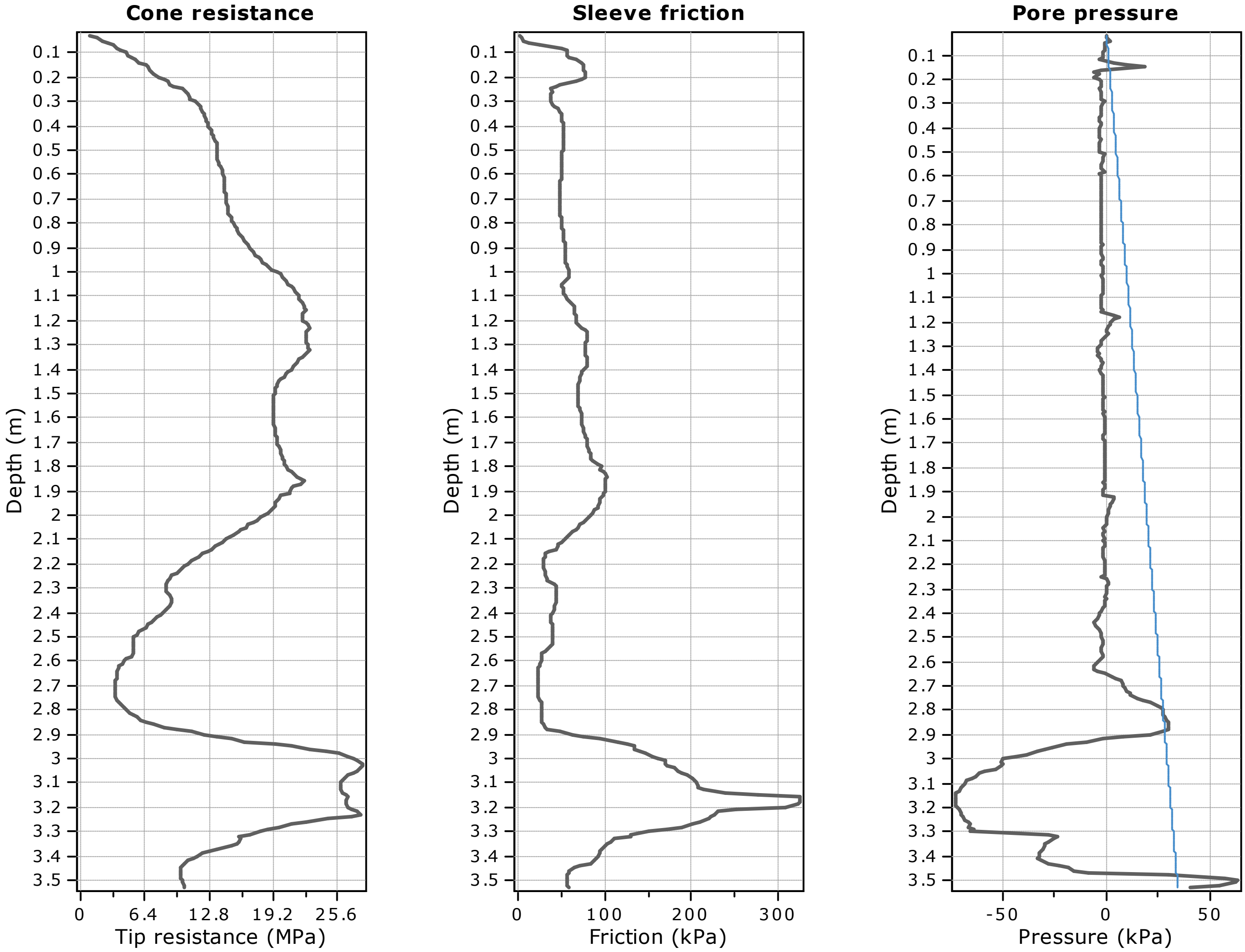

In-situ stress ratio


Soil sensitivity

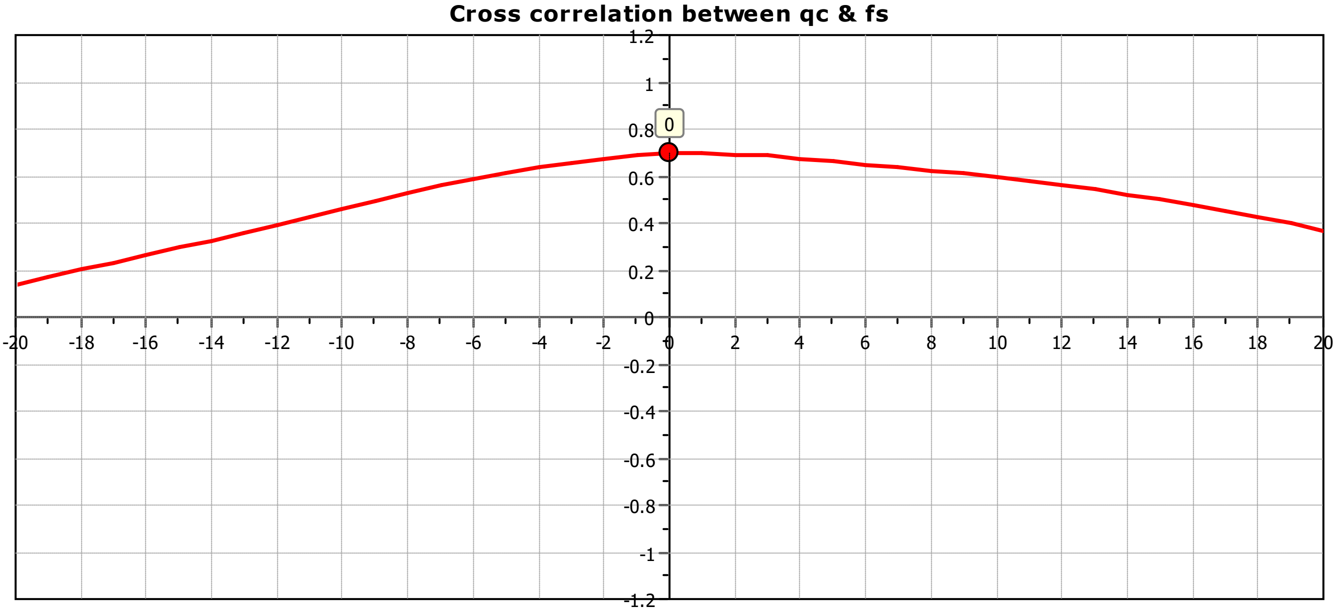

Effective friction angle

Calculation parameters

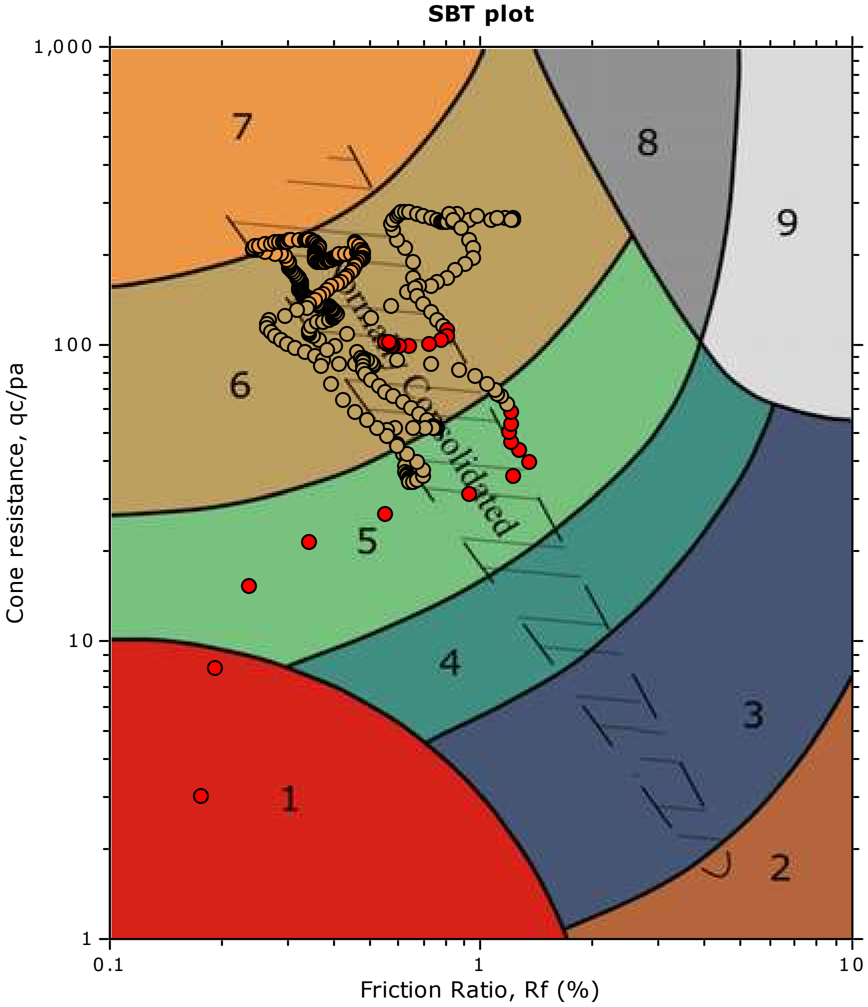
Soil Sensitivity factor, N_S: 7.00
—●— User defined estimation data

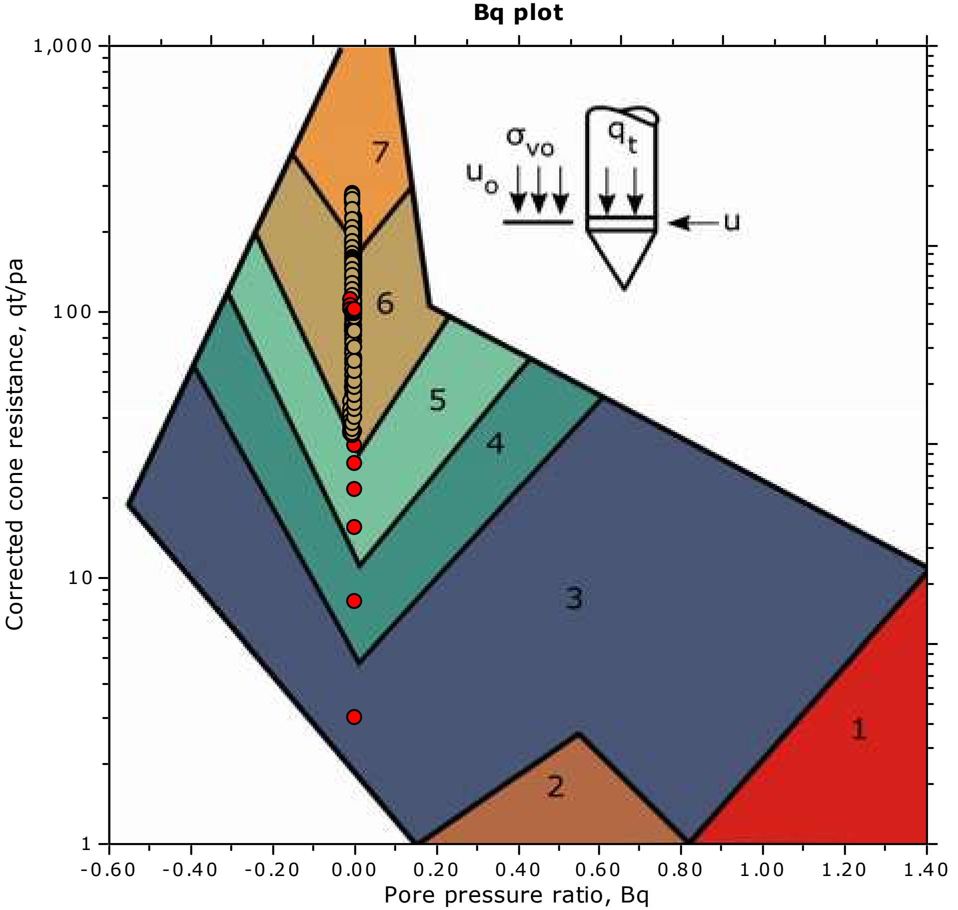


The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



SBT - Bq plots





SBT legend

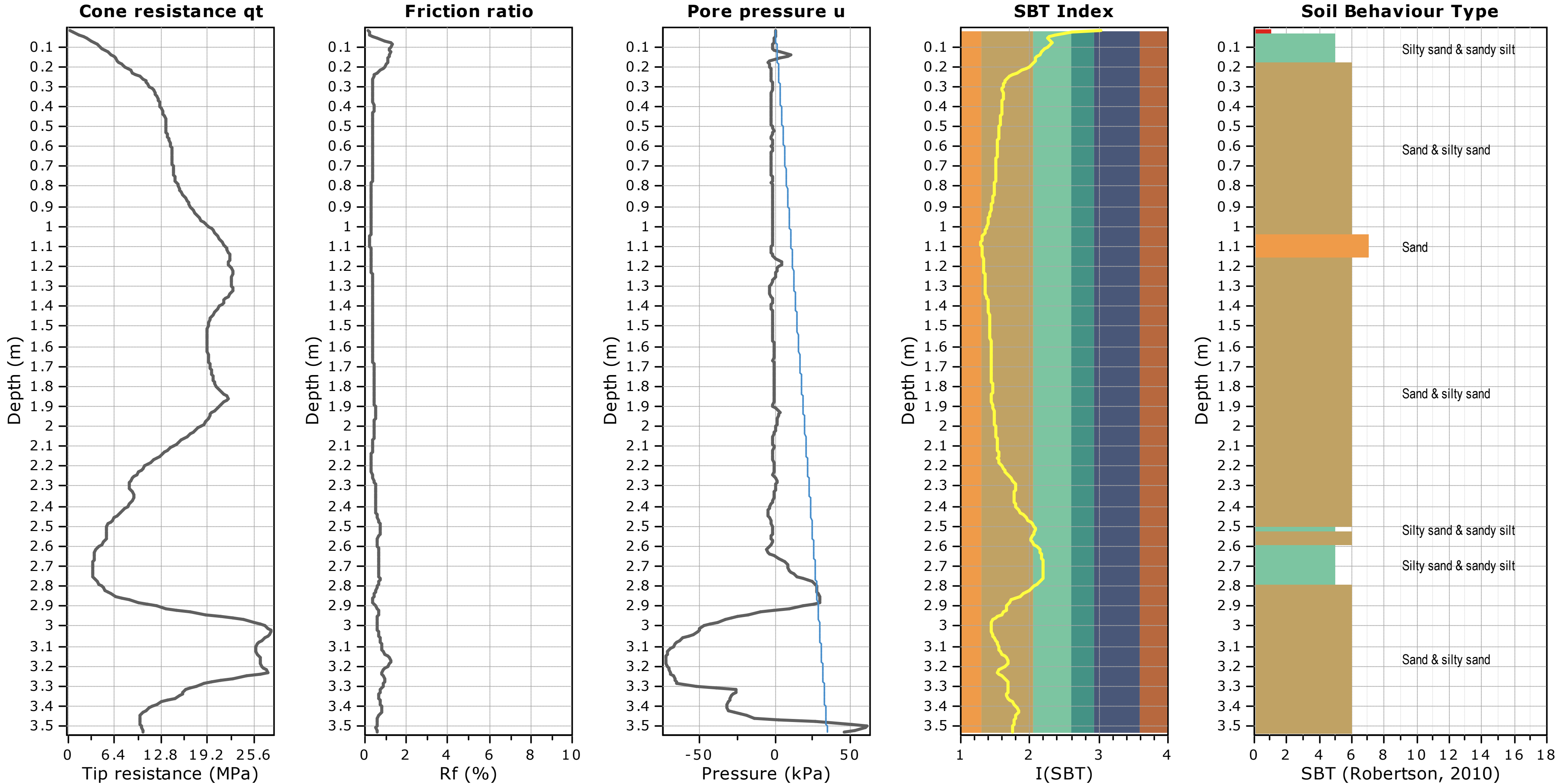
🟥 1. Sensitive fine grained
▨ 2. Organic material
▨ 3. Clay to silty clay
▨ 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
▨ 6. Clean sand to silty sand
🟧 7. Gravelly sand to sand
▨ 8. Very stiff sand to clayey sand
☐ 9. Very stiff fine grained

Cook Costello

http://www.geologismiki.gr

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

CPT: cpt08
Total depth: 3.53 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:



SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟨 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

cook | costello

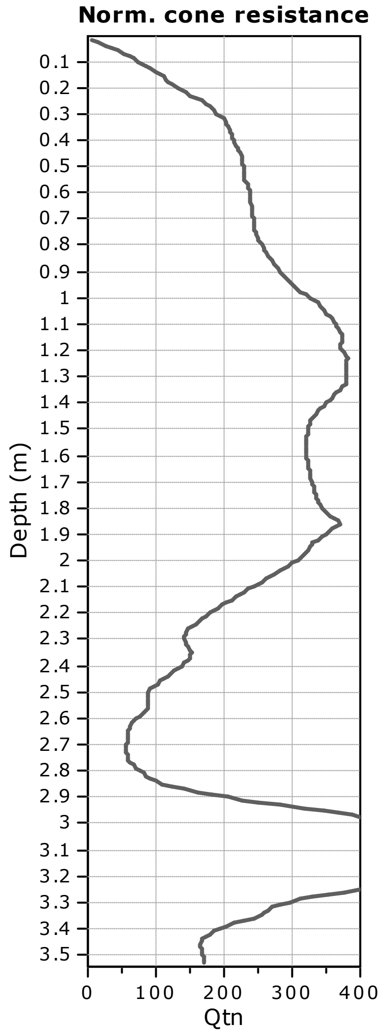
Cook Costello

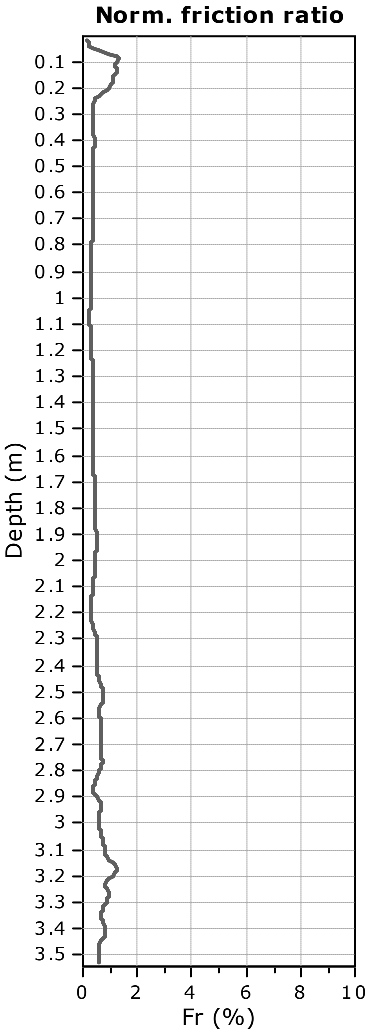
http://www.geologismiki.gr

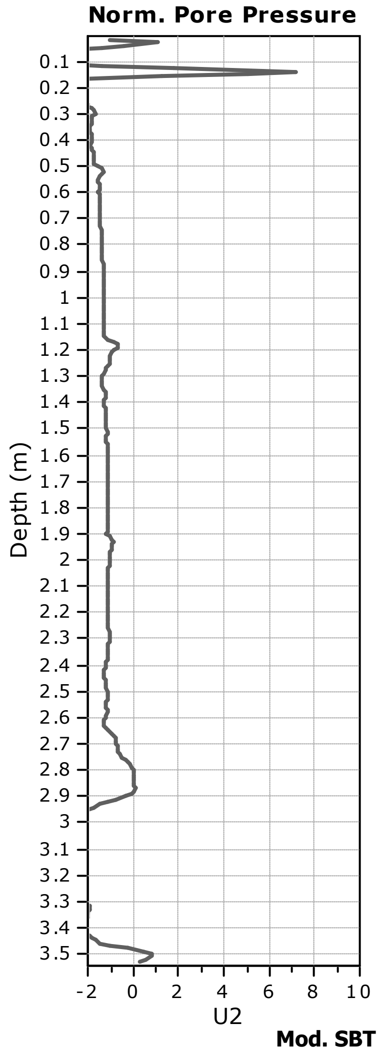
CPT: cpt08

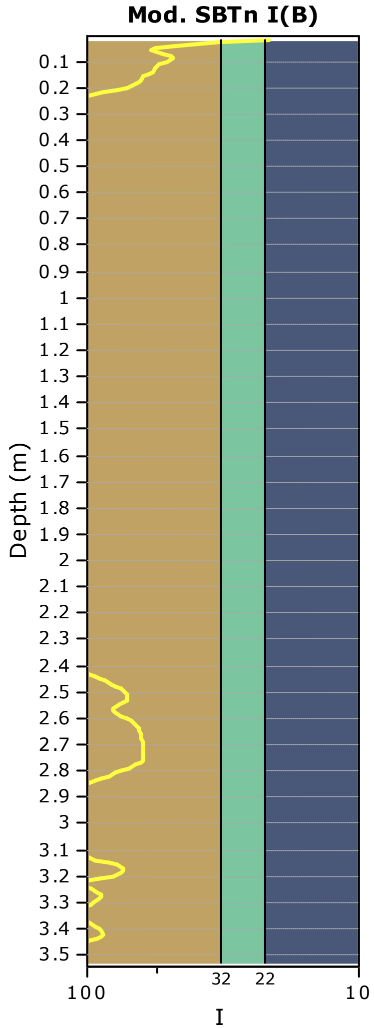
Total depth: 3.53 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

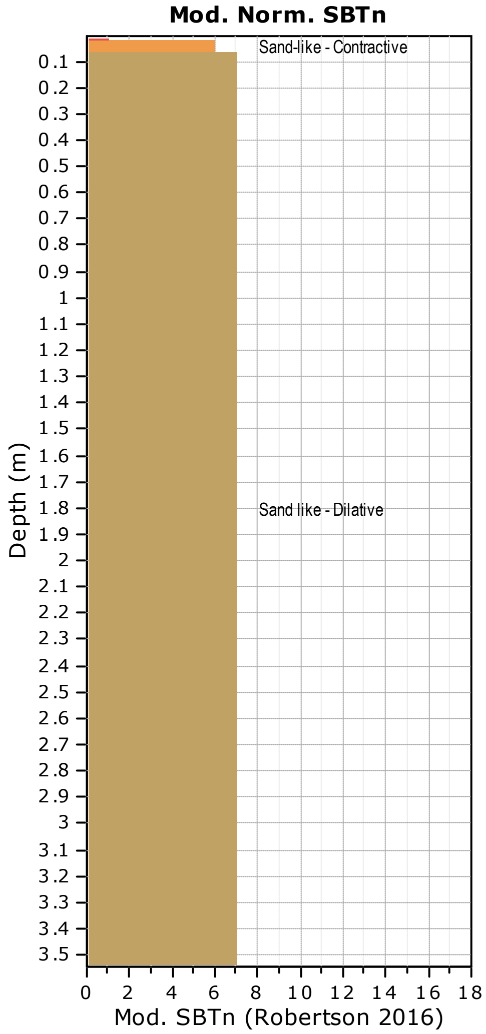
Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**











Mod. SBTn legend

- 🟥 1. CCS: ClayLike - Contractive, Sensitive
- 🟦 2. CC: Clay-like - Contractive
- ■ 3. CD: Clay-Like: Dilative
- 🟩 4. TC: Transitional - Contractive
- 🟩 5. TD: Transitional - Dilative
- 🟧 6. SC: Sand-like - Contractive
- 🟫 7. SD: Sand-like - Dilative

CPT: cpt08

Total depth: 3.53 m, Date: 17/03/2022

Surface Elevation: 0.00 m

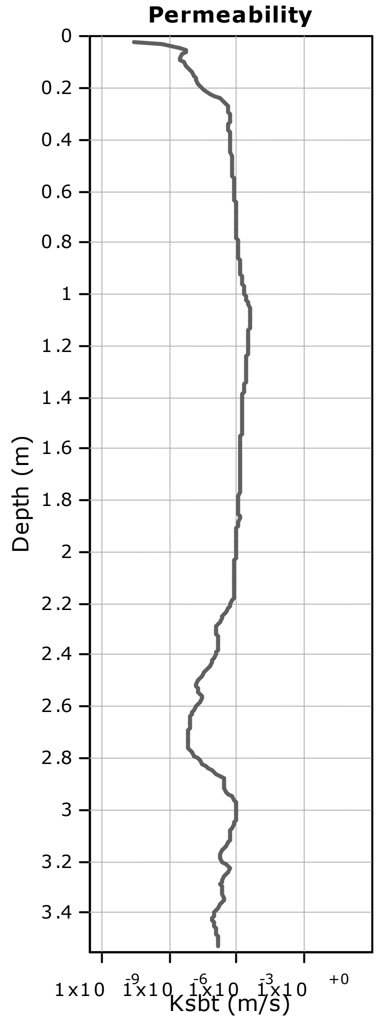
Coords: X:0.00, Y:0.00

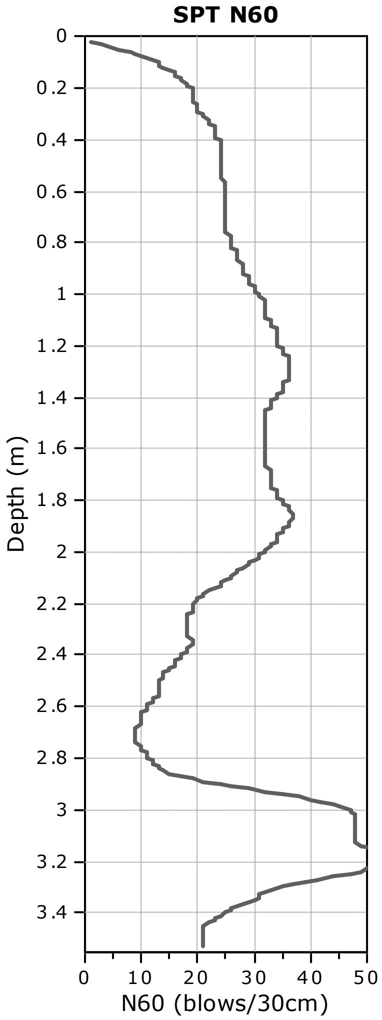
Cone Type:

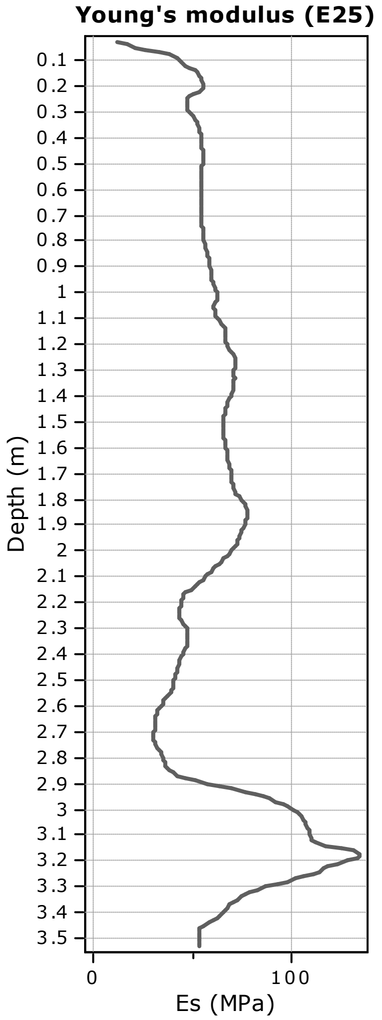
Cone Operator:

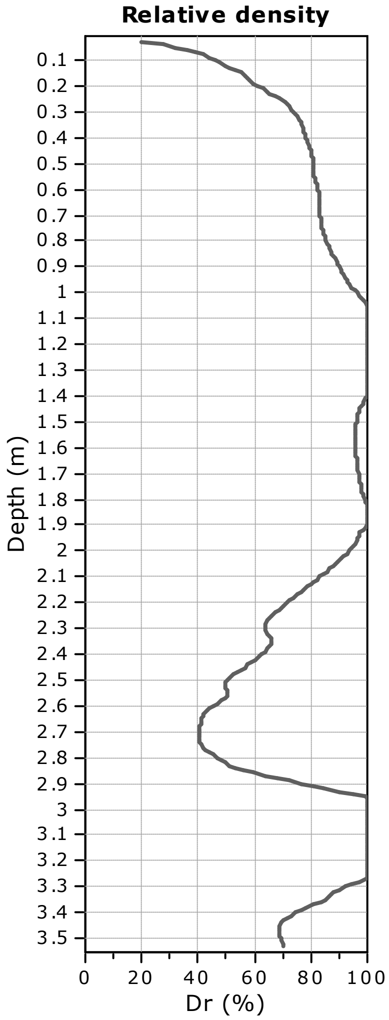
Project: **Stage 6 Landings Fill Testing CPTs**

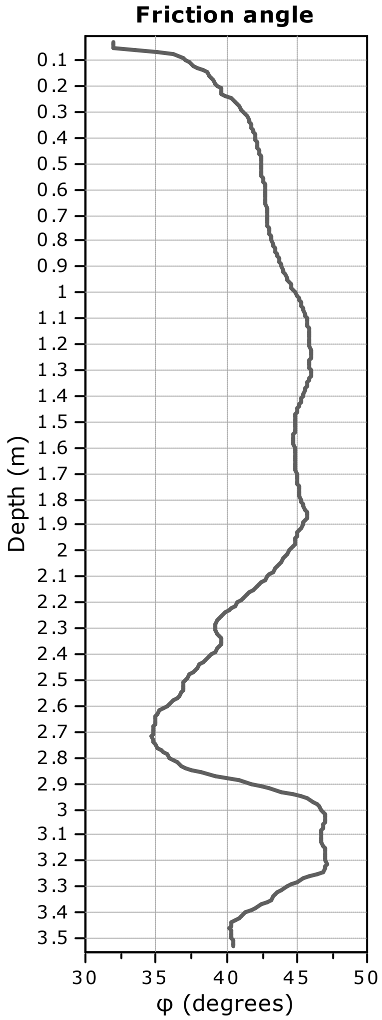
Location: **OTP The Landings Stage 6 & 7 Subdivision**











Calculation parameters

Permeability: Based on SBT_n

SPT N_{60}: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0

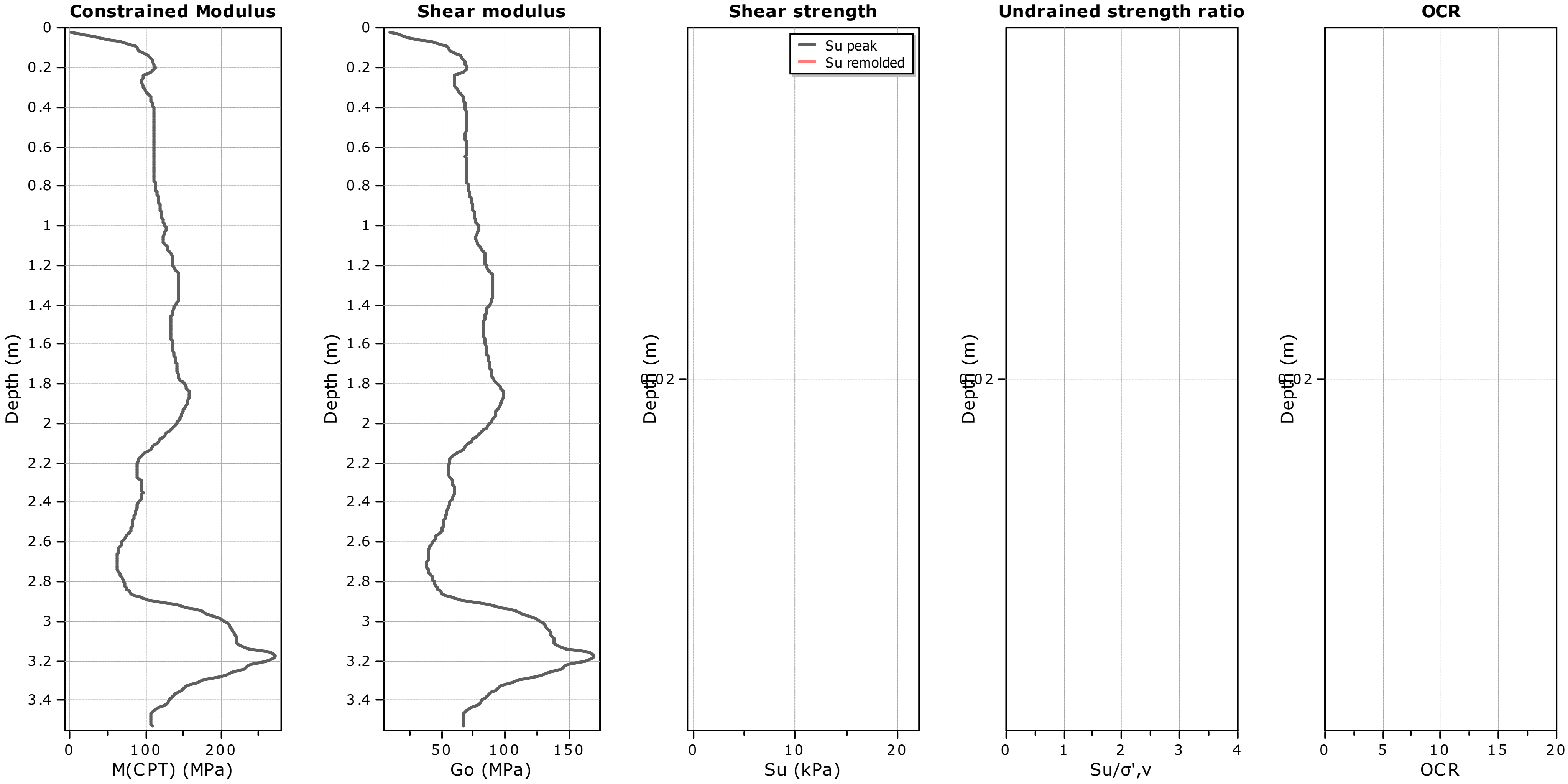
Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data

CPT: cpt08

Total depth: 3.53 m, Date: 17/03/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**



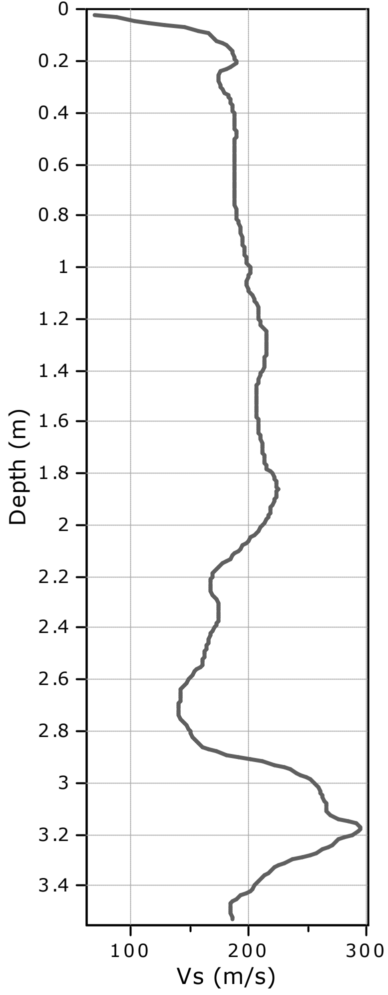
Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14

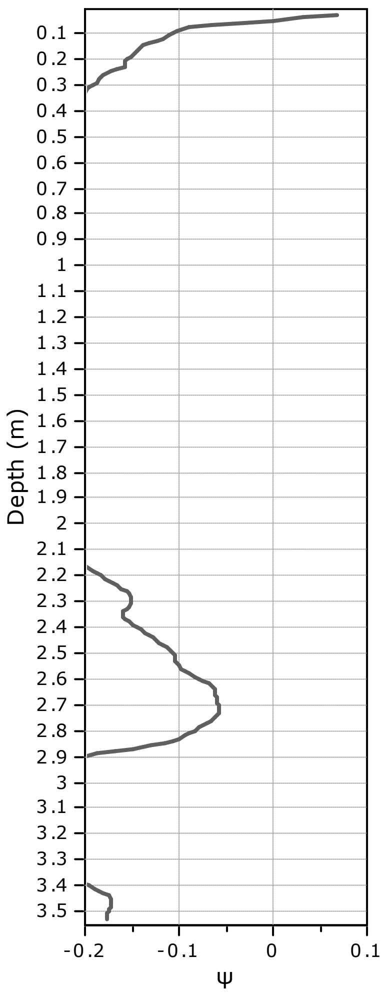
OCR factor for clays, N_{kt}: 0.33
● User defined estimation data
● Flat Dilatometer Test data

Project: **Stage 6 Landings Fill Testing CPTs**
Location: **OTP The Landings Stage 6 & 7 Subdivision**

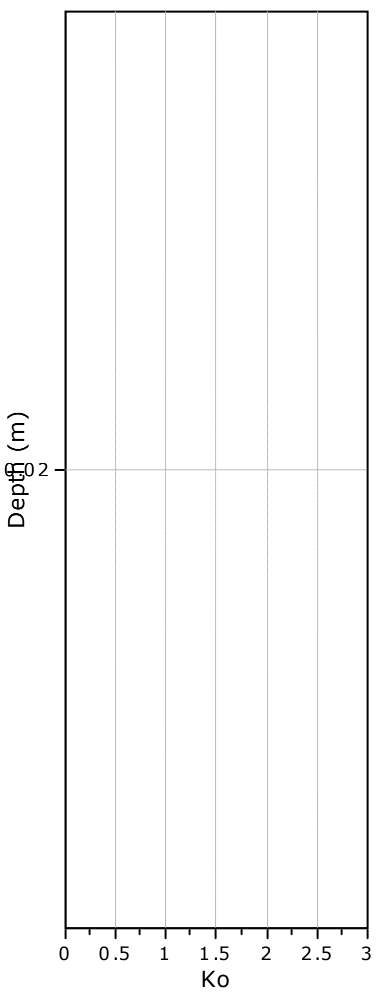
Shear Wave velocity



State parameter

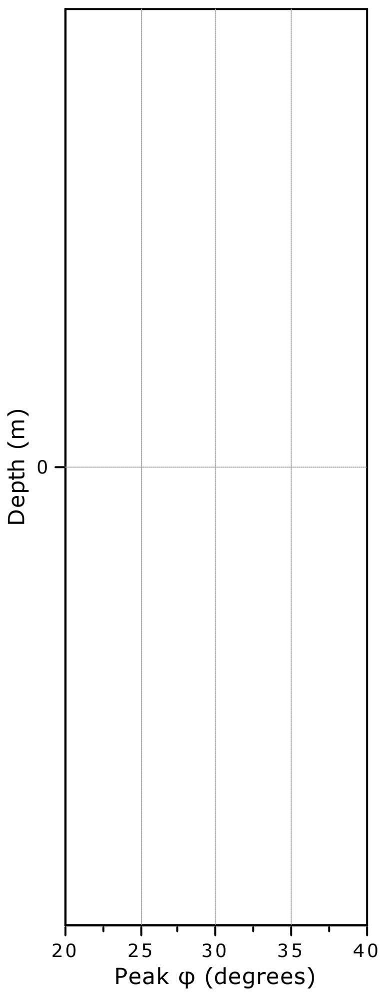


In-situ stress ratio



Soil sensitivity

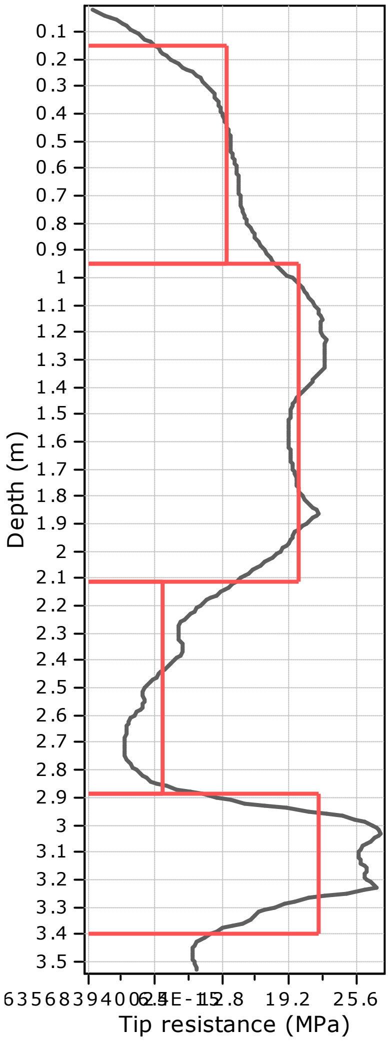
Effective friction angle



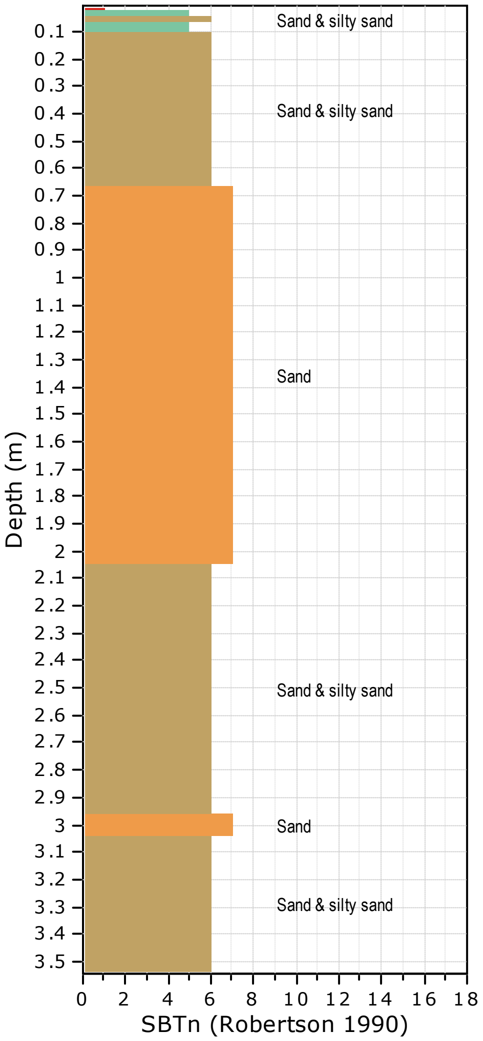
Calculation parameters

Soil Sensitivity factor, N_S: 7.00
● User defined estimation data

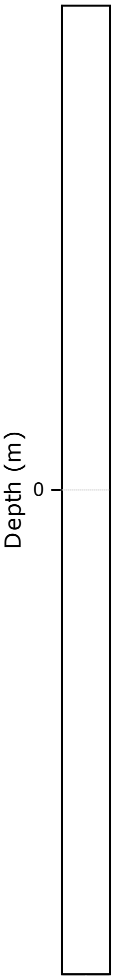
Cone resistance



Norm. Soil Behaviour Type



Typical Geotech. Section



Tabular results

.:: Layer No: 1 ::.

Code: Layer_1 **Start depth:** 0.15 (m), **End depth:** 0.95 (m)

Description: Sand & silty sand

Basic results

Total cone resistance: 13.29 ±2.69 MPa

Sleeve friction: 52.00 ±8.79 kPa

Ic: 1.40 ±0.17

SBT_n: 6

SBTn description: Sand & silty sand

Estimation results

Permeability: 7.16E-04 ±4.13E-04 m/s

N_{60}: 23.83 ±3.01 blows

Es: 54.76 ±2.89 MPa

Dr (%): 79.32 ±8.63

φ (degrees): 42.23 ±1.39 °

Unit weight: 19.00 ±0.00 kN/m³

Constrained Mod.: 109.52 ±5.79 MPa

Go: 68.63 ±3.63 MPa

Su: 0.00 ±0.00 kPa

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

Whangarei Laboratory
166 Bank Street
Whangarei
M: 027 656 5226
E: info@geocivil.co.nz

TEST REPORT

Lab Job No: 8020-1727

Your ref.: -

Date of Issue: 5/10/2021

Date of Re-Issue: -

Page: 1 of 2

Test Report No.
W21-1089

PROJECT: **The Landing, Piezo pH Testing**

CLIENT:
Cook Costello
2 Norfolk Street,
Whangārei 0110

ATTENTION: Bernard Devine

TEST METHODS: pH, Inhouse method

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

Alex Millar

A. Millar

Administrator

S. Kokich

Senior Technician

DETERMINATION OF THE pH LEVELS

In House

Lab Job No.:	8020-1727	**Sample No.:**	21-981
Client:	Cook Costello	**Tested By:**	M.A
Job:	The Landing, One Tree Point	**Date:**	16/09/2021
Location:	Groundwater piezos	**Checked By:**	A.M
		Date:	30/09/2021
Date Received:	16/09/2021	**Page:**	2 of 2
Report No.:	W21-1089		
Ref:	-	**Sampled by:**	J.A.

Sample Number	Sample Location	pH	pH Average
21-981	Stage 5 piezo	5.82	5.81
		5.79	
21-982	Stage 6 piezo	5.51	5.52
		5.53	
21-983	Stage 8 piezo	4.98	5.01
		5.04	
21-984	Stage 9 piezo	5.03	5.04
		5.04	

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TEST REPORT

Lab Job No:	8020-1727
Your ref.:	14233
Date of Issue:	6/10/2021
Date of Re-Issue:	-
Page:	1 of 5

Test Report No.
W21-1078

PROJECT: **The Landing, Laboratory Testing**

CLIENT:
Cook Costello
2 Norfolk Street,
Whangārei 0110

ATTENTION: Stefano Rotatori

TEST METHODS: Determination of the particle size distribution- wet sieving method
NZS 4402:1986 Test 2.8.1

SAMPLING METHOD: Hand test pit - sampling not accredited

TEST RESULTS: As per attached sheets

Alex Millar

A. Millar

Administrator

S. Kokich

Approved Signatory

ACCREDITED IANZ TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Whangarei
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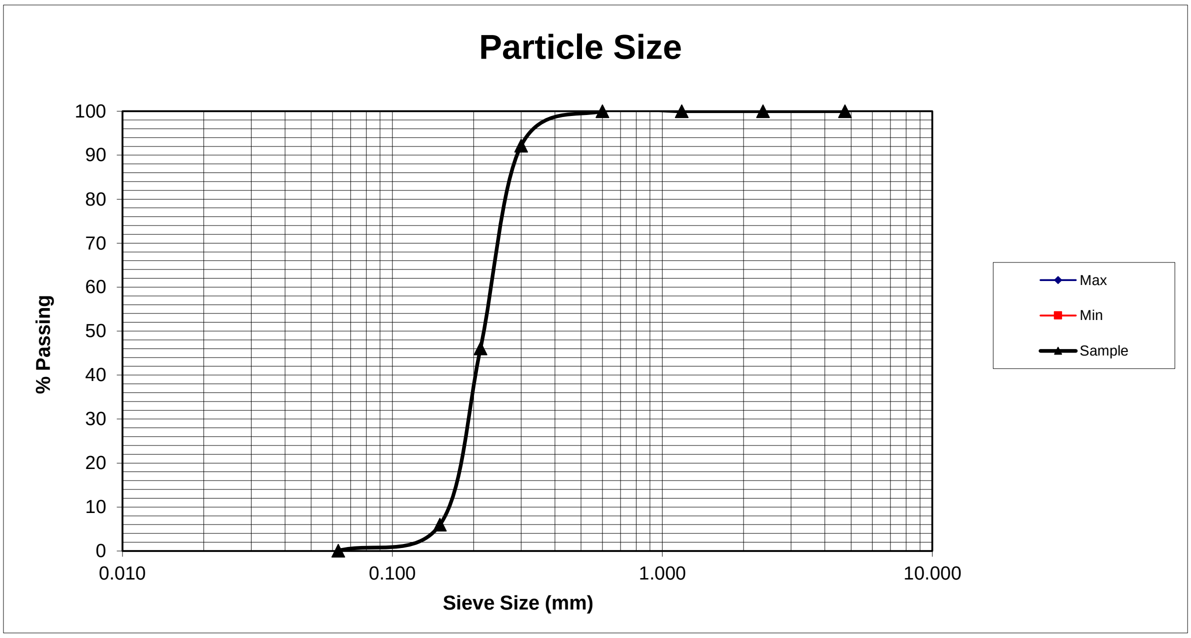
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402:1986 Test 2.8.1

Lab Job No:	8020-1727	**Sample No:**	21-929
Client:	Cook Costello Ltd	**Tested By:**	A.B
Location:	The Landing, One Tree Point Lot 349 cut area	**Date:**	13/09/2021
		Checked By:	A.M
Date Received:	2/08/2021	**Date:**	28/09/2021
Report No:	W21-1078	**Page:**	2 of 5
REF:	14233		
Sampling Method:	Hand test pit – Sampling not accredited	**Sampled By:**	A.B.
Date Sampled:	2/08/2021		
Test Details:	Wet sieving method		
History:	Natural state		

Description of Sample: **SAND, fine to medium, minor silt, moist, pale orange-brown.**

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
4.75			100
2.36			100
1.18			100
0.6			100
0.3			92
0.212			46
0.15			6
0.063			0



The percentage passing the finest sieve was obtained by difference

S. Kokich
Approved Signatory

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DETERMINATION OF DRY DENSITY/ WATER CONTENT RELATIONSHIP

NEW ZEALAND STANDARD COMPACTION

NZS 4402:1986 Test 4.1.1

Lab Job No: 8020-1727
Client: Cook Costello Ltd
Project: The Landing, One Tree Point
Location: Lot 349 cut area

Date Received: 2/08/2021
Report No: W21-1078
REF: 14233

Sample No.: 21-929
Tested By: J.Att
Date: 3/09/2021
Checked By: A.M
Date: 28/09/2021
Page: 3 of 5

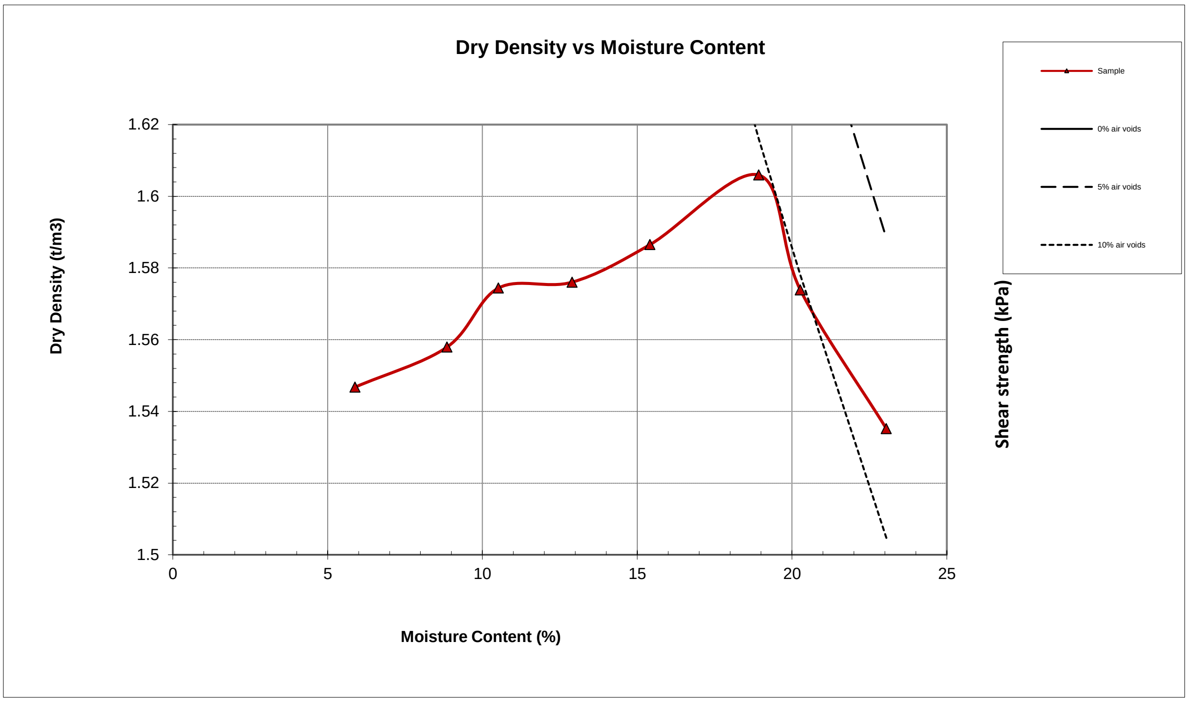
Sample Description: SAND, fine to medium, minor silt, moist, pale orange-brown.

Compaction used: New Zealand Standard Compaction Test performed on:
Whole sample

History: Natural

Total mass of sample: 20000 g

Mass retained on 19mm BS test sieve: 0 g



Test Results			
Water Content (%)	Dry Density (t/m^3)	Shear Vane (kPa)	
		Peak	Residual
5.9	1.547	-	-
8.9	1.558	-	-
10.5	1.574	-	-
12.9	1.576	-	-
15.4	1.587	-	-
18.9	1.606	-	-
20.3	1.574	-	-
23.0	1.535	-	-

Solid Density (t/m^3) = 2.72 **Assumed**
Optimum Water Content (%) = 19
Max Dry Density (t/m^3) = 1.61
Natural Water Content (%) = 9

S. Kokich
Approved Signatory

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Whangarei
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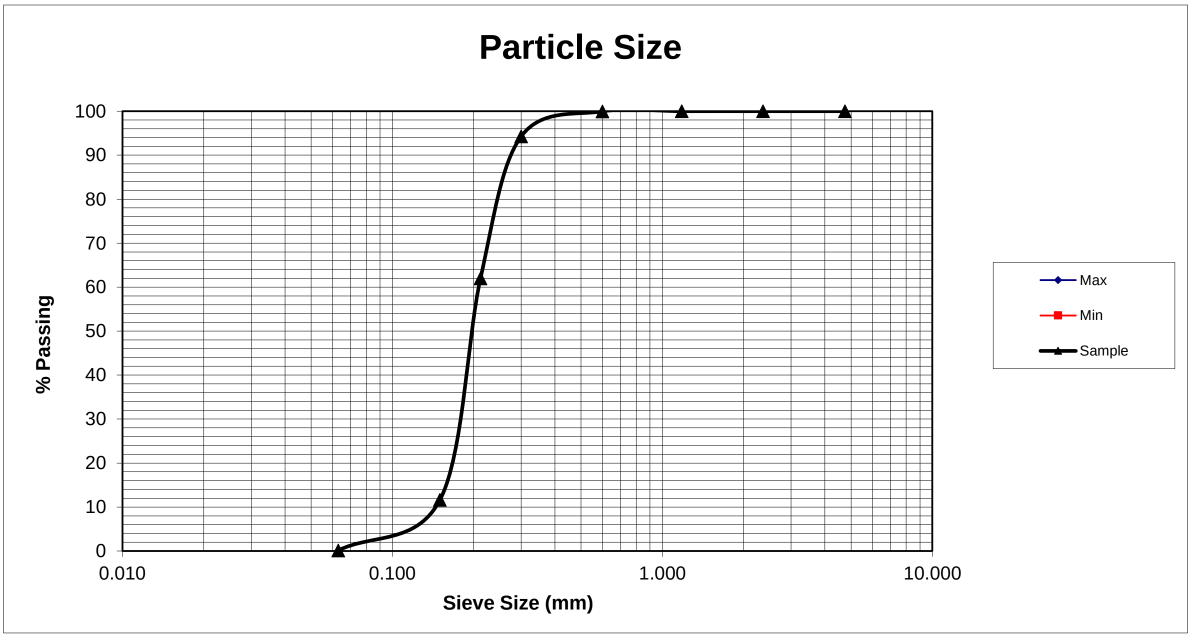
DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - GRAPH

NZS 4402:1986 Test 2.8.1

Lab Job No:	8020-1727	**Sample No:**	21-930
Client:	Cook Costello Ltd	**Tested By:**	A.B
Location:	The Landing, One Tree Point Lot 379 cut area	**Date:**	13/09/2021
		Checked By:	A.M
Date Received:	2/08/2021	**Date:**	28/09/2021
Report No:	W21-1078	**Page:**	4 of 5
REF:	14233		
Sampling Method:	Hand test pit – Sampling not accredited	**Sampled By:**	A.B.
Date Sampled:	2/08/2021		
Test Details:	Wet sieving method		
History:	Natural state		

Description of Sample: **SAND, fine to medium, minor silt, traces of amorphous organics, light brown.**

	% Passing		
Sieve Size	**Max**	**Min**	**Sample**
4.75			100
2.36			100
1.18			100
0.6			100
0.3			94
0.212			62
0.15			12
0.063			0



The percentage passing the finest sieve was obtained by difference

S. Kokich
Approved Signatory

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DETERMINATION OF DRY DENSITY/ WATER CONTENT RELATIONSHIP

NEW ZEALAND STANDARD COMPACTION

NZS 4402:1986 Test 4.1.1

Lab Job No:	8020-1727	**Sample No.:**	21-930
Client:	Cook Costello Ltd	**Tested By:**	J.Att
Project:	The Landing, One Tree Point	**Date:**	6/09/2021
Location:	Lot 379 cut area	**Checked By:**	A.M
		Date:	28/09/2021
Date Received:	2/08/2021	**Page:**	5 of 5
Report No:	W21-1078		
REF:	14233		

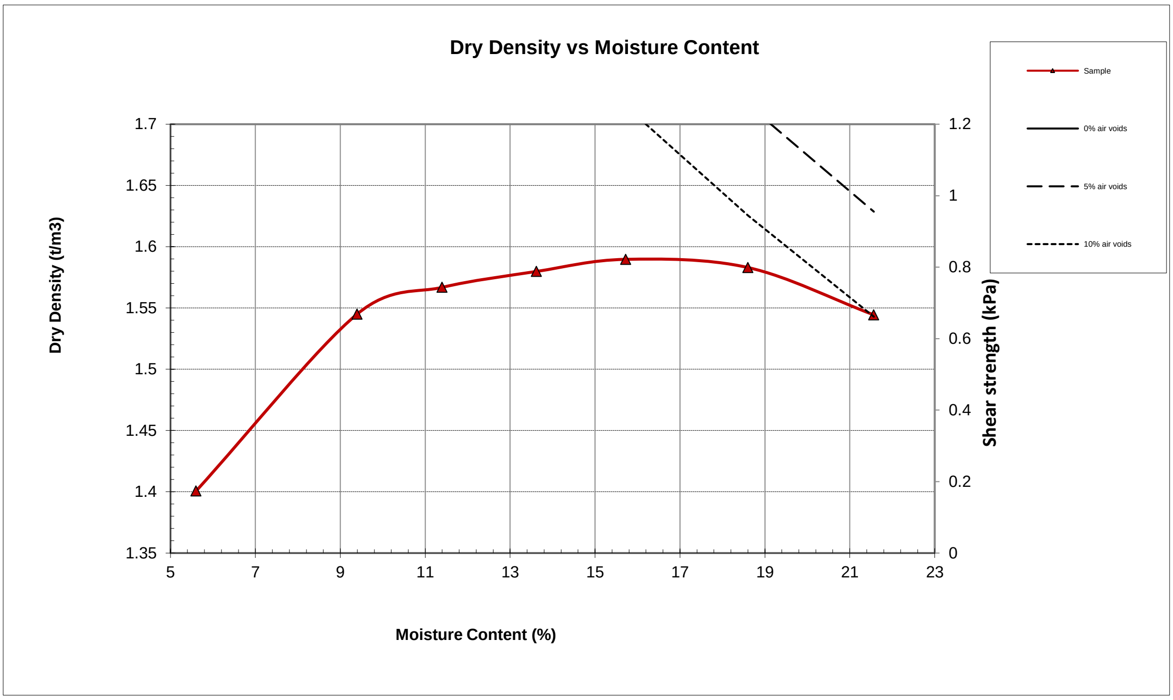
Sample Description: SAND, fine to medium, minor silt, traces of amorphous organics, light brown.

Compaction used: New Zealand Standard Compaction Test performed on:
Whole sample

History: Natural

Total mass of sample: 20000 g

Mass retained on 19mm BS test sieve: 0 g


Dry Density vs Moisture Content

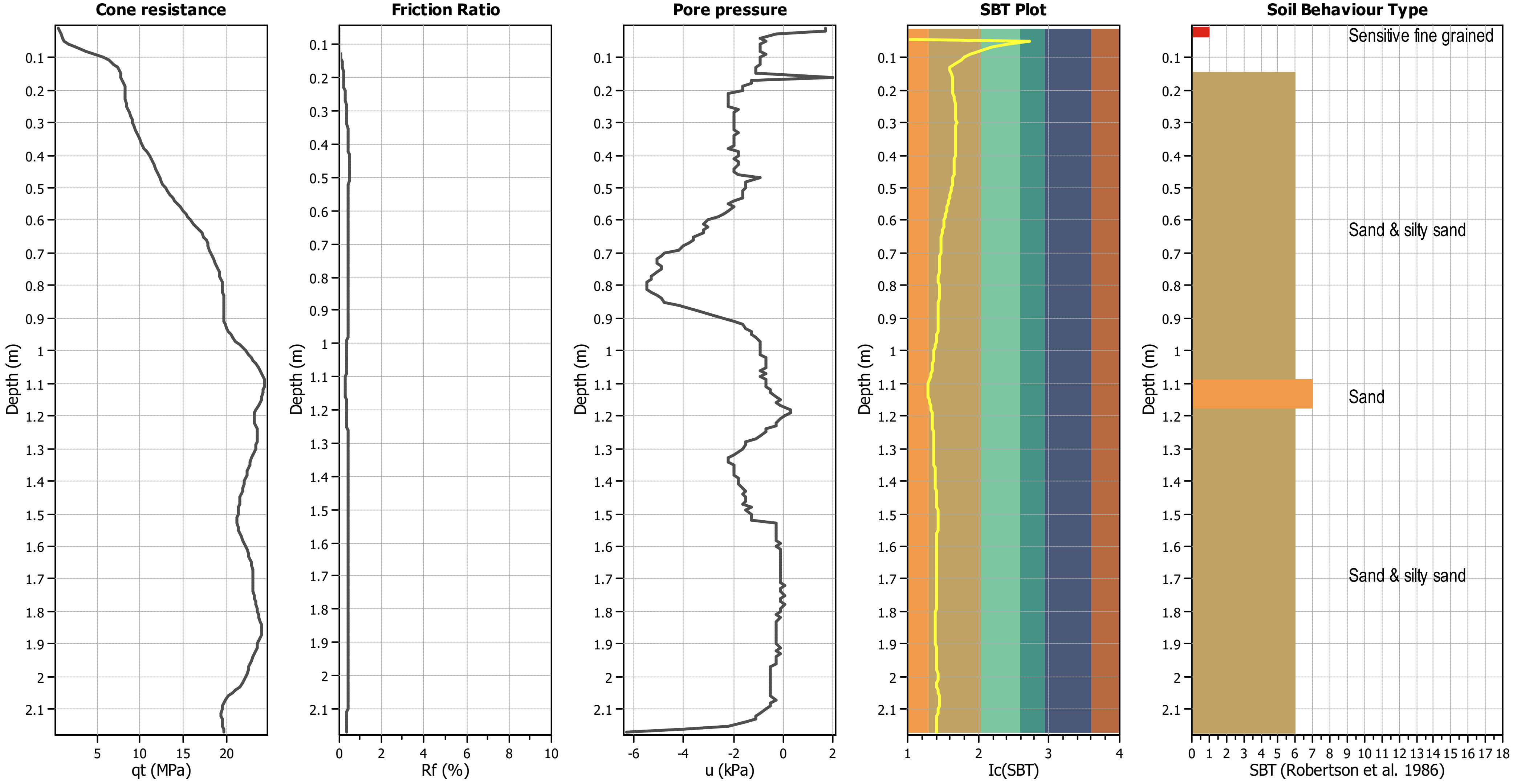
<table>
<tr><th colspan="4">Test Results</th></tr>
<tr><th rowspan="2">Water Content (%)</th><th rowspan="2">Dry Density (t/m³)</th><th colspan="2">Shear Vane (kPa)</th></tr>
<tr><th>Peak</th><th>Residual</th></tr>
<tr><td>5.6</td><td>1.401</td><td>-</td><td>-</td></tr>
<tr><td>9.4</td><td>1.545</td><td>-</td><td>-</td></tr>
<tr><td>11.4</td><td>1.567</td><td>-</td><td>-</td></tr>
<tr><td>13.6</td><td>1.580</td><td>-</td><td>-</td></tr>
<tr><td>15.7</td><td>1.590</td><td>-</td><td>-</td></tr>
<tr><td>18.6</td><td>1.583</td><td>-</td><td>-</td></tr>
<tr><td>21.6</td><td>1.544</td><td>-</td><td>-</td></tr>
</table>

Solid Density (t/m^3) =	**2.72 Assumed**
Optimum Water Content (%) =	**16**
Max Dry Density (t/m^3) =	**1.59**
Natural Water Content (%) =	**11**

S. Kokich
Approved Signatory

Appendix 5 – Liquefaction Results

CPT basic interpretation plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.03
Depth to water table (insitu): 3.00 m

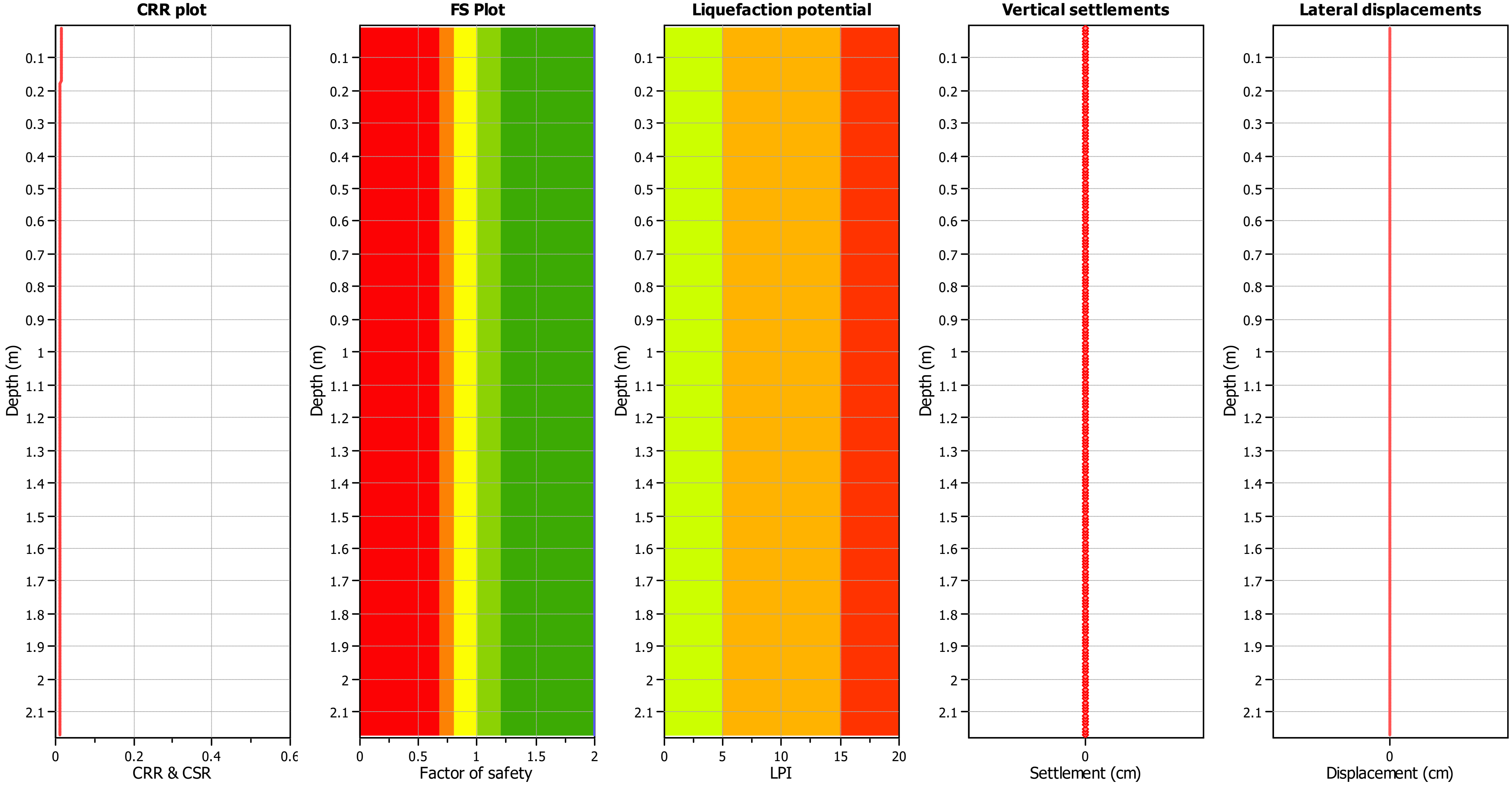
Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_σ applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
Limit depth: N/A

SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty
- 🟩 5. Silty sand to sandy silt
- 🟨 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬛ 8. Very stiff sand to
- ⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

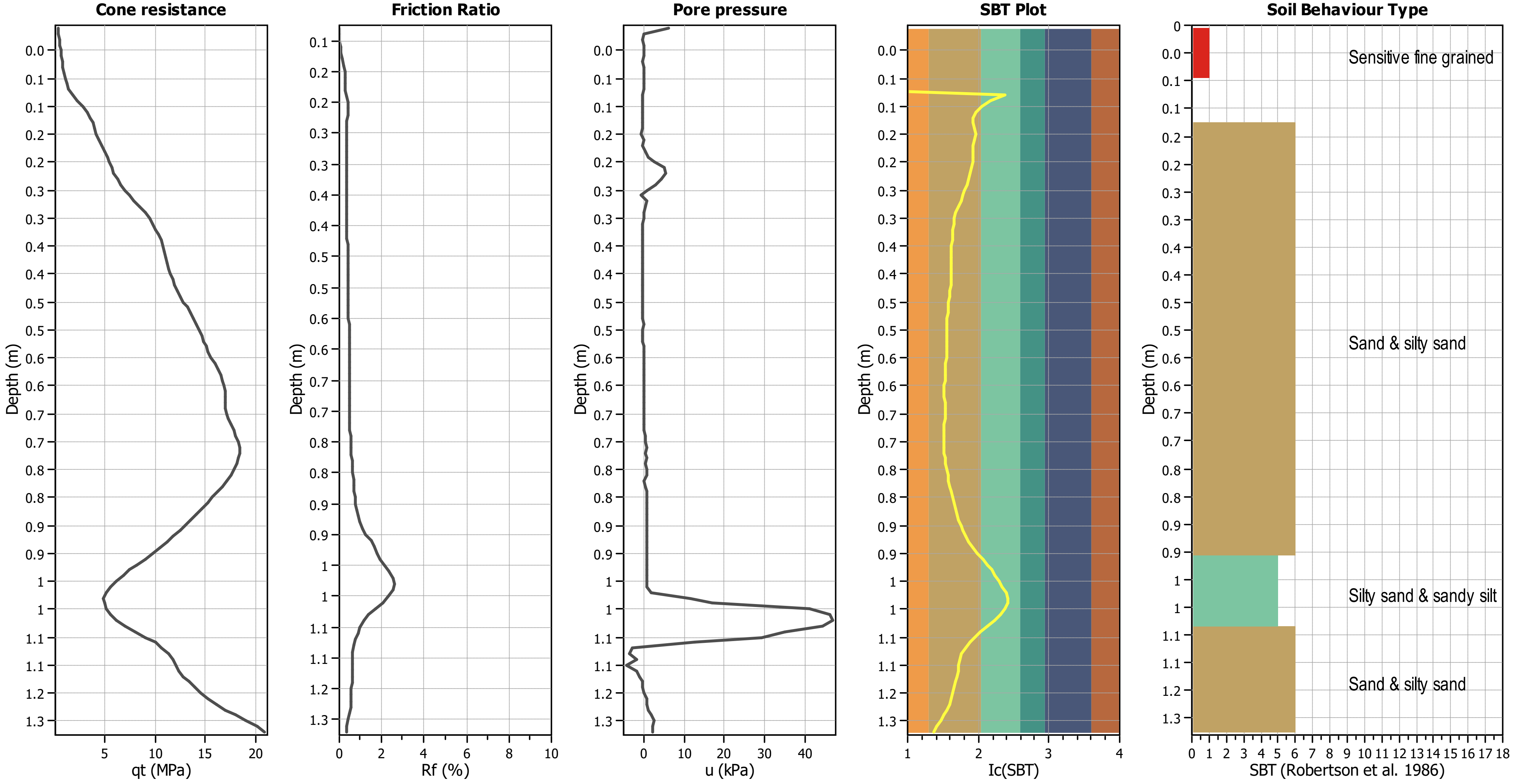
F.S. color scheme

- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
- 🟩 Almost certain it will not liquefy

LPI color scheme

- 🟥 Very high risk
- 🟧 High risk
- 🟨 Low risk

CPT basic interpretation plots



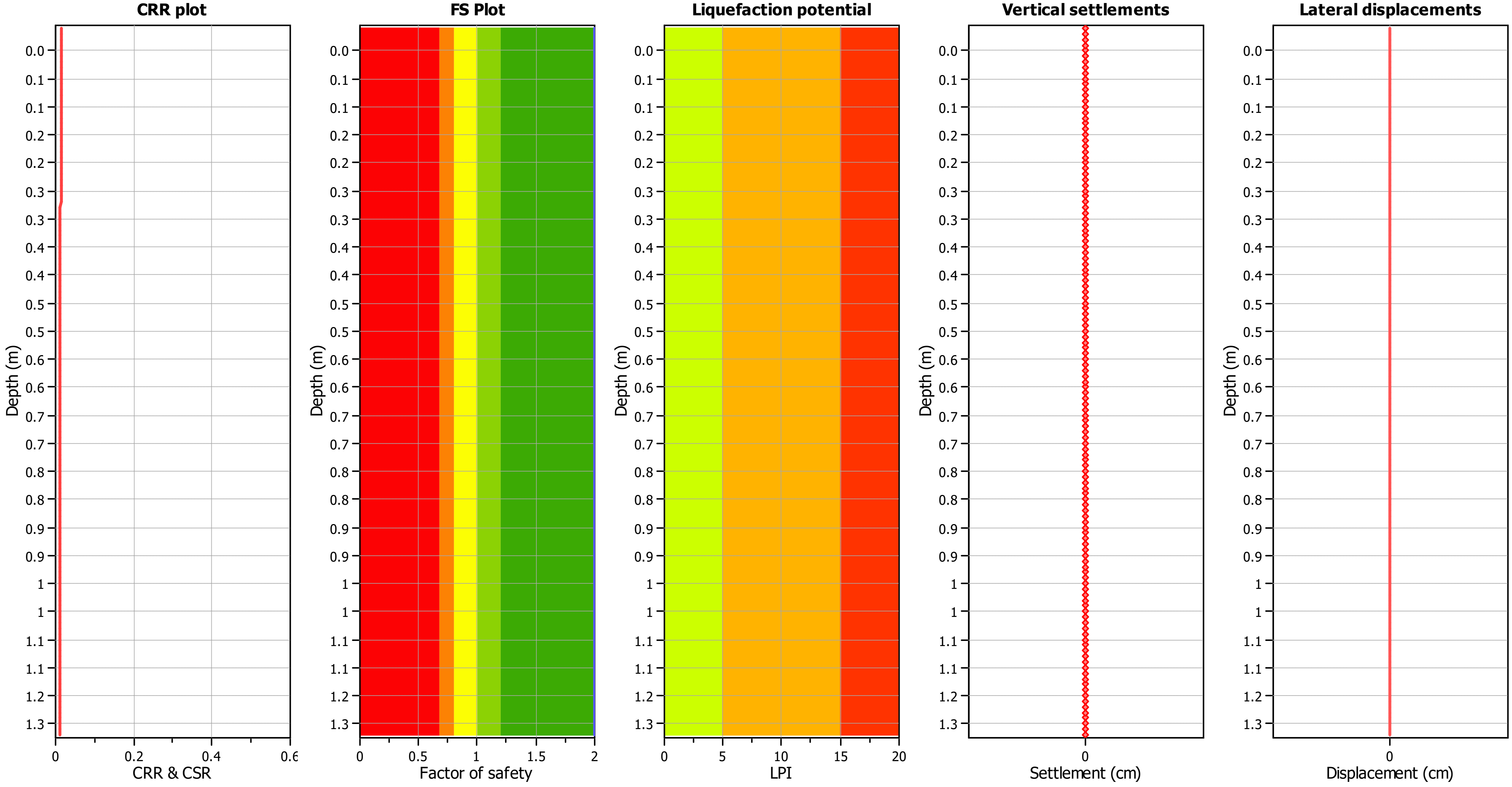
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

🟥 1. Sensitive fine grained	■ 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	■ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	☐ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

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LPI color scheme

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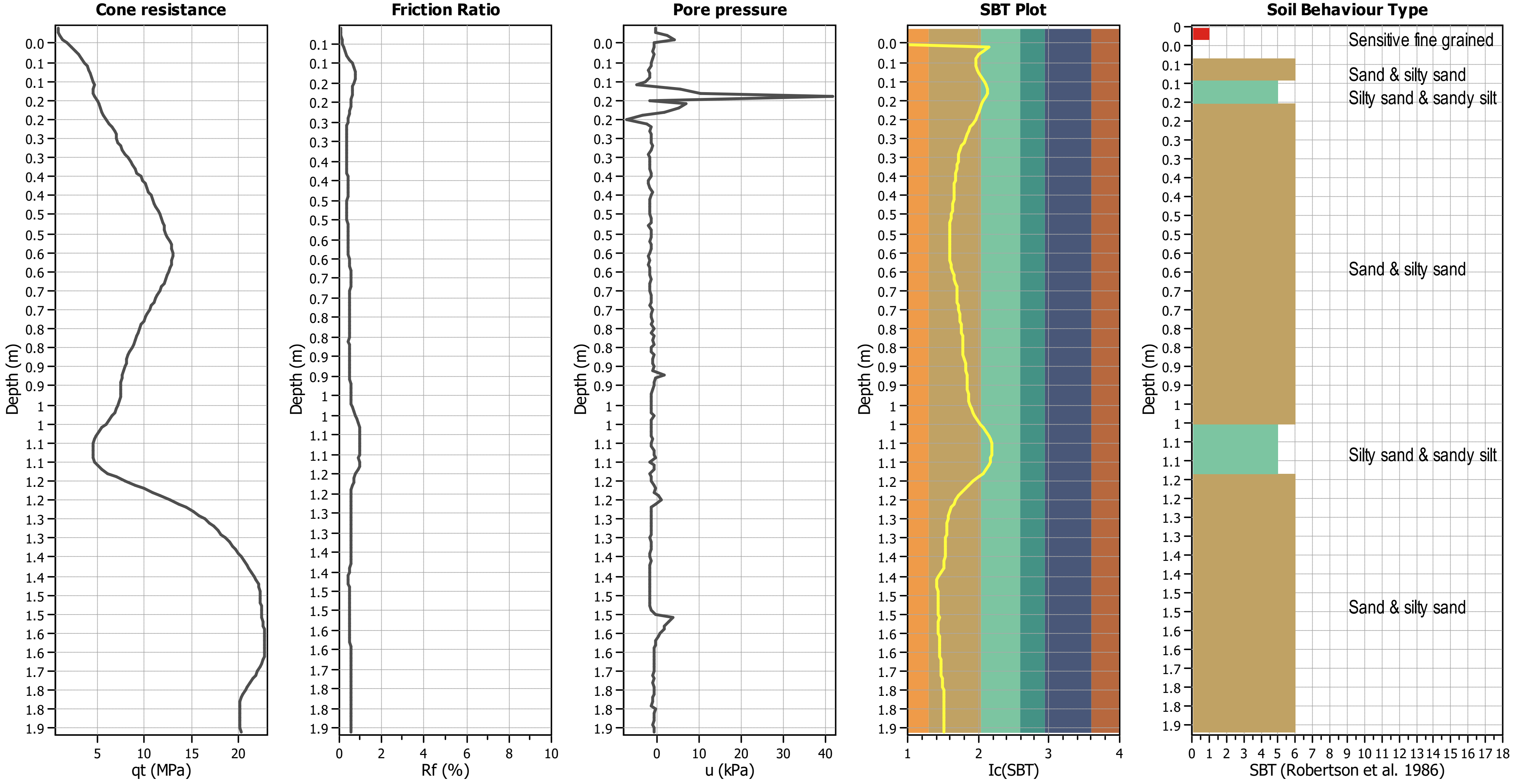
CPT basic interpretation plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.03
Depth to water table (insitu): 3.00 m

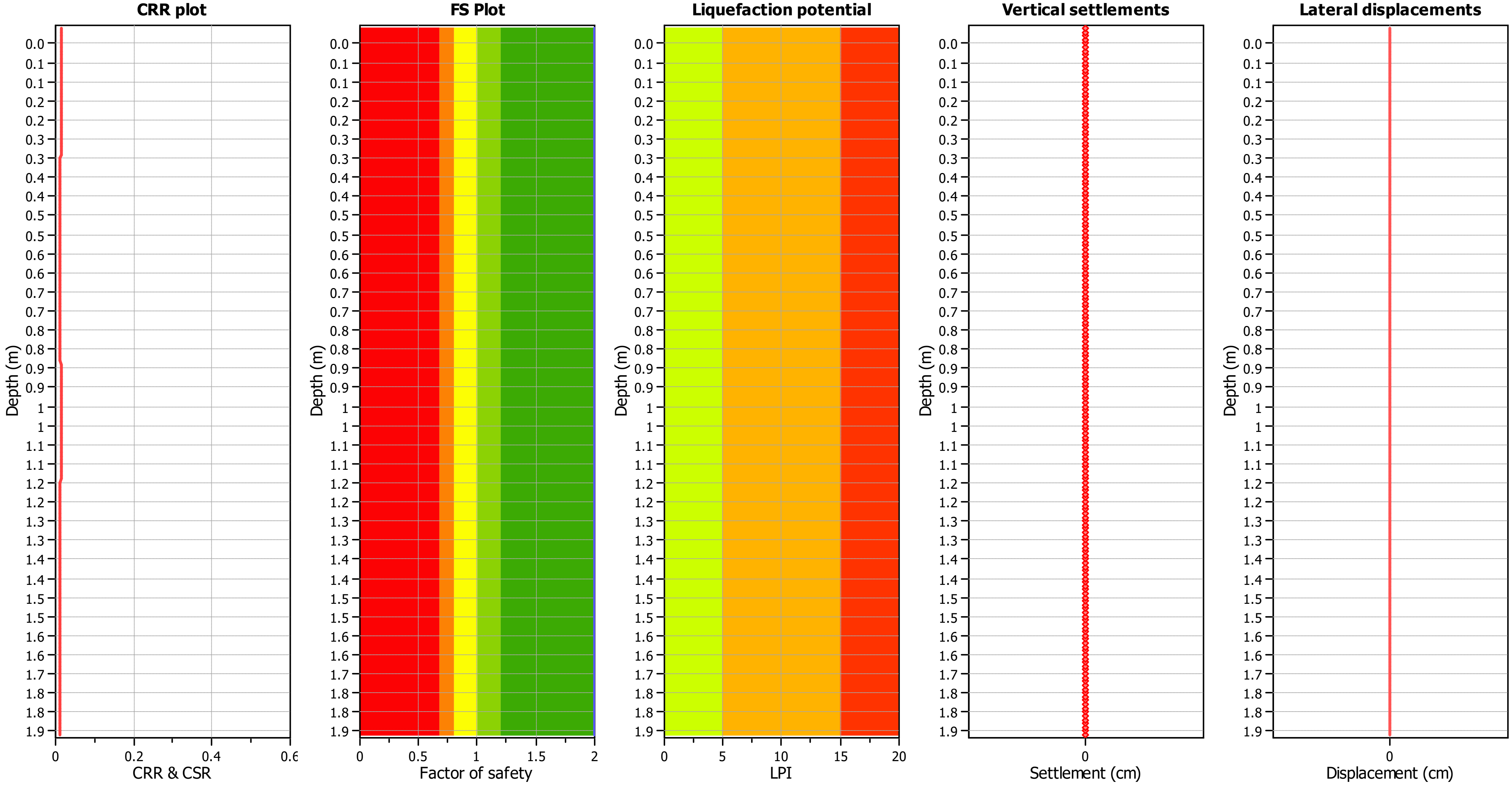
Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_{σ} applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
Limit depth: N/A

SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬛ 8. Very stiff sand to
⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
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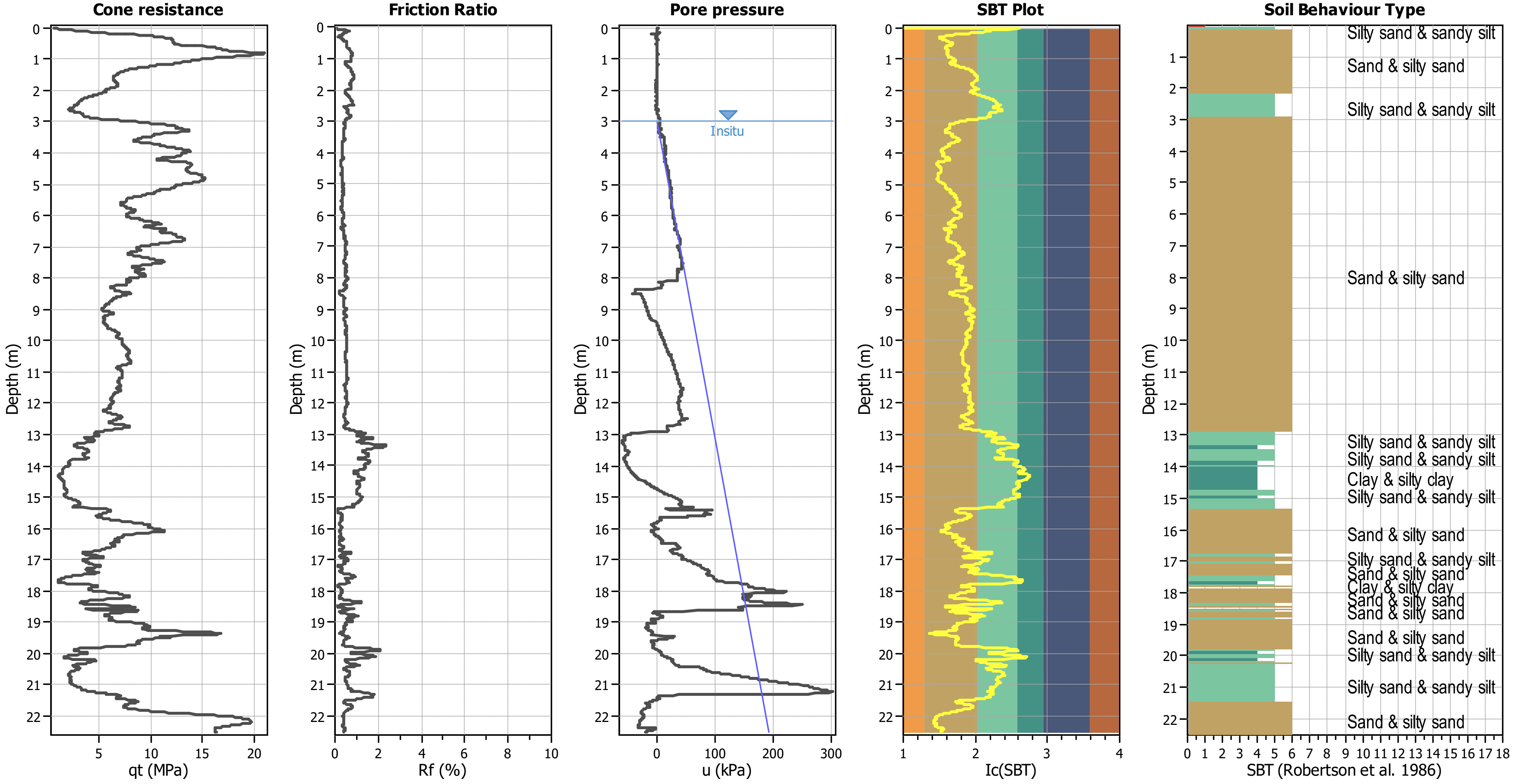
CPT basic interpretation plots



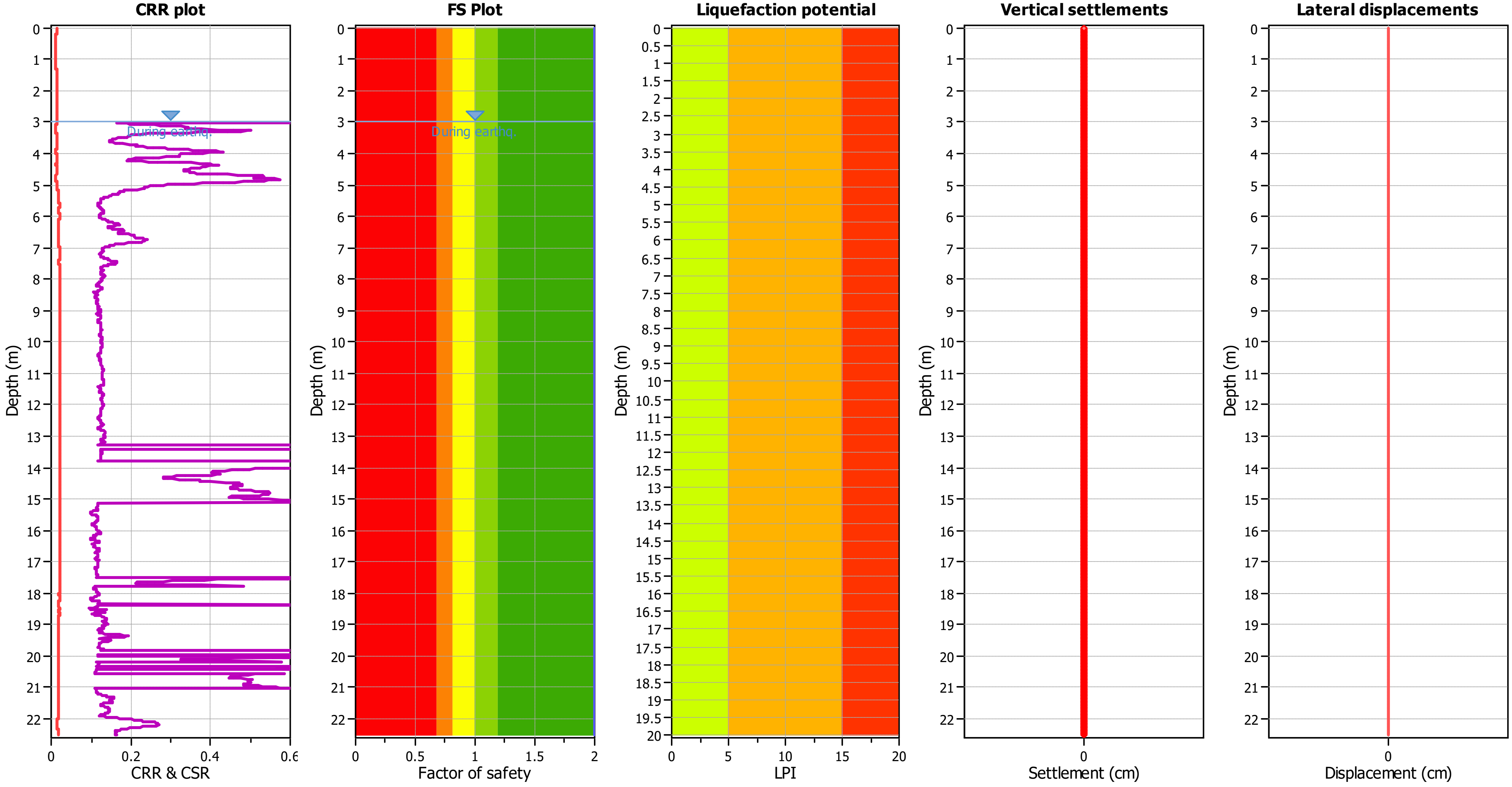
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬜ 8. Very stiff sand to
⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
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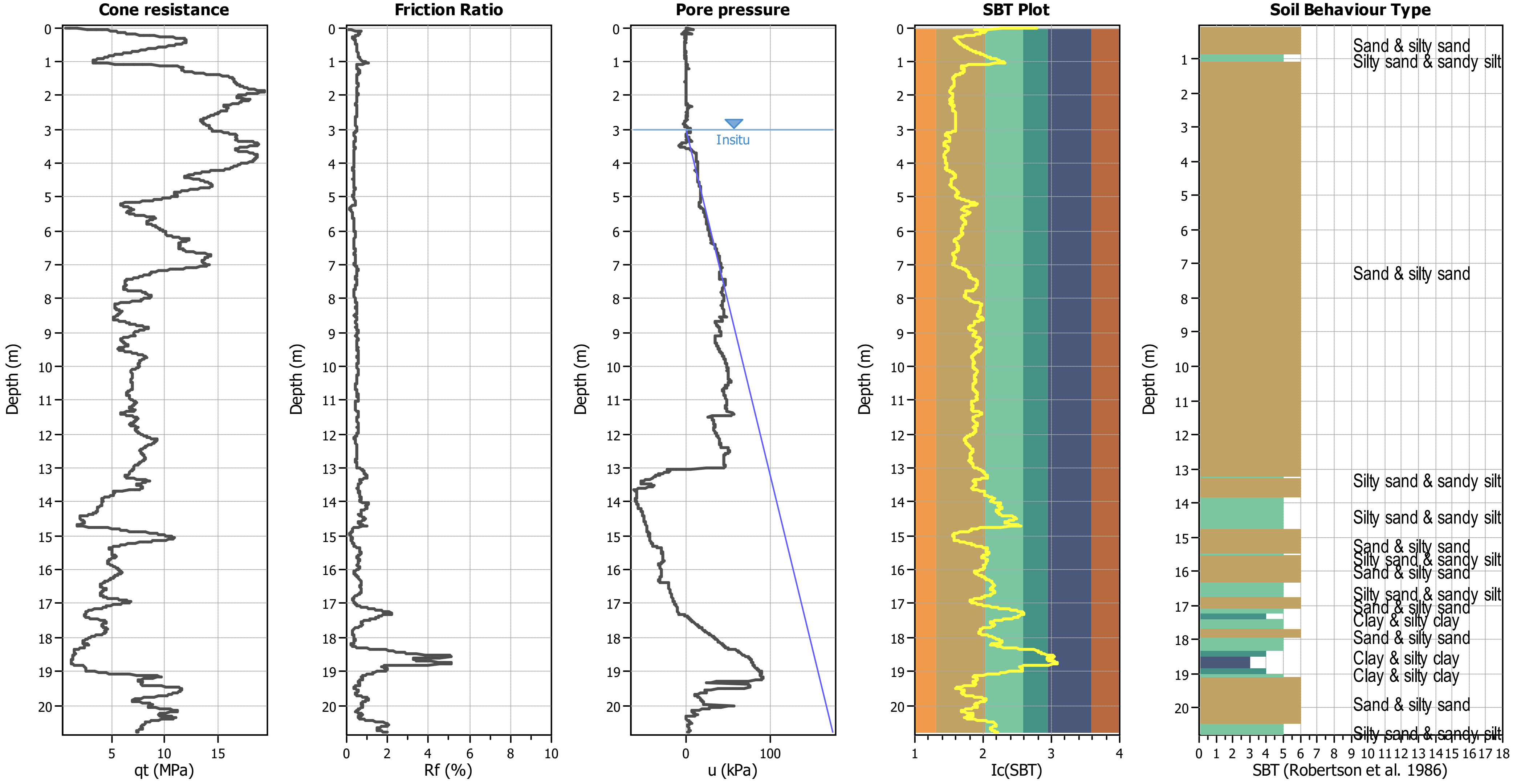
CPT basic interpretation plots



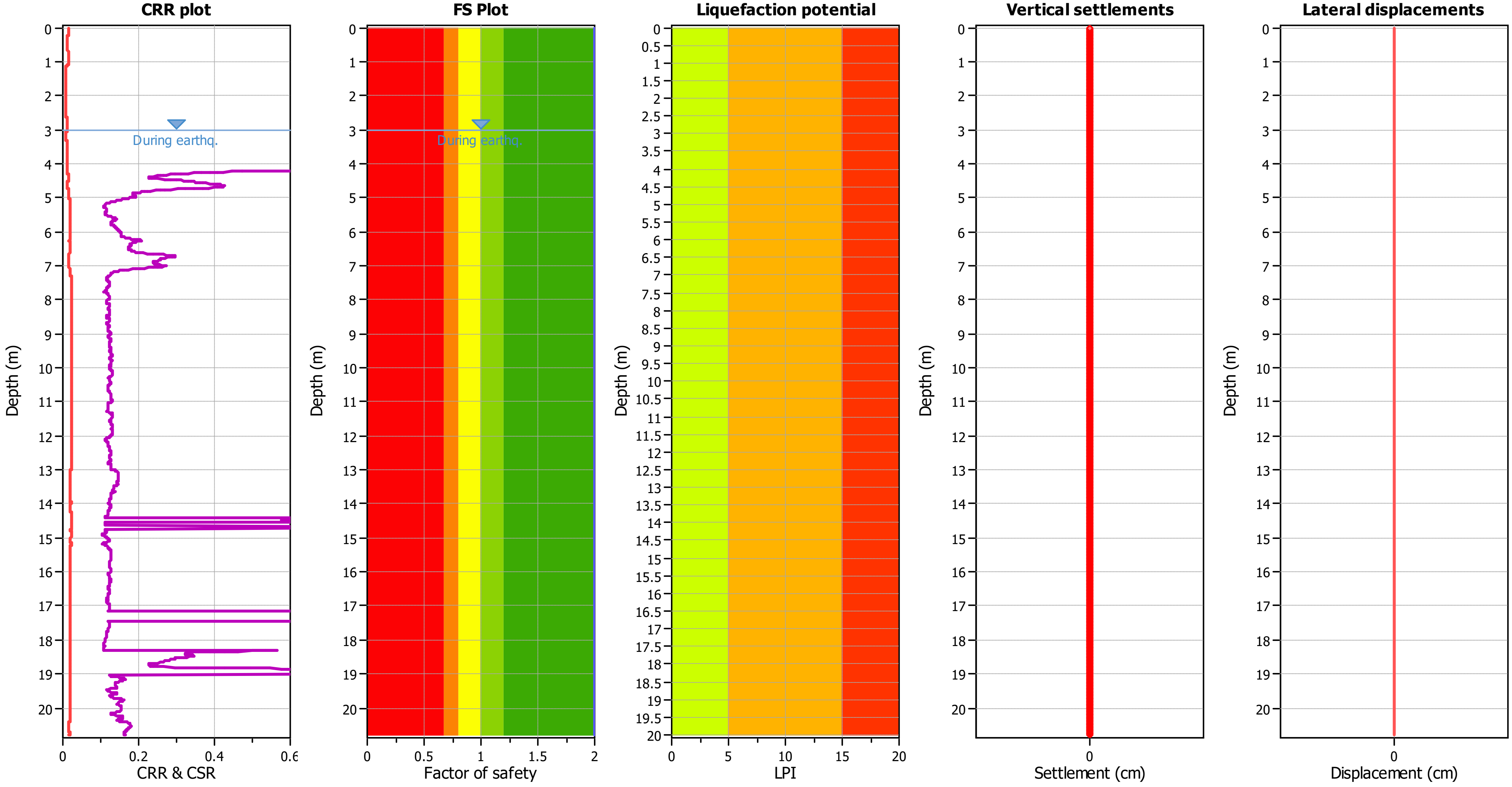
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

■ 1. Sensitive fine grained
■ 2. Organic material
■ 3. Clay to silty clay
■ 4. Clayey silt to silty
■ 5. Silty sand to sandy silt
■ 6. Clean sand to silty sand
■ 7. Gravely sand to sand
■ 8. Very stiff sand to
■ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

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LPI color scheme

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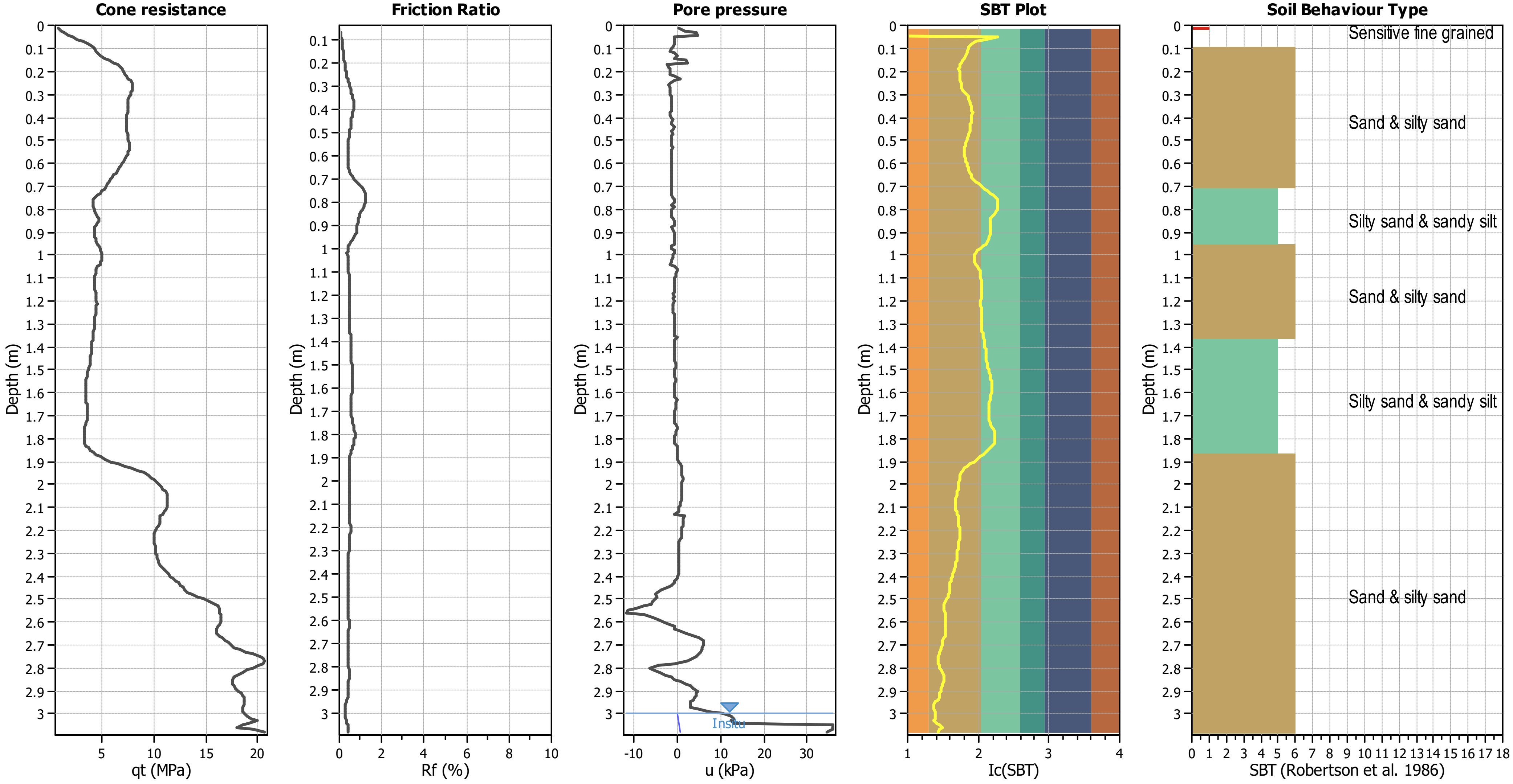
CPT basic interpretation plots



Cone resistance

Friction Ratio

Pore pressure

SBT Plot

Soil Behaviour Type

Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.03
Depth to water table (insitu): 3.00 m

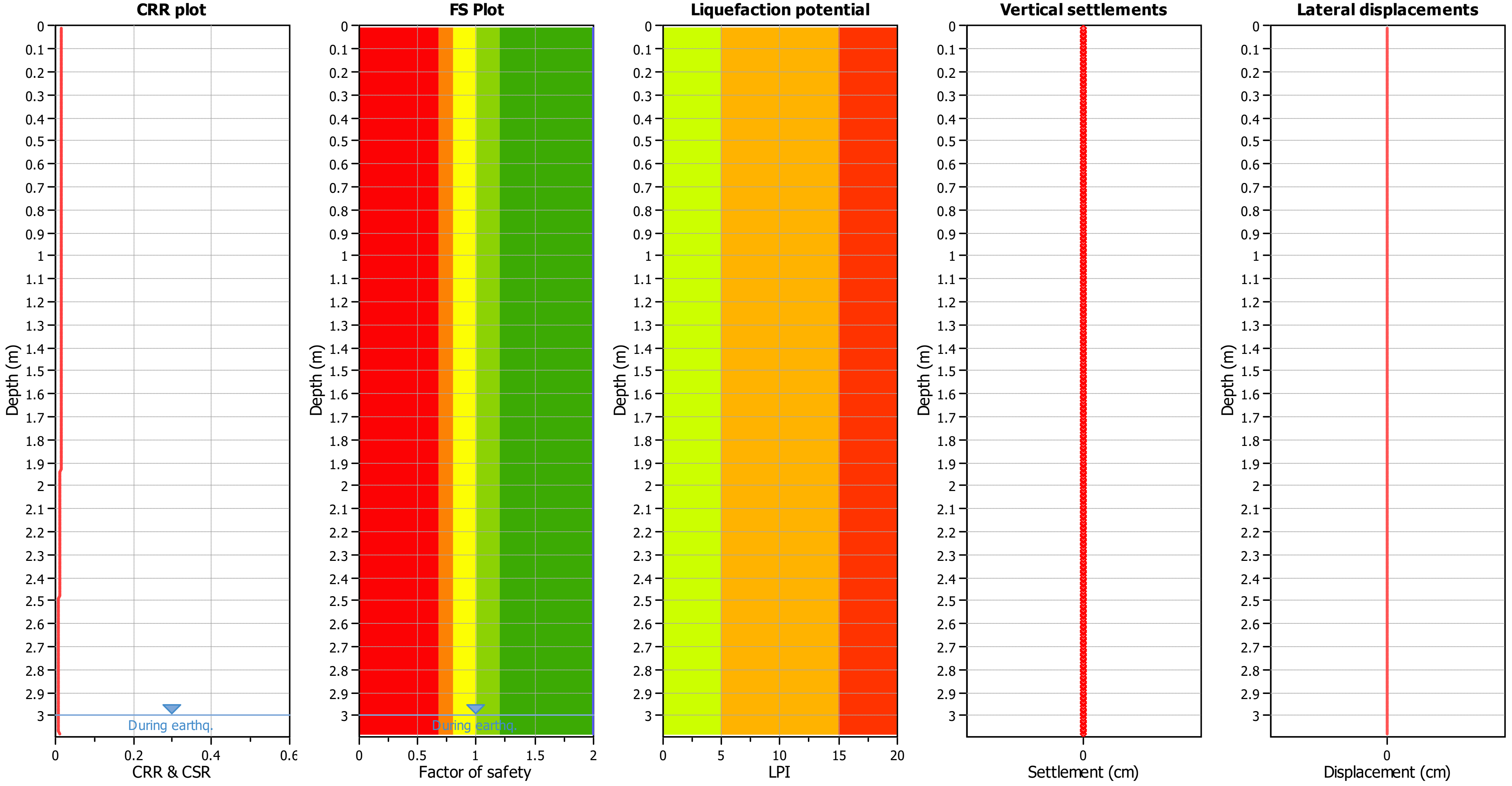
Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_σ applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
Limit depth: N/A

SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬜ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

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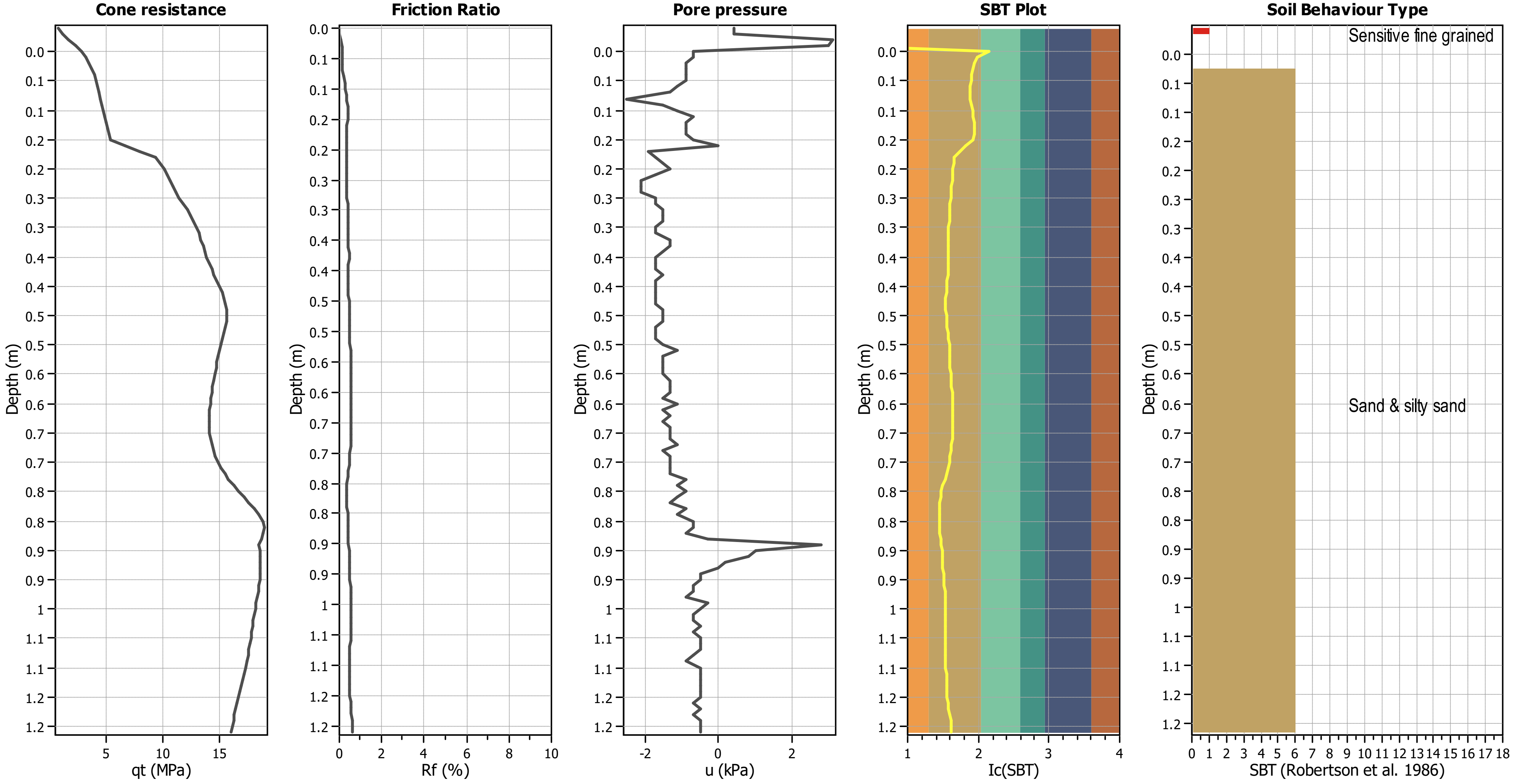
CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

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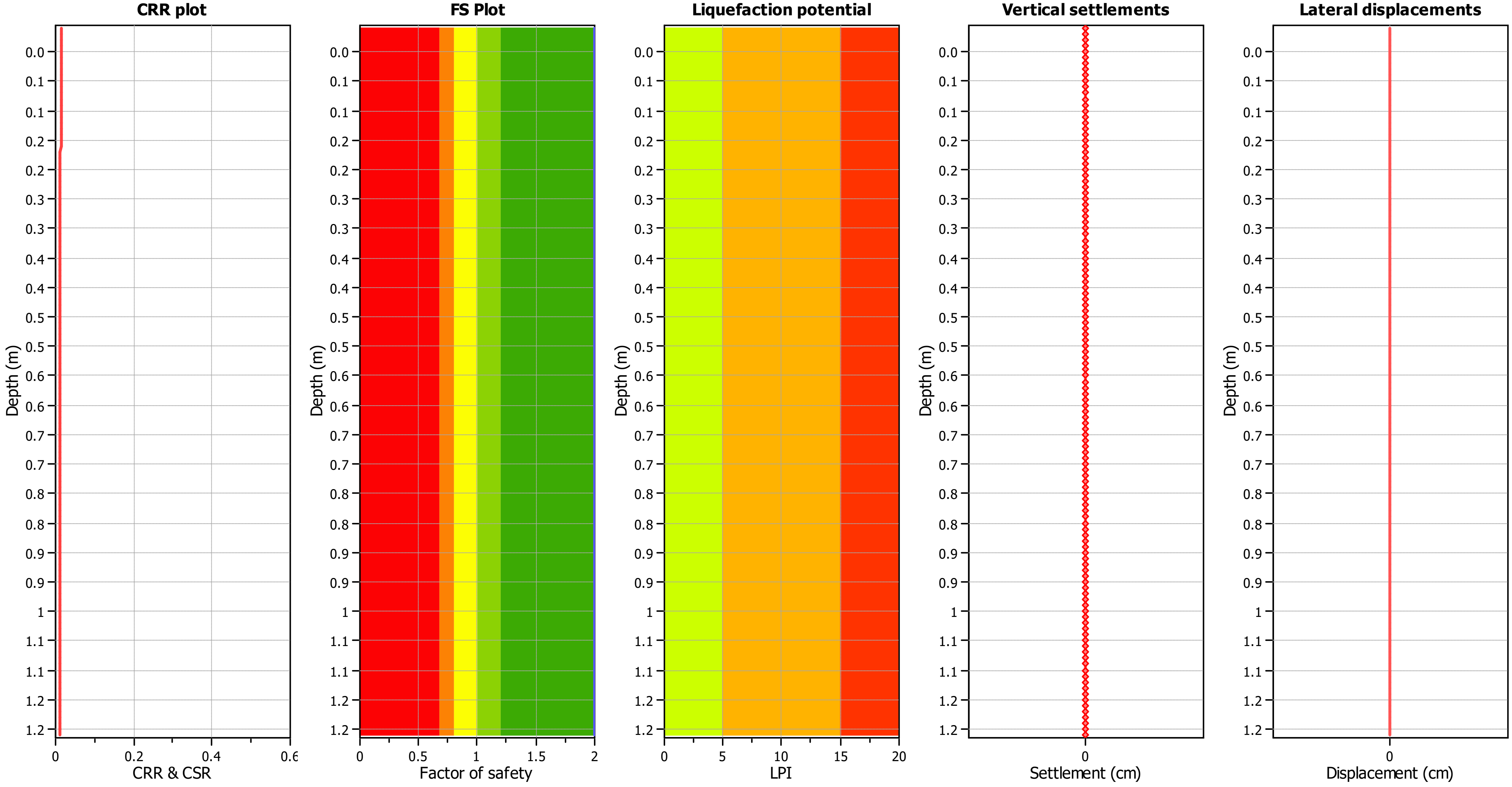
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬜ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
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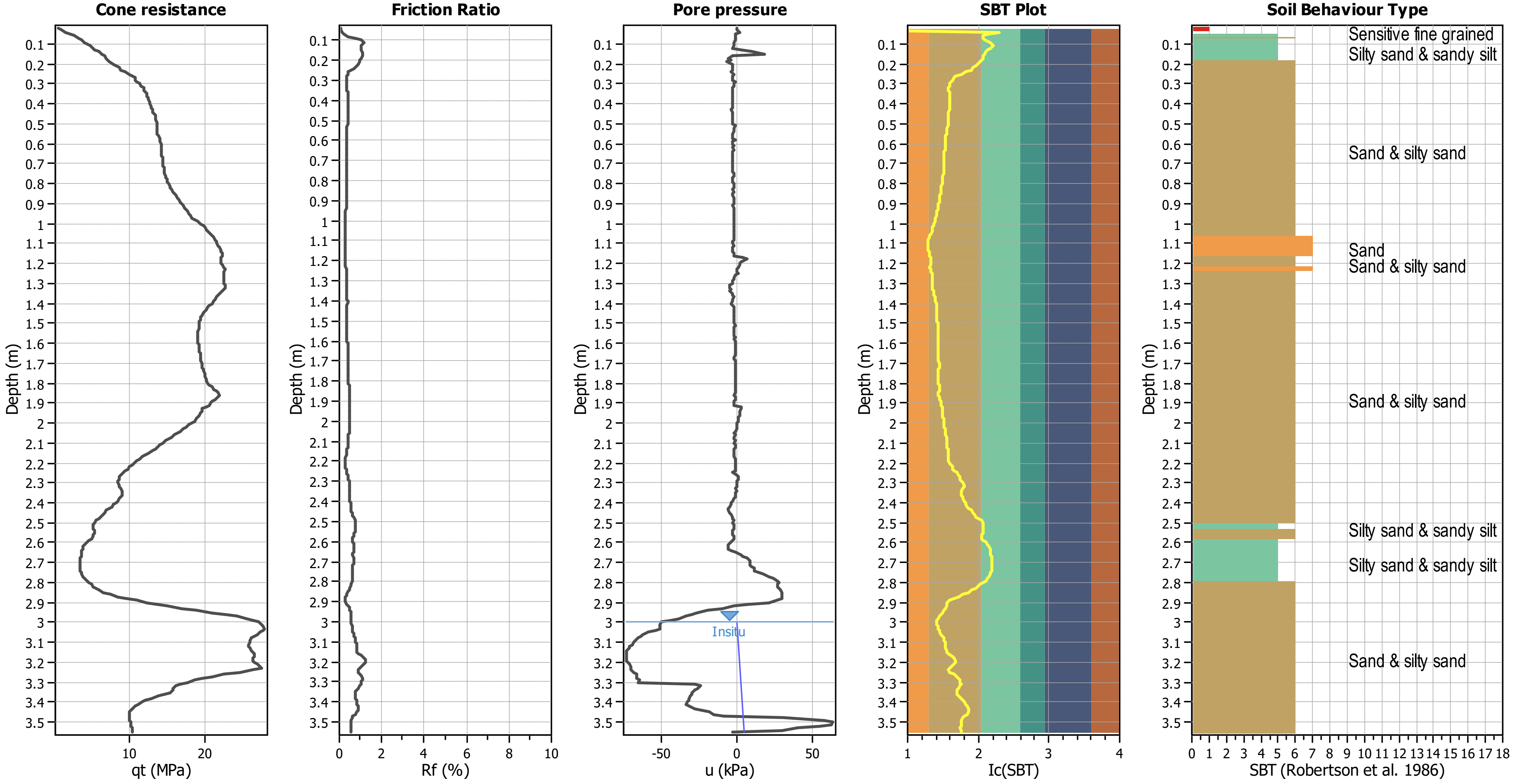
CPT basic interpretation plots



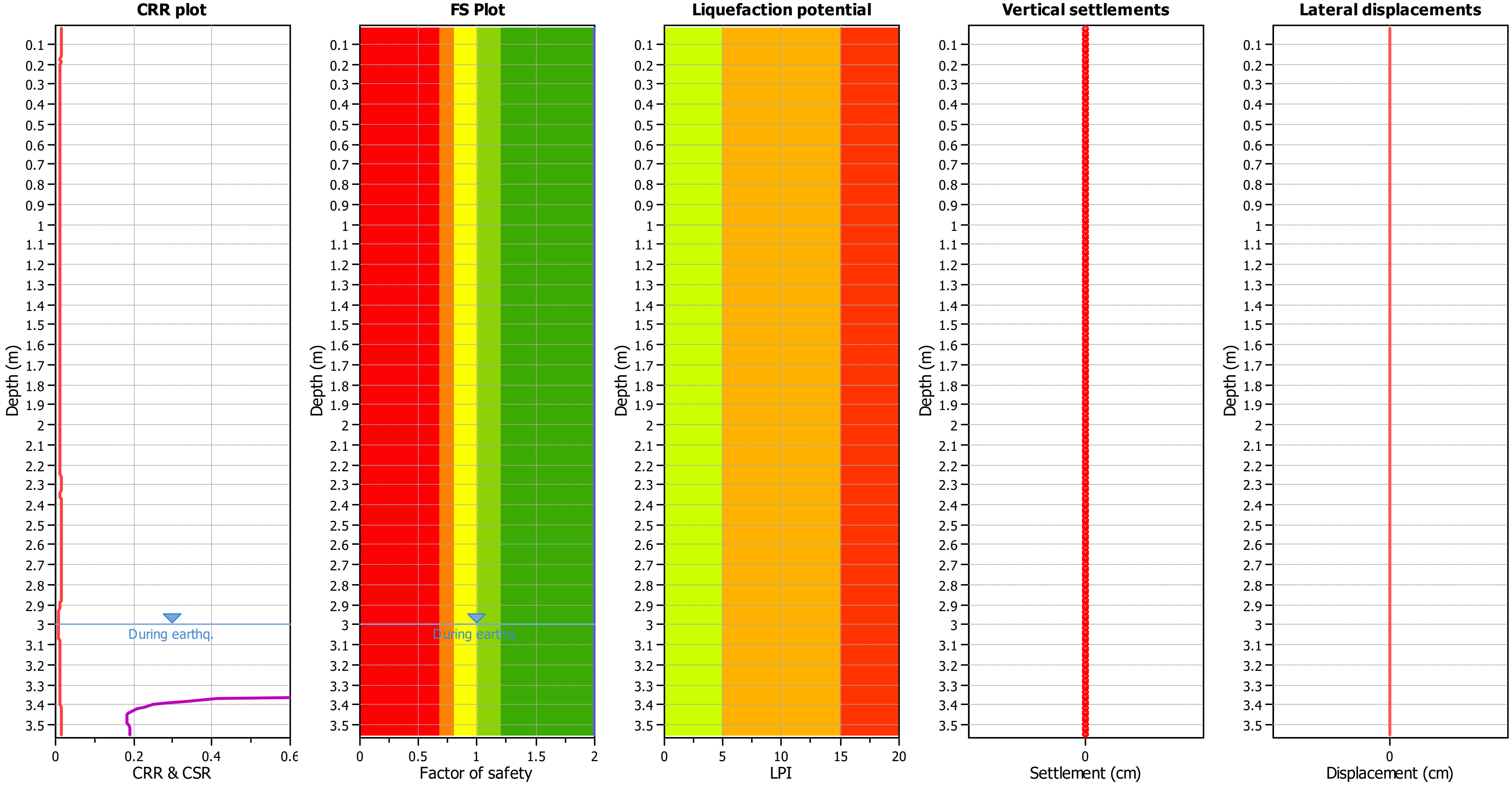
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.03	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬛ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
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LPI color scheme

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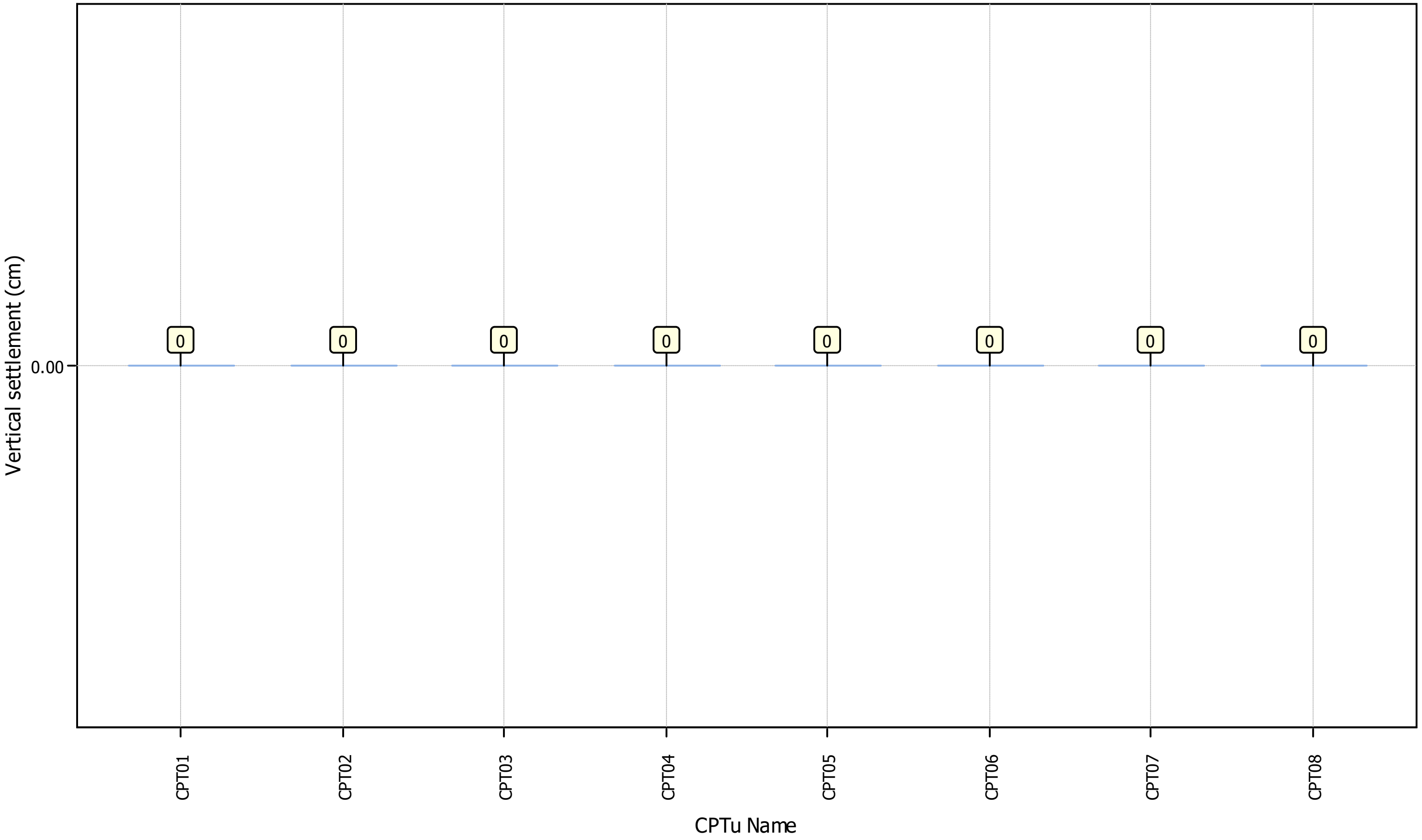
Project title : 14333 Stage 6 & 7 Liquefaction Analysis - SLS

Location : The Landings, One Tree Point

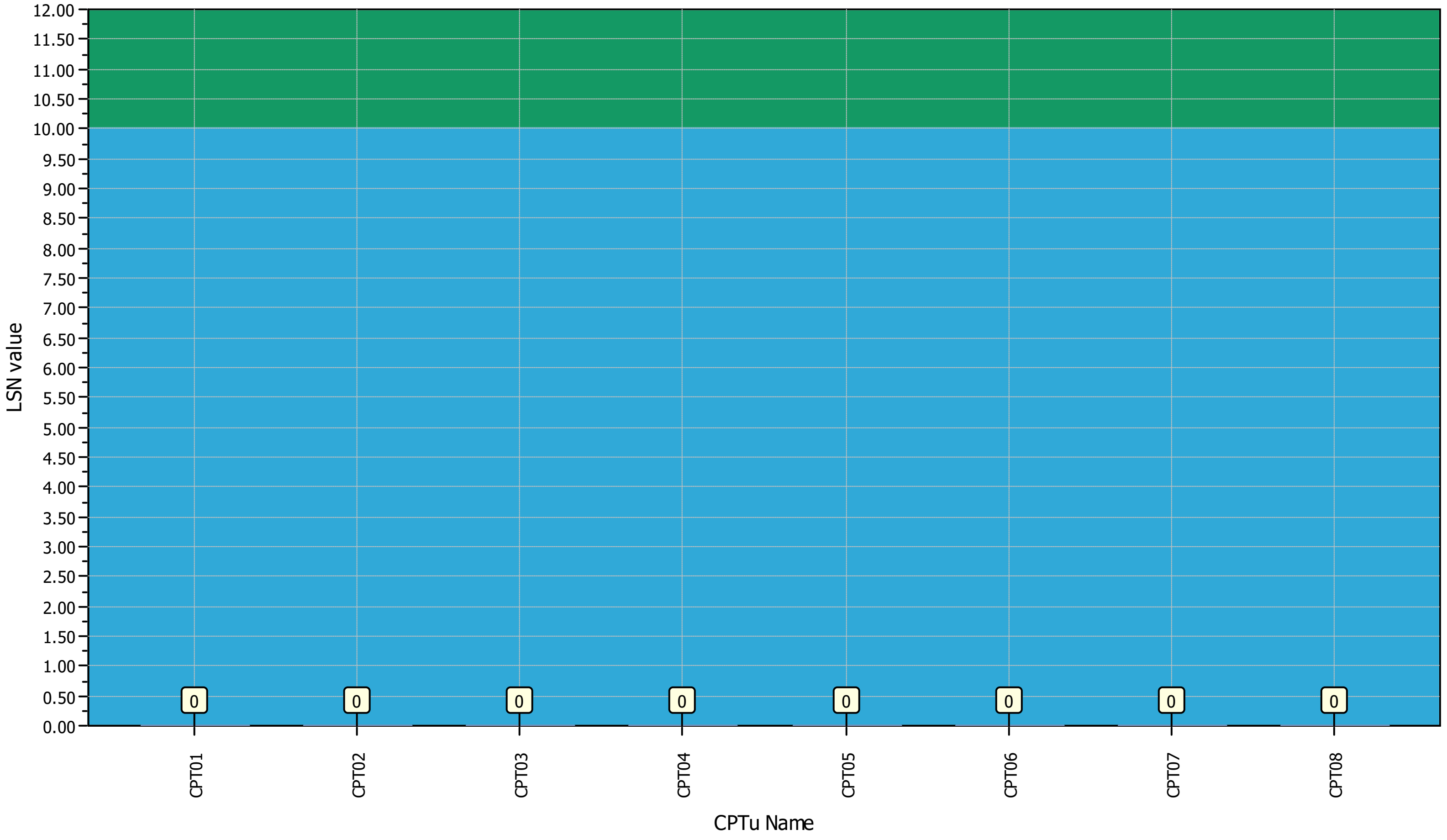
Overall vertical settlements report



Project title : 14333 Stage 6 & 7 Liquefaction Analysis - SLS

Location : The Landings, One Tree Point

Overall Liquefaction Severity Number report



LSN color scheme

- 🟥 Severe damage
- 🟥 Major expression of liquefaction
- 🟧 Moderate to severe exp. of liquefaction
- 🟨 Moderate expression of liquefaction
- 🟩 Minor expression of liquefaction
- 🟦 Little to no expression of liquefaction

Basic statistics

Total CPT number: 8

100% little liquefaction

0% minor liquefaction

0% moderate liquefaction

0% moderate to major liquefaction

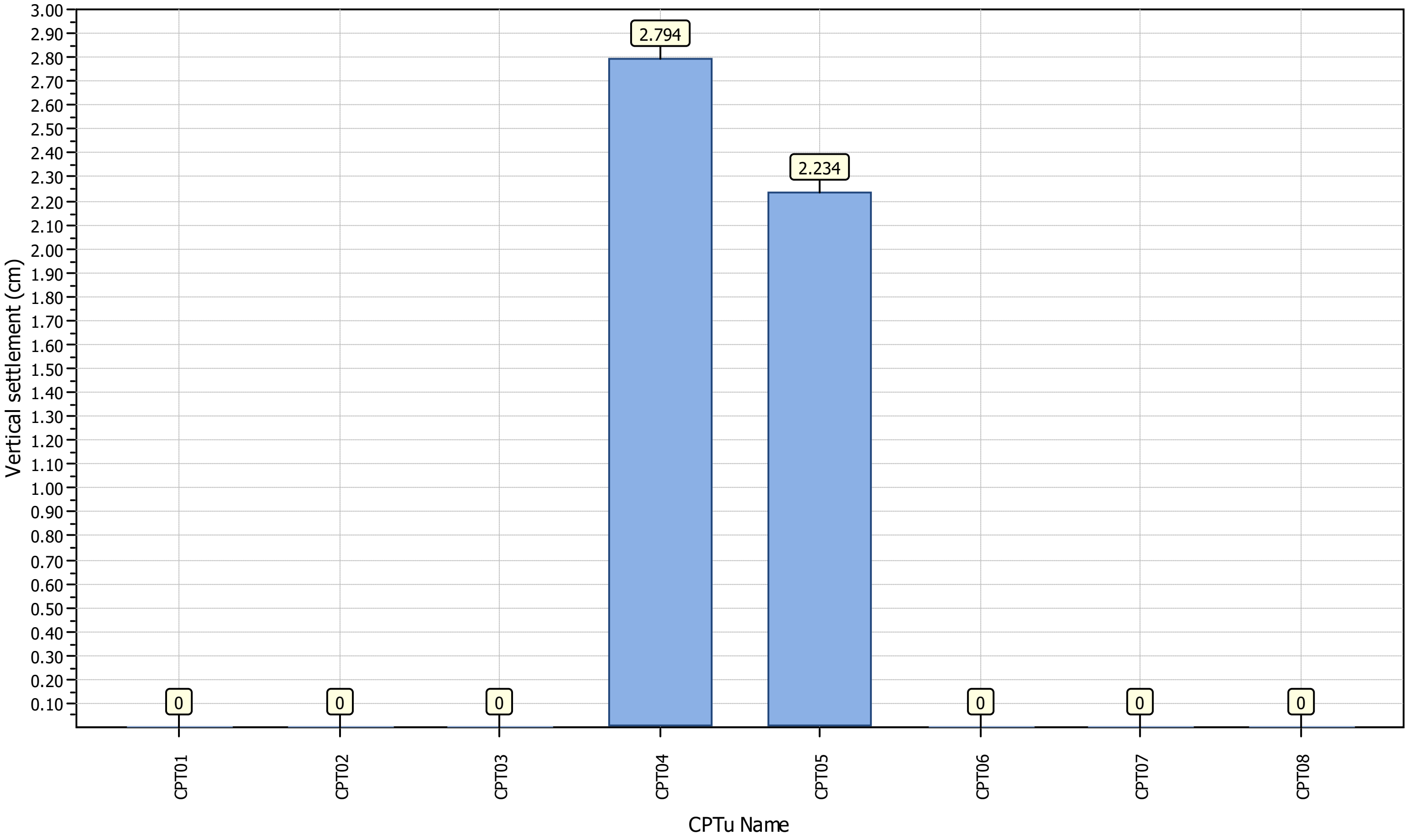
0% major liquefaction

0% severe liquefaction

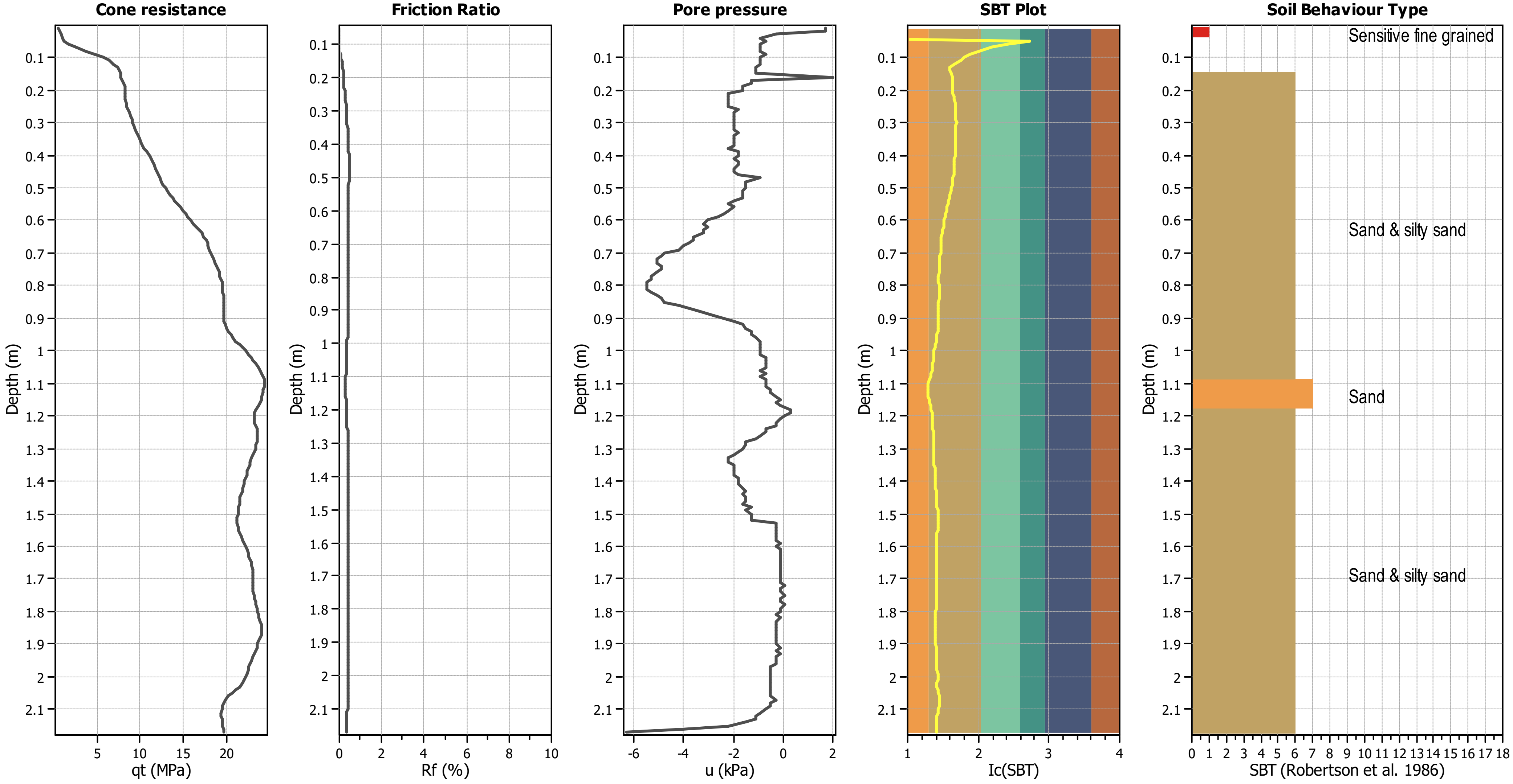
Project title : 14333 Stage 6 & 7 Liquefaction Analysis - ULS

Location : The Landings, One Tree Point

Overall vertical settlements report



CPT basic interpretation plots



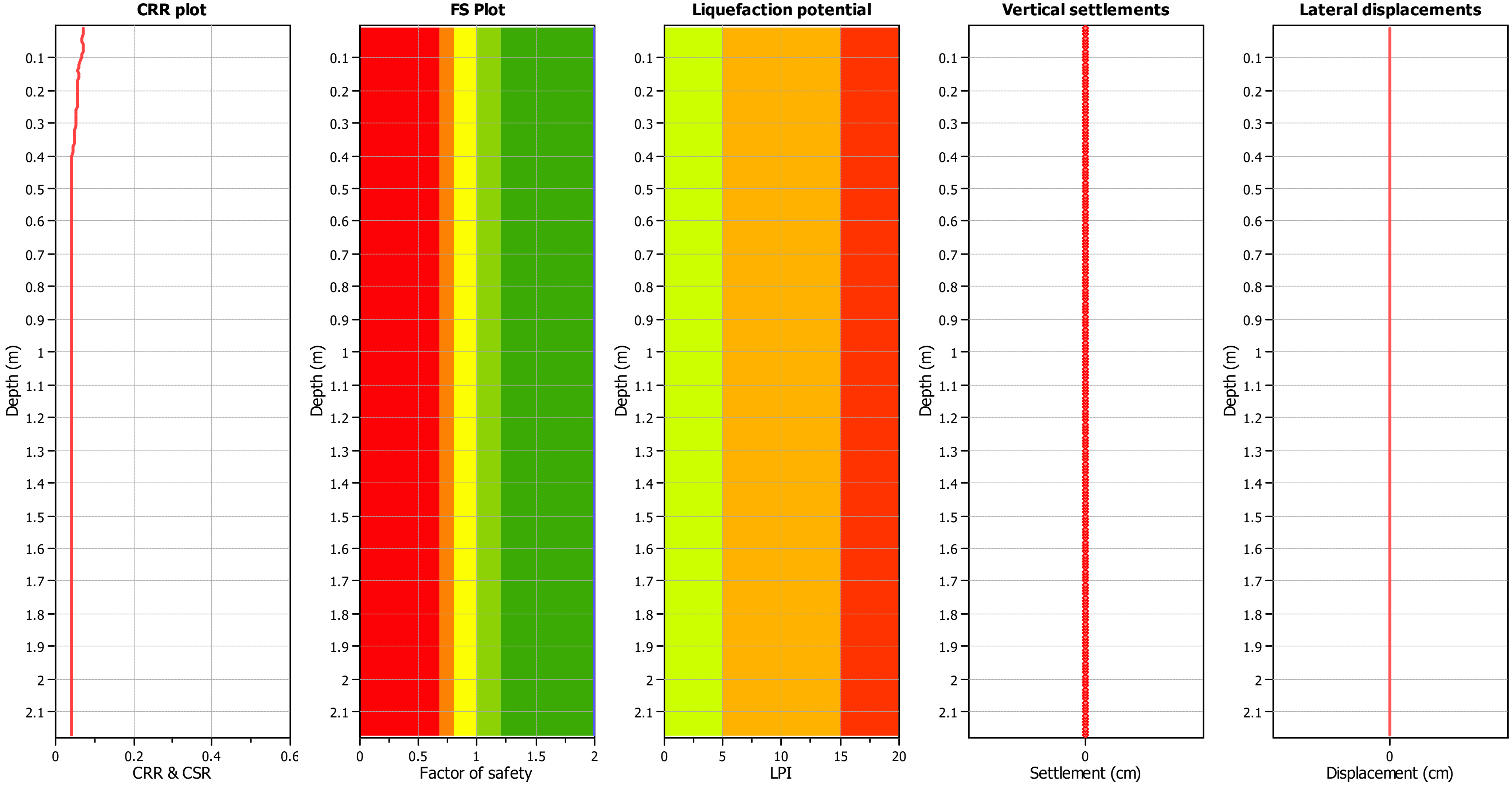
Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

🟥 1. Sensitive fine grained	■ 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	■ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	☐ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_{w}: 5.80
Peak ground acceleration: 0.13
Depth to water table (insitu): 3.00 m

Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_{σ} applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
Limit depth: N/A

F.S. color scheme

- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
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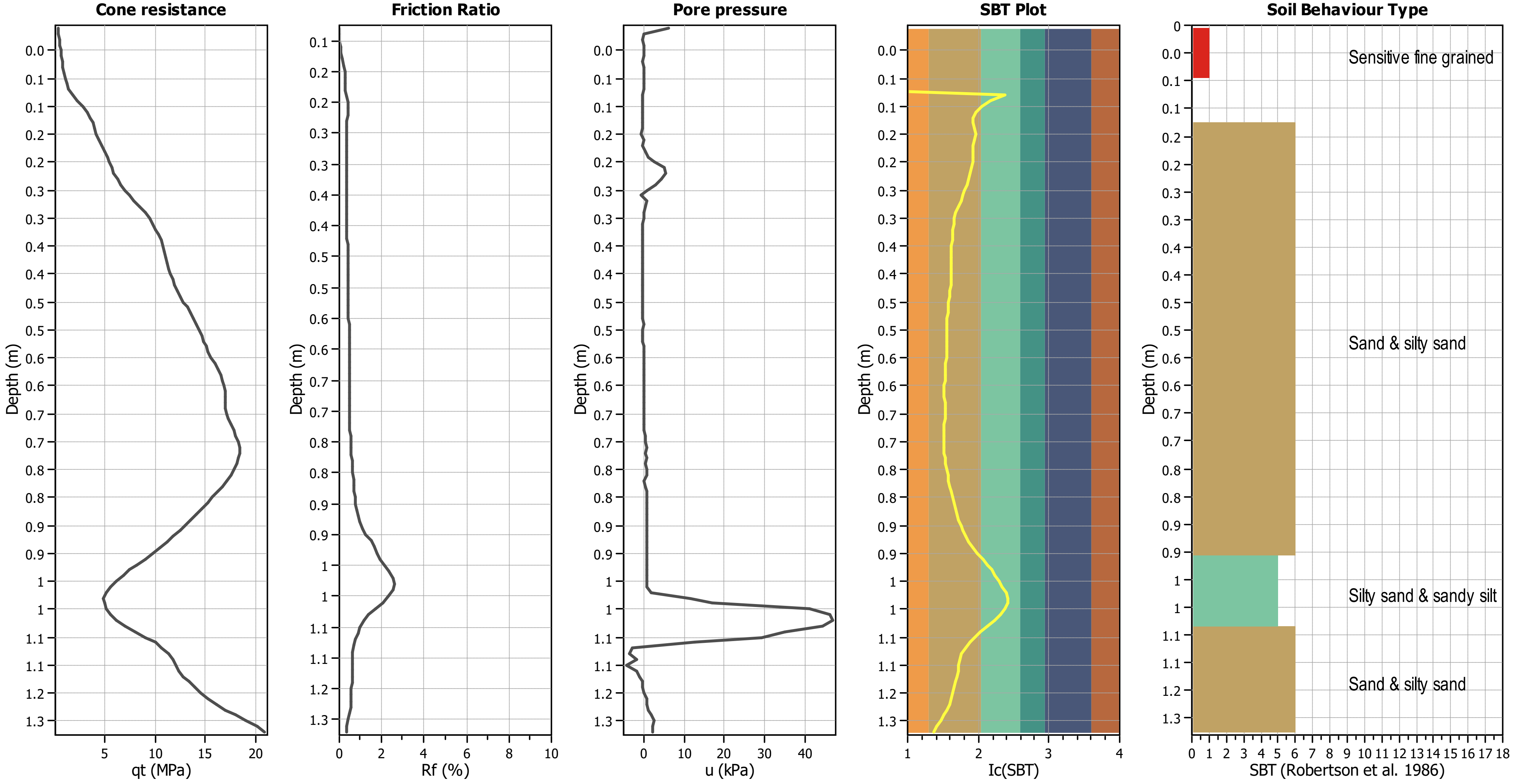
LPI color scheme

- 🟥 Very high risk
- 🟧 High risk
- 🟨 Low risk

CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
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SBT legend

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- 🟫 6. Clean sand to silty sand
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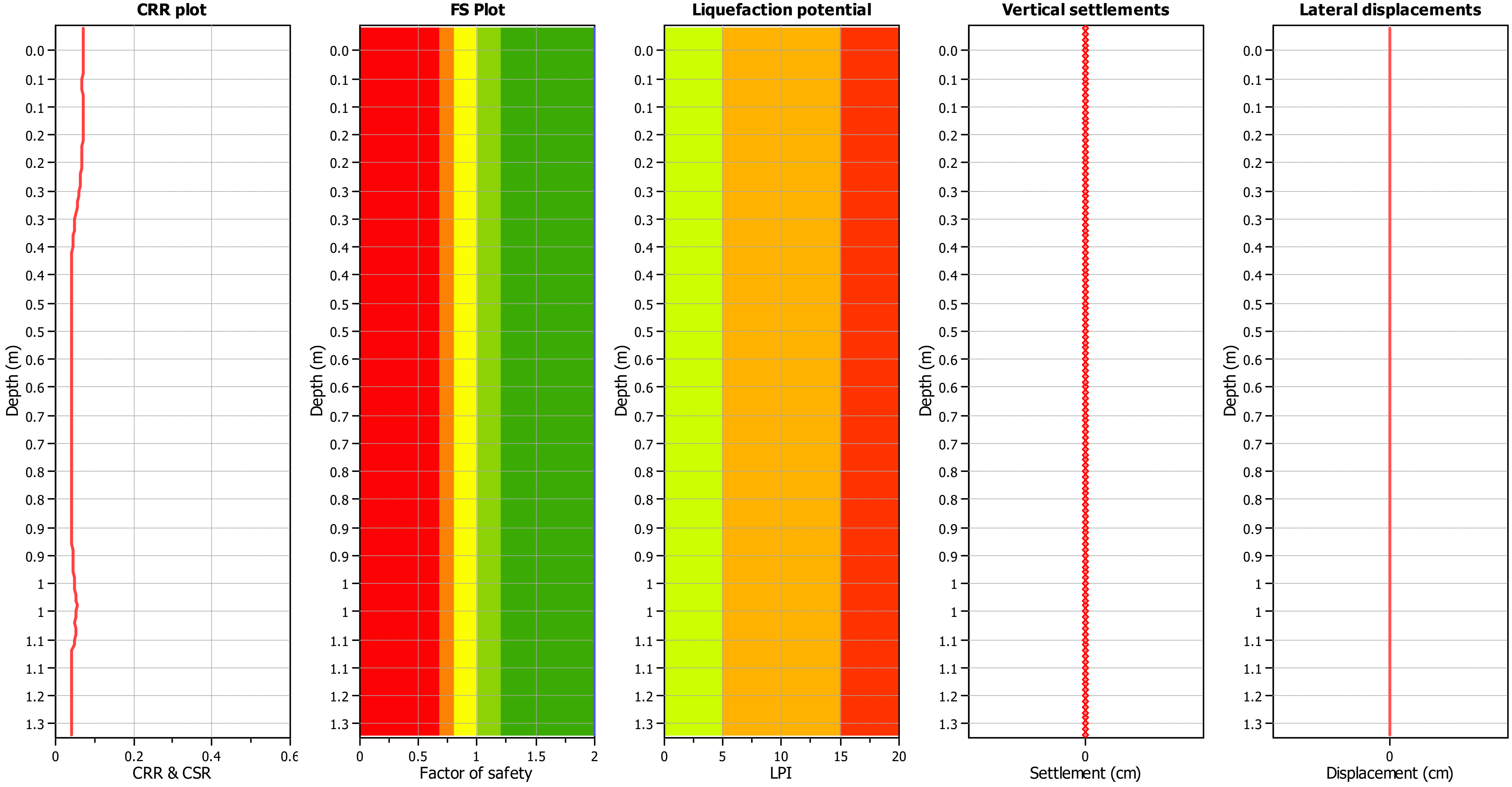
- ⬛ 8. Very stiff sand to
- ⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
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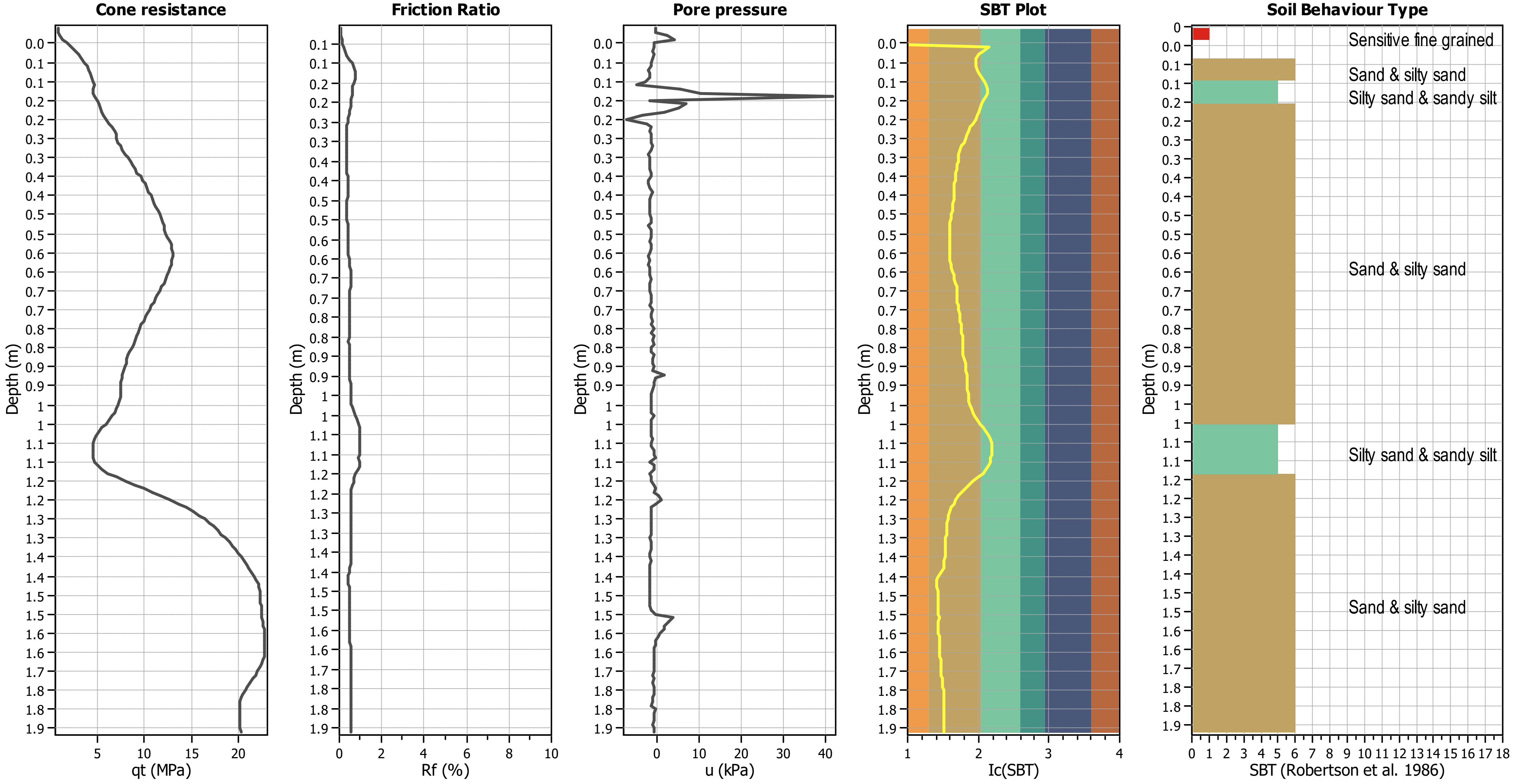
LPI color scheme

- 🟥 Very high risk
- 🟧 High risk
- 🟨 Low risk

CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
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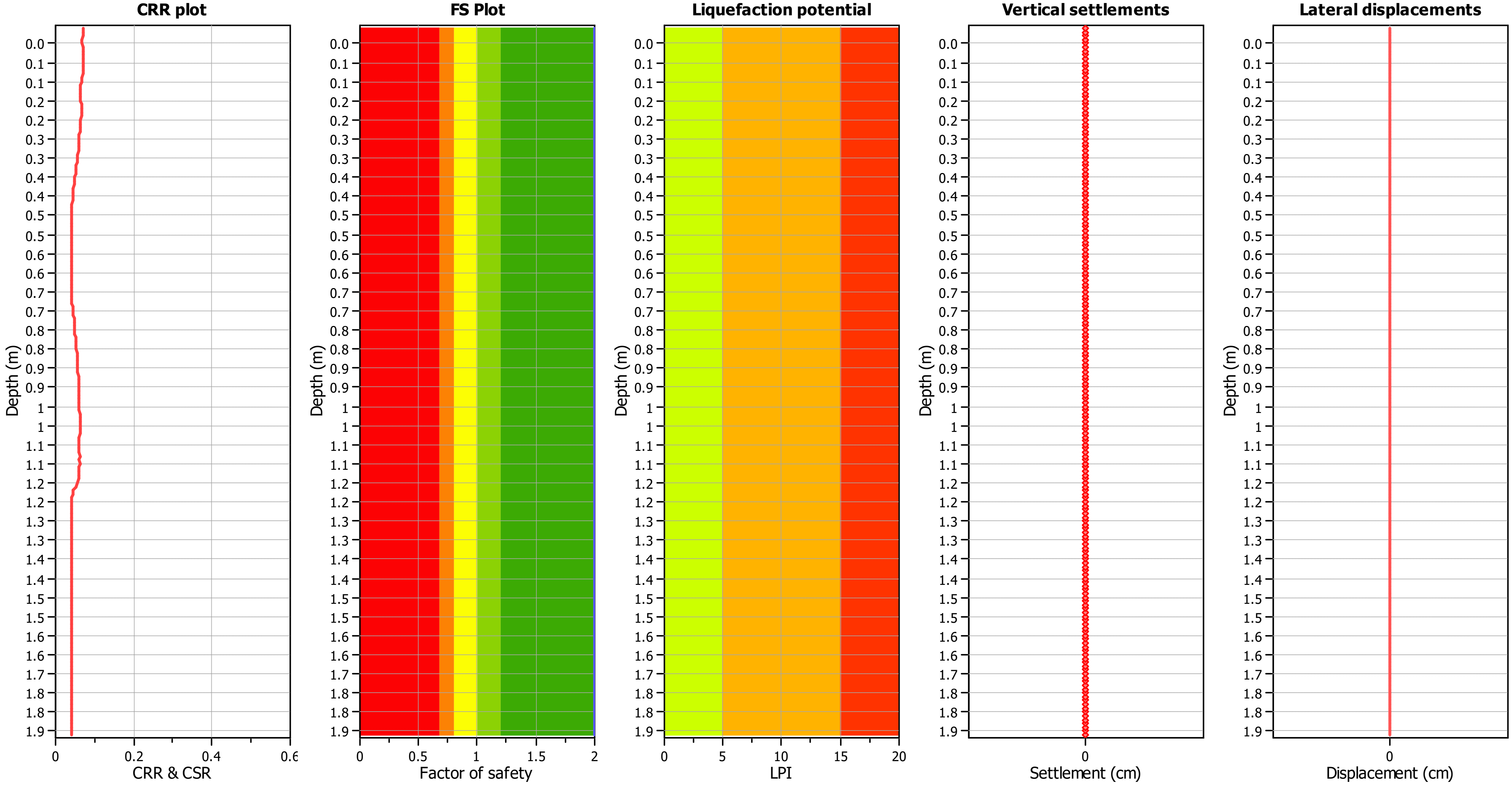
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

🟥	1. Sensitive fine grained	🟩	4. Clayey silt to silty	🟧	7. Gravely sand to sand
🟫	2. Organic material	🟩	5. Silty sand to sandy silt	⬛	8. Very stiff sand to
🟦	3. Clay to silty clay	🟫	6. Clean sand to silty sand	⬜	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
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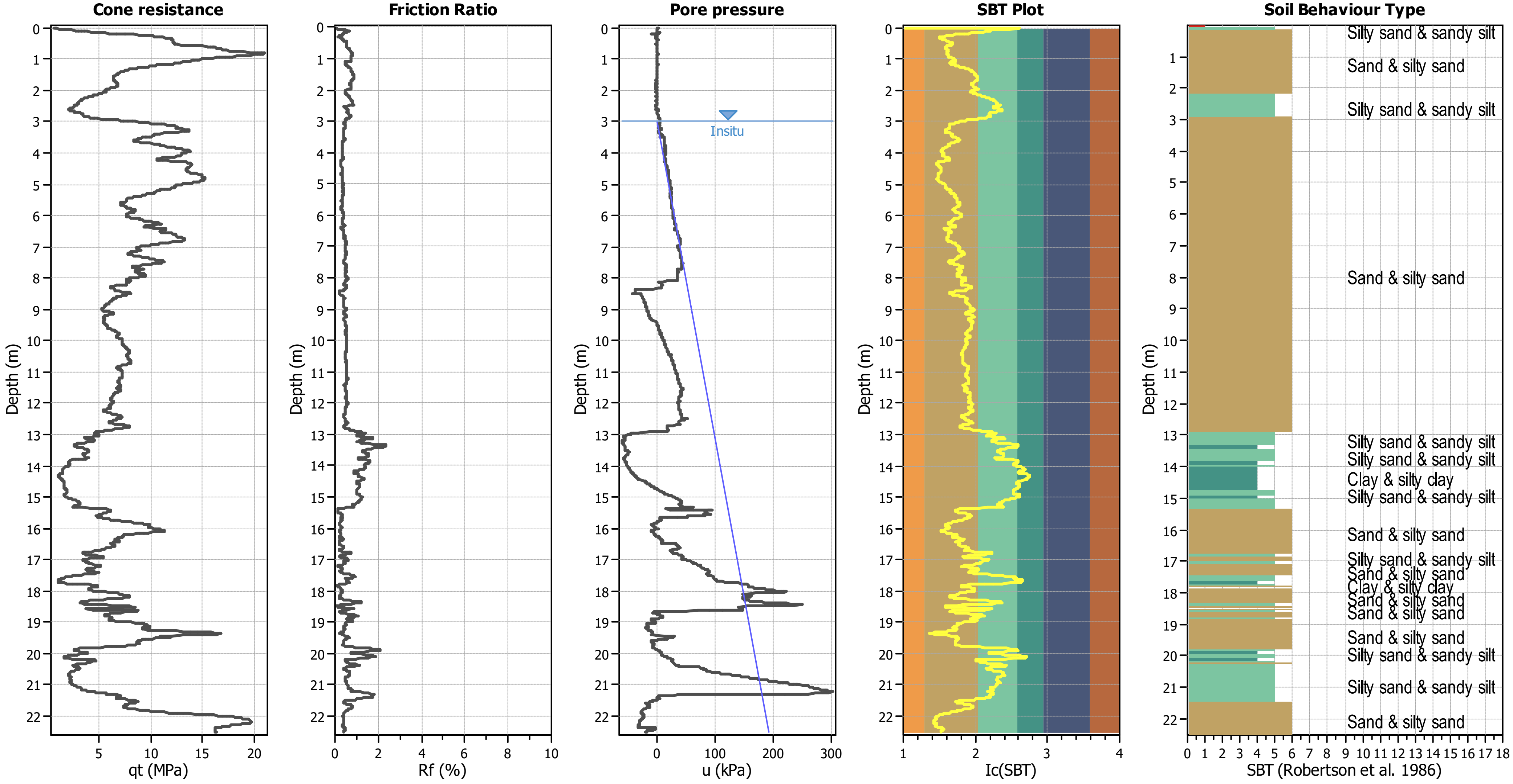
CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
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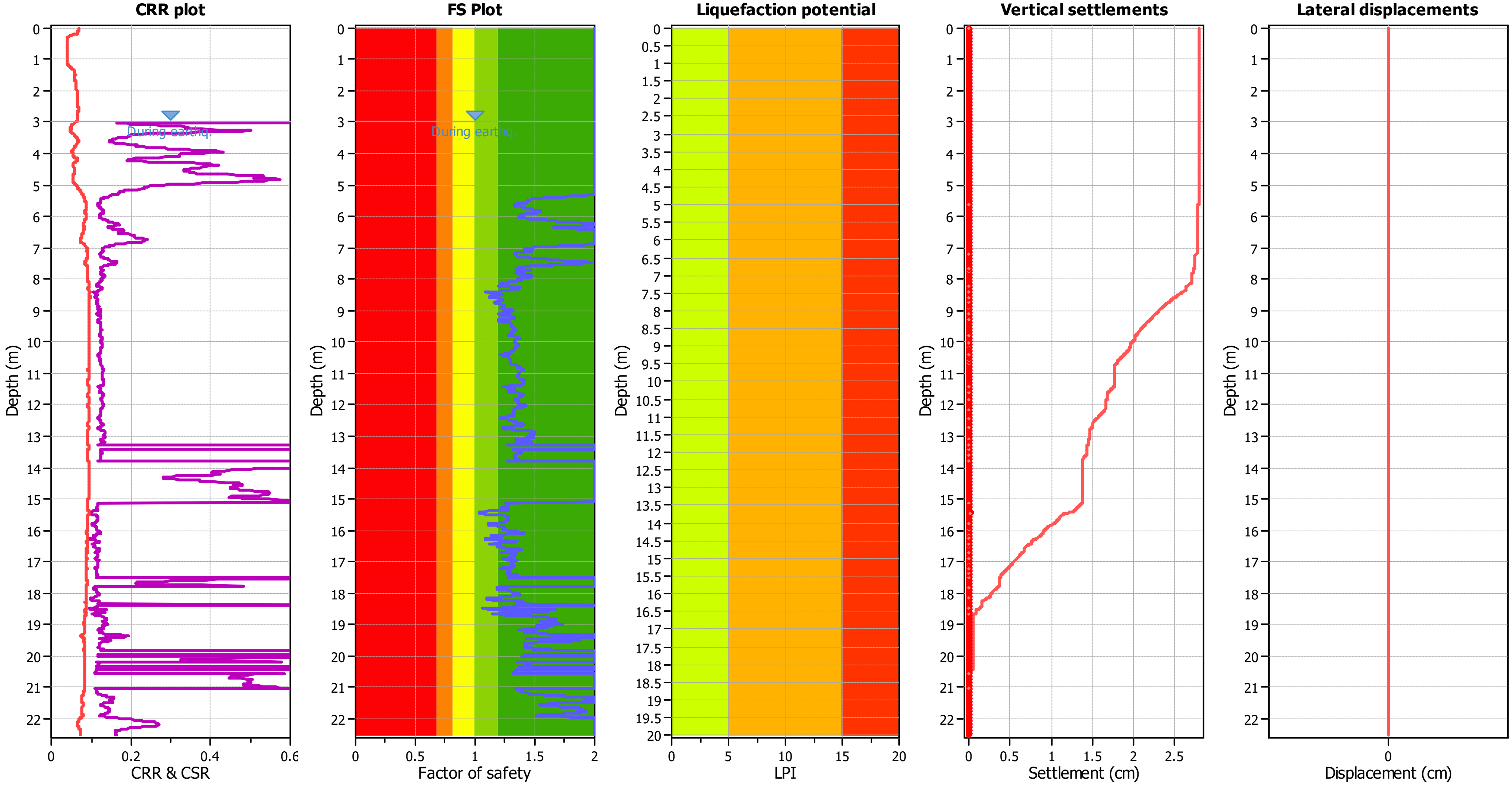
Depth to water table (insitu):	3.00 m	Fill height:	N/A	Limit depth:	N/A

SBT legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬛ 8. Very stiff sand to
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
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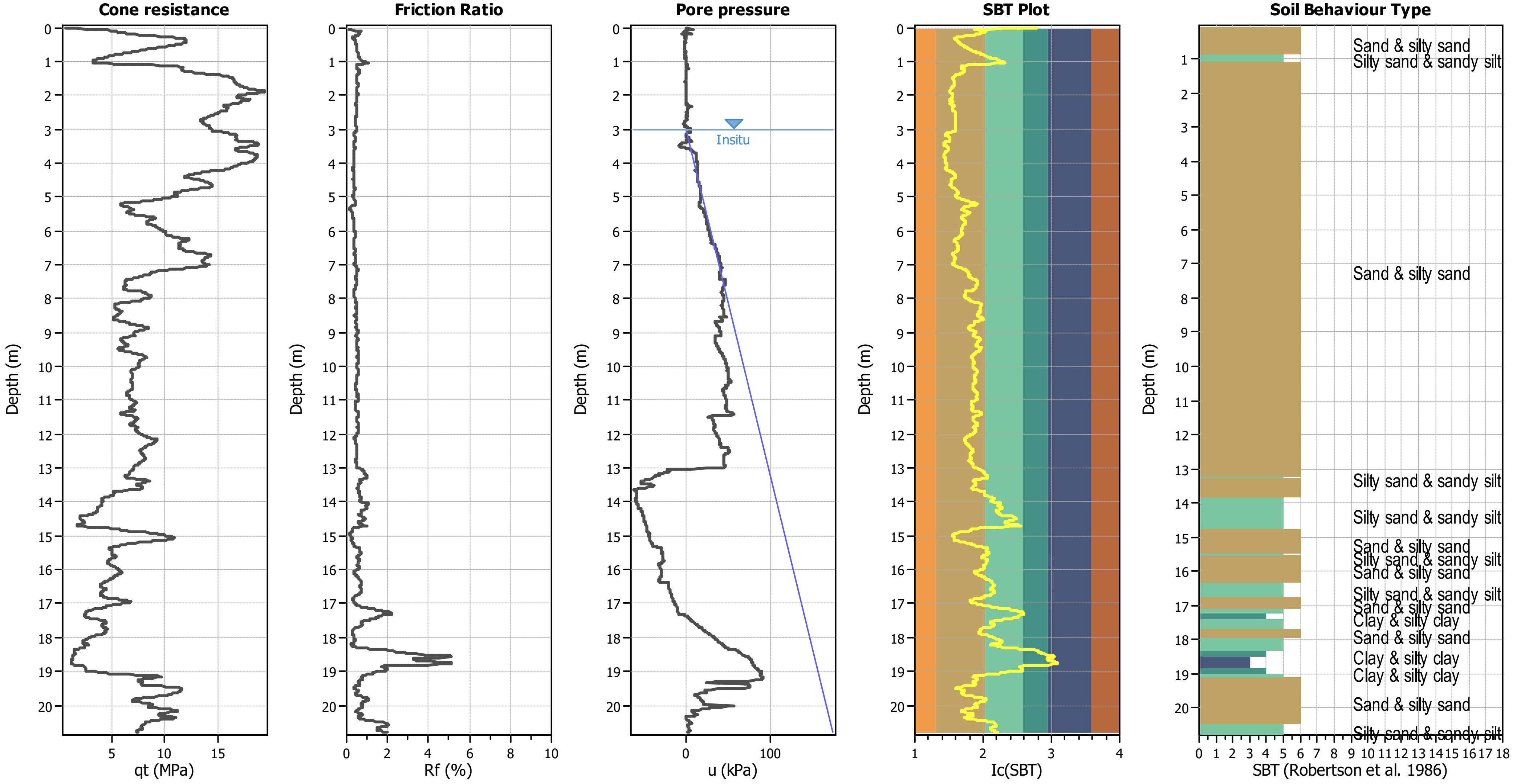
CPT basic interpretation plots



Input parameters and analysis data

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Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
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SBT legend

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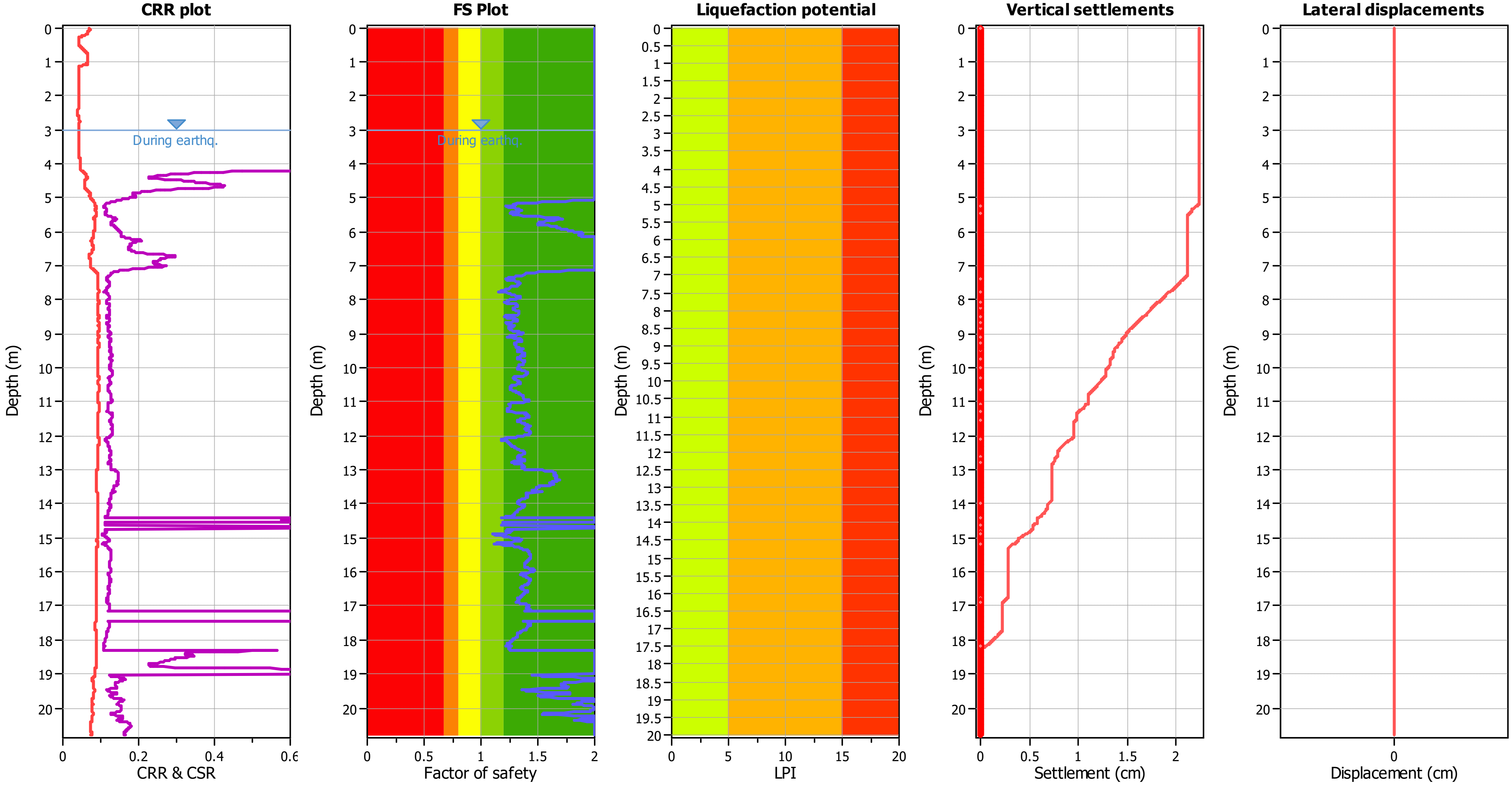
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬜ 8. Very stiff sand to
⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.13
Depth to water table (insitu): 3.00 m

Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_σ applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
Limit depth: N/A

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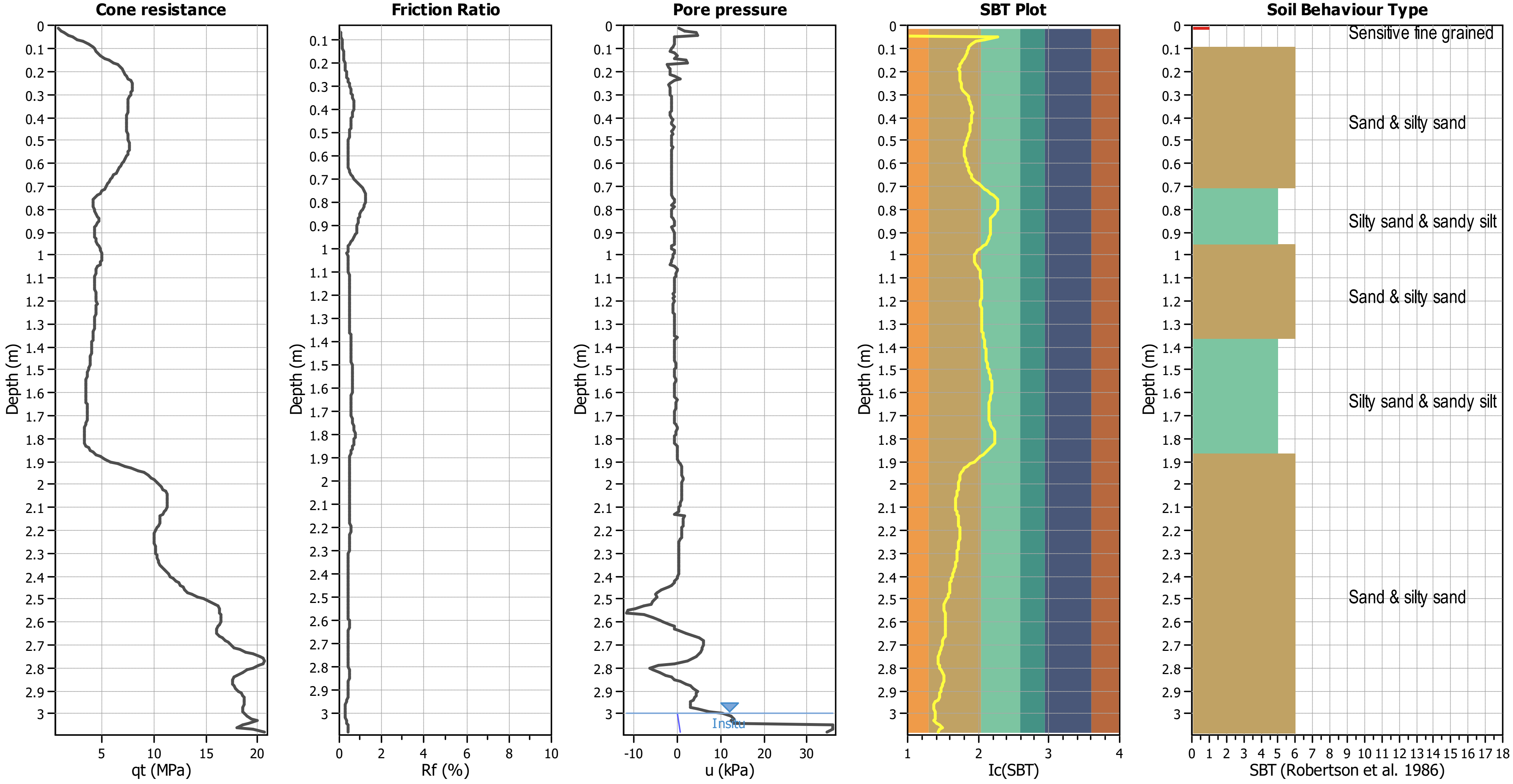
CPT basic interpretation plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.13
Depth to water table (insitu): 3.00 m

Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_σ applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
Limit depth: N/A

SBT legend

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🟫 2. Organic material
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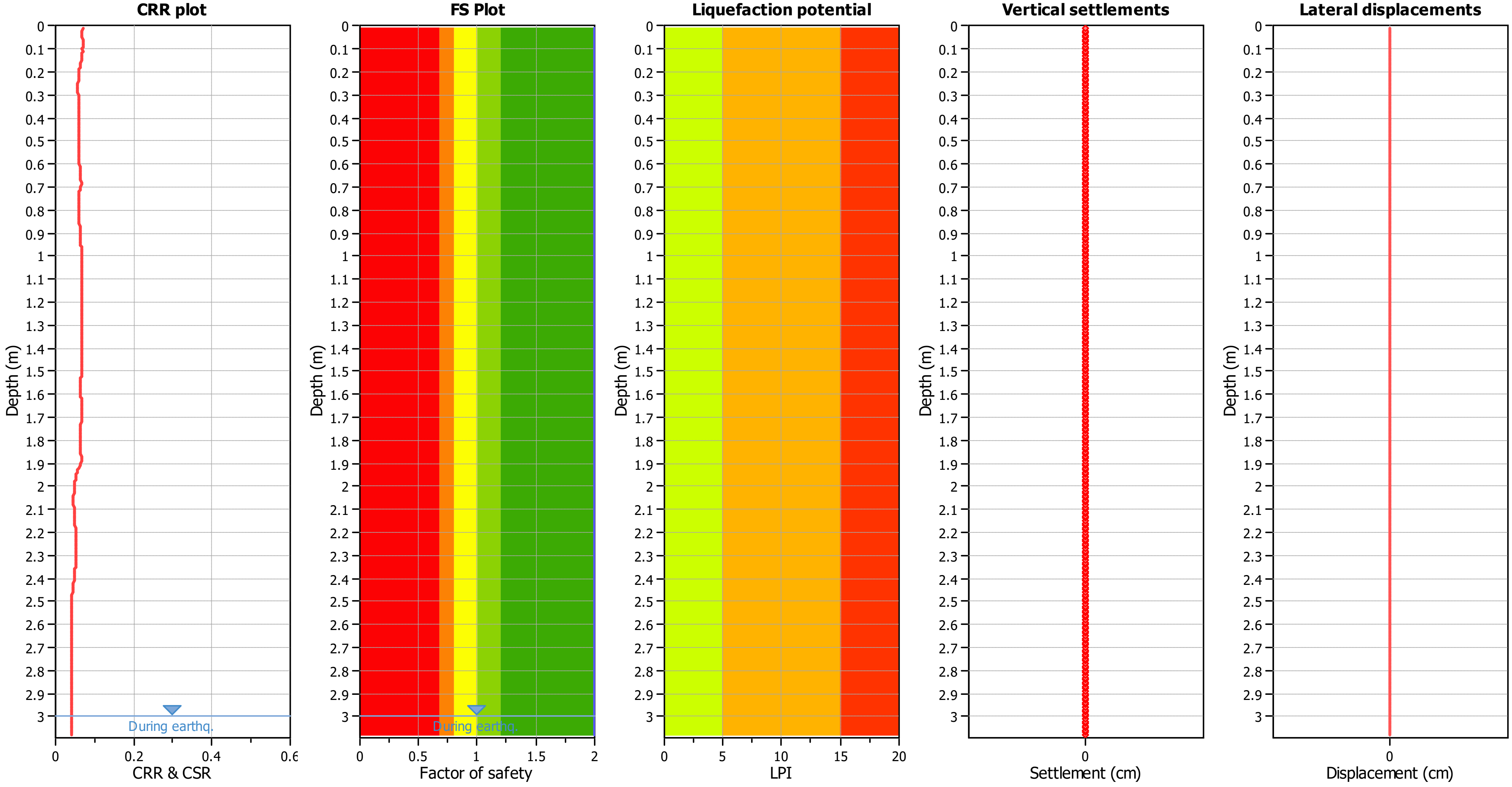
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬜ 8. Very stiff sand to
⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

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Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.13
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Depth to GWT (erthq.): 3.00 m
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Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_σ applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
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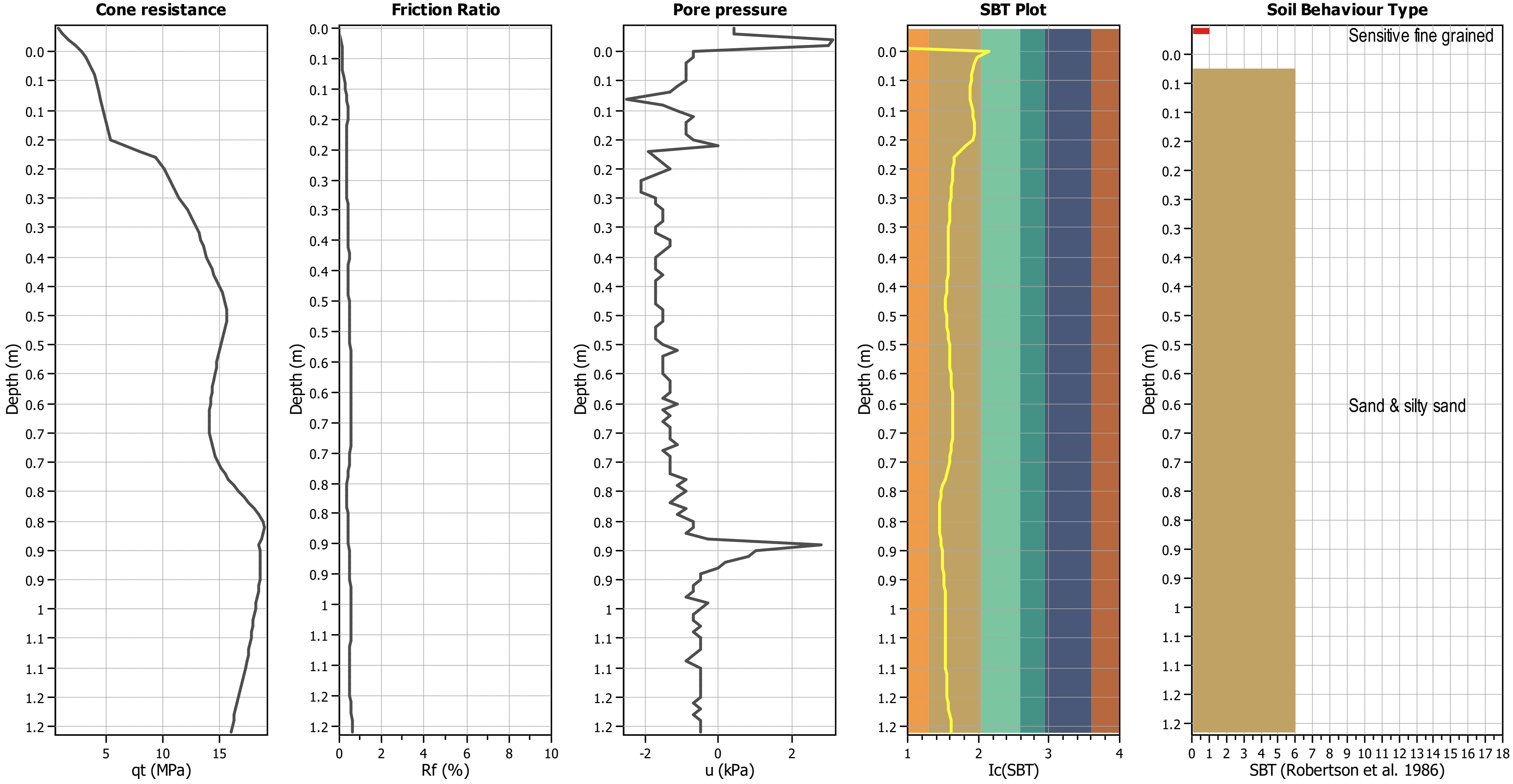
CPT basic interpretation plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.13
Depth to water table (insitu): 3.00 m

Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_σ applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
Limit depth: N/A

SBT legend

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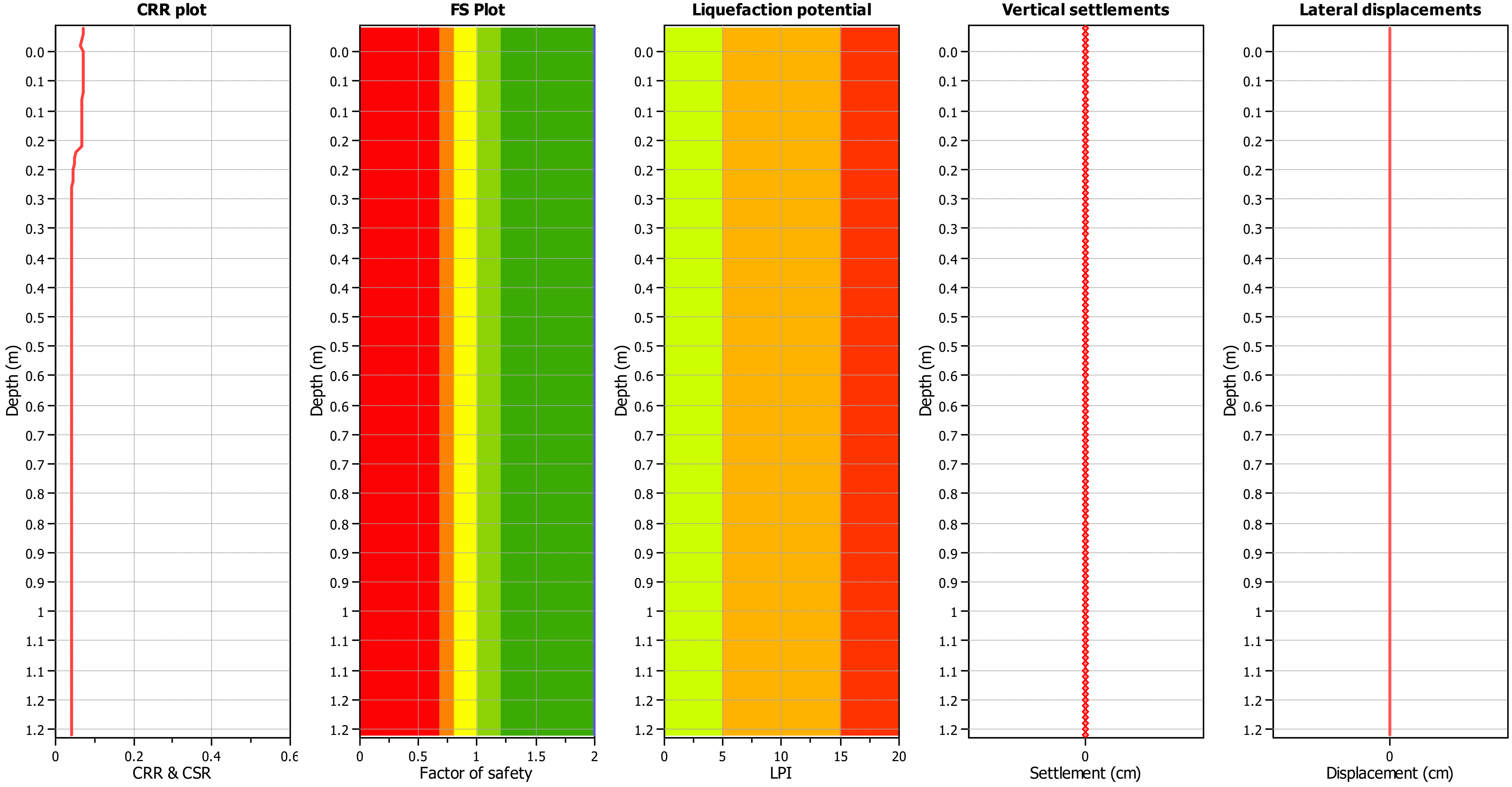
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬛ 8. Very stiff sand to
- ⬜ 9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
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Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
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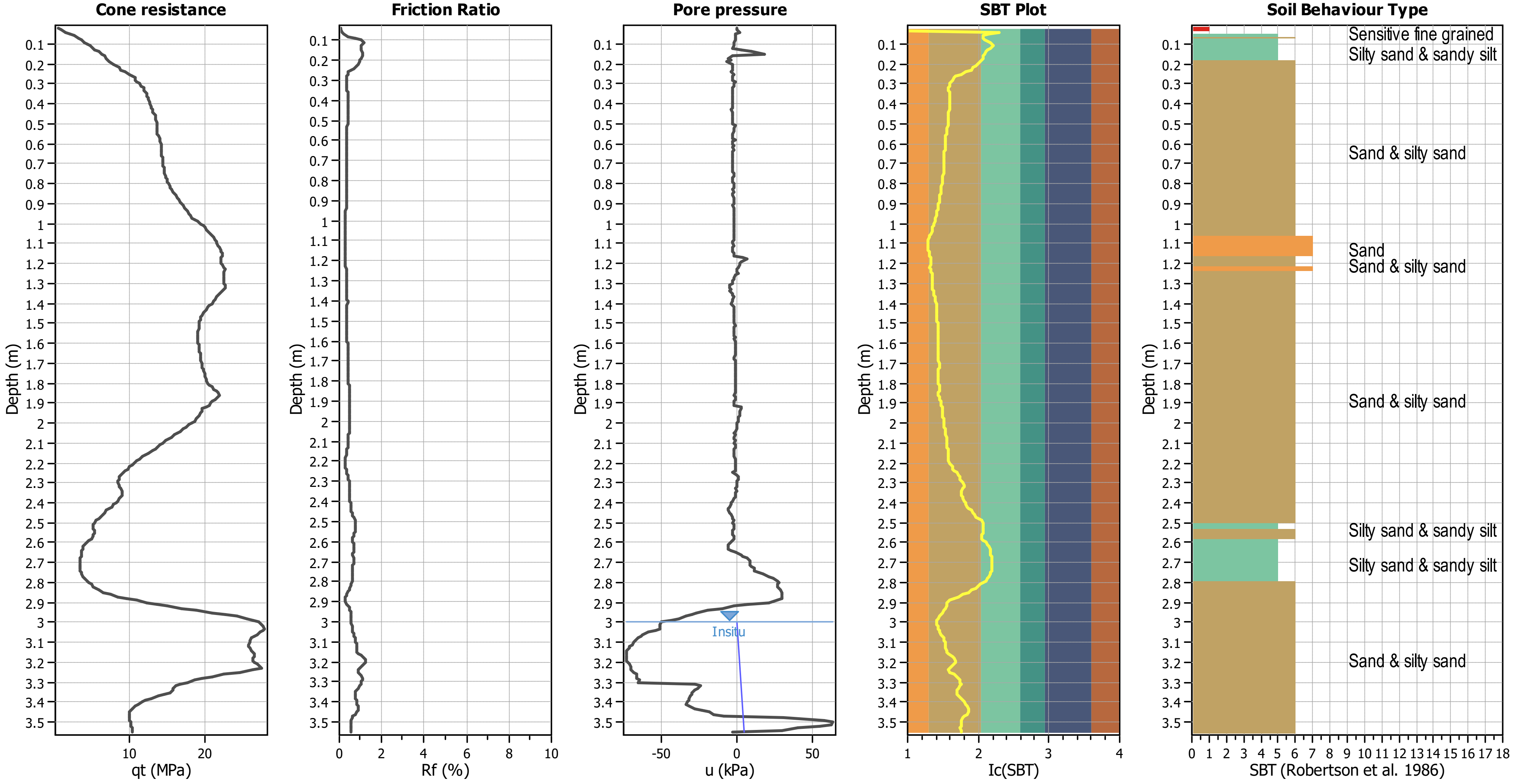
CPT basic interpretation plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
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Earthquake magnitude M_w:	5.80	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
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SBT legend

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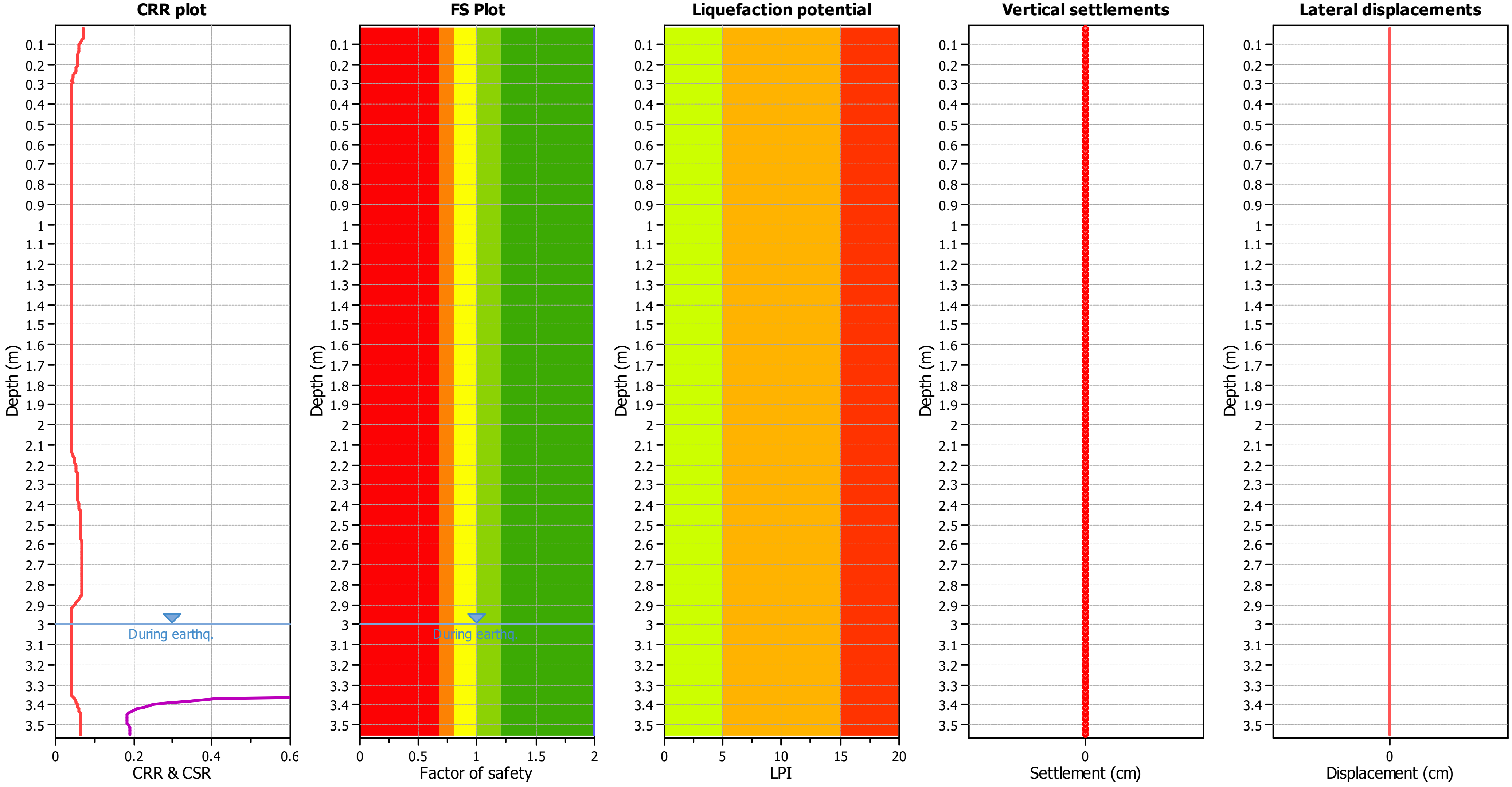
🟫	2. Organic material	🟩	5. Silty sand to sandy silt	⬛	8. Very stiff sand to
🟦	3. Clay to silty clay	🟫	6. Clean sand to silty sand	⬜	9. Very stiff fine grained

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method: B&I (2014)
Fines correction method: B&I (2014)
Points to test: Based on Ic value
Earthquake magnitude M_w: 5.80
Peak ground acceleration: 0.13
Depth to water table (insitu): 3.00 m

Depth to GWT (erthq.): 3.00 m
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT
Use fill: No
Fill height: N/A

Fill weight: N/A
Transition detect. applied: No
K_σ applied: Yes
Clay like behavior applied: Sand & Clay
Limit depth applied: No
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LPI color scheme

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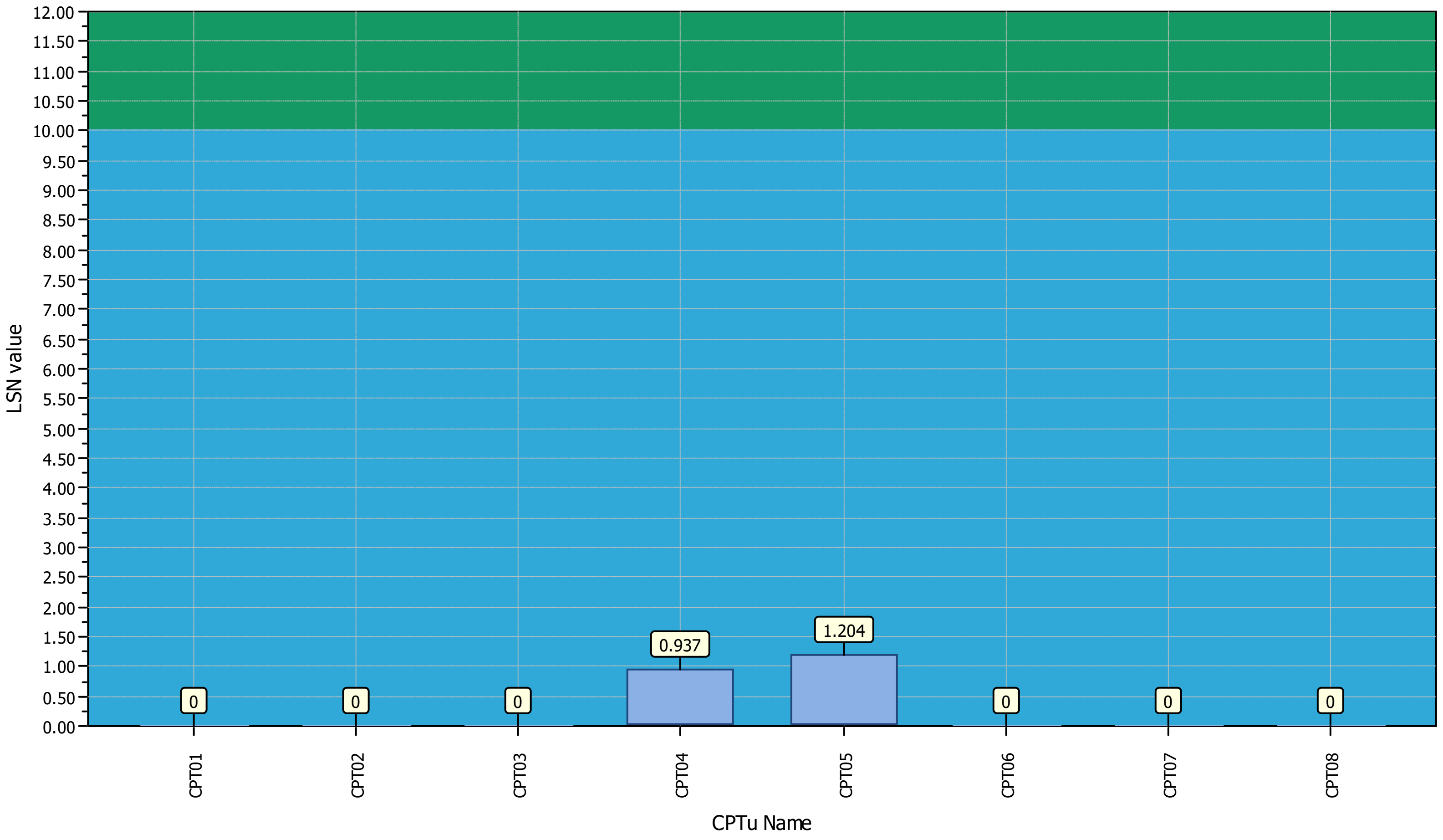
Project title : 14333 Stage 6 & 7 Liquefaction Analysis - ULS

Location : The Landings, One Tree Point

Overall Liquefaction Severity Number report



LSN color scheme

🟥 Severe damage
🟥 Major expression of liquefaction
🟧 Moderate to severe exp. of liquefaction
🟨 Moderate expression of liquefaction
🟩 Minor expression of liquefaction
🟦 Little to no expression of liquefaction

Basic statistics

Total CPT number: 8

100% little liquefaction

0% minor liquefaction

0% moderate liquefaction

0% moderate to major liquefaction

0% major liquefaction

0% severe liquefaction

Appendix 6 – Statement of Professional Opinion on Suitability of Land for Building Construction - Form EES-PO1

WHANGAREI DISTRICT COUNCIL Forum North ·
Private Bag 9023 · Whangarei 0148 · New Zealand Telephone (09) 430 4200 ·
0800 WDC INFO · 0800 932 463 · Facsimile (09) 438 7632 Website
http//www.wdc.govt.nz · E-mail mailroom@wdc.govt.nz

Creating the ultimate living environment

Statement of Professional Opinion on Suitability of Land for Building Construction

Form EES-PO1

Development The Landing – Stage 6, One Tree Point

Developer WFH POPERTIES LIMITED

Location One Tree Point

I *(full name)* Philip Joseph Cook

of *(Name and address of firm)* Cook Costello Ltd, Norfolk House, 2 Norfolk Street, Whangarei, Northland

Hereby confirm that

1 I am a geo-professional as defined in **Section 1.2** of the WDC EES and was retained by the developer as the geo-professional on the above development

2 The extent of my preliminary investigations are described in my Report(s) number 14333-006 dated 12/05/2022 & the conclusions and recommendations of that/those document(s) have been re-evaluated in the preparation of this report. The extent of my inspections during construction, & the results of all tests and/or re-evaluations carried out are as described in my geotechnical completion report dated 12/05/2022.

3 In my professional opinion, not to be construed as a guarantee, I consider that:

a The earth fills shown on the attached Plan No EW 400, 500 & 600 appended within Appendix 2 of the Completion Report dated 12/05/2022 have been placed in compliance with the requirements of Council & my specification

b The completed works take into account land slope & foundation stability considerations, subject to the appended foundation recommendations and earthworks restrictions, *(which should be read in conjunction with the appended final site contour plan* EW 400 - 600).

c Subject to 3(a) and 3(b) above, the original ground not affected by filling satisfies the description of 'good ground' as described in NZS3604/NZS4229

d Subject to 3(a) & 3(b) above, the filled ground satisfies the description of 'good ground' as described in NZS3604/NZS4229

e The original ground not affected by filling & the filled ground are not subject to erosion, subsidence, or slippage in accordance with the provisions of section 106 of the Resource Management Act 1991provided that:

(i) Site-specific geotechnical investigation and design of foundations are to be carried out at the detailed design of buildings.
(ii) Standard inspection of excavated foundations is to be carried out at time of construction
(iii) Buildings subject to heavy loads or vibrations will require specific design.

4 This professional opinion is furnished to the TA & the developer 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 of any building.

5 This certificate shall be read in conjunction with my geotechnical report referred to in clause 2 above & shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

Signature	*Qualifications*	*Date*
	ME, IntPE (NZ), CMEngNZ, CPEng # 1027758	12/05/2022