Geotechnical Report for Subdivision

1 Hansen Road

Queenstown

Report prepared for:

Coronation Road Holdings Limited

Report prepared by:

GeoSolve Ltd

Distribution:

Coronation Road Holding Limited

GeoSolve Limited (File)

November 2016

GeoSolve Ref: 160488

ACENZ MEMBER

Table of Contents

1 Introduction

1.1 General

This report presents the results of a geotechnical investigation that has been undertaken by GeoSolve Ltd for a proposed subdivision at 1 Hansen Road, Queenstown.

The investigations were carried out for Coronation Road Holdings Limited in accordance with GeoSolve Ltd's proposal dated 12 August 2016, which outlines the scope of work and conditions of engagement.

1.2 Development

It is understood that 1 Hansen Road is to be subdivided in to 13 lots, which are to be developed into residential properties. No specific development plans have been provided at this stage, however the site lot layout has been provided, see Figure 1, Appendix A.

2 Site Description

2.1 General

The subject property is located 100 m northeast of the Frankton roundabout, as shown on Figure 2.1 below.

Figure 2.1: Site Location Plan

The site is bounded by Lot 1 DP355881 Frankton-Ladies Mile Highway to the north, Hansen Road to the east, Frankton-Ladies Mile Highway to the south and Frankton cemetery and 1094 Frankton Road to the west. The majority of the site is currently vacant and vegetated in long grass. A residential dwelling is located in the southeast corner of the property with associated landscaping and trees surrounding the dwelling.

2.2 Topography and Surface Drainage

The majority of the site surface is sub-horizontal to gently sloping (<5°). In the northern third of the lot the ground slopes steeply at approximately 35° to the south. Schist outcrops and bluffs are scattered across the hillslope (see Figure 2, Appendix A). The area of proposed development does not extend on to the sloping ground.

The site is naturally free draining and no seepages were evident within the site boundary. Local drainage ditches/flow paths are present along the southern boundary of the site in association with the adjacent road network but do not cross the internal lot areas. The Arrow water race is located in the northern half of the lot, running along the base of the hill slope.

3 Geotechnical Investigations

An engineering geological site appraisal has been undertaken with confirmatory subsurface investigations during September 2016. The following investigations have been completed:

- 18 test pits to depths of up to 3.3 m;
- 11 Heavy Duty Dynamic Cone (HDCP) tests to depths of 15 m;
- 48 Scala penetrometer tests to 0.9 m;
- 1 borehole to a depth of 15 m, and;
- Geological mapping of the sloping land to the north of the site.

Investigations were completed for a previous assessment of the site. These investigations have been used for this assessment, comprising:

- 12 test pits to depths of up to 3.8 m.

Test pit, Scala penetrometer and bore hole locations and logs are contained in Appendices A and B respectively.

HDCP locations and logs are contained in Appendices A and C respectively.

4 Subsurface Conditions

4.1 Geological Setting

The site is located in the Wakatipu basin, a feature formed predominantly by glacial advances. Published references indicate the last glacial event occurred in the region between 10,000 and 20,000 years ago. Glaciations have left deposits of glacial till and glacial outwash over ice–scoured bedrock. Post glacial times have been dominated by the erosion of the bedrock and glacial sediment, with deposition of alluvial gravel by local watercourses and lacustrine sediment during periods of high lake levels.

Active fault traces were not observed at the site or in the immediate vicinity, and the closest major active fault is the Nevis-Cardrona Fault system. However, significant seismic risk exists in this region from potentially strong ground shaking, associated with the rupture of the Alpine Fault, located 80 km northwest of Queenstown along the west coast of the South Island. There is a high probability

that an earthquake with an expected magnitude of over M8 will occur along the Alpine Fault in the next 50 years.

4.2 Stratigraphy

The subsurface materials observed during site investigations typically comprised:

- 0.2-0.4 m of topsoil, overlying;
- 0.5-2.3 m of surface deltaic silt, overlying;
- Deltaic gravel, sand and silt.

Topsoil was observed at the surface of all tests pits to a depth of between 0.2 and 0.4 m. Minor uncontrolled fill was observed at the ground surface and beneath the topsoil in TPs 11 and 27.

Surface deltaic silt was observed to underlie the topsoil in most of the test pits and comprised soft to stiff SILT with minor sand and rootlets.

Variable compositions of deltaic silt, sand and gravel underlie the surface deltaic silt.

Deltaic silt/sand comprises lenses of firm to very stiff SILT and sandy SILT, loose to medium dense SAND and gravelly and silty SAND.

Deltaic gravel/sand comprises loose to medium dense sandy GRAVEL and gravelly SAND with minor cobbles and silt.

Full details of the observed subsurface stratigraphy can be found within the test pit logs and bore hole logs contained in Appendix B.

4.3 Groundwater

No groundwater seepage was observed in any of the test pits or measured within the HDCPs or borehole during the site investigations. Nearby well data indicates the regional groundwater table is at depths of approximately 42 m below current ground level.

5 Engineering Considerations

5.1 General

The recommendations and opinions contained in this report are based upon ground investigation data obtained at discrete locations and historical information held on the GeoSolve database.

The nature and continuity of subsoil conditions away from the investigation locations is inferred and cannot be guaranteed.

The actual sub-surface may show some variation from those described and all design recommendations contained in this report are subject to confirmation by inspection during construction.

5.2 Geotechnical Parameters

Table 5.1 provides a summary of the recommended geotechnical design parameters for the soil materials expected to be encountered during construction of the proposed development.

Table 5.1 Recommended Geotechnical Design Parameters

Unit	Thickness (m)	Bulk Density γ (kN/m^3)	Effective Cohesion c' (kPa)	Effective Friction ϕ' (deg)	Elastic Modulus E (kPa)	Poissons Ratio ν
Topsoil (soft organic SILT)	0.2-0.3	16	NA	NA	NA	NA
Surface Deltaic silt (soft to stiff, SILT with minor sand)	0.5-2.3	18	0	30	5,000	0.3
Deltaic gravel/ sand (loose to medium dense sandy GRAVEL and gravelly SAND with minor cobbles and silt)	Unconfirmed (15 m+)	19	0	34-36	20,000	0.3

5.3 Site Preparation

During the earthworks operations, all topsoil, organic matter, uncontrolled fill and other unsuitable materials should be removed from the construction areas in accordance with the recommendations of NZS 4431:1989.

Owing to the moderately erodible nature of some of the soils present across the site, sediment control measures should be instigated during earthworks construction.

Water should not be allowed to pond or collect near or under a foundation slab. Positive grading of the subgrade should be undertaken to prevent water ingress or ponding.

All fill that is utilised as bearing for foundations should be placed and compacted in accordance with the recommendations of NZS 4431:1989 and certification provided to that effect.

5.4 Excavations

5.4.1 General

No earthworks plans have been provided at this stage; however, shallow excavations are expected to be required to establish level building platforms and roadways across the site. These cuts are expected to be formed within topsoil and deltaic silt. Deeper cuts may be required to form stormwater soak pits.

Recommendations for temporary and permanent soil batter slope angles are described below in Table 5.2. Slopes that are required to be steeper than those described below should be structurally retained or subject to specific geotechnical design.

All slopes should be periodically monitored during construction for signs of instability and excessive erosion, and, where necessary, corrective measures should be implemented to the satisfaction of a geotechnical engineer or engineering geologist.

No seepage was encountered during test pitting. A geotechnical practitioner should inspect any seepage that may be encountered during construction.

5.4.2 Cut Slopes in Soil Materials

Table 5.2 summarises the recommended batter angles for temporary and permanent soil slopes.

Table 5.2 Recommended Batter Angles for Cuts in Soil Materials

Material Type	Recommended Maximum Batter Angles for Temporary Cuts Less than 3 m High (horizontal to vertical)		Recommended Maximum Batter for Permanent Cuts Less than 3 m High in Dry Ground (horizontal to vertical)
	Dry Ground	Wet Ground	
Topsoil	1.5H:1.0V	3.0H:1.0V	3.0H:1.0V
Deltaic silt	1.5H:1.0V	3.0H:1.0V	3.0H:1.0V
Deltaic gravel/ sand	1.5H:1.0V	2.5H:1.0V	2.5H: 1.0V

Note when using the values in Table 5.2 due allowance should be made for surcharge loads, e.g. crane, vehicle, building or stockpiling of materials at the slope crest. Appropriate set-backs from the slope crest should be utilised and geotechnical review of the slope stability may be required in specific cases.

5.5 Engineered Fill Slopes

All fill should be placed and compacted in accordance with the recommendations of NZS4431: 1989 and Queenstown Lakes District Council Standards. All cut and fill earthworks should be inspected and tested as appropriate during construction and certified by a Chartered Professional Engineer.

All un-retained fill slopes which are less than 3.0 m high should be constructed with a batter slope angle of 2.5H: 1.0V (horizontal to vertical) or flatter and be benched into sloping ground. Fill slopes greater than 3.0m in height, or steeper than 2.5H:1.0V, should be subject to geotechnical review.

5.6 Ground Retention

All retaining walls should be designed by a Chartered Professional Engineer using the geotechnical parameters recommended in Table 5.1 of this report. Due allowance should be made during the

detailed design of all retaining walls for any additional loads upslope of the wall (i.e. surcharge due to backslope, traffic, buildings and seismic forces).

All temporary slopes for retaining wall construction should be battered in accordance with Table 5.2.

Groundwater was not identified in the test pits but has the potential to develop following completion of the earthworks, in particular as a result of heavy or prolonged rainfall. To ensure potential groundwater seeps and flows are properly controlled behind the retaining walls, the following recommendations are provided:

- A minimum 0.3m width of durable free draining granular material should be placed behind all retaining structures;
- A heavy duty non-woven geotextile cloth, such as Bidim A14, should be installed between the natural ground surface and the free draining granular material to prevent siltation and blockage of the drainage media; and
- A heavy-duty (TNZ F/2 Class 500) perforated pipe should be installed within the drainage material at the base of all retaining structures to minimise the risk of excessive groundwater pressures developing. This drainage pipe should be connected to the permanent piped storm water system.
- Comprehensive waterproofing measures should be provided to the back face of all basement retaining walls to minimise groundwater seepage into the finished buildings.

Horizontal drains should be installed to collect and control groundwater flows if excessive groundwater seepages are encountered during construction, but this is considered unlikely. The location and design of all horizontal drains should be confirmed on site by a Geotechnical Engineer or Engineering Geologist. The outlet of all sub-soil or horizontal drains should be connected to the permanent piped storm water system.

5.7 Groundwater Issues

The water table is expected to lie at considerable depth beneath the site and any proposed excavations. Dewatering or other groundwater-related construction issues are therefore unlikely to be required. It is important that GeoSolve be contacted should there be any seepage, be encountered during construction.

No excavations are proposed in close proximity to the existing Arrow water race.

5.8 Foundations

5.8.1 General

Topsoil and uncontrolled fill will not provide adequate support for the proposed building foundations and will need to be removed from building footprints. It is recommended that all building foundations are constructed to bear upon the underlying natural soils, deltaic silt and gravel.

Fill that is utilised as bearing for foundations should be placed and compacted in accordance with NZS 4431:1989 and certification provided to that effect.

To minimise the effects of freeze-thaw cycles, all shallow foundations in soils should be founded a minimum of 0.4 m below the adjacent finished ground surface.

It is recommended the foundation subgrade be inspected by a suitably qualified and experienced geotechnical practitioner to confirm the conditions are in accordance with the assumptions and recommendations provided in this report.

5.8.2 Shallow Foundations on Soil Materials

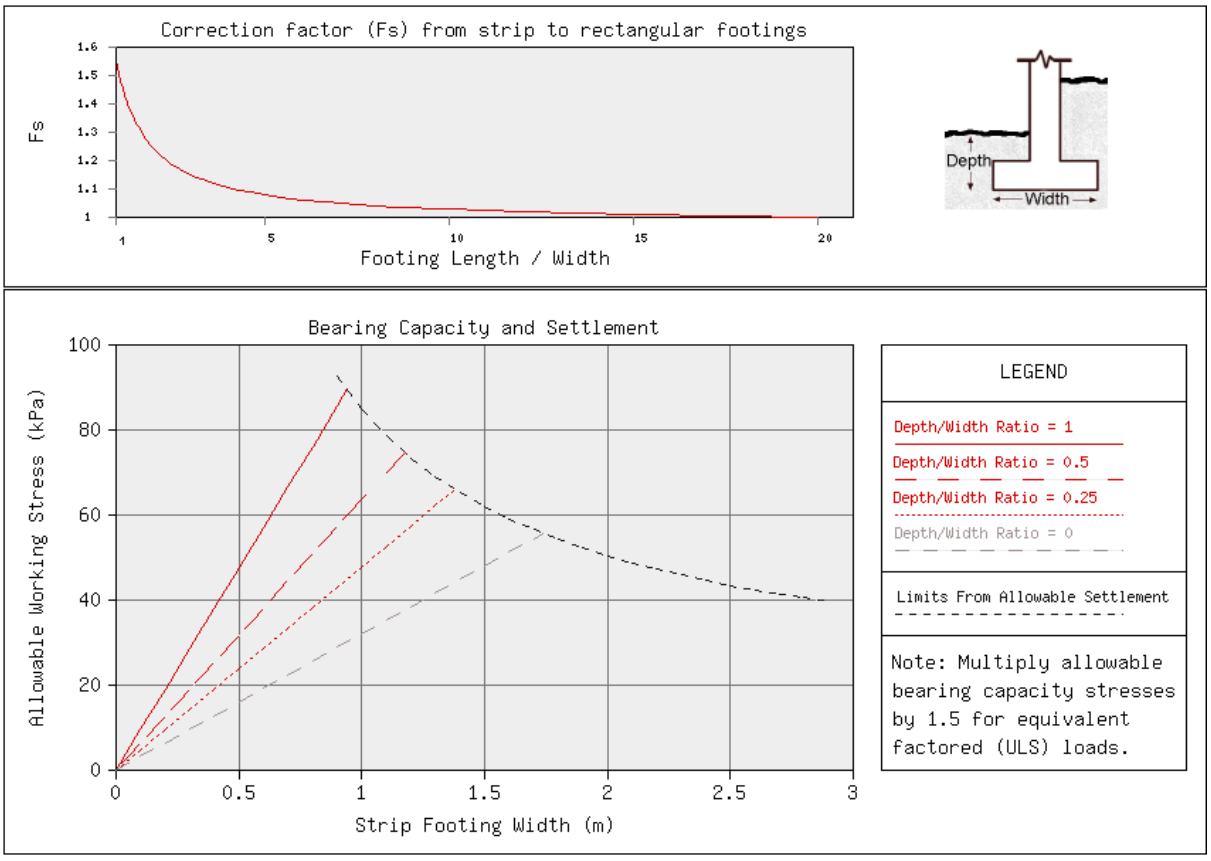
Foundations are expected to bear on both deltaic silt near surface and gravel soils at depth. Figures 5.1 and 5.2 summarise the recommended working stresses for shallow footings, which bear upon these soil types. It should be noted the foundation working stresses presented on Figure 5.1 and 5.2 are governed by bearing capacity in the case of narrow footings and settlement in the case of wide footings.

Deltaic Silt

Due to the low bearing strength only light weight structures and foundation slabs are likely to be suitable to bear on the deltaic silt.

From Figure 5.1, below, it can be seen an allowable working stress of approximately 45 kPa is recommended for a 500 mm wide by 500 mm deep strip footing founded on deltaic silt. This corresponds to a factored (ULS) bearing capacity of approximately 65 kPa and an ultimate geotechnical bearing capacity of 135 kPa. Note that the strength of deltaic silt soil can reduce significantly if they are exposed to the elements or trafficking/disturbance.

Figure 5.1. Recommended Bearing for Shallow Footings on Deltaic Silt

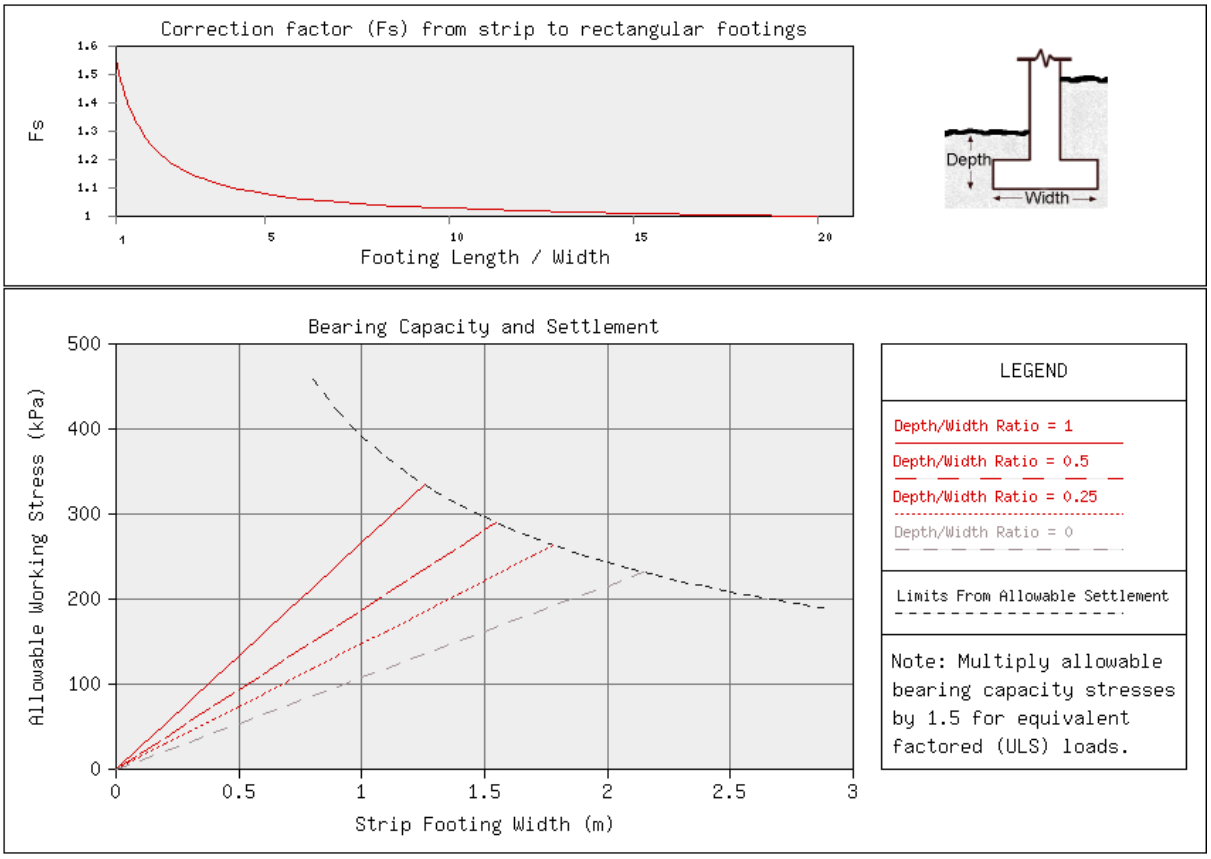


Deltaic Sandy Gravel, Gravelly Sand

In some areas of the site, shallow foundations may be extended to bear on the more competent deltaic gravel unit.

From Figure 5.2, it can be seen an allowable working stress of approximately 100 kPa is recommended for a 400 mm wide by 400 mm deep strip footing founded on deltaic gravel. This corresponds to a factored (ULS) bearing capacity of approximately 150 Pa and an ultimate geotechnical bearing capacity of 300 kPa.

Figure 5.2. Recommended Bearing for Shallow Footings on Deltaic Gravel



5.8.3 Excavation inspections

Inspection and testing (Scala penetrometers) should be completed during earthworks to confirm the above values are applicable and that the soil has not been softened by weather or excavation. Inspection is also recommended to ensure complete removal of historic uncontrolled fill has taken place.

5.8.4 Depth to Deltaic Gravel for Pile Foundations

It is understood that building foundations may comprise piles end bearing to the deltaic gravel unit underlying the low bearing strength surface deltaic silt layer. Table 5.3 below shows indicative depths to the deltaic gravel. There are discrete sand and silt lenses within the deltaic gravel unit that will need to be considered during pile design.

Further geotechnical input will be required during detailed design of any piled foundations.

Table 5.3 Approximate Depth to Gravel across Site

HDCP/BH	Subdivision Lot	Depth to gravel from current ground level
1	1	3.9 m
2	2	3.4 m
3	3	1.3 m
4	4	2.0 m
5	5	2.8 m
6	6	1.7 m
7	7	3.6 m
8	8	1.6 m
9	9	2.3 m
10	10	2.0 m
11	15	4.8 m
BH1	3, 4, 8	1.5 m

5.9 Site Subsoil Category

For detailed design purposes it is recommended the magnitude of seismic acceleration be estimated in accordance with the recommendations provided in NZS 1170.5:2004.

The site is Class D (deep or soft soil site) in accordance with NZS 1170.5:2004 seismic provisions. The soil parameters for static conditions given above require no downgrading for seismic bearing. (The materials are not subject to liquefaction or other strength loss on cyclic loading).

6 Hazard Assessment

6.1 Liquefaction

The site has been identified as LIC1 on the QLDC hazard register. Site investigations, including 11 HDCP tests and a borehole have been completed at 1 Hansen Road to assess liquefaction potential.

HDCP locations and logs are contained in Appendix A and C respectively.

6.1.1 Design Seismic Loadings

In accordance with NZS1170 – Structural Design Actions, the following two earthquake scenarios were considered based on the development buildings being classified Importance Level 2 with a 50-year design life.

These scenarios represent the following design performance requirements:

- Serviceability Limit State (SLS) – to avoid damage that would prevent the structure from being used as originally intended without repair, and;
- Ultimate Limit State (ULS) – to avoid collapse of the structural system.

In terms of NZS 1170, Class D sub-soil conditions (deep or soft soil) were assumed to underlie the site.

The earthquake scenarios used in liquefaction analyses are presented in Table 6.1.

Table 6.1 – Summary of the earthquake scenarios used in the liquefaction and lateral spreading assessment

	Serviceability Limit State (SLS) design earthquake	Ultimate Limit State (ULS) design earthquake IL2
Return period (years)	25	500
Moment Magnitude, Mw	6.2	6.3
Peak horizontal ground acceleration, PGA	0.08g	0.34g

6.1.2 Liquefaction Analysis

6.1.2.1 General

Liquefaction occurs when susceptible, saturated soils attempt to move to a denser state under cyclic shearing. In this report, liquefaction is defined as when pore pressures rise to reach the overburden stress. When this occurs, the following effects can happen at flat sites:

- Loss of strength;
- Ejection of material under pressure to the ground surface, and;
- Post-liquefaction volumetric densification as the materials reconsolidate.

In addition, sloping sites or sites with a 'free face' may experience lateral spreading or movement.

6.1.2.2 Liquefaction Assessment

The subsoils observed across the proposed development site predominantly comprise soft to stiff deltaic SILT overlying loose to medium dense sandy gravel and gravelly sand. No groundwater was observed during any of the investigations. It is expected that the groundwater table lies at

approximately 40 m depth. Therefore, shallow liquefaction is not a risk. The risk of liquefaction affecting residential dwellings under either SLS or ULS seismic loading is considered to be very low.

6.2 Landslide

Geological field mapping and assessment of the landslide feature shown on QLDC planning hazard maps to the north of the proposed development area has been undertaken. See attached plan, Figure 2, Appendix A.

6.2.1 Site Observations

A schist debris landslide has been identified to the north of the proposed development area, as mapped on the QLDC hazard register, see Figure 2, Appendix A. The toe of the landslide follows the contour along the base of the slope and extends upslope beyond the northern boundary of the site. The proposed development is located approximately 15 m from the toe of the landslide with a proposed road alignment situated between the development and the base of the slope.

A water race runs along the base of the slope, which is elevated within a fill mound, approximate 1-2 m above the development site level. A section of the water race is lined and covered with concrete; see Photo 2 and Figure 2, Appendix A. The tunnel over this section of the water race is covered in landslide debris, however, this looks historic, with no signs of recent movement.

The landslide surface north of the water race is densely vegetated with bush and well established pine trees with topsoil exposures. Historic landslide scarps were observed across the slope, north of the proposed subdivision area. The mapped landslide scarps are subdued with no sign of active slumping or erosion. A small open fissure, which looks relatively recent, was observed at the base of the scarp at the western edge of the mapped area (see Photo 1 and Figure 2, Appendix A). Along the water race a small scarp feature was observed on the upslope side, to the east of the water race tunnel. This scarp is localised and is the result of undercutting of the landslide debris by the water race. Schist exposures were observed across the slope with a chaotic concentration of schist boulders located above the water race tunnel.

No further surface soil erosion or slumping was observed across the slope.

6.2.2 Assessment and Recommendations

The site mapping indicated minor active scarps, however no active erosion or recent activity on a large scale was observed. It is expected that slow surficial creep will occur across the slope to the north of the development area. Under extreme rainfall events some accelerate creep may be observed, however no rapid deep-seated movement is expected.

Ongoing minor creep movement, accelerated creep movement during flood events or seismic induced movement of the embankments may cause a potential flooding risk to the proposed development from the water race. The risk of this occurring is low; however, it is recommended that future buildings be elevated above secondary flood flow paths that could eventuate if the water race was breached.

The schist debris landslide located to the north of the proposed development does not pose any significant or catastrophic risk/hazard to the proposed development at 1 Hansen Road, Queenstown.

Consultation with the Arrow Irrigation Company is recommended to confirm the current water race embankment stability inspection regime.

7 Neighbouring Structures

Natural Hazards: A risk of seismic activity has been identified for the region as a whole and appropriate allowance should be made for seismic loading during detailed design of the proposed buildings, foundations and associated earthworks.

Liquefaction and landslide hazards have been assessed for this site, see section 6 above.

Distances to adjoining structures: The site is bounded by developed land and roads. No adverse geotechnical implications apply for neighbouring properties/facilities provided appropriate measures are taken during the construction of the proposed development.

Aquifers: The regional groundwater table is expected to lie at significant depth beneath the proposed foundation level and no aquifer resource is expected to be adversely affected by the proposed development

Erosion and Sediment Control: The site presents some potential to generate silt runoff and this would naturally drain downslope. Effective systems for erosion control are runoff diversion drains and contour drains, while for sediment control, options are earth bunds, silt fences, hay bales, vegetation buffer strips and sediment ponds. Only the least amount of subsoil should be exposed at any stage and surfacing established as soon as practical. Details for implementation are given in Appendix B within the following link:

http://ecan.govt.nz/publications/General/FullErosionandSedimentControlGuideline.pdf

Noise: Standard excavation, piling and compaction plant will be required. QLDC requirements should be met in regard to this issue.

Dust: The soil materials at the site have potential to generate dust. Regular dampening of soil materials with sprinklers should be effective if required.

Vibration: Vibrations associated with machinery during site earthworks are unlikely to effect any neighbouring buildings due to the current minimum setback distance of 20 m+ (Terrace Junction buildings approximately 45 m to the west, 3 Hansen Road building approximately 25 m to the east).

8 Conclusions and Recommendations

- The stratigraphy across the site typically comprises topsoil overlying deltaic silt and deltaic sand and gravel;
- No groundwater was observed during site investigations. Permanent groundwater is expected to lie at approximately 40-45 m beneath the site;
- Recommendations for temporary and permanent batter slope angles are described in Table 5.2;
- Recommendations for foundations are provided in Section 5.9. Reduced (low) bearing capacities are available on the near surface deltaic silt soil. Extending footings or piles to bear on the underlying gravel where higher bearing is achievable should be considered during foundation design;
- All unsuitable materials identified in foundation excavations, particularly those softened by exposure to water, should be undercut and replaced with engineered fill during construction;
- Any fill that is utilised as bearing for foundations should be placed and compacted in accordance with NZS 4431:1989 and certification provided to that effect;
- The silt materials are susceptible to a reduction in strength if subject to trafficking or exposed to the elements. Construction works should be staged accordingly to ensure these materials are covered/protected shortly as soon as practical following exposure. Undercutting and/or protection with a granular fill layer may be appropriate in some cases;
- The risk of liquefaction affecting residential dwellings under either SLS or ULS seismic loading is considered to be very low;
- The mapped landslide located to the north of the development area does not pose any significant risk to the proposed development;
- A geotechnical practitioner should inspect all excavations and additionally any seepage, spring flow or under-runners that may be encountered during construction.

9 Applicability

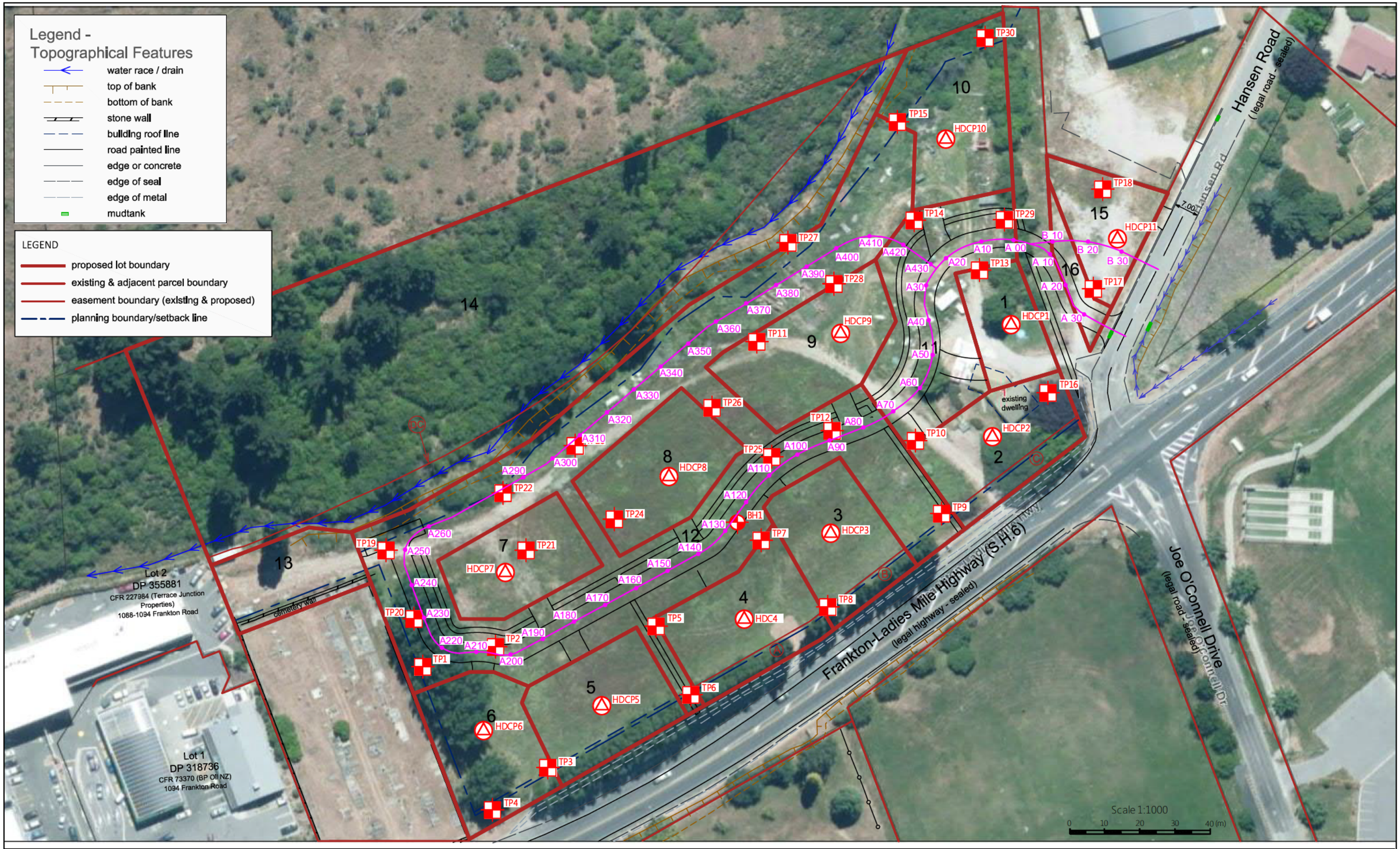
This report has been prepared for the benefit of Coronation Road Holdings Limited with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

It is important that we be contacted if there is any variation in subsoil conditions from those described in this report.

Report prepared by:	Reviewed for GeoSolve Ltd by:
	
.....	.....
Georgia Scott	Fraser Wilson
Geologist	Senior Engineering Geologist

Appendix A: Site Plans

- Site Investigation Plan
- Landslide Field Map



Key

Heavy Dynamic Cone Penetrometer Test (HDCP)

Test pit location

Drill hole and piezometer location

Road alignment and scala penetrometer test locations

GEOSOLVE
GEOTECHNICAL ENGINEERING • GEOHYDROLOGY & HYDROLOGY
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DRAFTING CHECKED	FAW	11/16
APPROVED	FAW	11/16
FILE	PDF	
SCALE (AT A3 SIZE)	1:1000	
PROJECT No	160488	

CORRONATION ROAD HOLDINGS LTD
Geotechnical Assessment
1 Hansen Road
Site Investigation Plan

FIG No Appendix A - Figure 1

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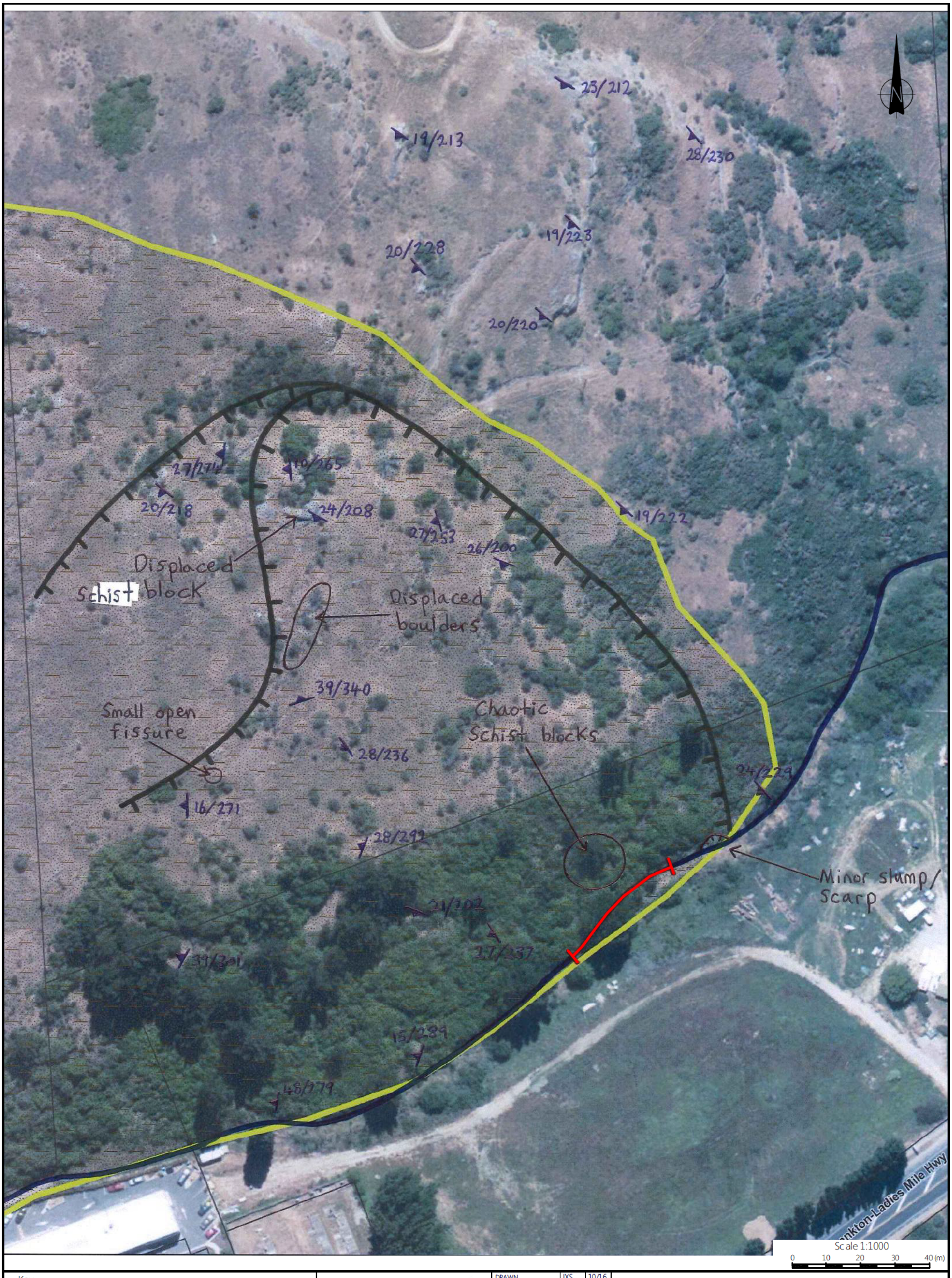

Key

- Water race tunnel
- Water race
- 28/230 Dip/dip diection of schist foliation
- Mapped extent of the landslide as shown on the QLDC hazard register maps
- Subdued landslide scarp

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CORONATION ROAD HOLDINGS LIMITED
Geotechnical Assessment
1 Hansen Road, Queenstown
Geological Field Map

FIG No Appendix A - Figure 2

REV 0

Photo 1: Open fissure in the landslide debris upslope of the proposed development.

Photo 2: Lined and covered concrete tunnel over water race.

Photo 3: Photo looking southeast down slope, towards the proposed development site.

Photo 4: Photo looking northwest up slope at the schist debris landslide.

Appendix B: Investigation Data

- Test Pit Logs
- Borehole Log
- Scala Penetrometer Logs

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 1**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 8-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 8-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with minor sand. Roots 50mm and rootlets. Sand is fine. Soft.	Moist	TOPSOIL
		0.7		Brown, sandy SILT with minor gravel. Roots and rootlets. Gravel is fine. Sand is fine. Soft to firm. Massive.	Moist	DELTAIC SILT
		1.4		Grey, SAND with rare silt. Roots and rootlets. Sand is fine. Loose. Massive.	Dry	DELTAIC SAND
	NO SEEPAGE	3.0		Brown/grey, layers of sandy GRAVEL and gravelly SAND with minor cobbles. Oxidised layer from 2.0 down. Sand is fine to coarse. Gravel is fine to coarse. Cobbles to 60 mm. Sub rounded. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3 m

COMMENT: Hole stood well, no seepage, roots to 1.4m.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 2**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 8-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 8-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rootlets and minor gravel and boulders. Gravel is fine to coarse. Boulders up to 250mm. Sub rounded/sub angular. Soft.	Moist	TOPSOIL
		0.8		Brown, SILT with rare sand and rootlets. Sand is fine. Soft. Massive.	Moist	DELTAIC SILT
		1.1		Grey, SAND with rare silt and minor rootlets. Sand is fine. Loose. Massive.	Dry	DELTAIC SAND
		2.35		Brown/grey, sandy GRAVEL and gravelly SAND with minor cobbles. Sand is fine to coarse. Gravel is fine to coarse. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL
		2.65		Brown/grey, SAND with minor gravel. Sand is fine. Gravel is fine. Medium dense. Bedded.	Dry	DELTAIC SAND
	NO SEEPAGE	3.1		Brown/grey, sandy GRAVEL and gravelly SAND with minor cobbles. Sand is fine to coarse. Gravel is fine to coarse. Medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.1 m

COMMENT: Hole stood well during excavation, no seepage.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 3**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 8-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 8-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.4		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		0.75		Light brown, silty SAND with minor rootlets. Sand is fine to medium. Loose. Massive.	Moist	DELTAIC SAND
		1.5		Brown, sandy GRAVEL and gravelly SAND with rootlets. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/ sub angular. Loose. Bedded.	Dry	DELTAIC SAND/GRAVEL
		2.4		Brown/ grey, SILT with minor sand and sand bands with rootlets. Sand is fine. Silt is firm to stiff. Sand is loose to medium dense. Bedded.	Dry	DELTAIC SILT
	NO SEEPAGE	2.9		Grey, SAND with rootlets. Sand is fine to medium. Medium dense. Massive.	Dry	DELTAIC SAND

Total Depth = 2.9 m

COMMENT: Hole stood well, dry, rootlets to full depth.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 4**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 8-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 8-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		0.8		Light brown, SILT with some sand and rootlets. Sand is fine. Non plastic. Soft. Massive.	Moist	DELTAIC SILT
		1.1		Grey, SAND with rootlets. Sand is fine. Loose. Massive.	Moist	DELTAIC SAND
		1.8		Grey, SILT with minor sand with rootlets. Sand is fine. Non plastic. Soft to firm. Massive.	Moist	DELTAIC SILT
	NO SEEPAGE	3.0		Brown/grey, gravelly SAND with some silt and sandy GRAVEL layers. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/ sub angular. Medium dense. Bed-ded.	Moist	DELTAIC SAND/GRAVEL

Total Depth = 3 m

COMMENT: Hole stood well during excavation, no seepage.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 5**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 8-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 8-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.2		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		0.6		Light brown, SILT with rootlets. Silt is non plastic. Soft. Massive.	Moist	DELTAIC SILT
		1.4		Grey, SILT with minor sand. Sand is fine. Silt is non plastic. Soft. Massive.	Moist	DELTAIC SILT
		1.9		Grey, SAND with some gravel and minor silt. Sand is fine. Gravel is fine to medium. Loose. Massive.	Dry	DELTAIC SAND
	NO SEEPAGE	3.2		Grey/brown, sandy GRAVEL and gravelly SAND with minor silt. Sand is fine to coarse. Gravel is fine to coarse. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.2 m

COMMENT: Hole stood well during excavation, no seepage.

Logged By: GXS

Checked Date:

Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 6**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING: mE	EQUIPMENT: 5.5T	OPERATOR: Wayne
NORTHING: mN	INFOMAP NO.	COMPANY: Forbes Earthworks
ELEVATION: m	DIMENSIONS:	HOLE STARTED: 8-Sep-16
METHOD:	EXCAV. DATUM:	HOLE FINISHED: 8-Sep-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		0.7		Light brown, SILT with rootlets. Silt is non plastic. Firm. Massive.	Moist	DELTAIC SILT
		1.9		Grey, SILT with minor sand and rootlets. Sand is fine. Silt is non plastic. Firm. Massive.		DELTAIC SILT
		2.2		Grey, SAND with minor rootlets. Sand is fine. Loose. Massive.	Dry	DELTAIC SAND
		2.8		Grey, SILT with minor sand and rootlets. Silt is non plastic. Firm. Massive.	Dry	DELTAIC SILT
	NO SEEPAGE	3.2		Brown/grey, sandy GRAVEL and gravelly SAND with minor silt. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub-angular. Loose. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.2 m

COMMENT: Hole stood well during excavation, no seepage.

Logged By: GXS

Checked Date:

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 7**

PROJECT: 1 Hansen Rd			Job Number: 160488
LOCATION: See site plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T	OPERATOR: Wayne
NORTHING:	mN	INFOMAP NO.	COMPANY: Forbes Earthworks
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 8-Sep-16
METHOD:		EXCAV. DATUM:	HOLE FINISHED: 8-Sep-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.2		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		1.1		Brown, SILT with minor sand and rootlets. Sand is fine. Soft to firm. Massive.	Moist	DELTAIC SILT
	NO SEEPAGE	3.3		Brown/grey, sandy GRAVEL and gravelly SAND with minor cobbles up to 150mm. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub-angular. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.3 m

COMMENT: Hole stood well during excavation, no seepage.

Logged By: GXS

Checked Date:

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 8**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 8-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 8-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.4		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		1.4		Brown/grey, SILT with minor sand and rootlets. Soft to firm. Massive.	Moist	DELTAIC SILT
	NO SEEPAGE	3.2		Brown/grey, sandy GRAVEL and gravelly SAND with minor cobbles. Sand is fine to coarse. Gravel is fine to coarse. Cobbles to 150 mm. Sub rounded/sub-angular. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.2 m

COMMENT: Hole stood well during excavation, no seepage.

Logged By: GXS

Checked Date:

Sheet: 1 of 1

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EXCAVATION LOG

EXCAVATION NUMBER: **TP 9**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 12-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 12-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
	NO SEEPAGE	0.4		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		1.0		Light brown, SILT with minor rootlets. Silt is non plastic. Soft. Massive.	Moist	DELTAIC SILT
		1.5		Grey, SILT with some sand. Sand is fine. Silt is non plastic. Soft to firm Massive.	Moist	DELTAIC SILT
		3.2		Grey/brown, gravelly SAND and sandy GRAVEL with minor cobbles. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub-angular. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.2 m

COMMENT: Hole stood well during excavation, no seepages.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 10**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING: mE	EQUIPMENT: 5.5T	OPERATOR: Wayne
NORTHING: mN	INFOMAP NO.	COMPANY: Forbes Earthworks
ELEVATION: m	DIMENSIONS:	HOLE STARTED: 12-Sep-16
METHOD:	EXCAV. DATUM:	HOLE FINISHED: 12-Sep-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.4		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		0.9		Light brown, SILT with rootlets. Soft.	Moist	DELTAIC SILT
		1.4		Grey, SILT with rare sand. Sand is fine. Firm.	Moist	DELTAIC SILT
		2.1		Grey, SAND with some gravel. Gravel is fine to medium. Sand is fine to coarse. Loose to medium dense.	Dry	DELTAIC SAND
	NO SEEPAGE	3.2		Brown/grey, sandy GRAVEL and gravelly SAND. Minor oxidised layers. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub angular. Loose to medium dense.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.2 m

COMMENT: Hole stood well, no seepage.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 11**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 12-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 12-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.5		Brown, organic SILT and gravelly SILT. Gravel is fine to coarse. Non plastic. Soft.	Moist	TOPSOIL/UNCONTROLLED FILL
		1.0		Grey, SILT, sandy SILT and SAND lenses. Sand is fine. Silt is non plastic. Dilatant. Soft. Loose.	Moist to wet	DELTAIC SILT/SAND
		1.1		Grey, SAND. Sand is fine to medium. Loose.	Moist	DELTAIC SAND
		2.5		Grey, SILT, sandy SILT and SAND lenses. Sand is fine. Silt is non plastic. Dilatant. Soft. Loose to medium dense.	Moist to wet	DELTAIC SILT/SAND
	NO SEEPAGE	3.2		Grey/brown, sandy GRAVEL and gravelly SAND. Minor oxidised layers. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub angular. Medium dense. Bedded.		DELTAIC SAND/GRAVEL

Total Depth = 3.2 m

COMMENT: Hole stood well during excavation, no seepages.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 12**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 12-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 12-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.2		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		1.2		Grey, SILT with rare sand. Sand is fine. Silt is non plastic. Soft to firm. Massive.	Moist	DELTAIC SILT
		2.0		Grey, SAND with some gravel. Gravel is fine to coarse. Sand is fine to coarse. Loose. Massive.	Dry	DELTAIC SAND
		2.8		Brown/grey, sandy GRAVEL and gravelly SAND. Minor oxidised layers. Gravel is fine to coarse. Sand is fine to coarse. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL
		3.2		Grey, sandy SILT and gravelly silty SAND. Sand is fine to coarse. Gravel is fine to coarse. Silt is non plastic. Stiff/ medium dense. Bedded.	Dry	DELTAIC SILT/SAND
	NO SEEPAGE	3.25		Brown/grey, sandy GRAVEL and gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub angular. Medium dense. Bedded	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3.25 m

COMMENT: Hole stood well during excavation, no seepages.

Logged By: GXS

Checked Date:

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 13**

PROJECT: 1 Hansen Rd			Job Number: 160488
LOCATION: See site plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 12-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 12-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.8		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		1.8		Brown/ grey, SILT and sandy SILT with SAND lenses. Sand is fine to medium. Silt is non plastic. Soft and loose.	Dry	DELTAIC SILT/SAND
		2.1		Grey, SAND. Sand is fine to medium. Loose.	Dry	DELTAIC SAND
	NO SEEPAGE	3.3		Brown/ grey, SILT with minor sand and SAND bands with minor rootlets. Sand is fine to medium. Gravel is fine to medium. Sub rounded/sub angular. Silt is non plastic. Soft to firm and loose.	Dry	DELTAIC SILT/SAND

Total Depth = 3.3 m

COMMENT: Hole with minor collapsing in SILT, no seepages.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 14**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T	OPERATOR: Wayne
NORTHING:	mN	INFOMAP NO.	COMPANY: Forbes Earthworks
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 12-Sep-16
METHOD:		EXCAV. DATUM:	HOLE FINISHED: 12-Sep-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		1.45		Brown/grey, SILT with minor sand and sandy SILT lenses. At 0.75 m, a 50 mm oxidised SAND lense. Sand is fine. Silt is non plastic. Soft to firm. Laminated.	Moist	DELTAIC SILT
		1.6		Grey, SAND. Sand is fine to medium. Loose. Massive.		DELTAIC SAND
		2.0		Grey brown, SILT with minor sand and sandy SILT lenses. Sand is fine to medium. Silt is non plastic. Soft to firm. Massive.		DELTAIC SILT
	NO SEEPAGE	3.0		Brown/grey, sandy GRAVEL and gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub angular. Medium dense. Bedded.		DELTAIC SAND/GRAVEL

Total Depth = 3 m

COMMENT: Hole stood well during excavation, no seepage.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 15**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 12-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 12-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.4		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		2.3		Brown, SILT with minor sand lenses. Sand is fine. Sit is non plastic. Soft to stiff.	Moist	DELTAIC SILT
	NO SEEPAGE	3.0		Brown/grey, sandy GRAVEL, sandy silty GRAVEL and gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse. Silt is non plastic. Medium dense. Bedded.	Moist	DELTAIC SAND/GRAVEL

Total Depth = 3 m

COMMENT: Easy digging for excavator. Hole stood well, no seepage.

Logged By: GXS

Checked Date:

Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 16**

PROJECT: 1 Hansen Rd			Job Number: 160488
LOCATION: See site plan		Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 12-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 12-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.4		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Moist	TOPSOIL
		1.0		Brown/grey, SILT with minor sand and rootlets. Sand is fine. Silt is non plastic. Soft. Massive.	Moist	DELTAIC SILT
		1.7		Grey, SAND with rare to minor gravel with rootlets. Sand is fine to medium. Gravel is fine. Loose to medium dense. Massive.	Dry	DELTAIC SAND
	NO SEEPAGE	3.0		Brown/grey, gravelly SAND and sandy GRAVEL. Minor oxidised layers. Sand is fine to coarse. Gravel is fine to coarse. Sub rounded/sub angular. Loose to medium dense. Bedded.	Dry	DELTAIC SAND/GRAVEL

Total Depth = 3 m

COMMENT: Hole stood well during excavation, minor collapse in gravels and sands layer (1.7-3.0).	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 17**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T		OPERATOR: Wayne	
NORTHING:	mN	INFOMAP NO.		COMPANY: Forbes Earthworks	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 12-Sep-16	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 12-Sep-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.2		Grey, gravelly SAND. Sand is fine to coarse. Gravel is fine to medium. Loose.	Dry	UNCONTROLLED FILL
		0.5		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.	Dry	TOPSOIL
	NO SEEPAGE	3.3		Brown, SAND, silty SAND, SILT and sandy SILT lenses. Sand is fine to medium. Silt is non plastic. Sand is loose. Silt is soft.	Dry	DELTAIC SILT/SAND

Total Depth = 3.3 m

COMMENT: Hole stood well during excavation, no seepage.

Logged By: GXS

Checked Date:

Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 18**

PROJECT: 1 Hansen Rd		Job Number: 160488
LOCATION: See site plan	Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 5.5T	OPERATOR: Wayne
NORTHING:	mN	INFOMAP NO.	COMPANY: Forbes Earthworks
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 12-Sep-16
METHOD:		EXCAV. DATUM:	HOLE FINISHED: 12-Sep-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rootlets and minor gravel and boulders. Soft.		TOPSOIL
		1.0		Light brown, SILT with rootlets. Silt is non plastic. Soft.		DELTAIC SILT
	NO SEEPAGE	3.0		Brown/ grey, SILT, SAND and sandy SILT lenses. Sand is fine. Silt is Soft. Sand is loose. Bedded.		DELTAIC SILT/SAND

Total Depth = 3 m

COMMENT: Hole stood well during excaation, no seepages.	Logged By: GXS
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 19**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator		OPERATOR: Nigel	
NORTHING:	mN	INFOMAP NO.		COMPANY: Horrell Contracting	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 1-Jul-04	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		1.6		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Firm to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
	NO SEEPAGE	3.4		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.4 m

COMMENT:	Logged By: BXB
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 20**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator		OPERATOR: Nigel	
NORTHING:	mN	INFOMAP NO.		COMPANY: Horrell Contracting	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 1-Jul-04	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		1.1		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Firm to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		1.6		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense. poorly developed cross-beds that face SW, the unit is sub-horizontal.	Slightly moist	DELTAIC GRAVEL
	NO SEEPAGE	3.4		Light brownish grey, sandy GRAVEL with rare silt, interbedded with sand and some silt. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. beds are sub-horizontal and are 100-300 mm thick.	Slightly moist	DELTAIC GRAVEL/ SAND

Total Depth = 3.4 m

COMMENT:

Logged By: BXB

Checked Date:

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 21**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator		OPERATOR: Nigel	
NORTHING:	mN	INFOMAP NO.		COMPANY: Horrell Contracting	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 1-Jul-04	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		0.8		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		0.9		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose. nonstratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		1.2		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Firm. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.1		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL
		2.2		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Stiff to very stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.3		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Medium dense. nonstratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
	NO SEEPAGE	3.2		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.2 m

COMMENT:

Logged By: BXB

Checked Date:

Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 22**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator	OPERATOR: Nigel
NORTHING:	mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
METHOD:		EXCAV. DATUM:	HOLE FINISHED: 1-Jul-04

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		0.8		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Moist to wet	DELTAIC SILT
		0.9		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose to medium dense. non-stratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		1.2		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Firm to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		1.5		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL
		1.7		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
	NO SEEPAGE	3.1		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.1 m

COMMENT:	Logged By: BXB
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 23**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan		Inclination: VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator	OPERATOR: Nigel
NORTHING:	mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
METHOD:		EXCAV. DATUM:	HOLE FINISHED: 1-Jul-04

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		1.1		Brownish grey, SILT with rare sand, and rare sandy SILT. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		1.2		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose. nonstratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		1.8		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.6		Brownish grey, sandy SILT. (MH-SP) sand is fine to medium, silt is highly micaceous. Uniform, dilatant, non-plastic. Stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
	NO SEEPAGE	3.5		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.5 m

COMMENT:	Logged By: BXB
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 24**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator	OPERATOR: Nigel
NORTHING:	mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
METHOD:		EXCAV. DATUM:	HOLE FINISHED: 1-Jul-04

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	slightly moist	TOPSOIL
		1.0		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	slightly moist	DELTAIC SILT
		1.1		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose. nonstratified, unit is sub-horizontal.	slightly moist	DELTAIC SAND
		1.3		Brownish grey, sandy SILT. (MH-SP) sand is fine, silt is highly micaceous. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	slightly moist	DELTAIC SILT
	NO SEEPAGE	3.4		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	slightly moist	DELTAIC GRAVEL

Total Depth = 3.4 m

COMMENT:	Logged By: BXB
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 25**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: SeeSite Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator		OPERATOR: Nigel	
NORTHING:	mN	INFOMAP NO.		COMPANY: Horrell Contracting	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 1-Jul-04	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		2.0		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.2		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL
		2.3		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.8		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL
	NO SEEPAGE	3.3		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Stiff to very stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT

Total Depth = 3.3 m

COMMENT:	Logged By: BXB
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 26**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING: mE	EQUIPMENT: 20 T Excavator	OPERATOR: Nigel	
NORTHING: mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
METHOD:	EXCAV. DATUM:	HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Moist	TOPSOIL
		1.1		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Moist	DELTAIC SILT
		1.2		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose. Nonstratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		2.3		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Firm to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.5		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL
		2.6		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Medium dense. Nonstratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
	NO SEEPAGE	3.3		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.3 m

COMMENT:	Logged By: BXB
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 27**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator		OPERATOR: Nigel	
NORTHING:	mN	INFOMAP NO.		COMPANY: Horrell Contracting	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 1-Jul-04	
METHOD:		EXCAV. DATUM:		HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		0.6		brown, SILT with minor sand and gravel, and rare roots and cobbles. (MH) sand is fine to coarse, gravel is fine to coarse, cobbles up to 100 mm, clasts are angular to rounded schist and meta-sediments. Uniform, dilatant, non-plastic. Soft. Nonstratified.	Moist	UNCONTROLLED FILL
		1.3		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		1.5		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose. Non-stratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		2.8		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
	NO SEEPAGE	3.8		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.8 m

COMMENT:

Logged By: BXB
Checked Date:
Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 28**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING: mE	EQUIPMENT: 20 T Excavator	OPERATOR: Nigel	
NORTHING: mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
METHOD:	EXCAV. DATUM:	HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.3		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		1.1		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		1.2		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose . Nonstratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		2.1		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.3		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Loose to medium dense. Poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL
		2.5		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Medium dense. non-stratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
	NO SEEPAGE	3.4		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.4 m

COMMENT:	Logged By: BXB
	Checked Date:
	Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 29**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING:	mE	EQUIPMENT: 20 T Excavator	OPERATOR: Nigel
NORTHING:	mN	INFOMAP NO.	COMPANY: Horrell Contracting
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 1-Jul-04
METHOD:		EXCAV. DATUM:	HOLE FINISHED: 1-Jul-04

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.4		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		1.4		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		1.8		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Loose. non-stratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		3.0		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		3.1		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Medium dense to dense. non-stratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
		3.3		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
	NO SEEPAGE	3.8		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.8 m

COMMENT:

Logged By: BXB
Checked Date:
Sheet: 1 of 1

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 30**

PROJECT: 1Hansen Road			Job Number: 160488
LOCATION: See Site Plan	Inclination:	VERTICAL	Direction:

EASTING: mE	EQUIPMENT: 20 T Excavator	OPERATOR: Nigel	
NORTHING: mN	INFOMAP NO.	COMPANY: Horrell Contracting	
ELEVATION: m	DIMENSIONS:	HOLE STARTED: 1-Jul-04	
METHOD:	EXCAV. DATUM:	HOLE FINISHED: 1-Jul-04	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.4		Dark brown, organic SILT with rare sand and gravel, and minor roots. Sand is fine to coarse, gravel is fine to coarse, clasts are angular to sub-rounded schist. Uniform, dilatant, non-plastic. Soft. non-stratified, unit is sub-horizontal.	Slightly moist	TOPSOIL
		2.4		Brownish grey, SILT with rare sand and roots, and rare horizons of sandy SILT, organic content is <5%. Silt is highly micaceous, sand is fine. Uniform, dilatant, non-plastic. Soft to stiff. poorly developed thin to laminated bedding, sub-horizontal.	Slightly moist	DELTAIC SILT
		2.5		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Medium dense to dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL
		2.6		Light grey, SAND with minor silt. Sand is fine to medium. Uniform, dilatant. Medium dense to dense. Nonstratified, unit is sub-horizontal.	Slightly moist	DELTAIC SAND
	NO SEEPAGE	3.8		Greyish brown, sandy GRAVEL with rare silt, and rare thin (<100 mm) beds of sandy SILT. Sand is fine to coarse, gravel is fine to coarse, silt is micaceous, clasts are angular to sub-rounded schist. Well graded. Dense. poorly developed beds (~50 to 200 mm) dipping very gently SE.	Slightly moist	DELTAIC GRAVEL

Total Depth = 3.8 m

COMMENT:

Logged By: BXB
Checked Date:
Sheet: 1 of 1

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BORE HOLE LOG

BOREHOLE No: **BH 1**

SHEET 1 OF 2

DRILLED BY: McNeill Drilling
LOGGED BY: J A Stewart
CHECKED: F Wilson
START DATE: 21-9-16
FINISH DATE: 21-9-16

PROJECT: 1 Hansen Road
LOCATION: Frankton
CO-ORDINATES: See site plan

JOB No: 160488
DIRECTION: Veritical
ANGLE FROM HORIZ.: 90°

R.L. GROUND:
R.L. COLLAR:
DATUM: Ground level

DRILL TYPE/METHOD/FLUID: Sonic Coring

GEOLOGICAL UNIT	DESCRIPTION OF CORE (SOIL: Classification, colour, consistency / density, moisture, plasticity)	Sampling Method	Core Recovery (%)	Moisture Condition	Strength/Density Classification	RL (m) / Depth (m)	Graphic Log	Drillers Notes	TESTING (Hammer Efficiency: 90+, Borehole Diameter: 3", Liner: No)	Water Loss (%)	Water Level	Casing	Installation	Core Box
TopSoil	Dark brown, Organic SILT. Rootlets.	Sonic Coring	100%	Moist		0				25 50 75				
Deltaic Silt / Sand	Light brown / grey, SILT. Non plastic, no dilatancy.													
	Grey, silty SAND. S=f. Micaceous.					1								
Deltaic Sand / Gravel	Brown, Sandy GRAVEL and grey, silty SAND. Micaceous.	SPT		Moist	Medium Dense				SPT @ 1.5m 1, 3, 4, 5, 5, 5 N=19 R=330mm					
	Grey/brown, Sandy GRAVEL.	Sonic Coring		Moist		2								
	Brown, Sandy GRAVEL.	SPT		Moist	Medium Dense				SPT @ 3.0m 3, 3, 4, 4, 5, 4 N=17 R=300mm					
	Grey, Sandy GRAVEL. FeO and manganese staining.	Sonic Coring		Moist		3								
	Grey, Sandy GRAVEL and silty SAND.	SPT		Moist	Medium Dense				SPT @ 4.5m 4, 4, 2, 3, 8, 7 N=20 R=340mm					
	Grey, Sandy GRAVEL.	Sonic Coring		Moist		4								
	Grey, Sandy GRAVEL.	SPT		Moist	Medium Dense				SPT @ 6.0m 7, 6, 4, 5, 6, 9 N=24 R=290mm					
	Grey, Sandy GRAVEL.	Sonic Coring		Moist		5								
	Light grey, Sandy GRAVEL.			Dry										
	Grey, gravelly SAND.			Moist		6								
	Grey, gravelly SAND and SAND with minor silt. S=f-m.	SPT		Moist	Medium Dense				SPT @ 7.5m 4, 3, 3, 3, 4, 4 N=14 R=340mm					
	Grey, SAND. S=f-m.	Sonic Coring		Moist		7								
	Grey, SAND with some gravel.			Moist										
	Light grey, Sandy GRAVEL.			Dry to Moist		8								
	Grey, SAND with minor gravel.	SPT		Moist	Medium Dense				SPT @ 9.0m 3, 2, 3, 4, 5, 6 N=18 R=290mm					
	Grey, SAND with minor to some gravel and gravelly SAND.	Sonic Coring		Moist		9								
						10								

Piezometer Dry

COMMENTS: Piezometer installed to 15.0m bgl.

Survey method:

Log Scale 1:50

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BORE HOLE LOG

BOREHOLE No: **BH 1**
SHEET 2 OF 2

PROJECT: 1 Hansen Road
LOCATION: Frankton
CO-ORDINATES: See Site plan

JOB No: 160488
DIRECTION: Vertical
ANGLE FROM HORIZ.: 90°

R.L. GROUND:
R.L. COLLAR:
DATUM: Ground level

DRILLED BY: McNeill Drilling
LOGGED BY: J A Stewart
CHECKED: F Wilson
START DATE: 21-9-2016
FINISH DATE: 21-9-2016

DRILL TYPE/METHOD/FLUID: Sonic Coring

GEOLOGICAL UNIT	DESCRIPTION OF CORE (SOIL: Classification, colour, consistency / density, moisture, plasticity)	Sampling Method	Core Recovery (%)	Moisture Condition	Strength/Density Classification	RL (m) / Depth (m)	Graphic Log	Drillers Notes	TESTING (Hammer Efficiency: 90+, Borehole Diameter: 3", Liner: No)	Water Loss (%)	Water Level	Casing	Installation	Core Box
Deltaic Sand / Gravel	Grey, Sandy GRAVEL.	Sonic Coring	100 %	Moist		10					Piezometer Dry			
	Grey, SAND. S=f-m.	SPT		Moist	Medium Dense				SPT @ 10.5m 4,3,4,5,5,7 N=21 R=310mm					
	Grey, gravelly SAND.	Sonic Coring		Moist		11								
	Grey, SAND with minor to some gravel. S=f-m													
	Grey, SAND with trace of gravel. S=f-m.					12			SPT @ 12.0m 6,7,7,7,6,6 N=26 R=290mm					
	Grey, Sandy GRAVEL.	SPT		Moist	Medium Dense									
	Grey, Sandy GRAVEL with a horizon of SAND and a horizon of gravelly SAND.	Sonic Coring		Moist		13			SPT @ 13.0m 6,4,5,4,4,4 N=17 R=250mm					
	Grey, Sandy GRAVEL.	SPT		Moist	Medium Dense									
	Grey, Sandy GRAVEL.	Sonic Coring		Moist		14								
	Grey, gravelly SAND.													
	Grey, Sandy GRAVEL.	SPT		Moist	Medium Dense	15			SPT @ 15.0m 4,3,3,3,4,5 N=15 R=280mm					
	End of borehole @ 15.0m bgl.					16								

COMMENTS: Piezometer installed to 15.0m bgl.

Survey method:

Log Scale 1:50

GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

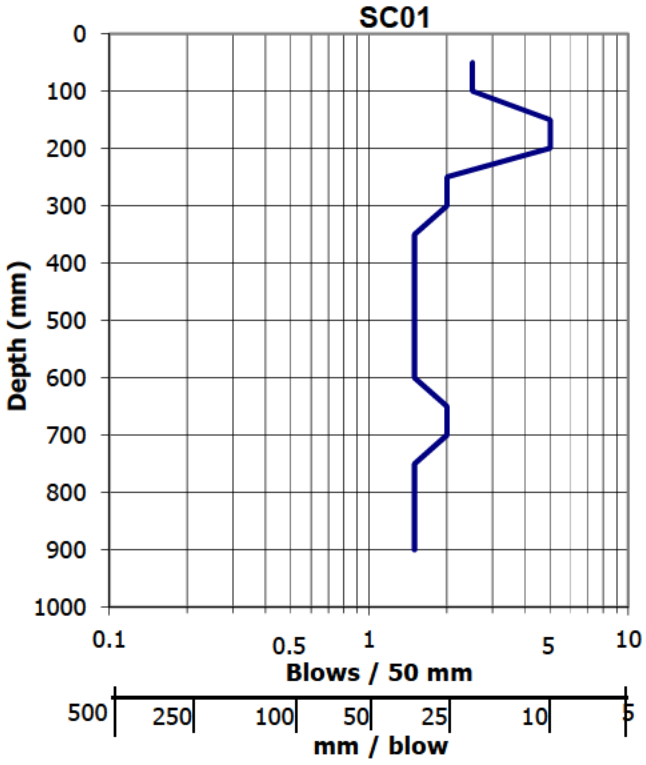
Date: 26/09/2016
Operated: JXH
Logged: JXH

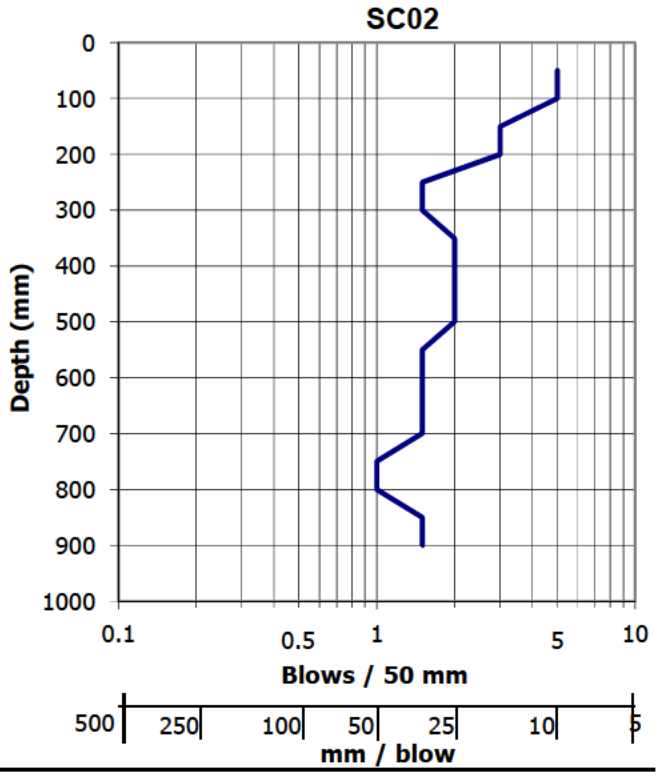
Test Number SC01 & SC02

Sheet 1 of 24

SC01 Location: B-30 RL: 0	
mm Driven	No. of Blows
50	2.5
100	2.5
150	5
200	5
250	2
300	2
350	1.5
400	1.5
450	1.5
500	1.5
550	1.5
600	1.5
650	2
700	2
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC02 Location: B-20 RL: 0	
mm Driven	No. of Blows
50	5
100	5
150	3
200	3
250	1.5
300	1.5
350	2
400	2
450	2
500	2
550	1.5
600	1.5
650	1.5
700	1.5
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

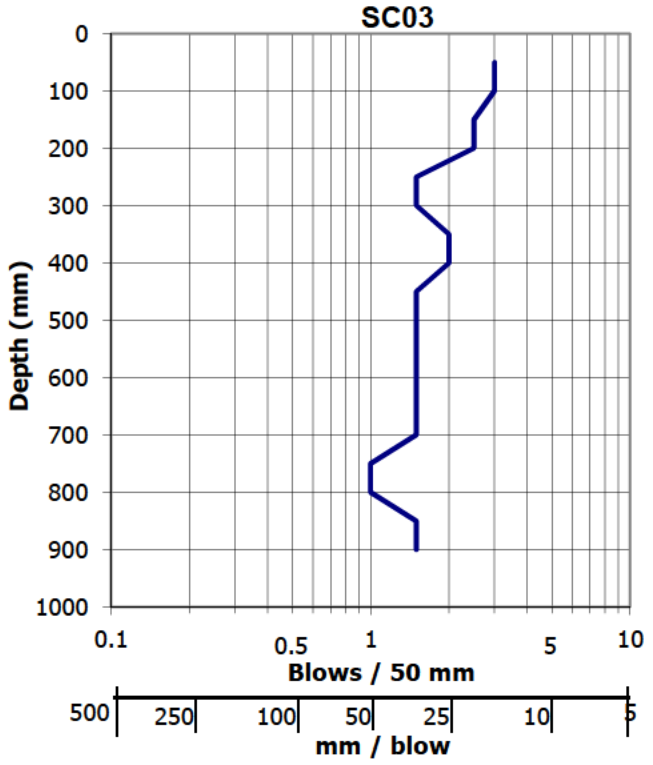
Date: 26/09/2016
Operated: JXH
Logged: JXH

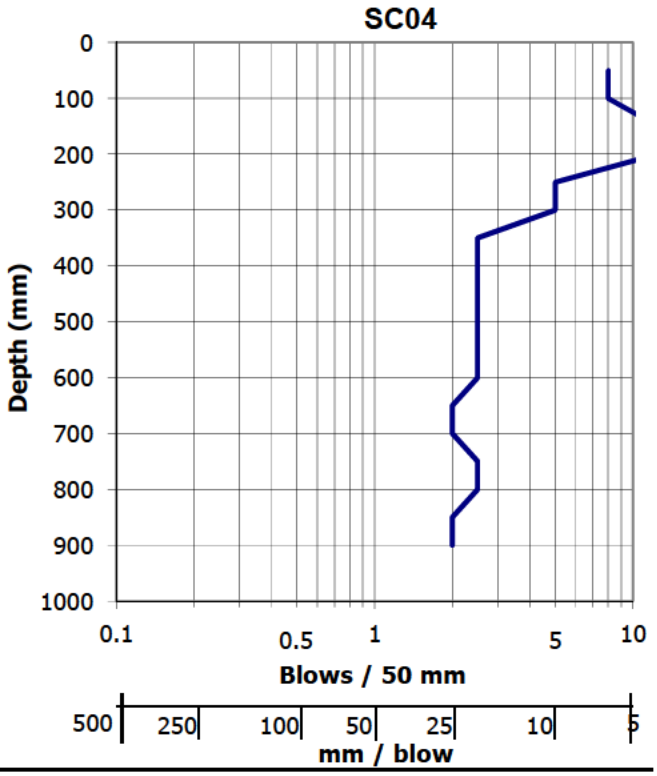
Test Number SC03 & SC04

Sheet 2 of 24

SC03 Location: B-10 RL: 0	
mm Driven	No. of Blows
50	3
100	3
150	2.5
200	2.5
250	1.5
300	1.5
350	2
400	2
450	1.5
500	1.5
550	1.5
600	1.5
650	1.5
700	1.5
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC04 Location: A-30 RL: 0	
mm Driven	No. of Blows
50	8
100	8
150	12.5
200	12.5
250	5
300	5
350	2.5
400	2.5
450	2.5
500	2.5
550	2.5
600	2.5
650	2
700	2
750	2.5
800	2.5
850	2
900	2
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

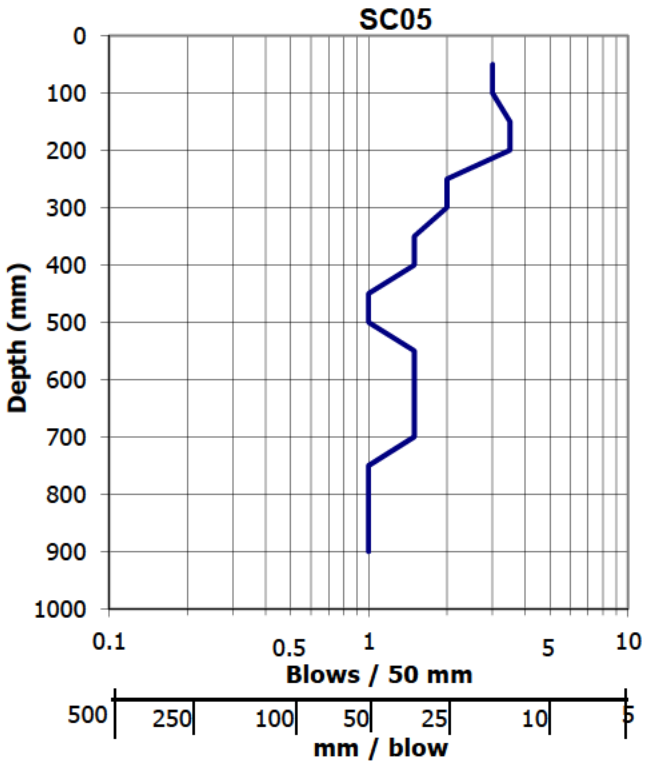
Date: 26/09/2016
Operated: JXH
Logged: JXH

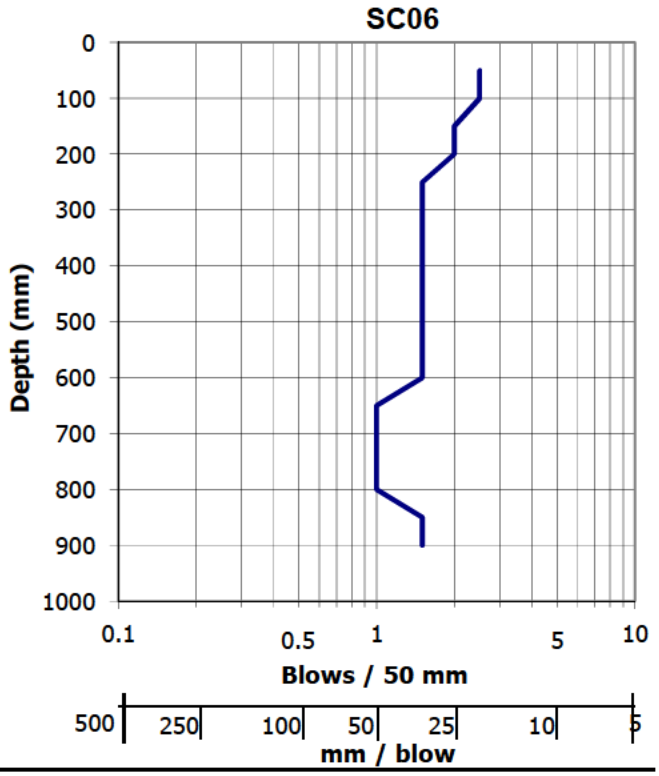
Test Number SC05 & SC06

Sheet 3 of 24

SC05 Location: A-20 RL: 0	
mm Driven	No. of Blows
50	3
100	3
150	3.5
200	3.5
250	2
300	2
350	1.5
400	1.5
450	1
500	1
550	1.5
600	1.5
650	1.5
700	1.5
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC06 Location: A-10 RL: 0	
mm Driven	No. of Blows
50	2.5
100	2.5
150	2
200	2
250	1.5
300	1.5
350	1.5
400	1.5
450	1.5
500	1.5
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

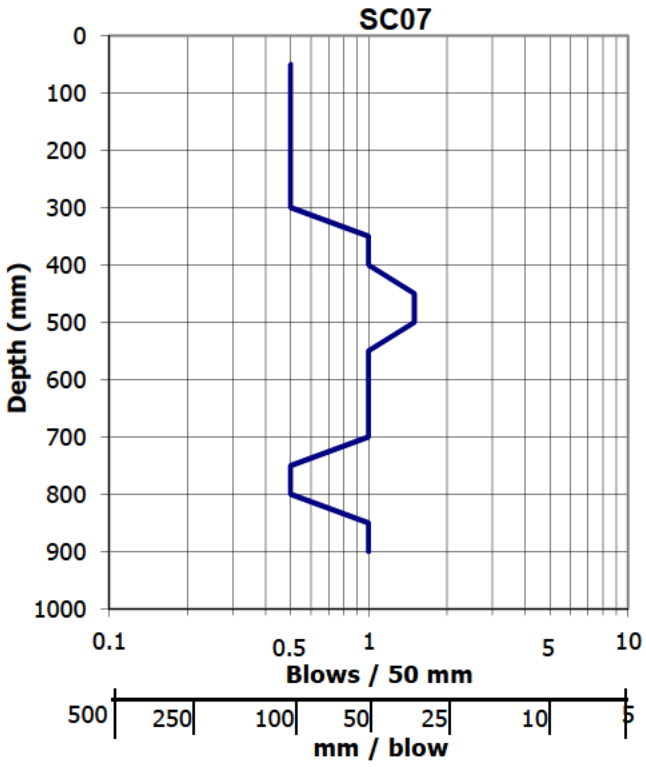
Date: 26/09/2016
Operated: JXH
Logged: JXH

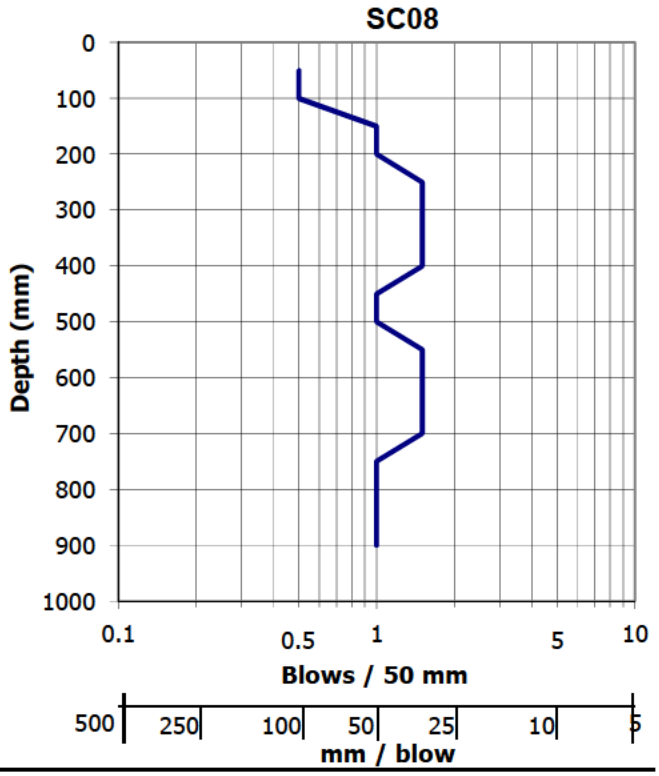
Test Number SC07 & SC08

Sheet 4 of 24

SC07 Location: A0.0 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	0.5
300	0.5
350	1
400	1
450	1.5
500	1.5
550	1
600	1
650	1
700	1
750	0.5
800	0.5
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC08 Location: A10 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	1
200	1
250	1.5
300	1.5
350	1.5
400	1.5
450	1
500	1
550	1.5
600	1.5
650	1.5
700	1.5
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

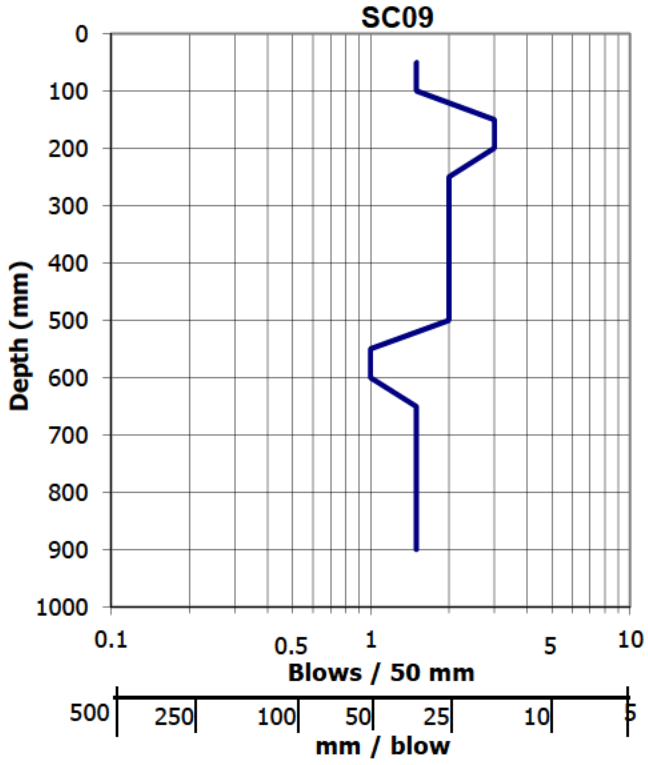
Date: 26/09/2016
Operated: JXH
Logged: JXH

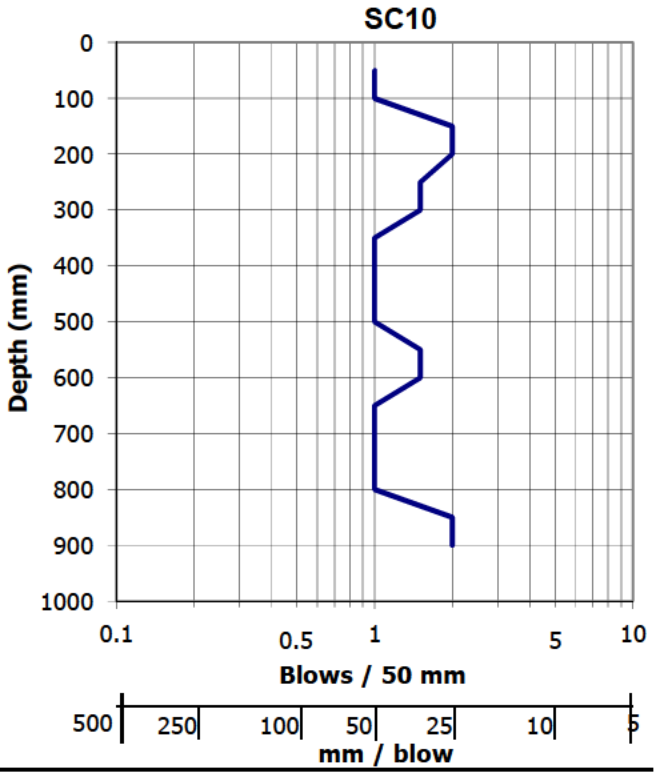
Test Number SC09 & SC10

Sheet 4 of 24

SC09 Location: A20 RL: 0	
mm Driven	No. of Blows
50	1.5
100	1.5
150	3
200	3
250	2
300	2
350	2
400	2
450	2
500	2
550	1
600	1
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC10 Location: A30 RL: 0	
mm Driven	No. of Blows
50	1
100	1
150	2
200	2
250	1.5
300	1.5
350	1
400	1
450	1
500	1
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	2
900	2
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

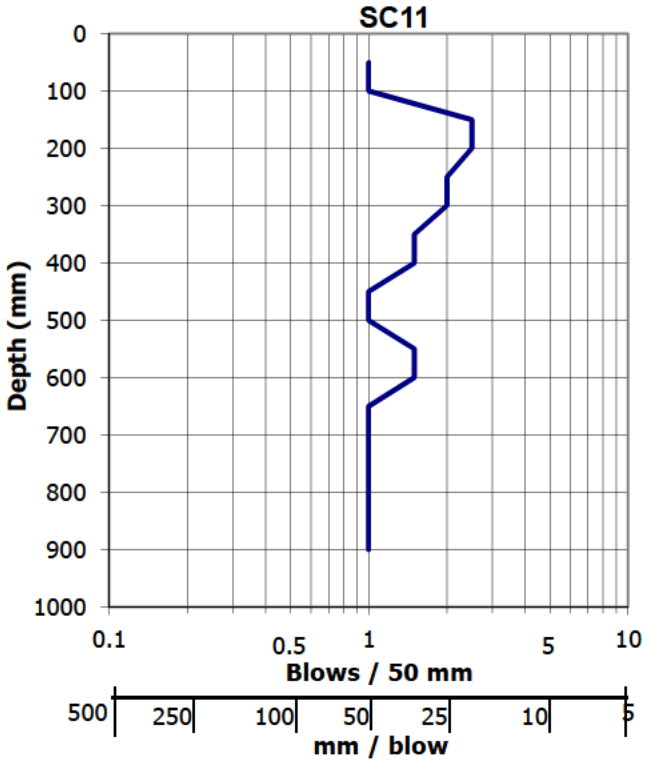
Date: 26/09/2016
Operated: JXH
Logged: JXH

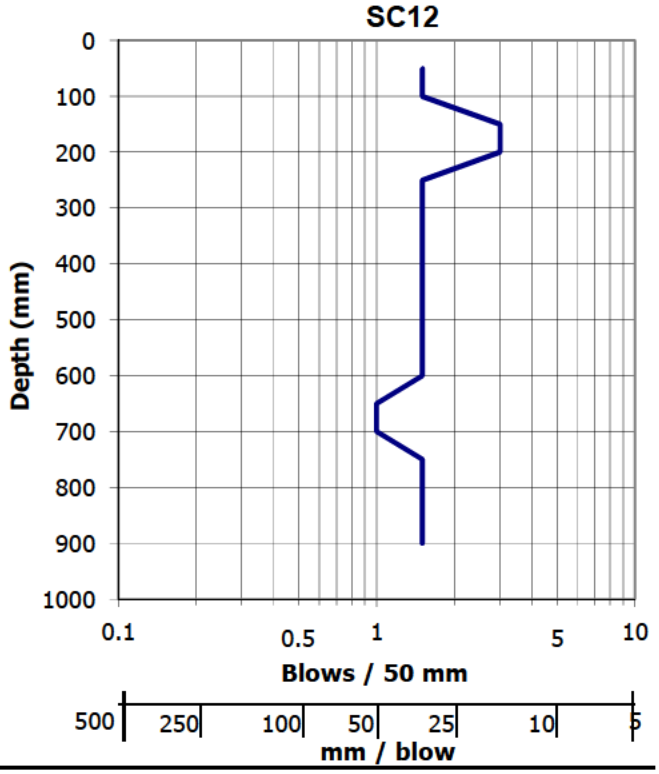
Test Number SC11 & SC12

Sheet 6 of 24

SC11 Location: A40 RL: 0	
mm Driven	No. of Blows
50	1
100	1
150	2.5
200	2.5
250	2
300	2
350	1.5
400	1.5
450	1
500	1
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC12 Location: A50 RL: 0	
mm Driven	No. of Blows
50	1.5
100	1.5
150	3
200	3
250	1.5
300	1.5
350	1.5
400	1.5
450	1.5
500	1.5
550	1.5
600	1.5
650	1
700	1
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

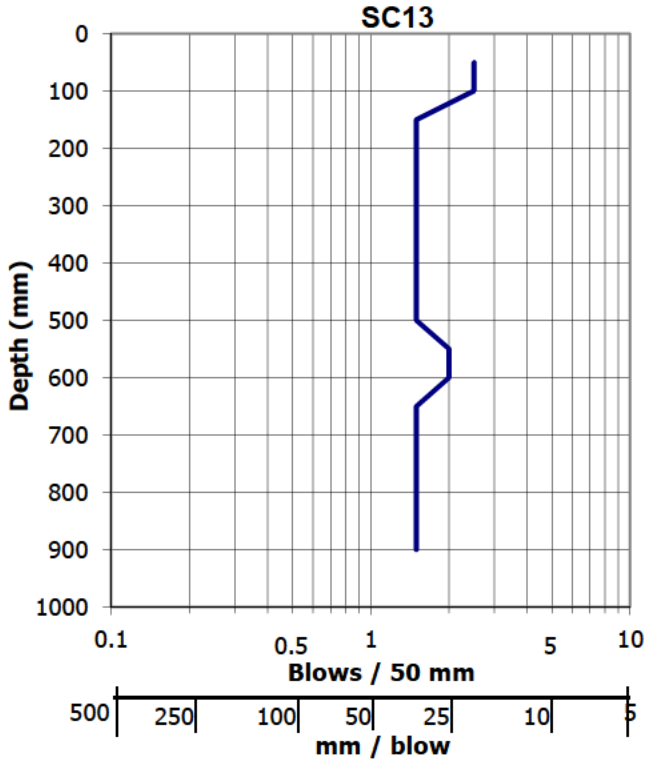
Date: 26/09/2016
Operated: JXH
Logged: JXH

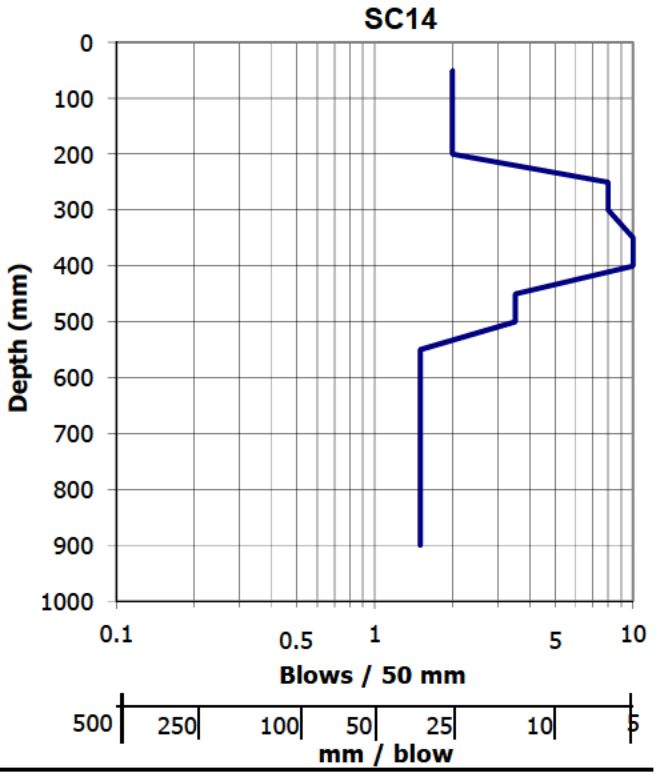
Test Number SC13 & SC14

Sheet 7 of 24

SC13 Location: A60 RL: 0	
mm Driven	No. of Blows
50	2.5
100	2.5
150	1.5
200	1.5
250	1.5
300	1.5
350	1.5
400	1.5
450	1.5
500	1.5
550	2
600	2
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC14 Location: A70 RL: 0	
mm Driven	No. of Blows
50	2
100	2
150	2
200	2
250	8
300	8
350	10
400	10
450	3.5
500	3.5
550	1.5
600	1.5
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

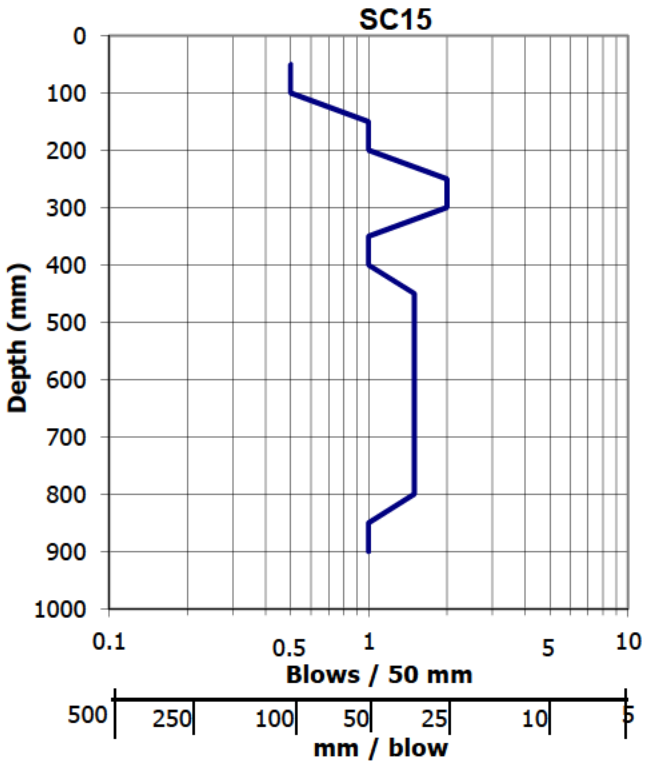
Date: 26/09/2016
Operated: JXH
Logged: JXH

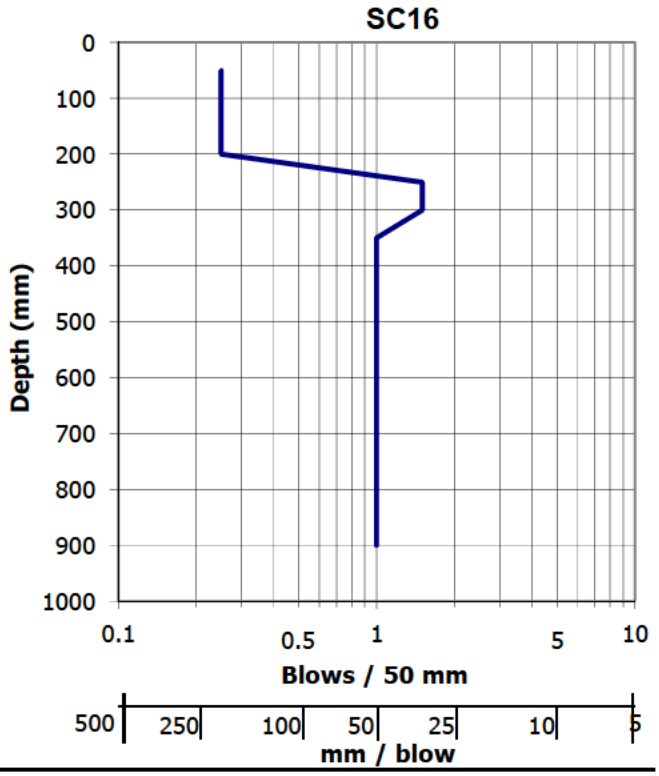
Test Number SC15 & SC16

Sheet 8 of 24

SC15 Location: A80 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	1
200	1
250	2
300	2
350	1
400	1
450	1.5
500	1.5
550	1.5
600	1.5
650	1.5
700	1.5
750	1.5
800	1.5
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC16 Location: A90 RL: 0	
mm Driven	No. of Blows
50	0.25
100	0.25
150	0.25
200	0.25
250	1.5
300	1.5
350	1
400	1
450	1
500	1
550	1
600	1
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

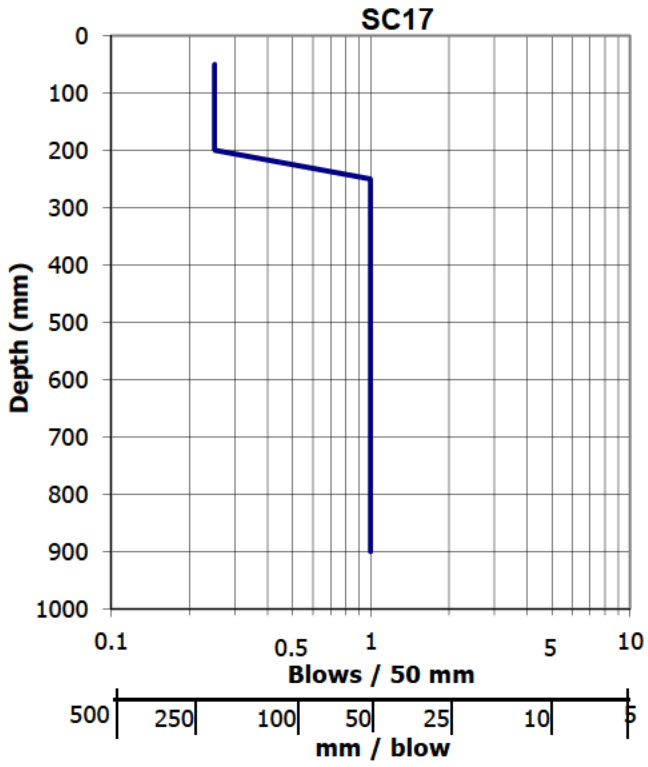
Date: 26/09/2016
Operated: JXH
Logged: JXH

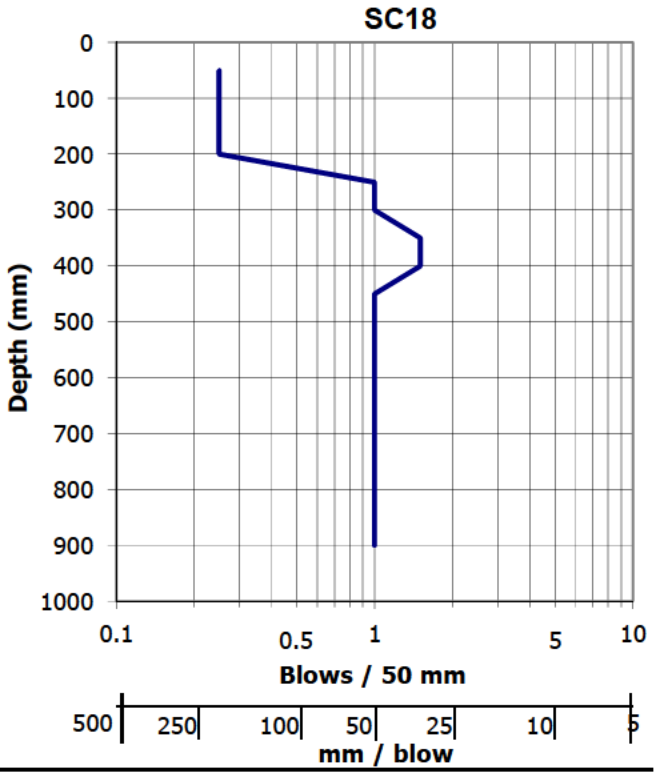
Test Number SC17 & SC18

Sheet 9 of 24

SC17 Location: A100 RL: 0	
mm Driven	No. of Blows
50	0.25
100	0.25
150	0.25
200	0.25
250	1
300	1
350	1
400	1
450	1
500	1
550	1
600	1
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC18 Location: A110 RL: 0	
mm Driven	No. of Blows
50	0.25
100	0.25
150	0.25
200	0.25
250	1
300	1
350	1.5
400	1.5
450	1
500	1
550	1
600	1
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

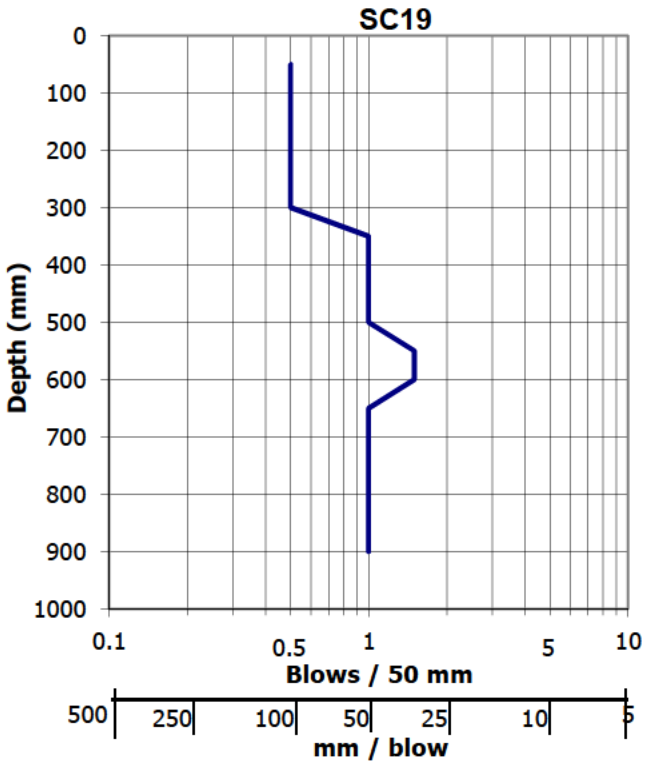
Date: 26/09/2016
Operated: JXH
Logged: JXH

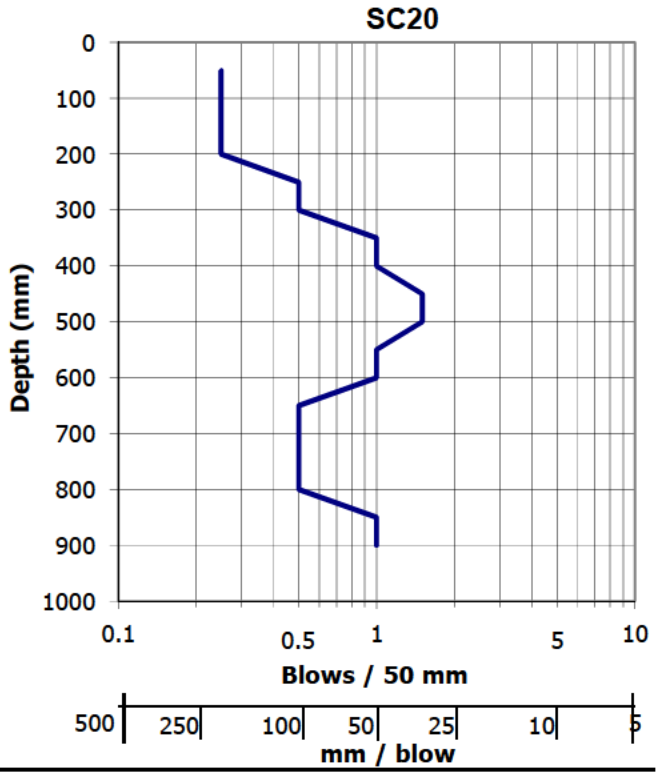
Test Number SC19 & SC20

Sheet 10
of 24

SC19 Location: A120 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	0.5
300	0.5
350	1
400	1
450	1
500	1
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC20 Location: A130 RL: 0	
mm Driven	No. of Blows
50	0.25
100	0.25
150	0.25
200	0.25
250	0.5
300	0.5
350	1
400	1
450	1.5
500	1.5
550	1
600	1
650	0.5
700	0.5
750	0.5
800	0.5
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

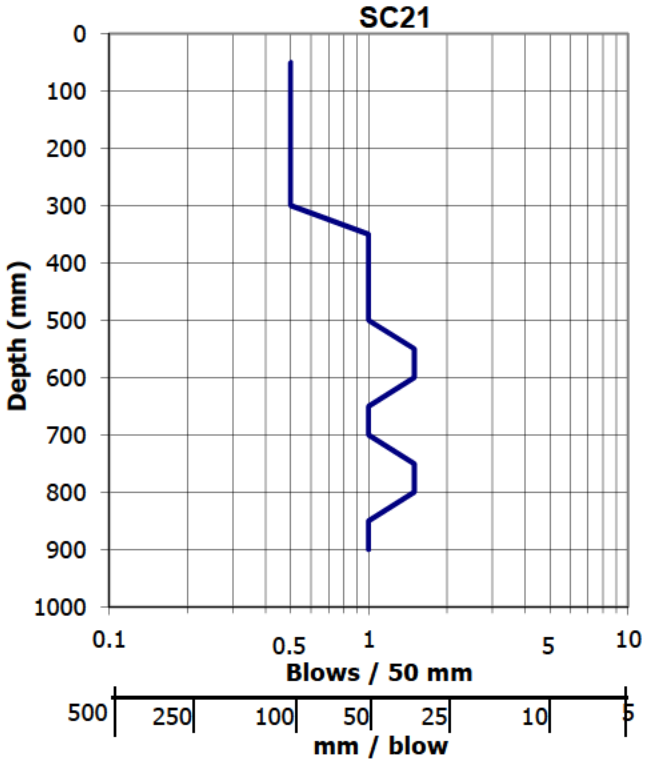
Date: 26/09/2016
Operated: JXH
Logged: JXH

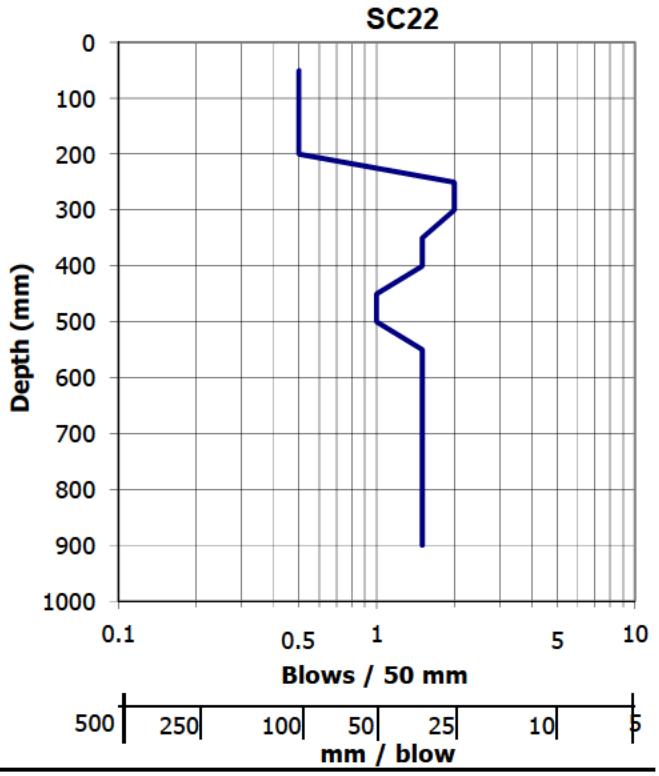
Test Number SC21 & SC22

Sheet 11 of 24

SC21 Location: A140 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	0.5
300	0.5
350	1
400	1
450	1
500	1
550	1.5
600	1.5
650	1
700	1
750	1.5
800	1.5
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC22 Location: A150 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	2
300	2
350	1.5
400	1.5
450	1
500	1
550	1.5
600	1.5
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

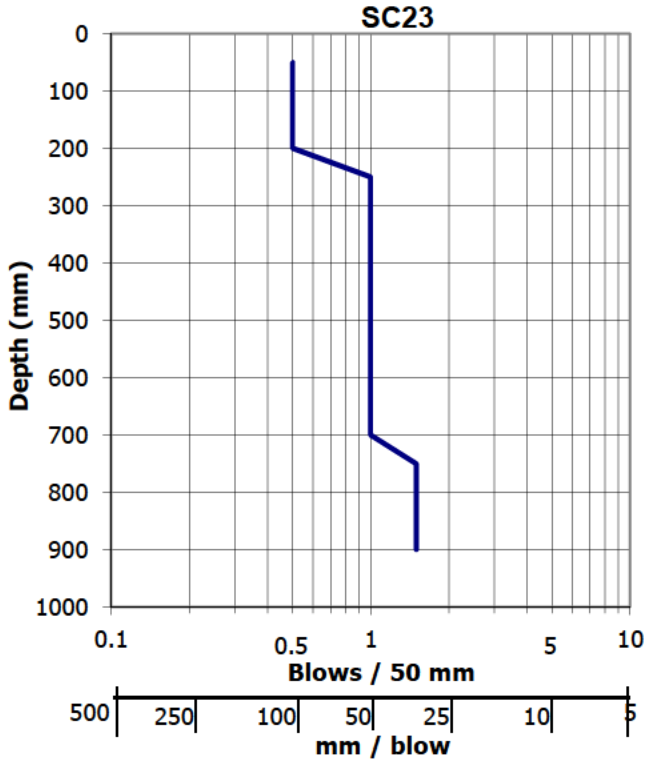
Date: 26/09/2016
Operated: JXH
Logged: JXH

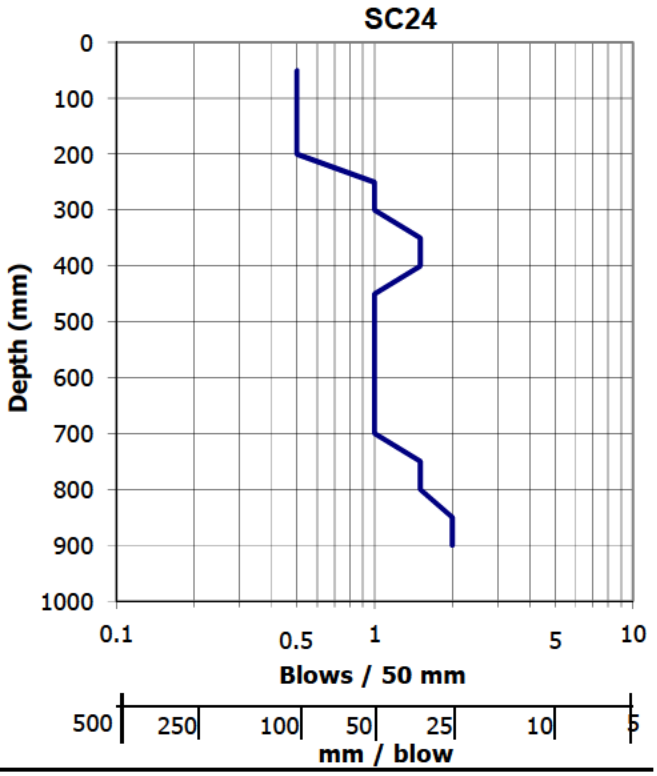
Test Number SC23 & SC24

Sheet 12 of 24

SC23 Location: A160 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1
300	1
350	1
400	1
450	1
500	1
550	1
600	1
650	1
700	1
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC24 Location: A170 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1
300	1
350	1.5
400	1.5
450	1
500	1
550	1
600	1
650	1
700	1
750	1.5
800	1.5
850	2
900	2
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

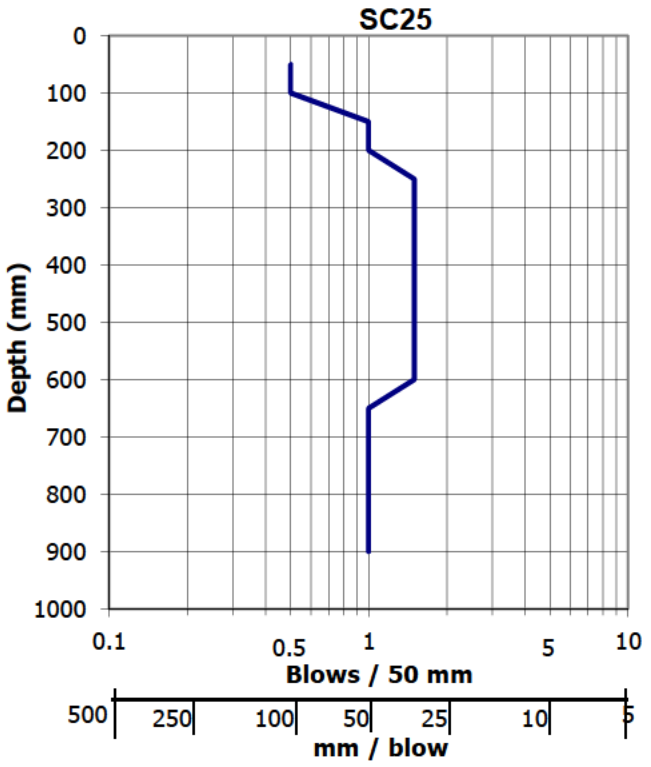
Date: 26/09/2016
Operated: JXH
Logged: JXH

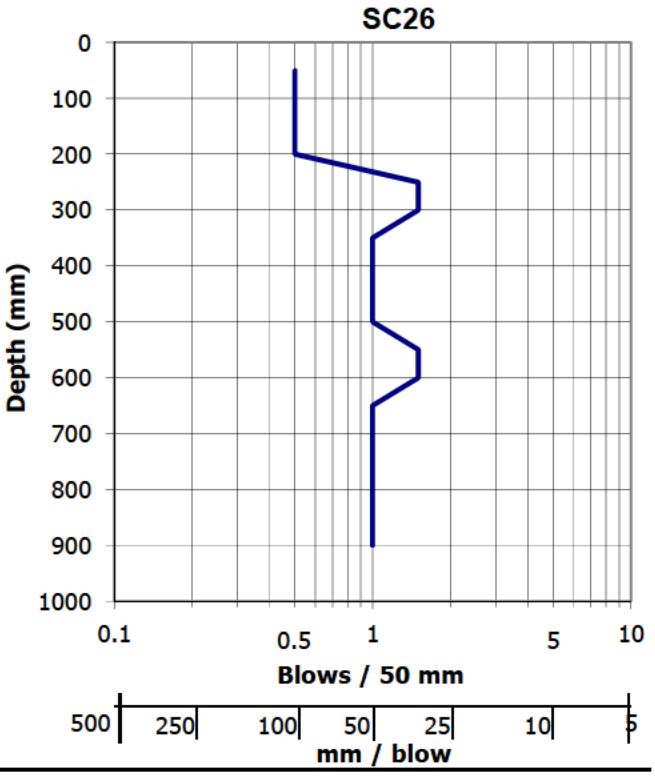
Test Number SC25 & SC26

Sheet 13 of 24

SC25 Location: A180 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	1
200	1
250	1.5
300	1.5
350	1.5
400	1.5
450	1.5
500	1.5
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC26 Location: A190 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1.5
300	1.5
350	1
400	1
450	1
500	1
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

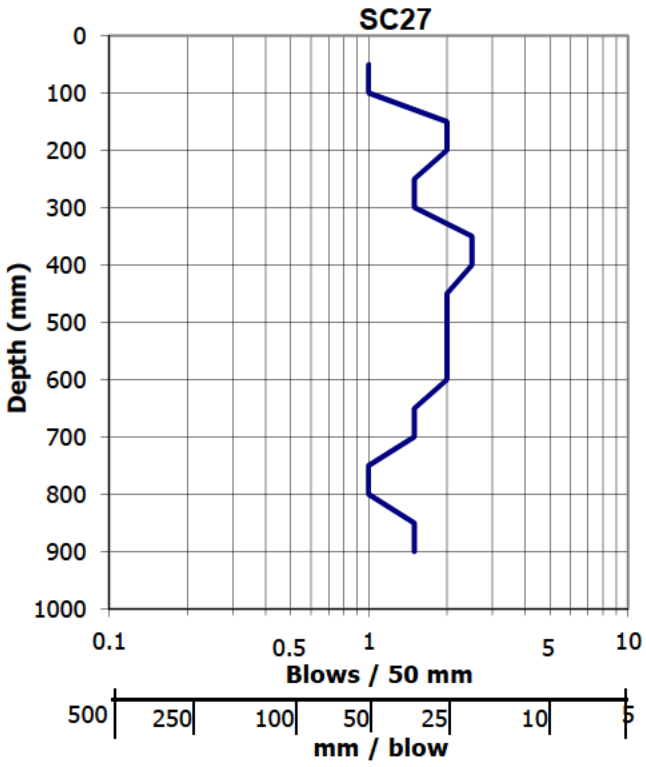
Date: 26/09/2016
Operated: JXH
Logged: JXH

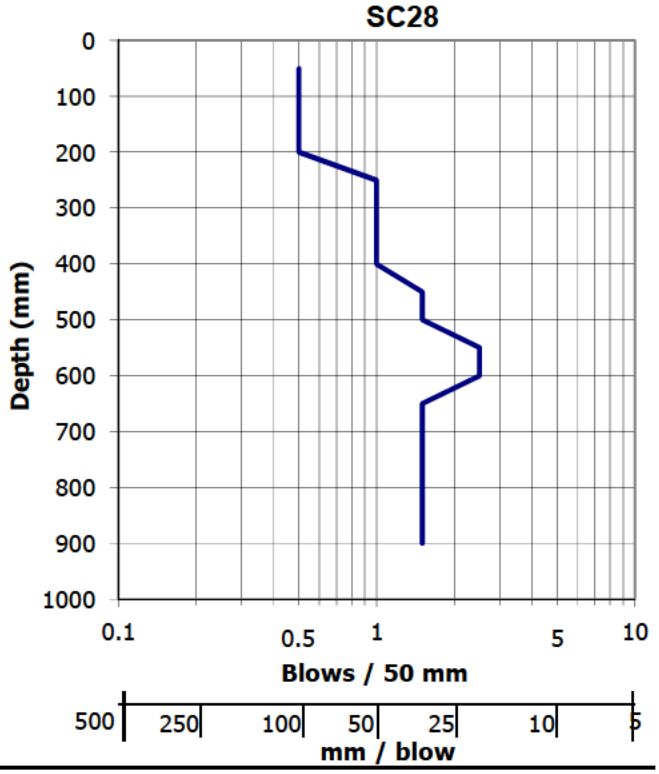
Test Number SC27 & SC28

Sheet 14
of 24

SC27 Location: A200 RL: 0	
mm Driven	No. of Blows
50	1
100	1
150	2
200	2
250	1.5
300	1.5
350	2.5
400	2.5
450	2
500	2
550	2
600	2
650	1.5
700	1.5
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC28 Location: A210 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1
300	1
350	1
400	1
450	1.5
500	1.5
550	2.5
600	2.5
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

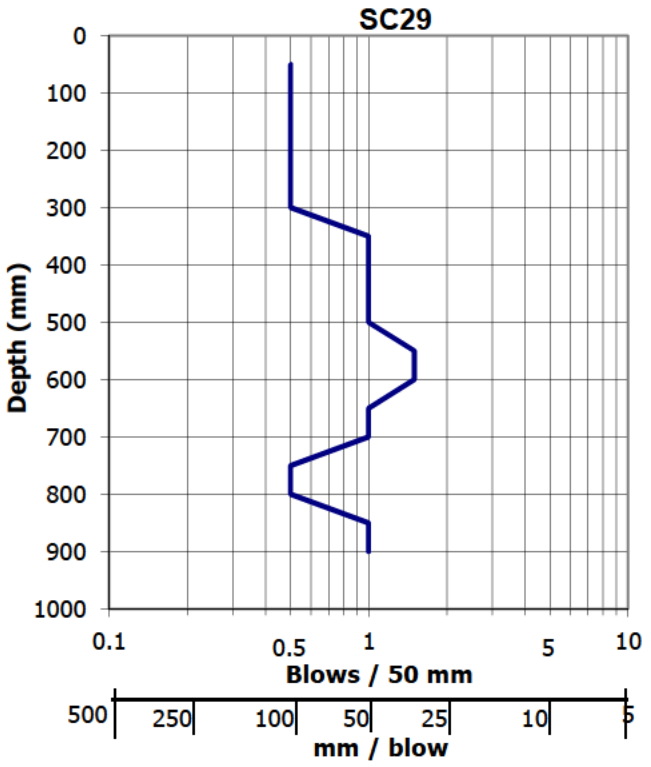
Date: 26/09/2016
Operated: JXH
Logged: JXH

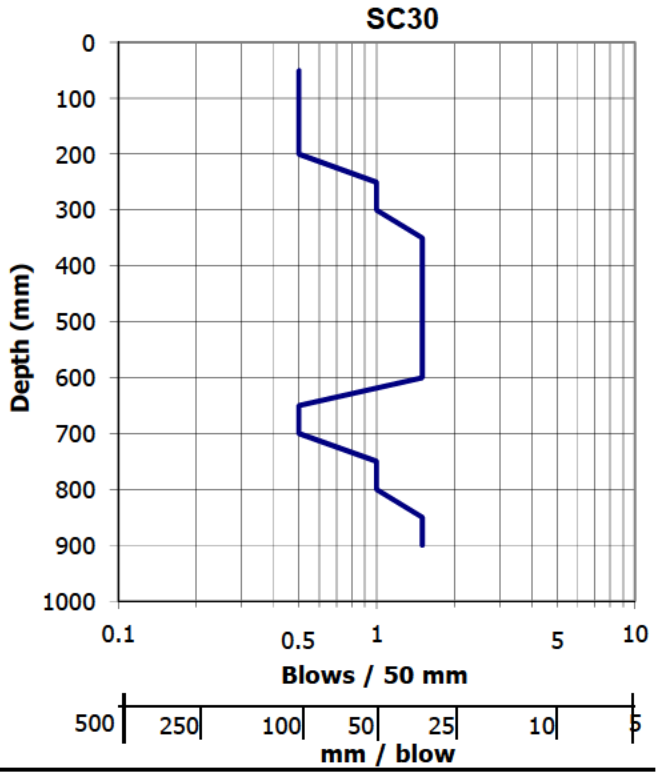
Test Number SC29 & SC30

Sheet 15
of 24

SC29 Location: A220 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	0.5
300	0.5
350	1
400	1
450	1
500	1
550	1.5
600	1.5
650	1
700	1
750	0.5
800	0.5
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC30 Location: A230 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1
300	1
350	1.5
400	1.5
450	1.5
500	1.5
550	1.5
600	1.5
650	0.5
700	0.5
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

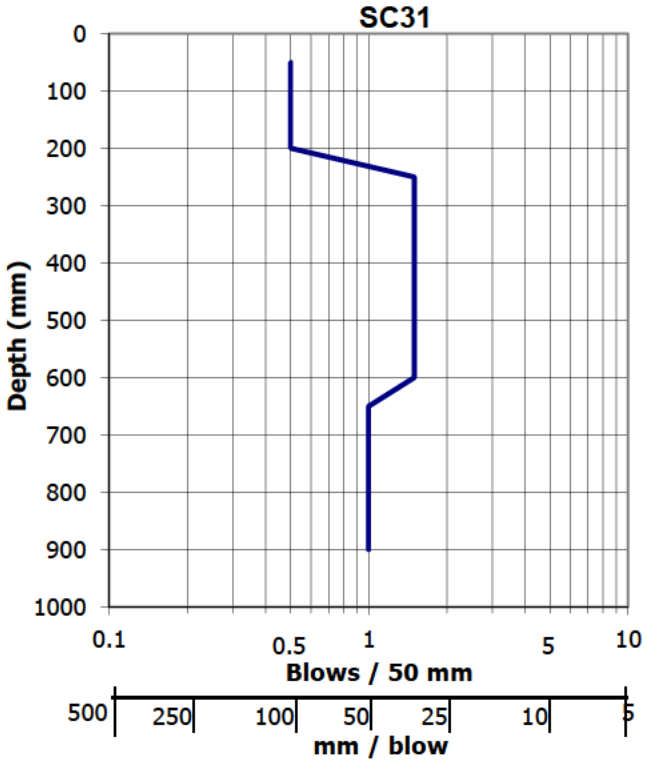
Date: 26/09/2016
Operated: JXH
Logged: JXH

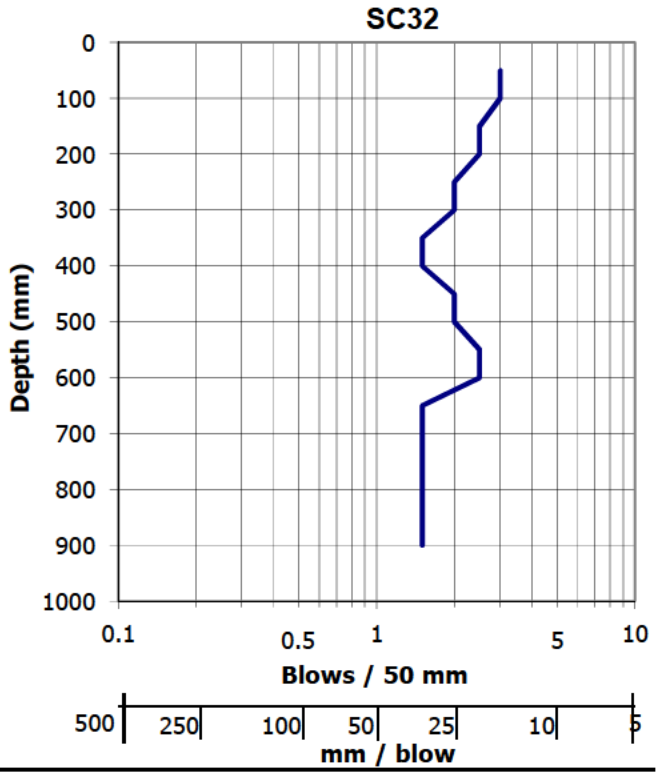
Test Number SC31 & SC32

Sheet 16 of 24

SC31 Location: A240 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1.5
300	1.5
350	1.5
400	1.5
450	1.5
500	1.5
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC32 Location: A250 RL: 0	
mm Driven	No. of Blows
50	3
100	3
150	2.5
200	2.5
250	2
300	2
350	1.5
400	1.5
450	2
500	2
550	2.5
600	2.5
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

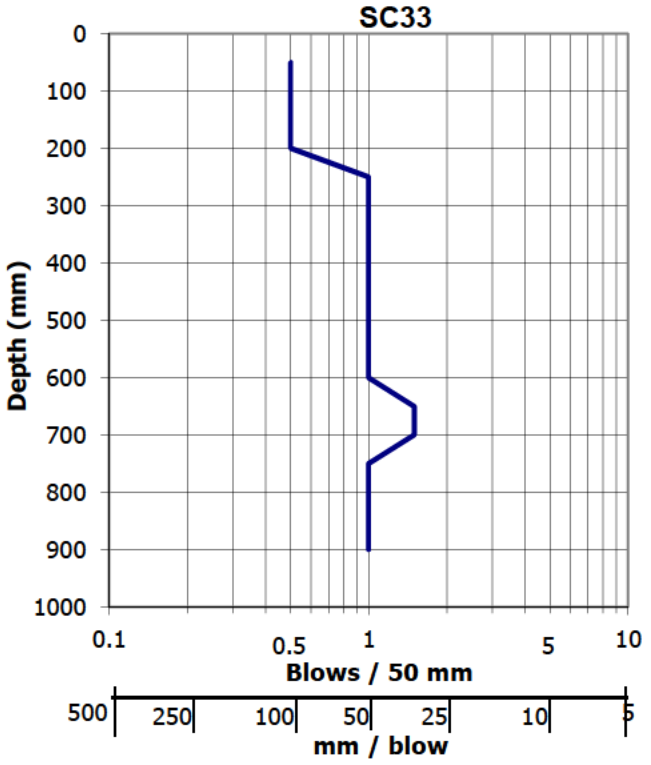
Date: 26/09/2016
Operated: JXH
Logged: JXH

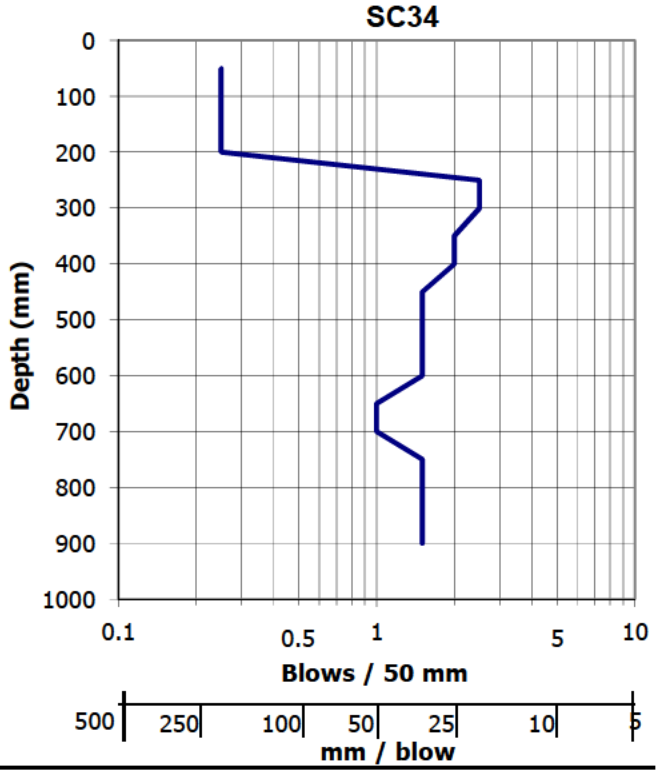
Test Number SC33 & SC20

Sheet 17
of 24

SC33 Location: A260 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1
300	1
350	1
400	1
450	1
500	1
550	1
600	1
650	1.5
700	1.5
750	1
800	1
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC34 Location: A290 RL: 0	
mm Driven	No. of Blows
50	0.25
100	0.25
150	0.25
200	0.25
250	2.5
300	2.5
350	2
400	2
450	1.5
500	1.5
550	1.5
600	1.5
650	1
700	1
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





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SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

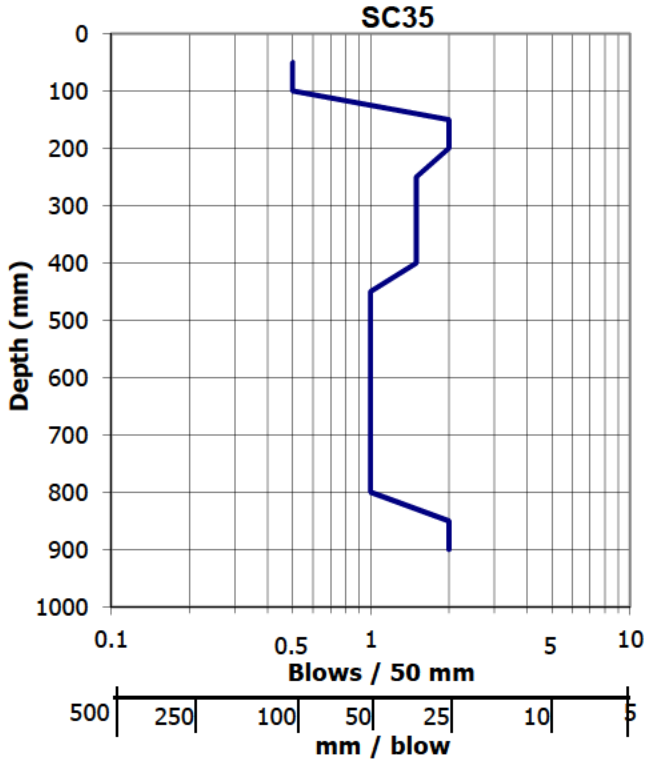
Date: 26/09/2016
Operated: JXH
Logged: JXH

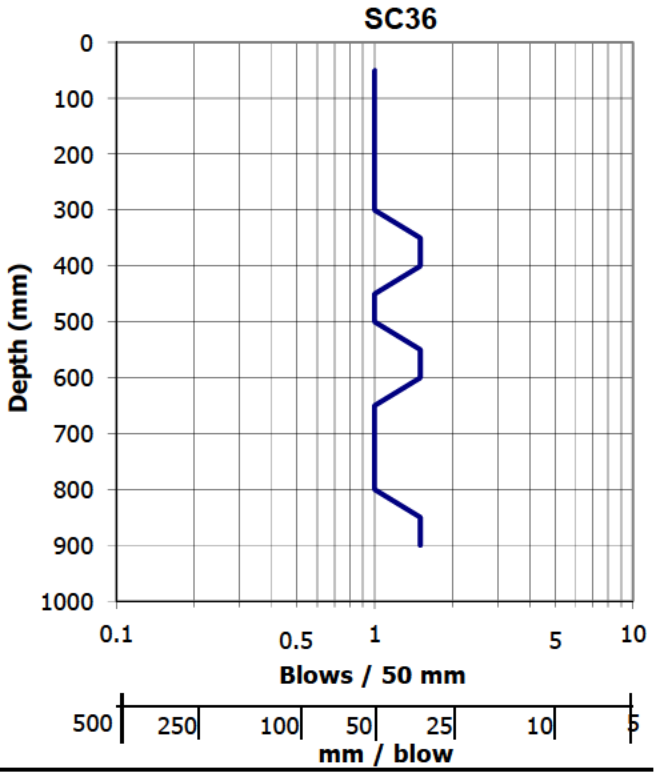
Test Number SC35 & SC36

Sheet 18 of 24

SC35 Location: A300 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	2
200	2
250	1.5
300	1.5
350	1.5
400	1.5
450	1
500	1
550	1
600	1
650	1
700	1
750	1
800	1
850	2
900	2
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC36 Location: A310 RL: 0	
mm Driven	No. of Blows
50	1
100	1
150	1
200	1
250	1
300	1
350	1.5
400	1.5
450	1
500	1
550	1.5
600	1.5
650	1
700	1
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

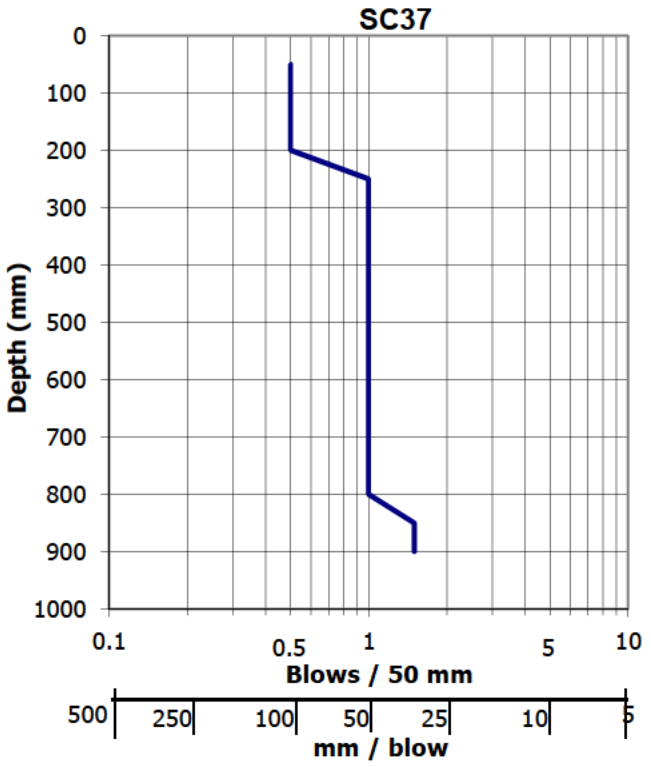
Date: 26/09/2016
Operated: JXH
Logged: JXH

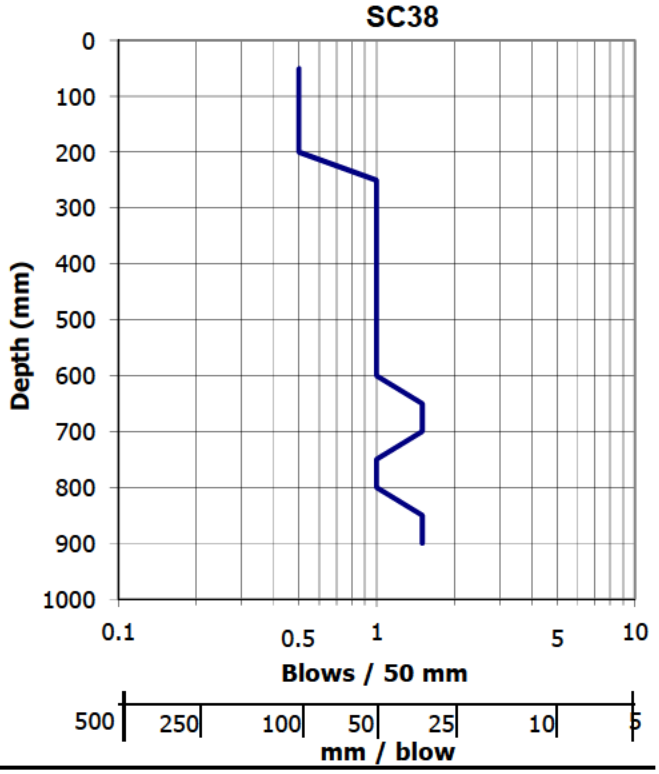
Test Number SC37 & SC38

Sheet 19
of 24

SC37 Location: A320 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1
300	1
350	1
400	1
450	1
500	1
550	1
600	1
650	1
700	1
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC38 Location: A330 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1
300	1
350	1
400	1
450	1
500	1
550	1
600	1
650	1.5
700	1.5
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

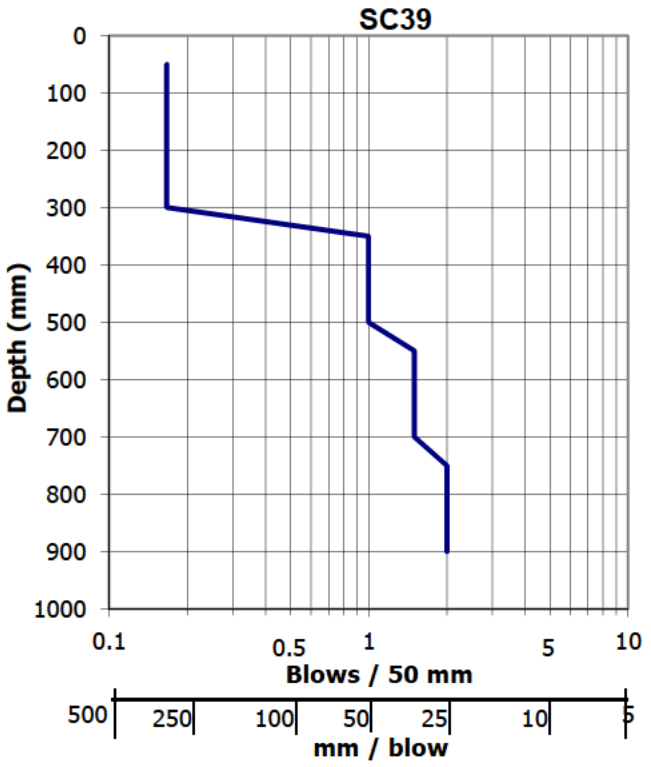
Date: 26/09/2016
Operated: JXH
Logged: JXH

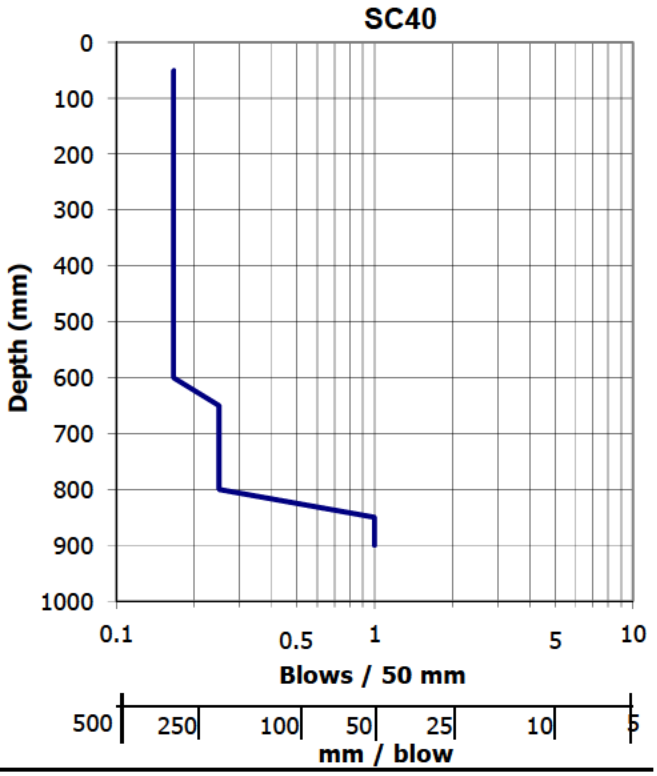
Test Number SC39 & SC40

Sheet 20
of 24

SC39 Location: A340 RL: 0	
mm Driven	No. of Blows
50	0.1666
100	0.1666
150	0.1666
200	0.1666
250	0.1666
300	0.1666
350	1
400	1
450	1
500	1
550	1.5
600	1.5
650	1.5
700	1.5
750	2
800	2
850	2
900	2
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC40 Location: A350 RL: 0	
mm Driven	No. of Blows
50	0.1666
100	0.1666
150	0.1666
200	0.1666
250	0.1666
300	0.1666
350	0.1666
400	0.1666
450	0.1666
500	0.1666
550	0.1666
600	0.1666
650	0.25
700	0.25
750	0.25
800	0.25
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

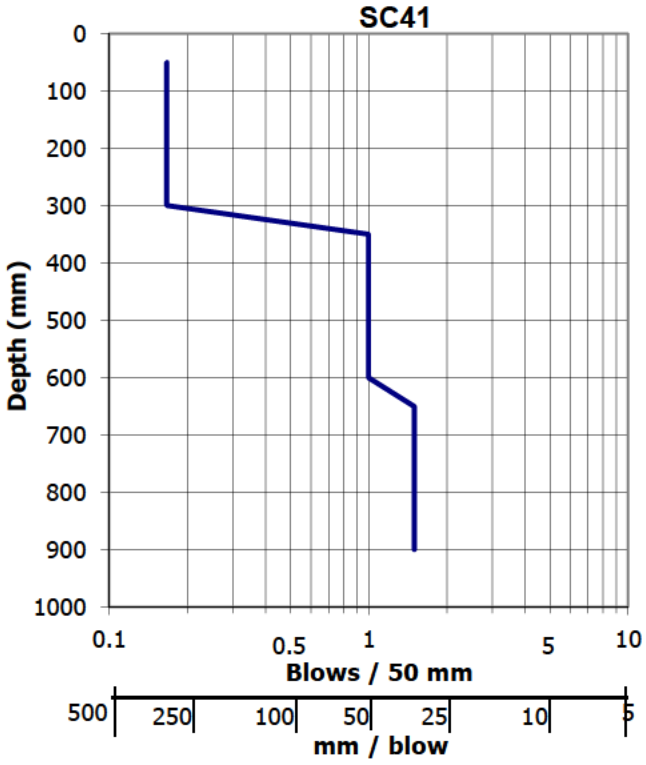
Date: 26/09/2016
Operated: JXH
Logged: JXH

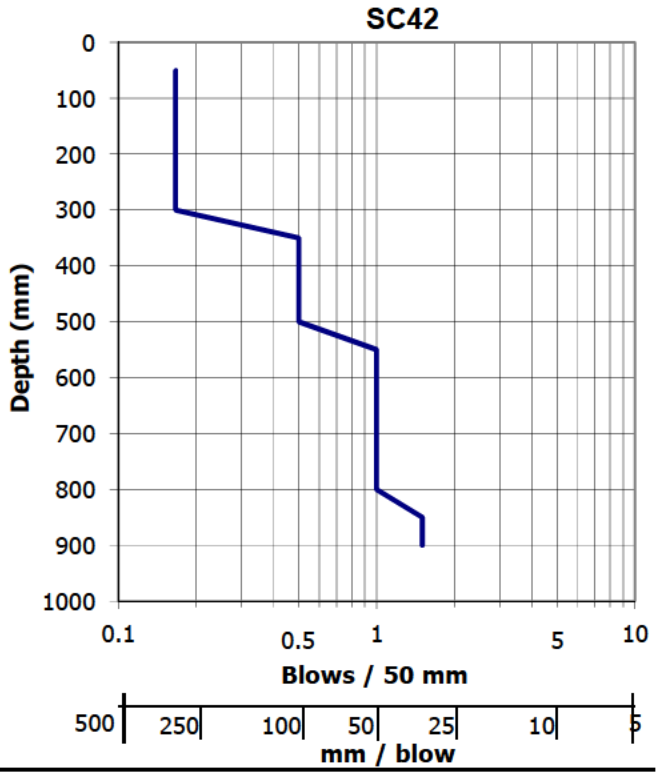
Test Number SC41 & SC42

Sheet 21
of 24

SC41 Location: A360 RL: 0	
mm Driven	No. of Blows
50	0.1666
100	0.1666
150	0.1666
200	0.1666
250	0.1666
300	0.1666
350	1
400	1
450	1
500	1
550	1
600	1
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC42 Location: A370 RL: 0	
mm Driven	No. of Blows
50	0.1666
100	0.1666
150	0.1666
200	0.1666
250	0.1666
300	0.1666
350	0.5
400	0.5
450	0.5
500	0.5
550	1
600	1
650	1
700	1
750	1
800	1
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

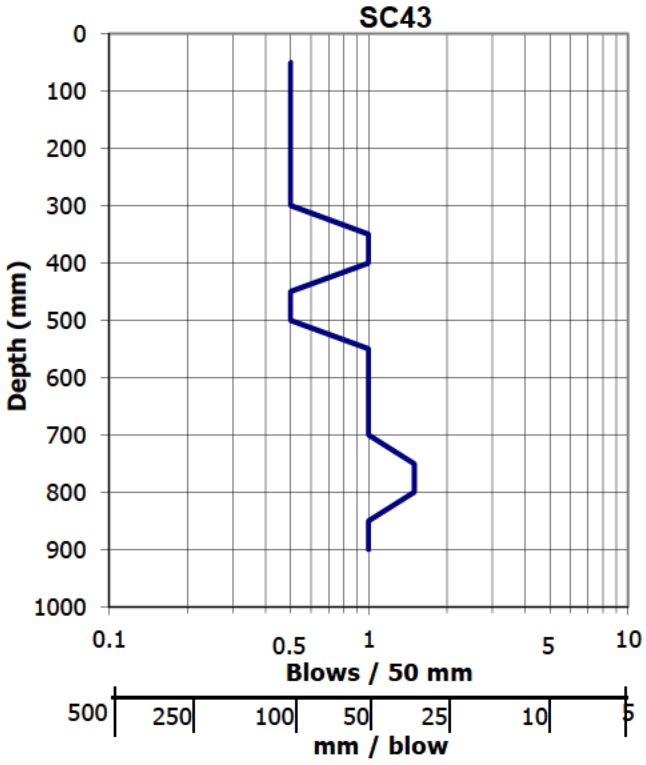
Date: 26/09/2016
Operated: JXH
Logged: JXH

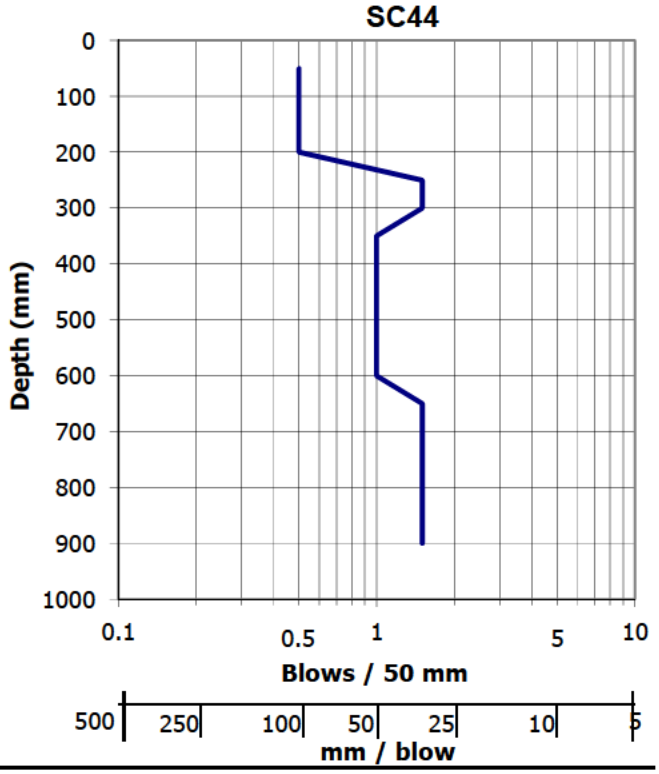
Test Number SC43 & SC44

Sheet 22
of 24

SC43 Location: A380 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	0.5
300	0.5
350	1
400	1
450	0.5
500	0.5
550	1
600	1
650	1
700	1
750	1.5
800	1.5
850	1
900	1
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC44 Location: A390 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	1.5
300	1.5
350	1
400	1
450	1
500	1
550	1
600	1
650	1.5
700	1.5
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

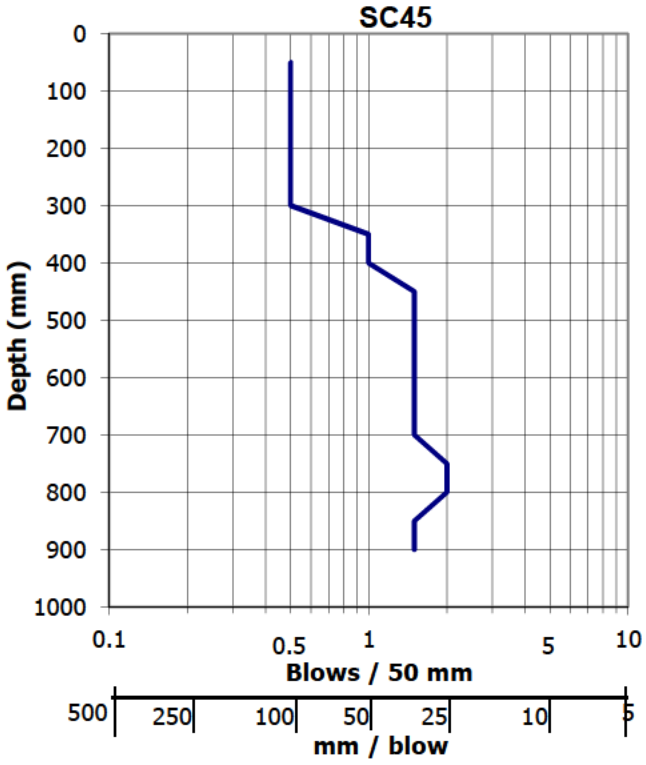
Date: 26/09/2016
Operated: JXH
Logged: JXH

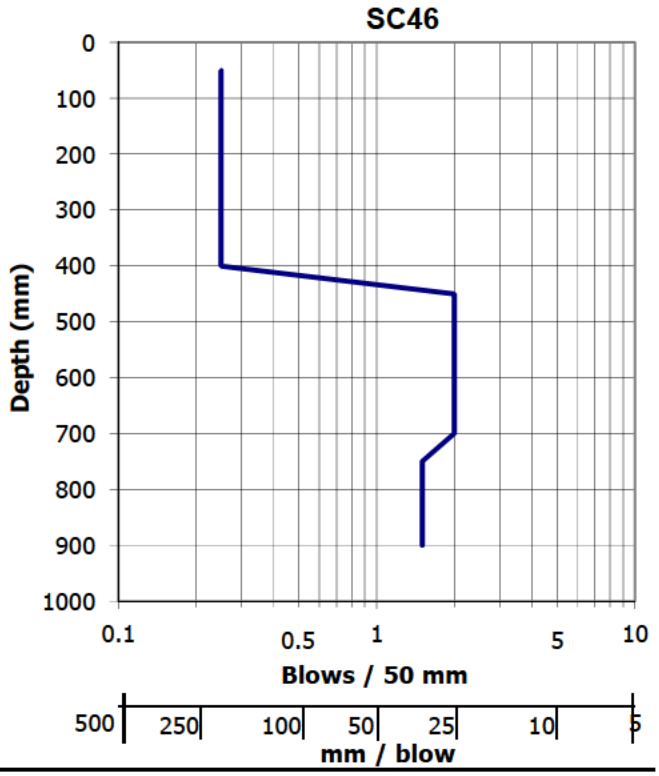
Test Number SC45 & SC46

Sheet 23
of 24

SC45 Location: A400 RL: 0	
mm Driven	No. of Blows
50	0.5
100	0.5
150	0.5
200	0.5
250	0.5
300	0.5
350	1
400	1
450	1.5
500	1.5
550	1.5
600	1.5
650	1.5
700	1.5
750	2
800	2
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

SC46 Location: A410 RL: 0	
mm Driven	No. of Blows
50	0.25
100	0.25
150	0.25
200	0.25
250	0.25
300	0.25
350	0.25
400	0.25
450	2
500	2
550	2
600	2
650	2
700	2
750	1.5
800	1.5
850	1.5
900	1.5
950	
1000	
Inferred Soil Type	
Watertable Depth	





GeoSolve Ltd

SCALA PENETROMETER LOG

Job No: 160488
Project: 1HansenRd

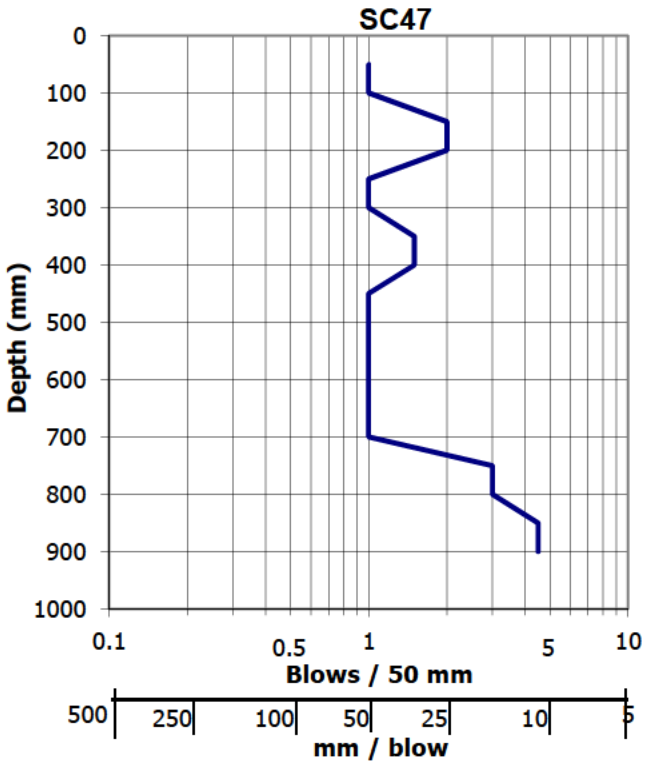
Date: 26/09/2016
Operated: JXH
Logged: JXH

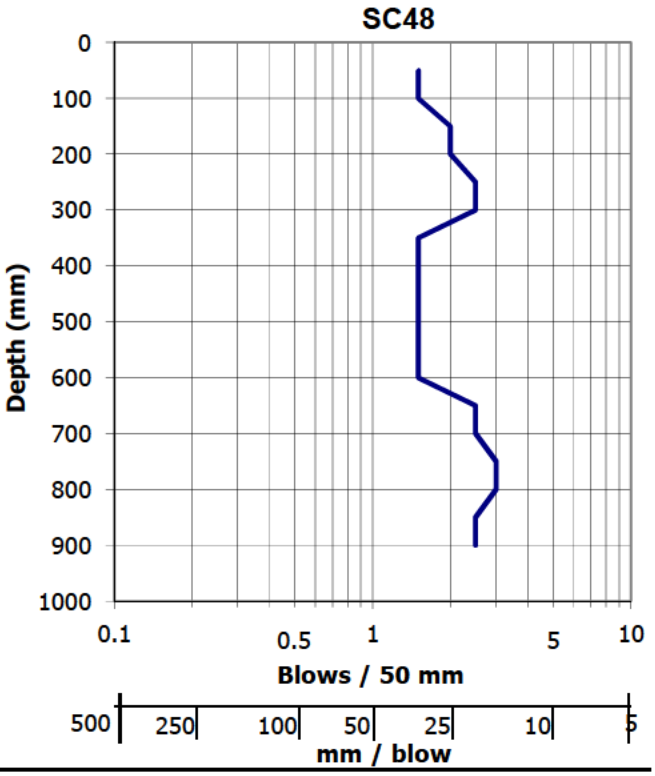
Test Number SC47 & SC48

Sheet 24
of 24

SC47 Location: A420 RL: 0	
mm Driven	No. of Blows
50	1
100	1
150	2
200	2
250	1
300	1
350	1.5
400	1.5
450	1
500	1
550	1
600	1
650	1
700	1
750	3
800	3
850	4.5
900	4.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

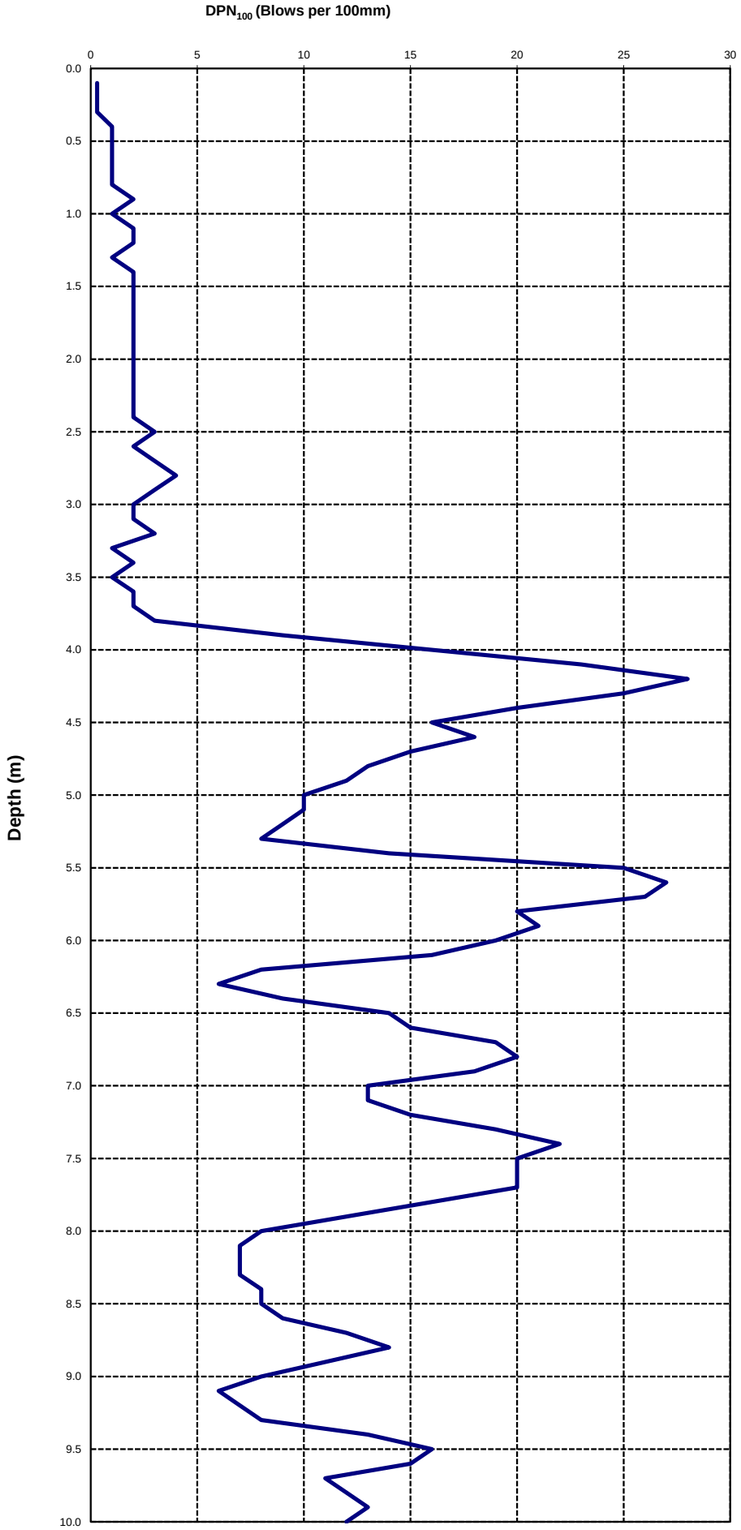
SC48 Location: A430 RL: 0	
mm Driven	No. of Blows
50	1.5
100	1.5
150	2
200	2
250	2.5
300	2.5
350	1.5
400	1.5
450	1.5
500	1.5
550	1.5
600	1.5
650	2.5
700	2.5
750	3
800	3
850	2.5
900	2.5
950	
1000	
Inferred Soil Type	
Watertable Depth	

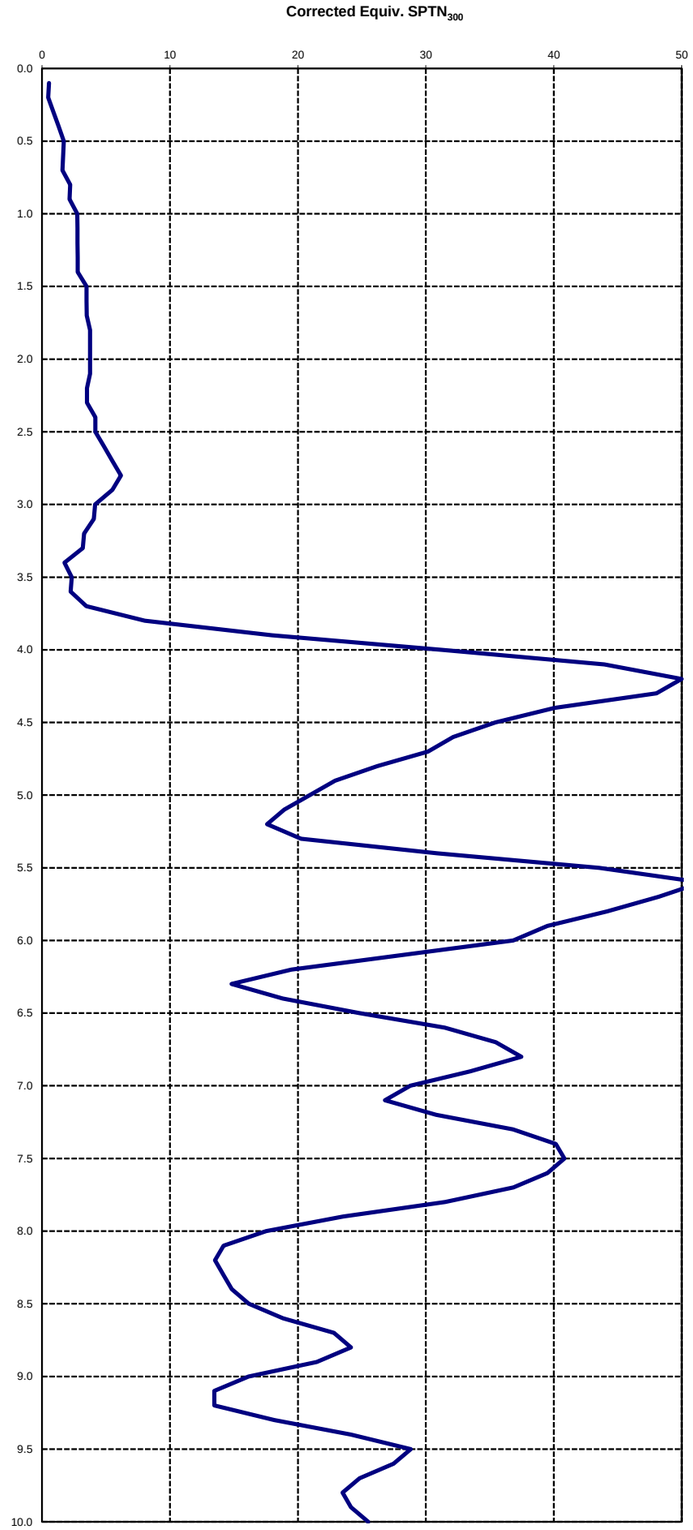


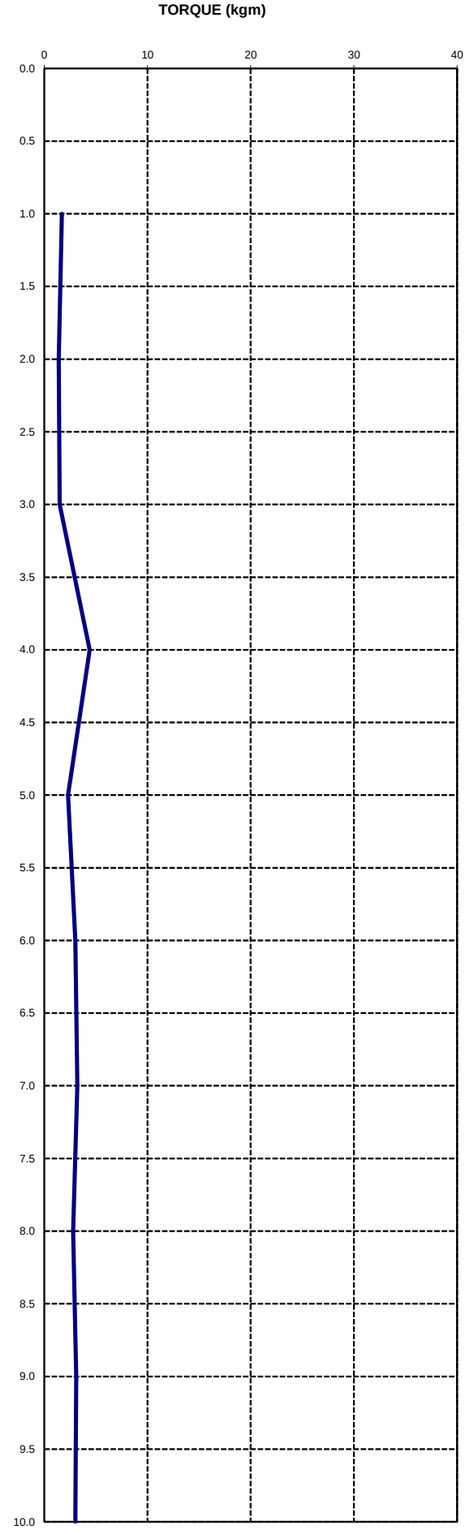


Appendix C: HDCP Data

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	0.30	0.5	
0.2	0.30	0.5	
0.3	0.30	0.9	
0.4	1.00	1.3	
0.5	1.00	1.7	
0.6	1.00	1.7	
0.7	1.00	1.6	
0.8	1.00	2.2	
0.9	2.00	2.1	
1.0	1.00	2.8	1.7
1.1	2.00	2.8	
1.2	2.00	2.8	
1.3	1.00	2.8	
1.4	2.00	2.8	
1.5	2.00	3.5	
1.6	2.00	3.5	
1.7	2.00	3.5	
1.8	2.00	3.8	
1.9	2.00	3.8	
2.0	2.00	3.8	1.4
2.1	2.00	3.8	
2.2	2.00	3.5	
2.3	2.00	3.5	
2.4	2.00	4.2	
2.5	3.00	4.2	
2.6	2.00	4.8	
2.7	3.00	5.5	
2.8	4.00	6.2	
2.9	3.00	5.5	
3.0	2.00	4.2	1.5
3.1	2.00	4.1	
3.2	3.00	3.3	
3.3	1.00	3.2	
3.4	2.00	1.8	
3.5	1.00	2.3	
3.6	2.00	2.2	
3.7	2.00	3.5	
3.8	3.00	8.0	
3.9	9.00	18.0	
4.0	16.00	31.3	4.4
4.1	23.00	44.0	
4.2	28.00	50.0	
4.3	25.00	48.0	
4.4	20.00	40.1	
4.5	16.00	35.4	
4.6	18.00	32.1	
4.7	15.00	30.2	
4.8	13.00	26.2	
4.9	12.00	22.9	
5.0	10.00	20.9	2.3
5.1	10.00	18.9	
5.2	9.00	17.6	
5.3	8.00	20.2	
5.4	14.00	30.9	
5.5	25.00	43.5	
5.6	27.00	51.5	
5.7	26.00	48.2	
5.8	20.00	44.2	
5.9	21.00	39.5	
6.0	19.00	36.8	3
6.1	16.00	28.2	
6.2	8.00	19.5	
6.3	6.00	14.8	
6.4	9.00	18.8	
6.5	14.00	24.8	
6.6	15.00	31.5	
6.7	19.00	35.5	
6.8	20.00	37.5	
6.9	18.00	33.5	
7.0	13.00	28.8	3.2
7.1	13.00	26.8	
7.2	15.00	30.8	
7.3	19.00	36.8	
7.4	22.00	40.1	
7.5	20.00	40.8	
7.6	20.00	39.5	
7.7	20.00	36.8	
7.8	16.00	31.5	
7.9	12.00	23.5	
8.0	8.00	17.5	2.8
8.1	7.00	14.2	
8.2	7.00	13.5	
8.3	7.00	14.2	
8.4	8.00	14.8	
8.5	8.00	16.2	
8.6	9.00	18.8	
8.7	12.00	22.8	
8.8	14.00	24.1	
8.9	11.00	21.5	
9.0	8.00	16.1	3.1
9.1	6.00	13.5	
9.2	7.00	13.5	
9.3	8.00	18.1	
9.4	13.00	24.1	
9.5	16.00	28.8	
9.6	15.00	27.5	
9.7	11.00	24.8	
9.8	12.00	23.5	
9.9	13.00	24.2	
10.0	12.00	25.5	3







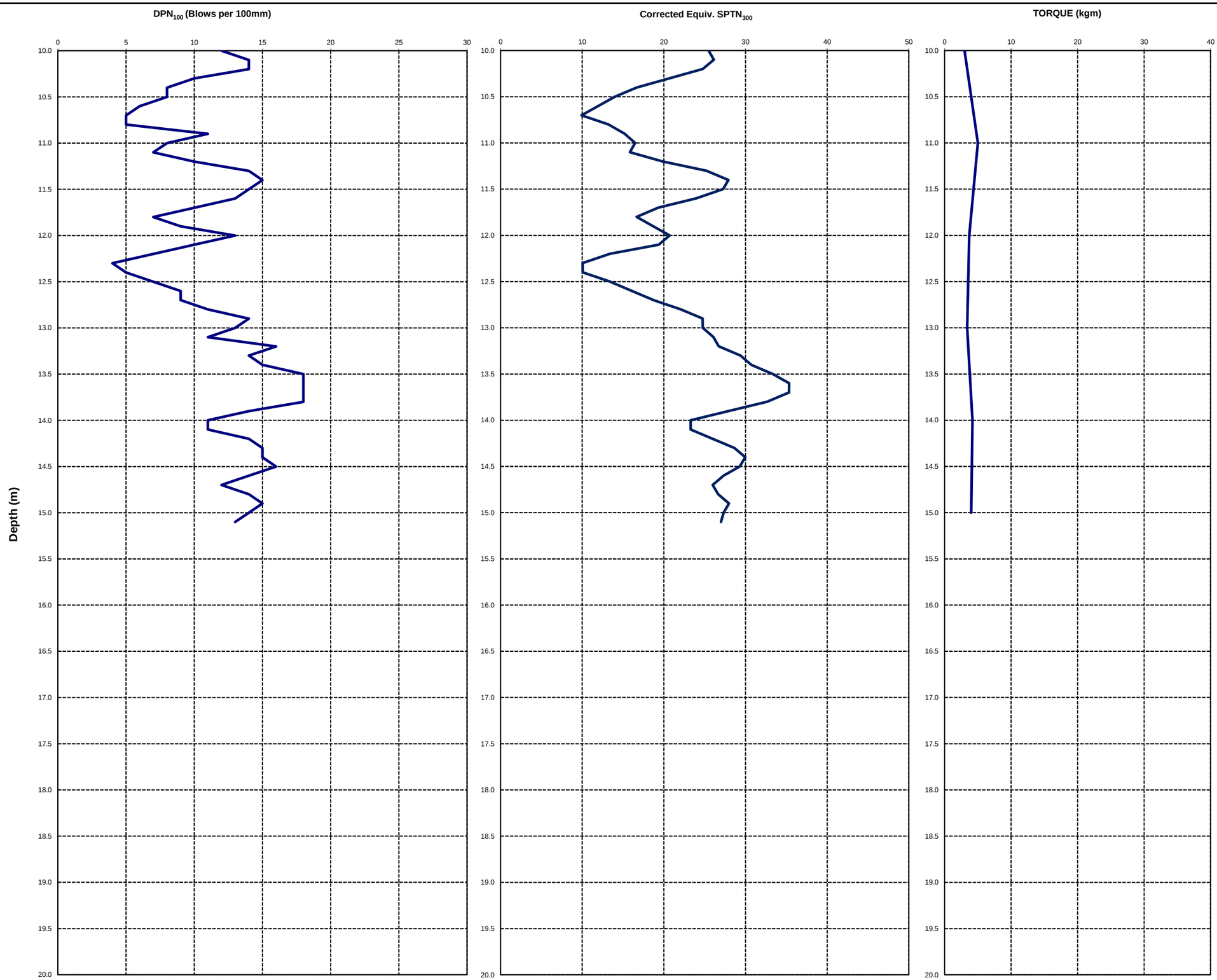
GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**

LOCATION	**HDCP1**
JOB NUMBER	**160488**

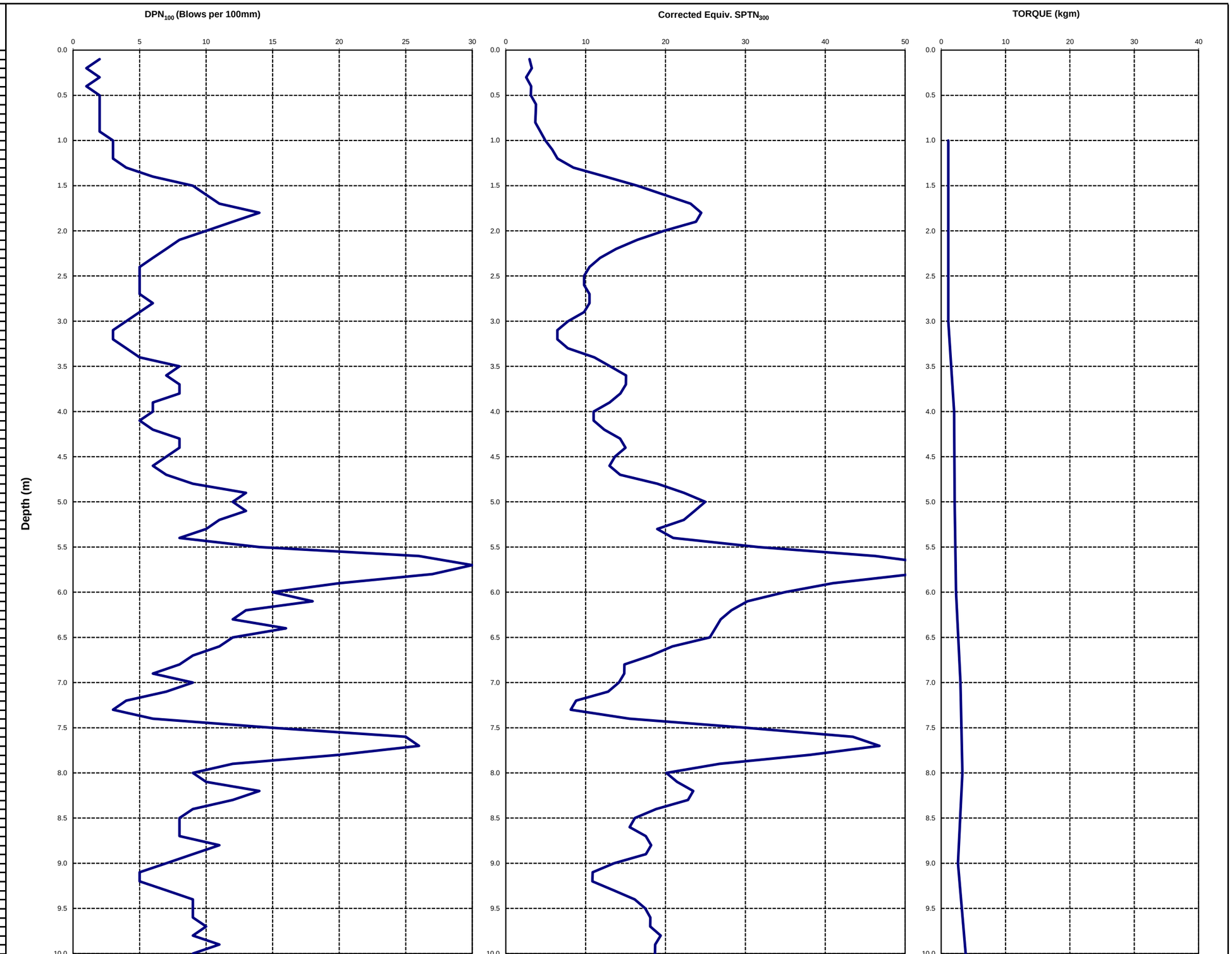
DATE	**8/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
10.1	14	26.1	
10.2	14	24.8	
10.3	10	20.7	
10.4	8	16.7	
10.5	8	14.0	
10.6	6	12.0	
10.7	5	9.9	
10.8	5	13.2	
10.9	11	15.2	
11.0	8	16.5	5
11.1	7	15.8	
11.2	10	19.9	
11.3	14	25.2	
11.4	15	27.9	
11.5	14	27.3	
11.6	13	23.9	
11.7	10	19.3	
11.8	7	16.7	
11.9	9	18.7	
12.0	13	20.7	3.7
12.1	10	19.4	
12.2	7	13.4	
12.3	4	10.1	
12.4	5	10.1	
12.5	7	13.4	
12.6	9	16.1	
12.7	9	18.7	
12.8	11	22.1	
12.9	14	24.8	
13.0	13	24.8	3.4
13.1	11	26.1	
13.2	16	26.7	
13.3	14	29.4	
13.4	15	30.7	
13.5	18	33.4	
13.6	18	35.3	
13.7	18	35.3	
13.8	18	32.6	
13.9	14	28.0	
14.0	11	23.3	4.2
14.1	11	23.3	
14.2	14	26.0	
14.3	15	28.6	
14.4	15	30.0	
14.5	16	29.3	
14.6	14	27.3	
14.7	12	26.0	
14.8	14	26.6	
14.9	15	28.0	
15.0	14	27.3	4
15.1	13	27.0	
15.2			
15.3			
15.4			
15.5			
15.6			
15.7			
15.8			
15.9			
16.0			
16.1			
16.2			
16.3			
16.4			
16.5			
16.6			
16.7			
16.8			
16.9			
17.0			
17.1			
17.2			
17.3			
17.4			
17.5			
17.6			
17.7			
17.8			
17.9			
18.0			
18.1			
18.2			
18.3			
18.4			
18.5			
18.6			
18.7			
18.8			
18.9			
19.0			
19.1			
19.2			
19.3			
19.4			
19.5			
19.6			
19.7			
19.8			
19.9			
20.0			



CLIENT	Coronation Holdings Ltd	LOCATION	HDCP1
PROJECT	1 Hansen Rd, Queenstown	JOB NUMBER	160488
DESCRIPTION	HDCP results 10-20m	DATE	8/09/2016
		LOGGED BY	RC
		ANALYSED BY	RC
		CHECKED BY	GXS

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	2.00	3.0	
0.2	1.00	3.3	
0.3	2.00	2.6	
0.4	1.00	3.2	
0.5	2.00	3.1	
0.6	2.00	3.8	
0.7	2.00	3.7	
0.8	2.00	3.7	
0.9	2.00	4.3	
1.0	3.00	5.0	1.1
1.1	3.00	5.8	
1.2	3.00	6.5	
1.3	4.00	8.5	
1.4	6.00	12.5	
1.5	9.00	16.5	
1.6	10.00	19.8	
1.7	11.00	23.1	
1.8	14.00	24.5	
1.9	12.00	23.8	
2.0	10.00	19.8	1.1
2.1	8.00	16.5	
2.2	7.00	13.8	
2.3	6.00	11.8	
2.4	5.00	10.5	
2.5	5.00	9.8	
2.6	5.00	9.8	
2.7	5.00	10.5	
2.8	6.00	10.5	
2.9	5.00	9.8	
3.0	4.00	7.8	1.1
3.1	3.00	6.5	
3.2	3.00	6.4	
3.3	4.00	7.8	
3.4	5.00	11.1	
3.5	8.00	13.1	
3.6	7.00	15.1	
3.7	8.00	15.0	
3.8	8.00	14.4	
3.9	6.00	13.0	
4.0	6.00	11.0	2
4.1	5.00	11.0	
4.2	6.00	12.3	
4.3	8.00	14.3	
4.4	8.00	15.0	
4.5	7.00	13.7	
4.6	6.00	13.0	
4.7	7.00	14.3	
4.8	9.00	19.0	
4.9	13.00	22.3	
5.0	12.00	25.0	2.1
5.1	13.00	23.6	
5.2	11.00	22.3	
5.3	10.00	19.0	
5.4	8.00	21.0	
5.5	14.00	31.6	
5.6	26.00	46.3	
5.7	30.00	55.0	
5.8	27.00	50.9	
5.9	20.00	40.9	
6.0	15.00	34.9	2.3
6.1	18.00	30.3	
6.2	13.00	28.3	
6.3	12.00	26.9	
6.4	16.00	26.2	
6.5	12.00	25.5	
6.6	11.00	20.9	
6.7	9.00	18.2	
6.8	8.00	14.8	
6.9	6.00	14.8	
7.0	9.00	14.2	3
7.1	7.00	12.8	
7.2	4.00	8.8	
7.3	3.00	8.1	
7.4	6.00	15.5	
7.5	15.00	30.1	
7.6	25.00	43.5	
7.7	26.00	46.8	
7.8	20.00	38.1	
7.9	12.00	26.8	
8.0	9.00	20.1	3.3
8.1	10.00	21.5	
8.2	14.00	23.5	
8.3	12.00	22.8	
8.4	9.00	18.8	
8.5	8.00	16.2	
8.6	8.00	15.5	
8.7	8.00	17.5	
8.8	11.00	18.2	
8.9	9.00	17.5	
9.0	7.00	13.6	2.6
9.1	5.00	10.9	
9.2	5.00	10.9	
9.3	7.00	13.5	
9.4	9.00	16.1	
9.5	9.00	17.5	
9.6	9.00	18.1	
9.7	10.00	18.1	
9.8	9.00	19.4	
9.9	11.00	18.7	
10.0	9.00	18.7	3.8



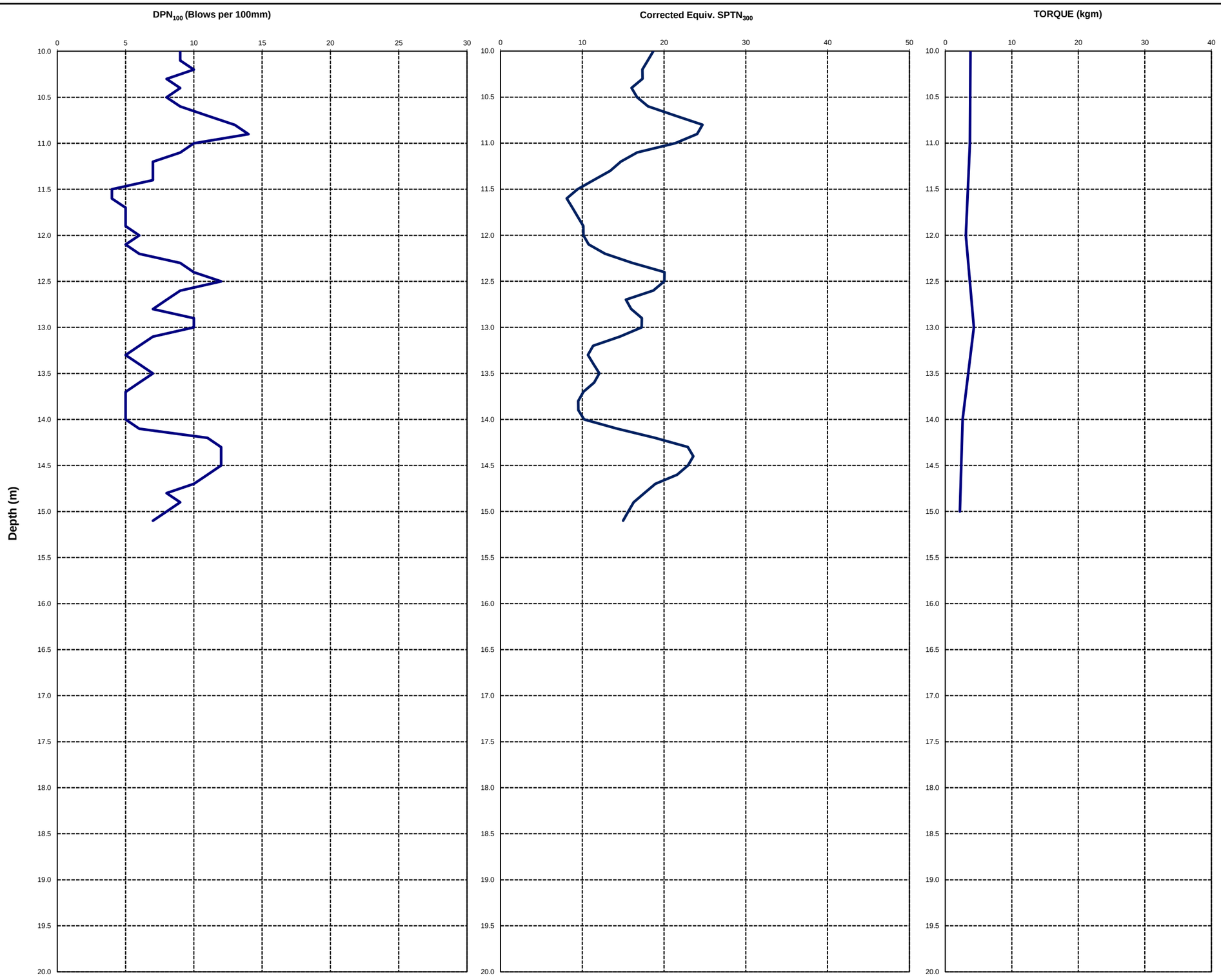
GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**

LOCATION	**HDCP2**
JOB NUMBER	**160488**

DATE	**7/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

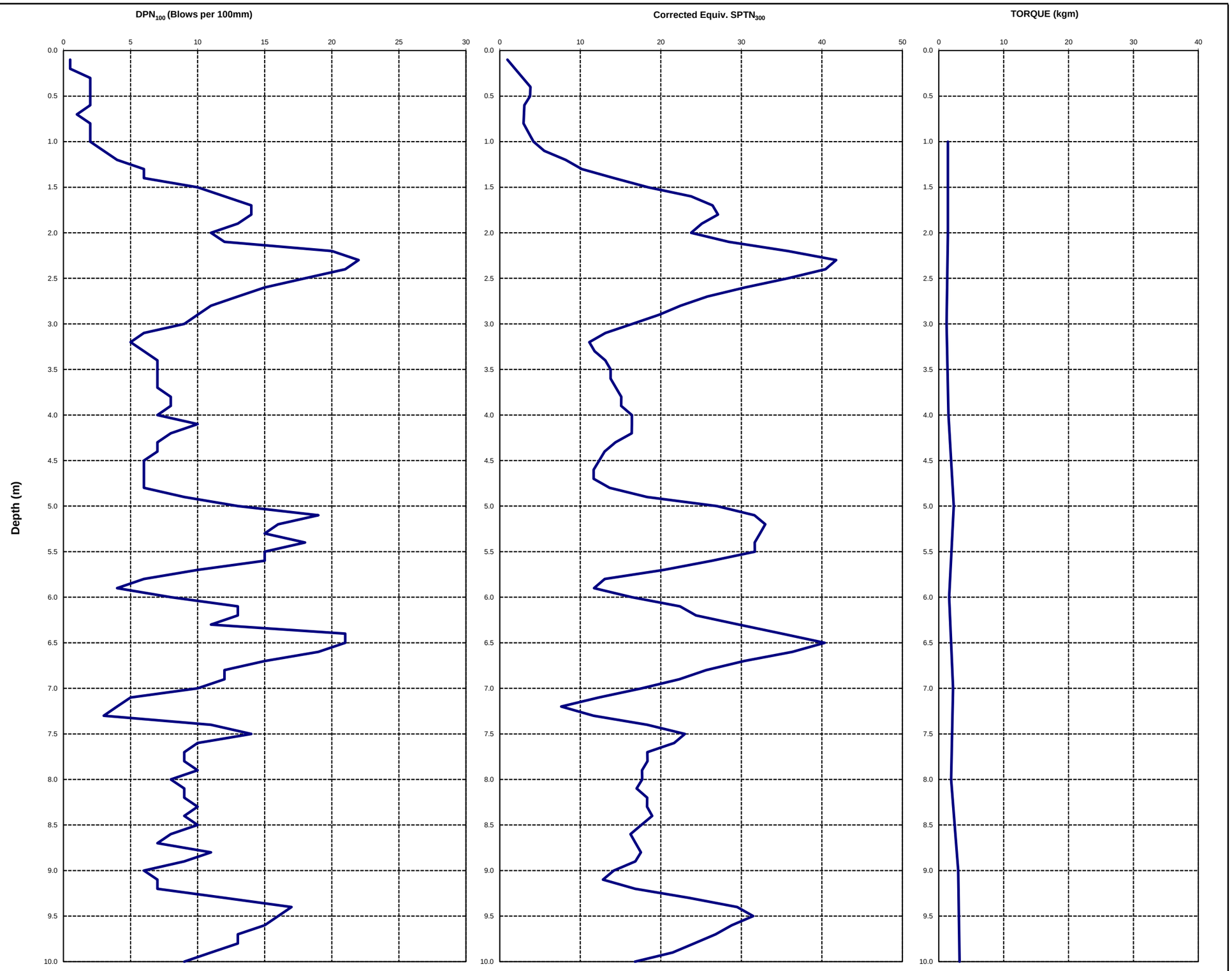
Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
10.1	9	18.0	
10.2	10	17.4	
10.3	8	17.4	
10.4	9	16.0	
10.5	8	16.7	
10.6	9	18.0	
10.7	11	21.4	
10.8	13	24.7	
10.9	14	24.0	
11.0	10	21.4	3.7
11.1	9	16.7	
11.2	7	14.7	
11.3	7	13.4	
11.4	7	11.4	
11.5	4	9.4	
11.6	4	8.1	
11.7	5	8.8	
11.8	5	9.5	
11.9	5	10.1	
12.0	6	10.1	3.1
12.1	5	10.8	
12.2	6	12.8	
12.3	9	16.1	
12.4	10	20.1	
12.5	12	20.0	
12.6	9	18.7	
12.7	8	15.3	
12.8	7	16.0	
12.9	10	17.3	
13.0	10	17.3	4.3
13.1	7	14.6	
13.2	6	11.3	
13.3	5	10.7	
13.4	6	11.4	
13.5	7	12.1	
13.6	6	11.4	
13.7	5	10.1	
13.8	5	9.5	
13.9	5	9.5	
14.0	5	10.2	2.6
14.1	6	14.2	
14.2	11	18.9	
14.3	12	22.9	
14.4	12	23.6	
14.5	12	22.9	
14.6	11	21.6	
14.7	10	18.9	
14.8	8	17.6	
14.9	9	16.3	
15.0	8	15.6	2.2
15.1	7	15.0	
15.2			
15.3			
15.4			
15.5			
15.6			
15.7			
15.8			
15.9			
16.0			
16.1			
16.2			
16.3			
16.4			
16.5			
16.6			
16.7			
16.8			
16.9			
17.0			
17.1			
17.2			
17.3			
17.4			
17.5			
17.6			
17.7			
17.8			
17.9			
18.0			
18.1			
18.2			
18.3			
18.4			
18.5			
18.6			
18.7			
18.8			
18.9			
19.0			
19.1			
19.2			
19.3			
19.4			
19.5			
19.6			
19.7			
19.8			
19.9			
20.0			



GeoSolve

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 10-20m**
LOCATION	**HDCP2**
JOB NUMBER	**160488**
DATE	**7/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	0.50	1.0	
0.2	0.50	1.9	
0.3	2.00	2.9	
0.4	2.00	3.8	
0.5	2.00	3.8	
0.6	2.00	3.0	
0.7	1.00	3.0	
0.8	2.00	3.0	
0.9	2.00	3.6	
1.0	2.00	4.2	1.4
1.1	3.00	5.5	
1.2	4.00	8.2	
1.3	6.00	10.2	
1.4	6.00	14.2	
1.5	10.00	18.4	
1.6	12.00	23.8	
1.7	14.00	26.4	
1.8	14.00	27.1	
1.9	13.00	25.1	
2.0	11.00	23.8	1.4
2.1	12.00	28.4	
2.2	20.00	35.8	
2.3	22.00	41.8	
2.4	21.00	40.4	
2.5	18.00	35.8	
2.6	15.00	30.4	
2.7	13.00	25.8	
2.8	11.00	22.5	
2.9	10.00	19.8	
3.0	9.00	16.5	1.2
3.1	6.00	13.1	
3.2	5.00	11.1	
3.3	6.00	11.8	
3.4	7.00	13.1	
3.5	7.00	13.8	
3.6	7.00	13.8	
3.7	7.00	14.4	
3.8	8.00	15.1	
3.9	8.00	15.1	
4.0	7.00	16.4	1.5
4.1	10.00	16.4	
4.2	8.00	16.4	
4.3	7.00	14.4	
4.4	7.00	13.0	
4.5	6.00	12.3	
4.6	6.00	11.7	
4.7	6.00	11.6	
4.8	6.00	13.6	
4.9	9.00	18.3	
5.0	13.00	26.9	2.3
5.1	19.00	31.6	
5.2	16.00	33.0	
5.3	15.00	32.3	
5.4	18.00	31.7	
5.5	15.00	31.7	
5.6	15.00	26.3	
5.7	10.00	20.4	
5.8	6.00	13.0	
5.9	4.00	11.7	
6.0	8.00	16.4	1.6
6.1	13.00	22.4	
6.2	13.00	24.4	
6.3	11.00	29.7	
6.4	21.00	35.0	
6.5	21.00	40.3	
6.6	19.00	36.3	
6.7	15.00	30.3	
6.8	12.00	25.6	
6.9	12.00	22.3	
7.0	10.00	17.6	2.2
7.1	5.00	12.3	
7.2	4.00	7.6	
7.3	3.00	11.6	
7.4	11.00	18.3	
7.5	14.00	23.0	
7.6	10.00	21.7	
7.7	9.00	18.3	
7.8	9.00	18.3	
7.9	10.00	17.7	
8.0	8.00	17.7	1.9
8.1	9.00	17.0	
8.2	9.00	18.3	
8.3	10.00	18.3	
8.4	9.00	18.9	
8.5	10.00	17.6	
8.6	8.00	16.2	
8.7	7.00	16.9	
8.8	11.00	17.5	
8.9	9.00	16.8	
9.0	6.00	14.2	3
9.1	7.00	12.8	
9.2	7.00	16.8	
9.3	12.00	23.5	
9.4	17.00	29.5	
9.5	16.00	31.5	
9.6	15.00	28.8	
9.7	13.00	26.8	
9.8	13.00	24.1	
9.9	11.00	21.5	
10.0	9.00	16.8	3.2



GeoSolve

CLIENT	Coronation Holdings Ltd
PROJECT	1 Hansen Rd, Queenstown
DESCRIPTION	HDCP results 0-10m
LOCATION	HDCP3
JOB NUMBER	160488
DATE	7/09/2016
LOGGED BY	RC
ANALYSED BY	RC
CHECKED BY	GXS

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
10.1	6	14.1	
10.2	7	12.8	
10.3	7	12.7	
10.4	6	12.7	
10.5	7	12.0	
10.6	6	13.4	
10.7	8	16.7	
10.8	12	20.0	
10.9	11	22.0	
11.0	11	21.3	4.1
11.1	11	20.7	
11.2	10	20.7	
11.3	11	20.7	
11.4	11	20.0	
11.5	9	17.4	
11.6	7	19.4	
11.7	14	23.4	
11.8	15	29.5	
11.9	16	28.1	
12.0	12	26.8	3
12.1	13	24.1	
12.2	12	24.1	
12.3	12	20.1	
12.4	7	14.8	
12.5	4	10.1	
12.6	5	8.8	
12.7	5	11.4	
12.8	8	13.4	
12.9	8	15.4	
13.0	8	15.4	3.7
13.1	8	16.0	
13.2	9	20.1	
13.3	14	24.1	
13.4	14	22.7	
13.5	7	17.4	
13.6	6	10.8	
13.7	4	9.4	
13.8	5	8.8	
13.9	5	8.1	
14.0	3	7.5	3.1
14.1	4	6.1	
14.2	3	8.1	
14.3	6	12.7	
14.4	11	19.4	
14.5	13	21.4	
14.6	9	20.7	
14.7	10	18.0	
14.8	9	18.0	
14.9	9	18.6	
15.0	11	20.6	4.4
15.1	12	23.0	
15.2			
15.3			
15.4			
15.5			
15.6			
15.7			
15.8			
15.9			
16.0			
16.1			
16.2			
16.3			
16.4			
16.5			
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16.8			
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17.0			
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17.9			
18.0			
18.1			
18.2			
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18.7			
18.8			
18.9			
19.0			
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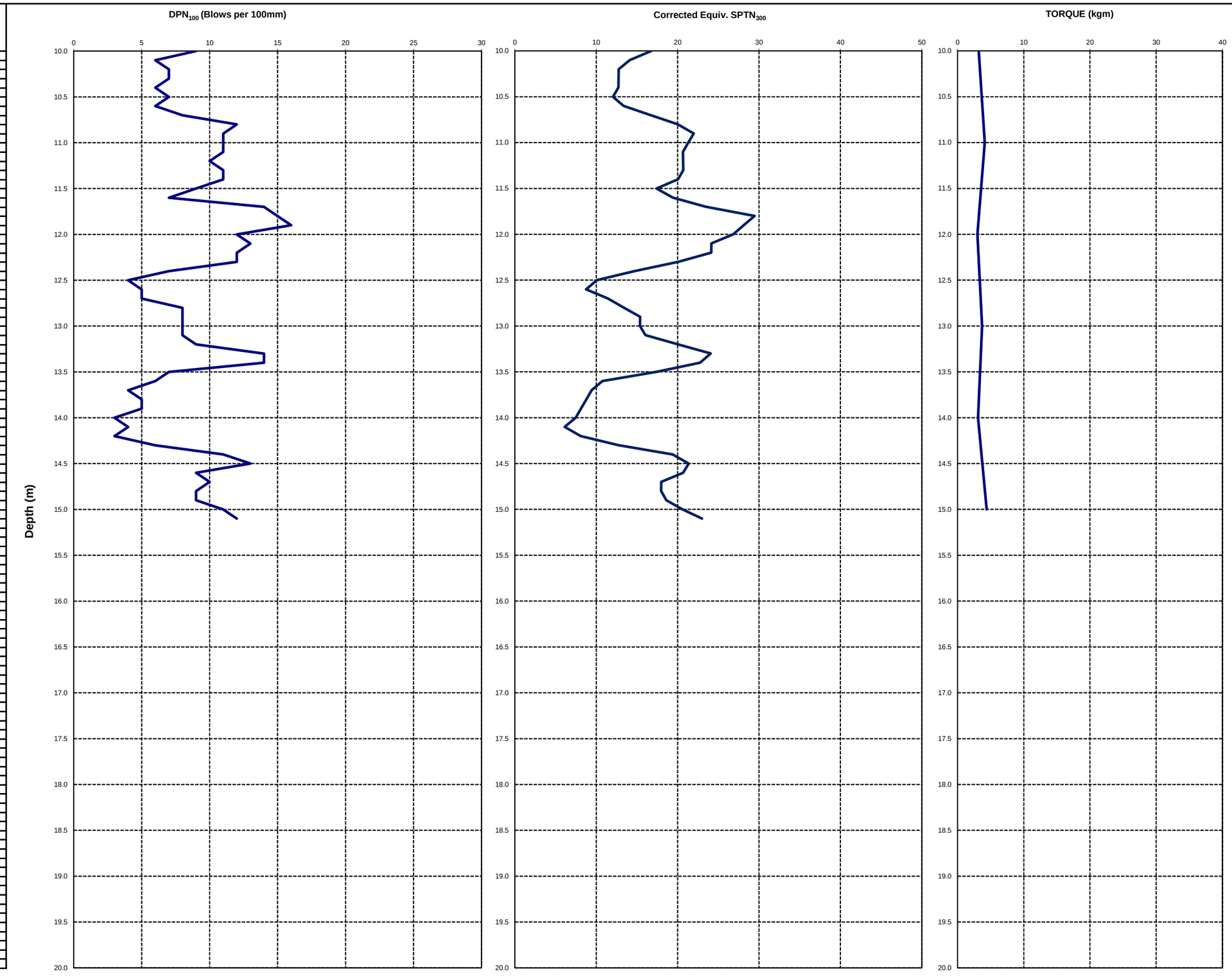
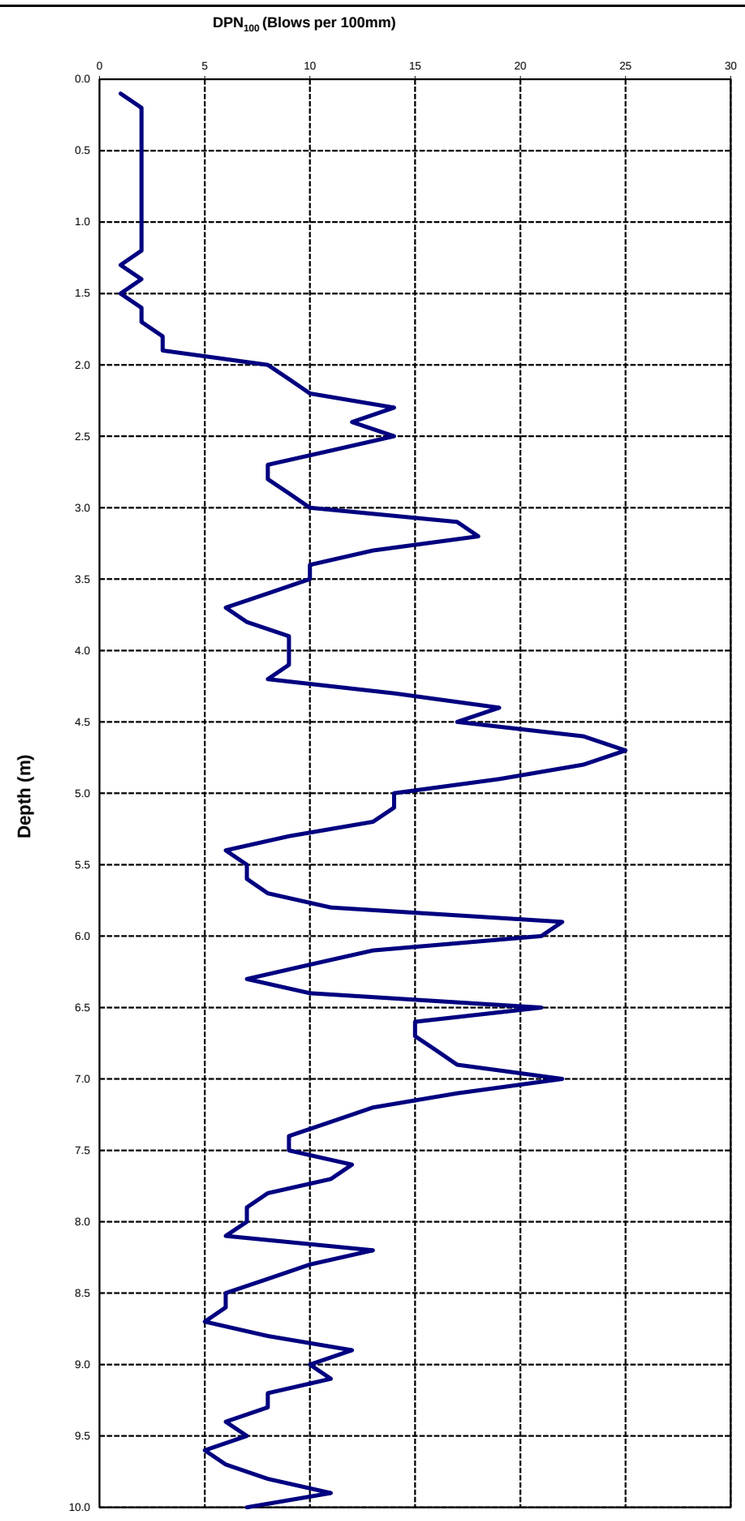
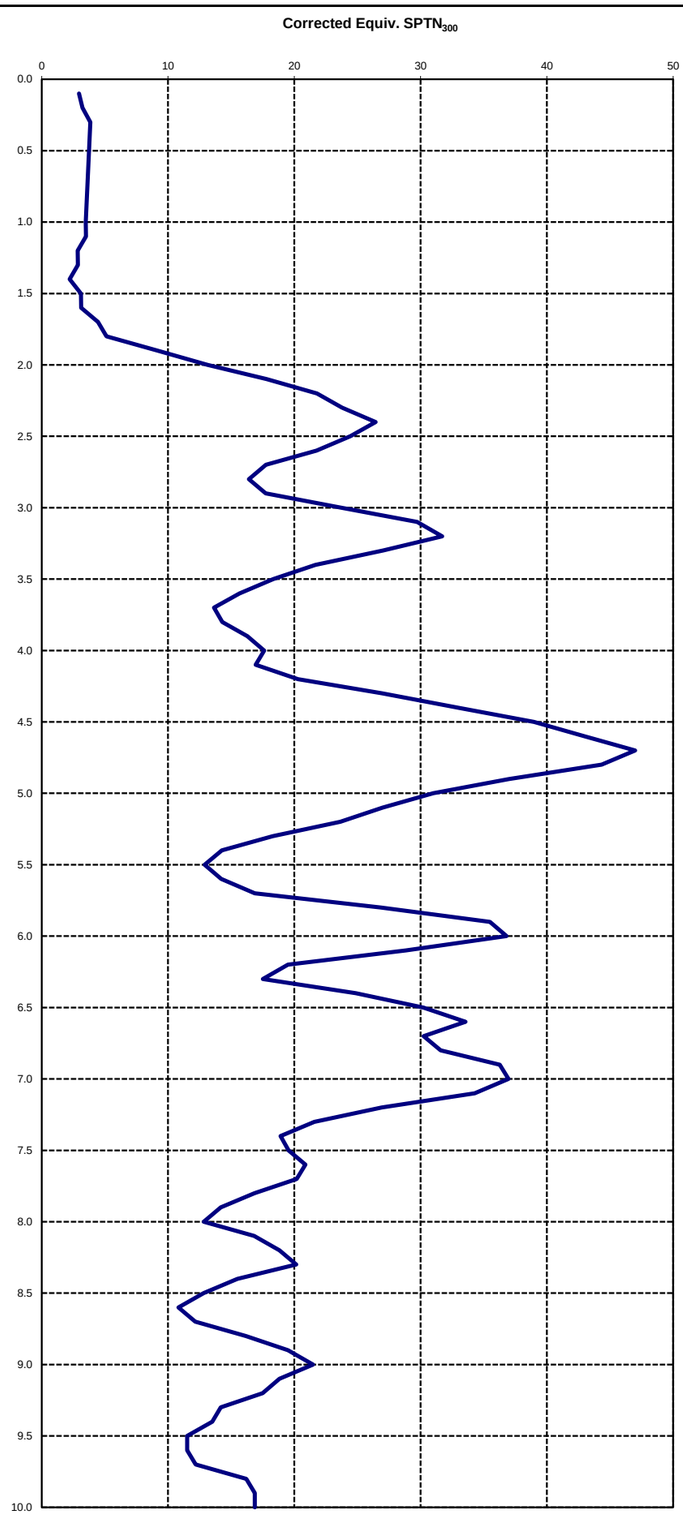
19.7			
19.8			
19.9			
20.0			

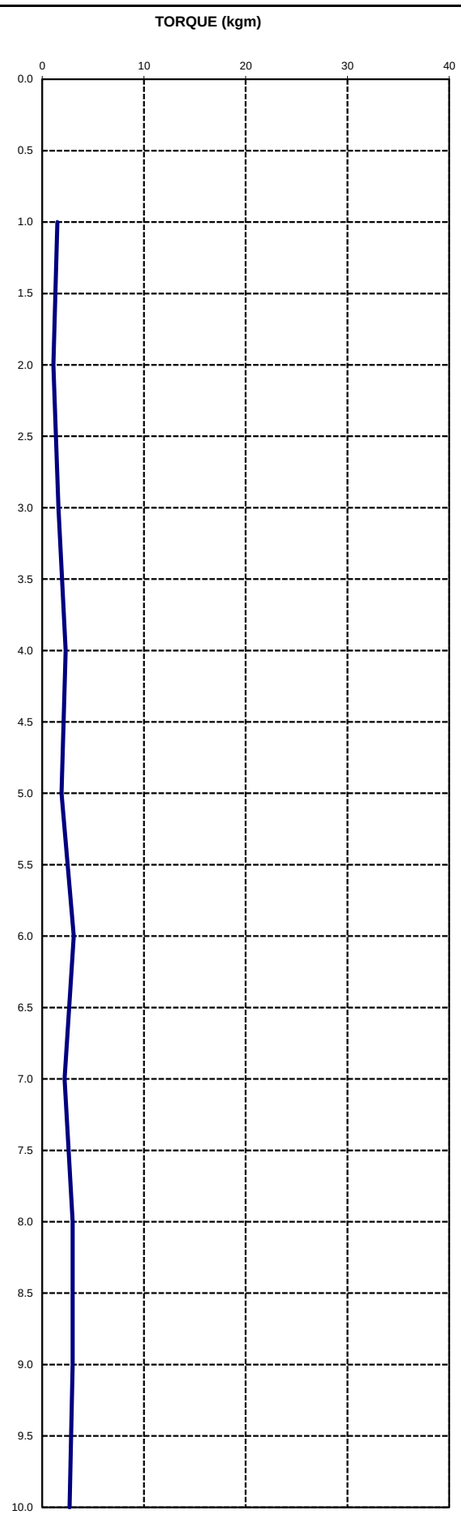


CLIENT	Coronation Holdings Ltd	LOCATION	HDCP3
PROJECT	1 Hansen Rd, Queenstown	JOB NUMBER	160488
DESCRIPTION	HDCP results 10-20m	DATE	7/09/2016
		LOGGED BY	RC
		ANALYSED BY	RC
		CHECKED BY	GXS

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	1.00	2.9	
0.2	2.00	3.2	
0.3	2.00	3.8	
0.4	2.00	3.8	
0.5	2.00	3.7	
0.6	2.00	3.7	
0.7	2.00	3.6	
0.8	2.00	3.6	
0.9	2.00	3.5	
1.0	2.00	3.5	1.5
1.1	2.00	3.5	
1.2	2.00	2.9	
1.3	1.00	2.9	
1.4	2.00	2.2	
1.5	1.00	3.1	
1.6	2.00	3.1	
1.7	2.00	4.5	
1.8	3.00	5.1	
1.9	3.00	9.1	
2.0	8.00	13.1	1.1
2.1	9.00	17.8	
2.2	10.00	21.8	
2.3	14.00	23.8	
2.4	12.00	26.4	
2.5	14.00	24.4	
2.6	11.00	21.8	
2.7	8.00	17.8	
2.8	8.00	16.4	
2.9	9.00	17.7	
3.0	10.00	23.7	1.6
3.1	17.00	29.7	
3.2	18.00	31.7	
3.3	13.00	27.0	
3.4	10.00	21.7	
3.5	10.00	18.3	
3.6	8.00	15.7	
3.7	6.00	13.6	
3.8	7.00	14.3	
3.9	9.00	16.3	
4.0	9.00	17.6	2.3
4.1	9.00	16.9	
4.2	8.00	20.3	
4.3	14.00	27.0	
4.4	19.00	33.0	
4.5	17.00	39.0	
4.6	23.00	43.0	
4.7	25.00	47.0	
4.8	23.00	44.3	
4.9	19.00	37.0	
5.0	14.00	31.0	1.9
5.1	14.00	27.0	
5.2	13.00	23.6	
5.3	9.00	18.3	
5.4	6.00	14.3	
5.5	7.00	12.9	
5.6	7.00	14.2	
5.7	8.00	16.9	
5.8	11.00	26.8	
5.9	22.00	35.5	
6.0	21.00	36.8	3.1
6.1	13.00	28.8	
6.2	10.00	19.5	
6.3	7.00	17.5	
6.4	10.00	24.9	
6.5	21.00	30.2	
6.6	15.00	33.6	
6.7	15.00	30.2	
6.8	16.00	31.6	
6.9	17.00	36.3	
7.0	22.00	37.0	2.2
7.1	17.00	34.3	
7.2	13.00	26.9	
7.3	11.00	21.6	
7.4	9.00	18.9	
7.5	9.00	19.6	
7.6	12.00	20.9	
7.7	11.00	20.2	
7.8	8.00	16.9	
7.9	7.00	14.2	
8.0	7.00	12.8	3
8.1	6.00	16.8	
8.2	13.00	18.8	
8.3	10.00	20.2	
8.4	8.00	15.5	
8.5	6.00	12.8	
8.6	6.00	10.8	
8.7	5.00	12.2	
8.8	8.00	16.2	
8.9	12.00	19.5	
9.0	10.00	21.5	3
9.1	11.00	18.8	
9.2	8.00	17.5	
9.3	8.00	14.2	
9.4	6.00	13.5	
9.5	7.00	11.5	
9.6	5.00	11.5	
9.7	6.00	12.2	
9.8	8.00	16.2	
9.9	11.00	16.9	
10.0	7.00	16.9	2.7







GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**

LOCATION	**HDCP4**
JOB NUMBER	**160488**

DATE	**6/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
10.1	8	16.9	
10.2	11	20.9	
10.3	13	23.6	
10.4	12	22.9	
10.5	10	20.9	
10.6	10	18.9	
10.7	9	16.3	
10.8	6	12.3	
10.9	4	12.3	
11.0	9	19.6	2.3
11.1	17	29.6	
11.2	19	37.6	
11.3	21	34.9	
11.4	13	30.2	
11.5	12	22.2	
11.6	9	18.9	
11.7	8	15.5	
11.8	7	14.8	
11.9	8	13.5	
12.0	6	15.5	3.1
12.1	10	18.8	
12.2	13	22.8	
12.3	12	21.4	
12.4	8	17.4	
12.5	7	14.7	
12.6	8	15.3	
12.7	9	16.0	
12.8	8	17.3	
12.9	10	17.9	
13.0	10	21.2	4.5
13.1	13	21.9	
13.2	11	20.6	
13.3	8	15.9	
13.4	6	11.9	
13.5	5	13.3	
13.6	10	18.6	
13.7	14	24.6	
13.8	14	25.3	
13.9	11	21.3	
14.0	8	17.3	3.9
14.1	8	17.3	
14.2	11	21.3	
14.3	14	28.0	
14.4	18	33.9	
14.5	20	36.6	
14.6	18	36.6	
14.7	18	33.9	
14.8	16	30.6	
14.9	13	25.2	
15.0	10	21.9	4.7
15.1	11	21.0	
15.2			
15.3			
15.4			
15.5			
15.6			
15.7			
15.8			
15.9			
16.0			
16.1			
16.2			
16.3			
16.4			
16.5			
16.6			
16.7			
16.8			
16.9			
17.0			
17.1			
17.2			
17.3			
17.4			
17.5			
17.6			
17.7			
17.8			
17.9			
18.0			
18.1			
18.2			
18.3			
18.4			
18.5			
18.6			
18.7			
18.8			
18.9			
19.0			
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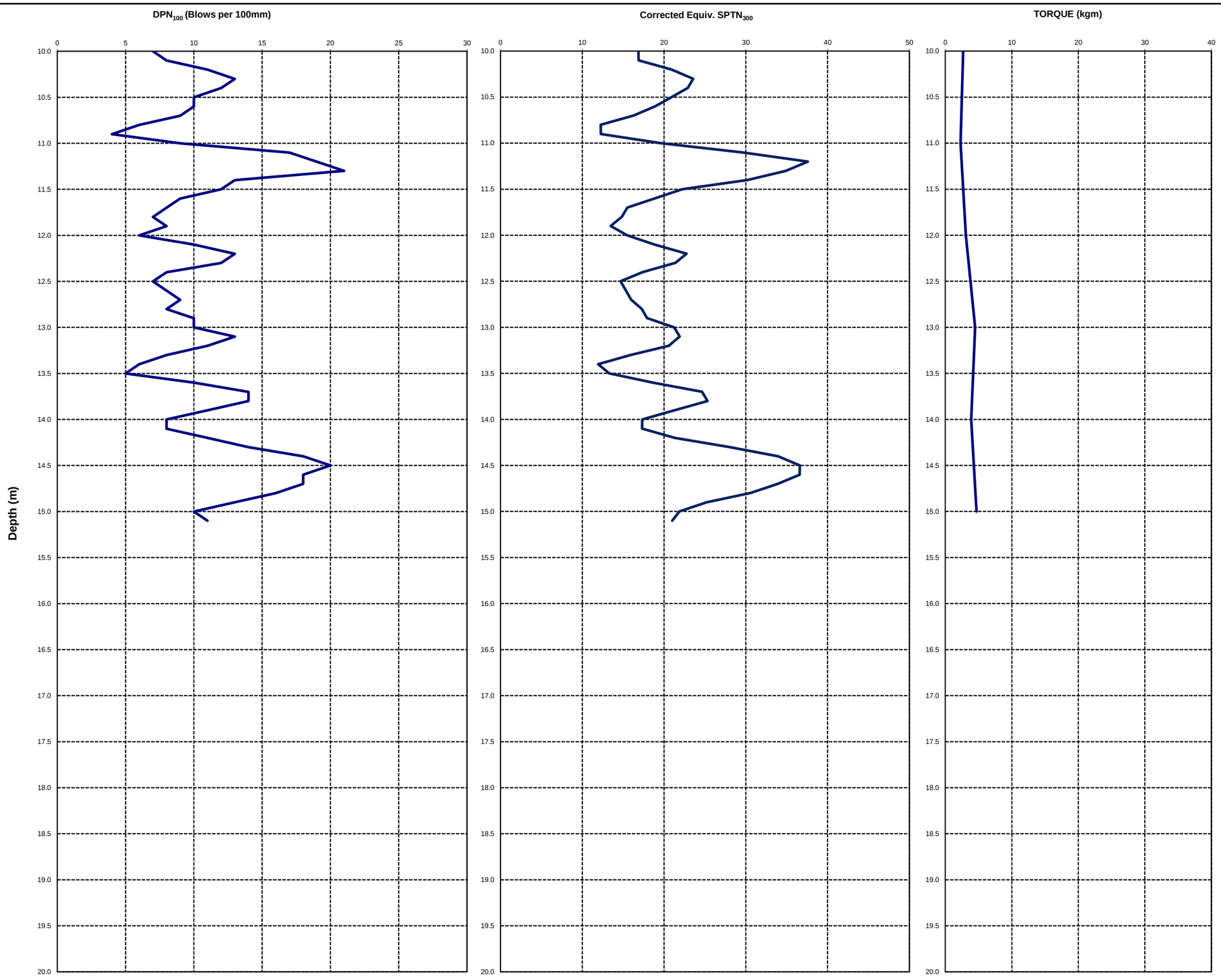

GeoSolve

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 10-20m**

LOCATION	**HDCP4**
JOB NUMBER	**160488**

DATE	**6/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	1.00	3.0	
0.2	2.00	4.6	
0.3	4.00	5.2	
0.4	2.00	5.2	
0.5	2.00	3.8	
0.6	2.00	3.8	
0.7	2.00	4.4	
0.8	3.00	4.4	
0.9	2.00	4.4	
1.0	2.00	3.7	1
1.1	2.00	3.0	
1.2	1.00	3.0	
1.3	2.00	3.0	
1.4	2.00	3.7	
1.5	2.00	3.8	
1.6	2.00	3.8	
1.7	2.00	3.2	
1.8	1.00	3.8	
1.9	3.00	3.8	
2.0	2.00	4.5	1
2.1	2.00	3.8	
2.2	2.00	3.8	
2.3	2.00	3.8	
2.4	2.00	5.1	
2.5	4.00	7.1	
2.6	5.00	8.5	
2.7	4.00	8.5	
2.8	4.00	13.1	
2.9	12.00	20.5	
3.0	15.00	27.8	1.3
3.1	15.00	28.4	
3.2	13.00	30.4	
3.3	18.00	35.1	
3.4	22.00	39.7	
3.5	20.00	37.1	
3.6	14.00	30.4	
3.7	12.00	25.7	
3.8	13.00	27.0	
3.9	16.00	27.7	
4.0	13.00	25.7	1.8
4.1	10.00	20.0	
4.2	7.00	18.7	
4.3	11.00	24.7	
4.4	19.00	39.3	
4.5	29.00	53.3	
4.6	32.00	61.0	
4.7			
4.8			
4.9			
5.0			
5.1			
5.2			
5.3			
5.4			
5.5			
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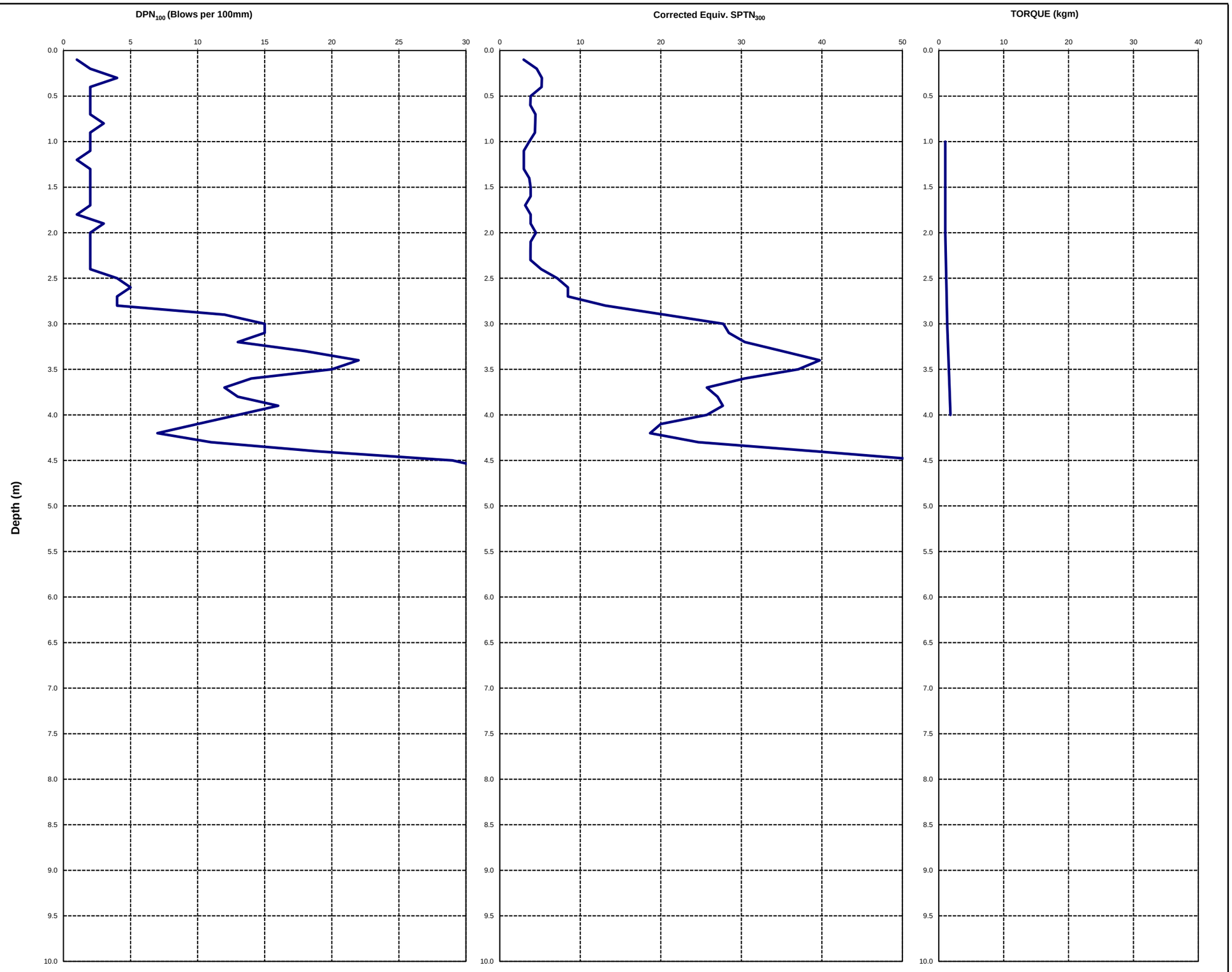

GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**

LOCATION	**HDCP5**
JOB NUMBER	**160488**

DATE	**6/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	1.00	2.0	
0.2	1.00	3.3	
0.3	3.00	3.9	
0.4	2.00	4.5	
0.5	2.00	4.5	
0.6	3.00	5.8	
0.7	4.00	7.1	
0.8	4.00	7.1	
0.9	3.00	6.5	
1.0	3.00	5.8	1
1.1	3.00	5.2	
1.2	2.00	4.5	
1.3	2.00	4.5	
1.4	3.00	5.8	
1.5	4.00	6.5	
1.6	3.00	9.8	
1.7	8.00	17.8	
1.8	16.00	30.4	
1.9	22.00	41.1	
2.0	24.00	46.4	1.4
2.1	24.00	43.8	
2.2	18.00	37.1	
2.3	14.00	30.4	
2.4	14.00	30.4	
2.5	18.00	35.7	
2.6	22.00	39.1	
2.7	19.00	37.1	
2.8	15.00	31.1	
2.9	13.00	25.1	
3.0	10.00	25.7	1.6
3.1	16.00	31.7	
3.2	22.00	38.4	
3.3	20.00	37.1	
3.4	14.00	28.4	
3.5	9.00	21.7	
3.6	10.00	18.4	
3.7	9.00	16.4	
3.8	6.00	15.7	
3.9	9.00	14.4	
4.0	7.00	15.1	1.5
4.1	7.00	15.7	
4.2	10.00	17.7	
4.3	10.00	19.0	
4.4	9.00	20.4	
4.5	12.00	25.7	
4.6	18.00	29.7	
4.7	15.00	29.0	
4.8	11.00	24.3	
4.9	11.00	20.3	
5.0	9.00	20.3	2.4
5.1	11.00	22.0	
5.2	13.00	28.7	
5.3	19.00	32.0	
5.4	16.00	32.7	
5.5	14.00	28.7	
5.6	13.00	25.3	
5.7	11.00	32.0	
5.8	24.00	43.3	
5.9	30.00	54.0	
6.0			
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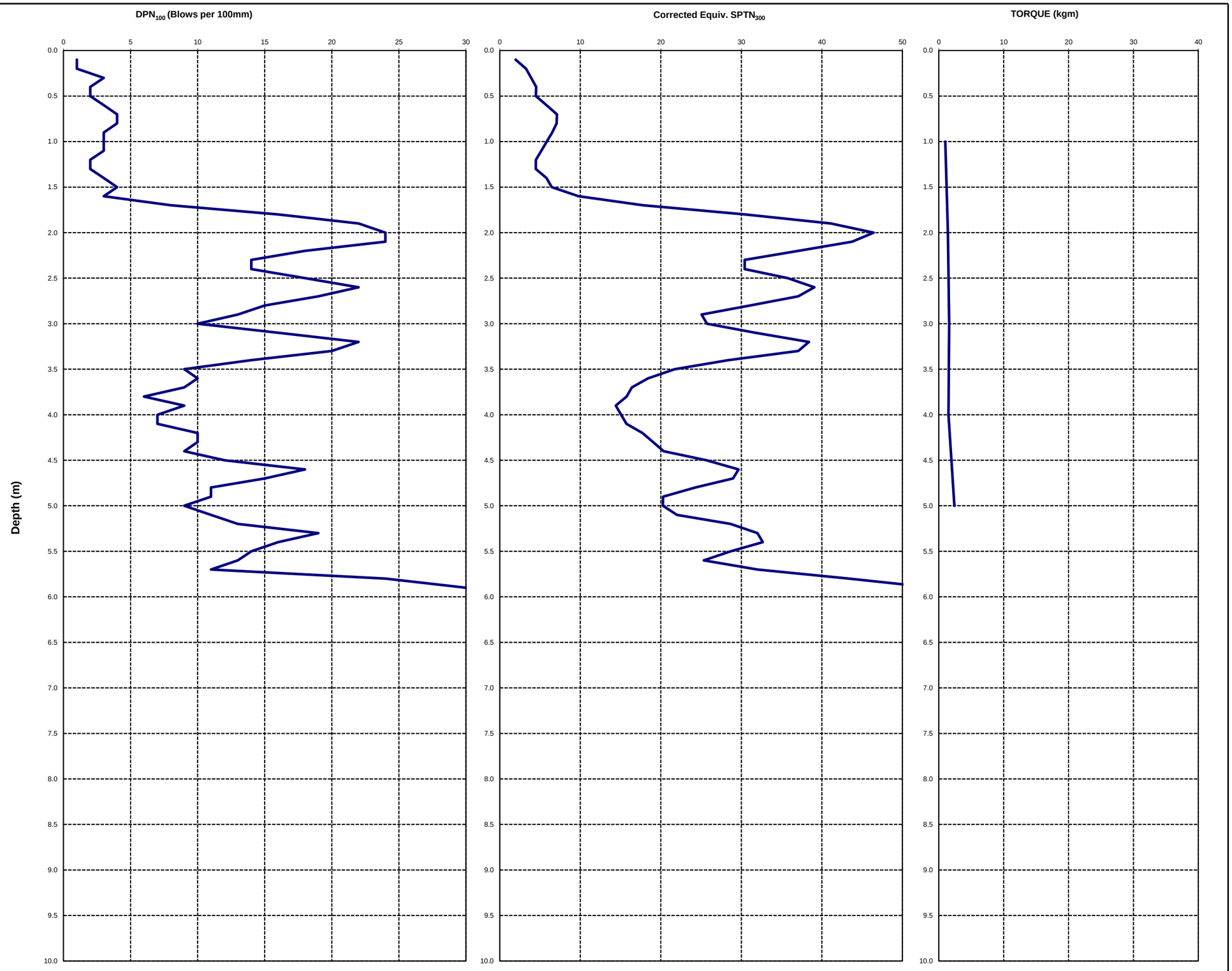

GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**
LOCATION	**HDCP6**
JOB NUMBER	**160488**
DATE	**6/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	1.00	6.0	
0.2	5.00	7.3	
0.3	5.00	8.6	
0.4	3.00	7.2	
0.5	3.00	5.1	
0.6	2.00	5.1	
0.7	3.00	5.1	
0.8	3.00	5.7	
0.9	3.00	7.2	
1.0	5.00	11.0	1.1
1.1	9.00	13.6	
1.2	7.00	14.3	
1.3	6.00	12.5	
1.4	6.00	13.1	
1.5	8.00	14.5	
1.6	8.00	15.1	
1.7	7.00	16.5	
1.8	10.00	19.8	
1.9	13.00	25.1	
2.0	15.00	33.1	1.1
2.1	22.00	38.5	
2.2	21.00	42.9	
2.3	22.00	39.1	
2.4	16.00	33.8	
2.5	13.00	28.4	
2.6	14.00	24.4	
2.7	10.00	21.1	
2.8	8.00	17.1	
2.9	8.00	14.4	
3.0	6.00	13.1	1.5
3.1	6.00	11.7	
3.2	6.00	10.4	
3.3	4.00	9.1	
3.4	4.00	8.4	
3.5	5.00	9.7	
3.6	6.00	14.4	
3.7	11.00	19.7	
3.8	13.00	24.4	
3.9	13.00	22.4	
4.0	8.00	17.7	1.7
4.1	6.00	13.7	
4.2	7.00	14.4	
4.3	9.00	16.4	
4.4	9.00	17.7	
4.5	9.00	16.4	
4.6	7.00	17.8	
4.7	11.00	19.1	
4.8	11.00	19.8	
4.9	8.00	15.8	
5.0	5.00	21.1	1.2
5.1	19.00	29.1	
5.2	20.00	40.4	
5.3	22.00	40.4	
5.4	19.00	38.4	
5.5	17.00	31.7	
5.6	12.00	24.4	
5.7	8.00	21.7	
5.8	13.00	21.7	
5.9	12.00	22.4	
6.0	9.00	23.0	1.8
6.1	14.00	25.7	
6.2	16.00	27.7	
6.3	12.00	23.7	
6.4	8.00	16.3	
6.5	5.00	15.0	
6.6	10.00	17.6	
6.7	12.00	24.3	
6.8	15.00	36.9	
6.9	29.00	38.9	
7.0	15.00	34.3	2.4
7.1	8.00	24.0	
7.2	13.00	34.7	
7.3	31.00	44.0	
7.4			
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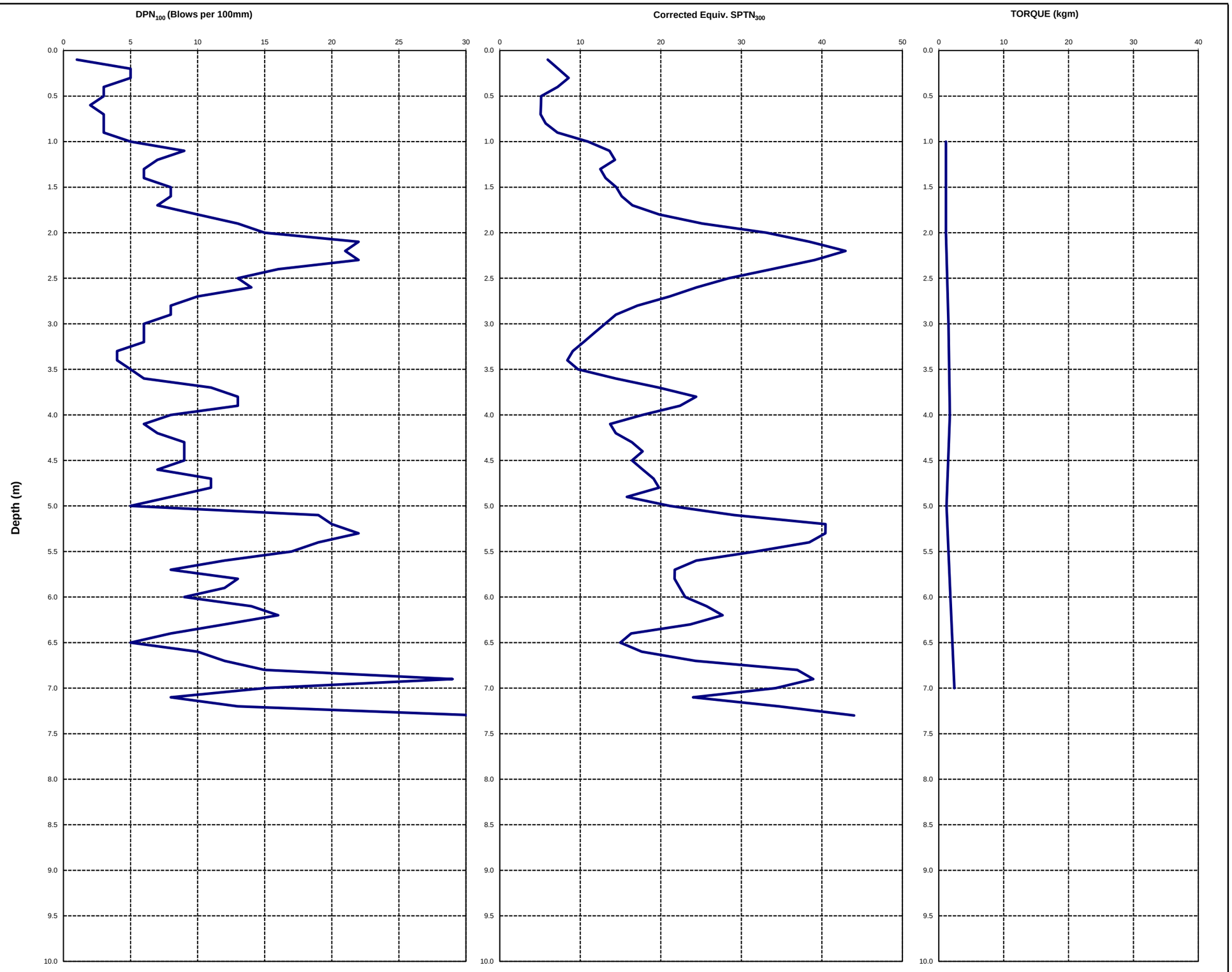


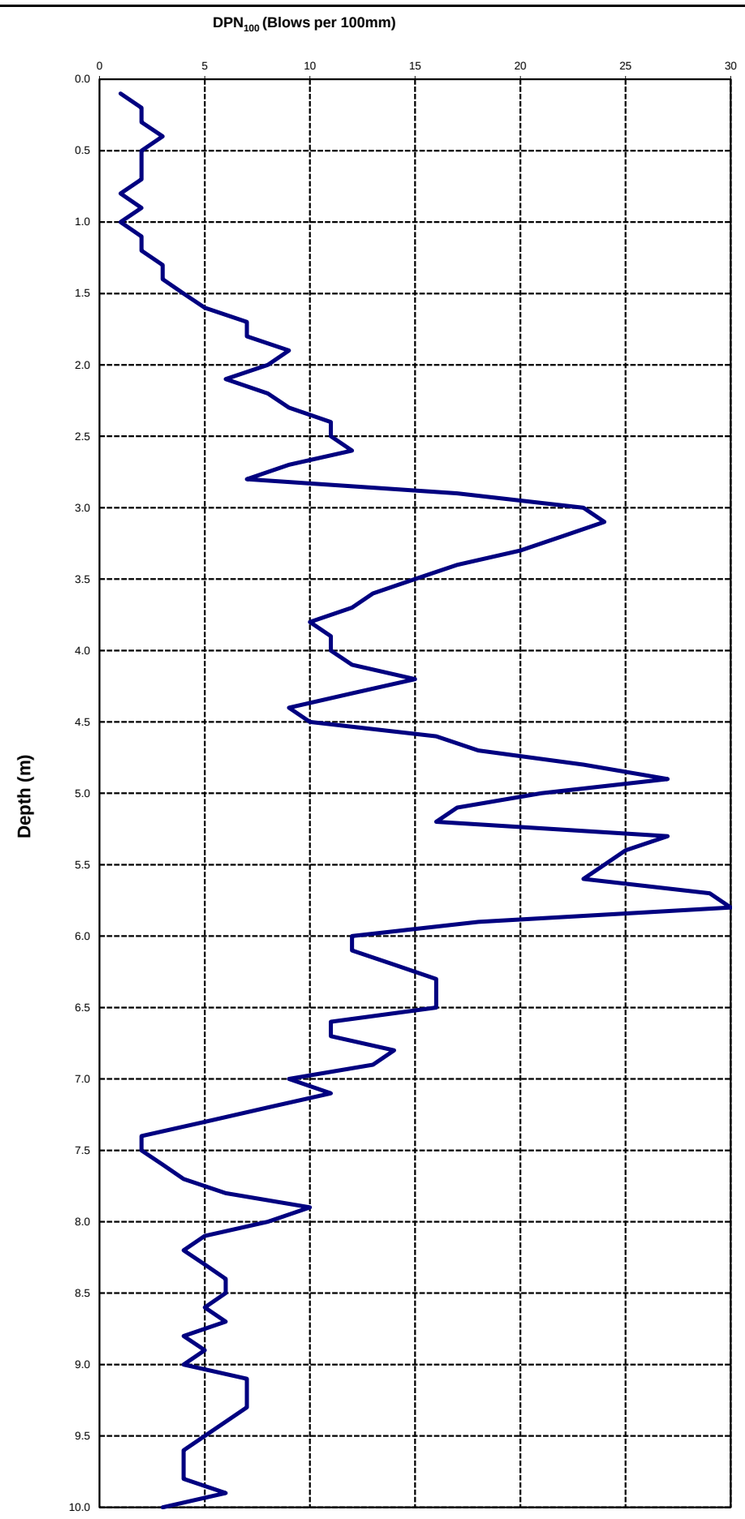
GEOSOLVE

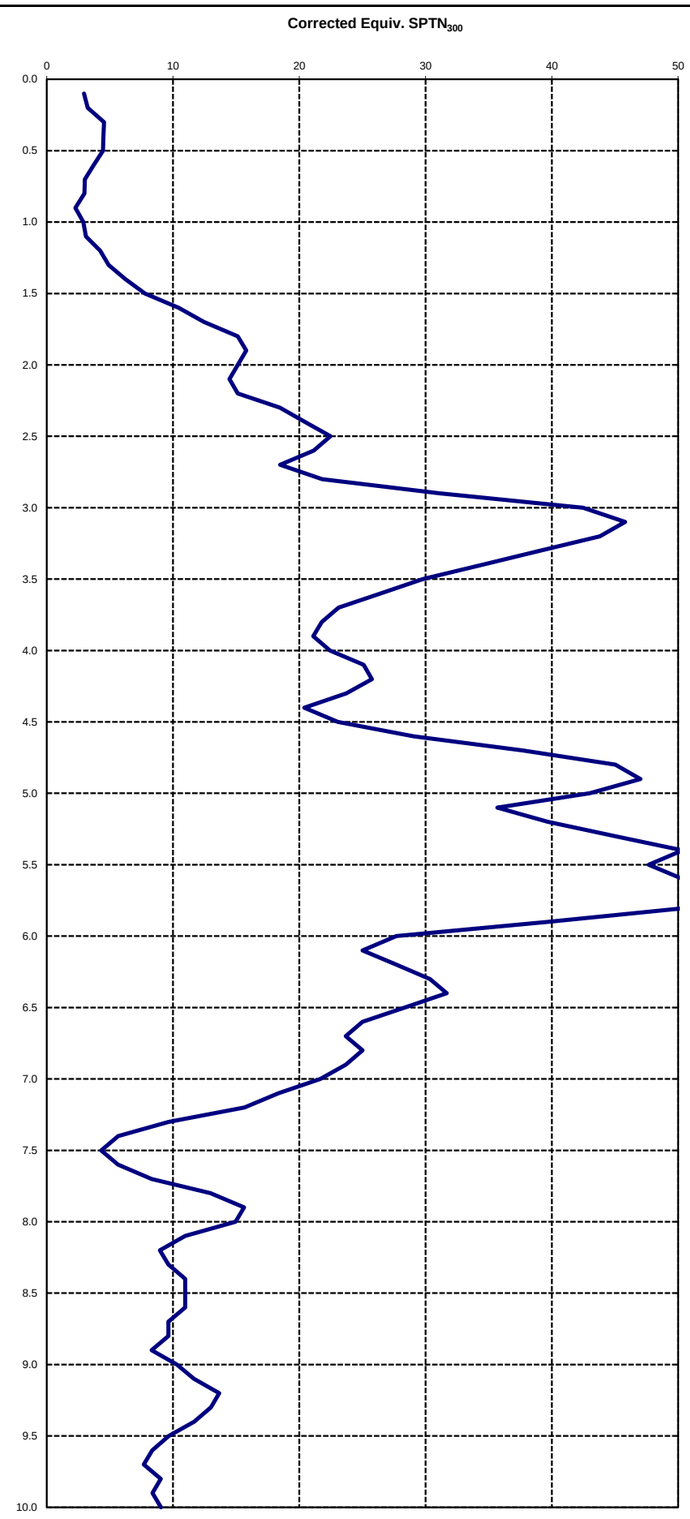
CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**

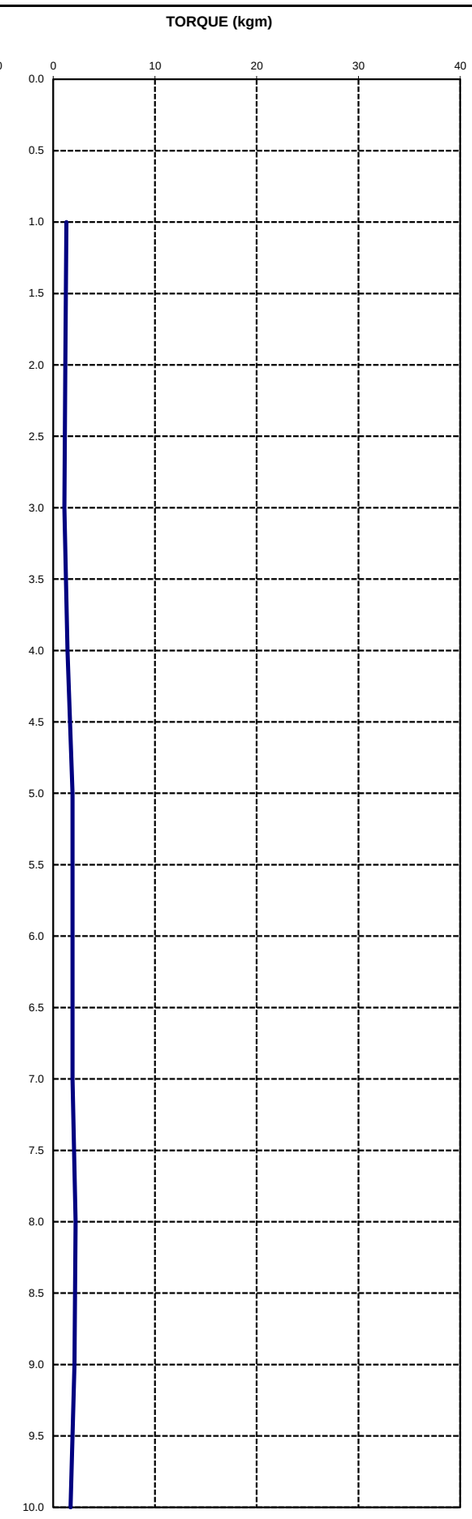
LOCATION	**HDCP7**
JOB NUMBER	**160488**

DATE	**6/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	1.00	3.0	
0.2	2.00	3.2	
0.3	2.00	4.5	
0.4	3.00	4.5	
0.5	2.00	4.4	
0.6	2.00	3.7	
0.7	2.00	3.0	
0.8	1.00	3.0	
0.9	2.00	2.3	
1.0	1.00	2.9	1.3
1.1	2.00	3.1	
1.2	2.00	4.2	
1.3	3.00	4.9	
1.4	3.00	6.2	
1.5	4.00	7.8	
1.6	5.00	10.5	
1.7	7.00	12.5	
1.8	7.00	15.1	
1.9	9.00	15.8	
2.0	8.00	15.1	1.2
2.1	6.00	14.5	
2.2	8.00	15.1	
2.3	9.00	18.5	
2.4	11.00	20.5	
2.5	11.00	22.5	
2.6	12.00	21.1	
2.7	9.00	18.5	
2.8	7.00	21.8	
2.9	17.00	31.1	
3.0	23.00	42.5	1.1
3.1	24.00	45.8	
3.2	22.00	43.8	
3.3	20.00	39.1	
3.4	17.00	34.5	
3.5	15.00	29.8	
3.6	13.00	26.4	
3.7	12.00	23.1	
3.8	10.00	21.8	
3.9	11.00	21.1	
4.0	11.00	22.4	1.4
4.1	12.00	25.1	
4.2	15.00	25.7	
4.3	12.00	23.7	
4.4	9.00	20.4	
4.5	10.00	23.1	
4.6	16.00	29.0	
4.7	18.00	37.7	
4.8	23.00	45.0	
4.9	27.00	47.0	
5.0	21.00	43.0	1.9
5.1	17.00	35.7	
5.2	16.00	39.7	
5.3	27.00	45.0	
5.4	25.00	50.3	
5.5	24.00	47.7	
5.6	23.00	50.3	
5.7	29.00	54.3	
5.8	30.00	51.0	
5.9	18.00	39.7	
6.0	12.00	27.7	1.9
6.1	12.00	25.0	
6.2	14.00	27.7	
6.3	16.00	30.3	
6.4	16.00	31.7	
6.5	16.00	28.3	
6.6	11.00	25.0	
6.7	11.00	23.7	
6.8	14.00	25.0	
6.9	13.00	23.7	
7.0	9.00	21.7	1.9
7.1	11.00	18.3	
7.2	8.00	15.7	
7.3	5.00	9.7	
7.4	2.00	5.7	
7.5	2.00	4.3	
7.6	3.00	5.6	
7.7	4.00	8.3	
7.8	6.00	13.0	
7.9	10.00	15.6	
8.0	8.00	15.0	2.2
8.1	5.00	11.0	
8.2	4.00	9.0	
8.3	5.00	9.6	
8.4	6.00	11.0	
8.5	6.00	11.0	
8.6	5.00	11.0	
8.7	6.00	9.6	
8.8	4.00	9.6	
8.9	5.00	8.3	
9.0	4.00	10.3	2.1
9.1	7.00	11.6	
9.2	7.00	13.7	
9.3	7.00	13.0	
9.4	6.00	11.7	
9.5	5.00	9.7	
9.6	4.00	8.4	
9.7	4.00	7.7	
9.8	4.00	9.0	
9.9	6.00	8.4	
10.0	3.00	9.0	1.7







GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**

LOCATION	**HDCP8**
JOB NUMBER	**160488**

DATE	**7/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
10.1	5	9.0	
10.2	6	11.0	
10.3	6	11.7	
10.4	6	11.7	
10.5	6	11.7	
10.6	6	13.7	
10.7	9	15.7	
10.8	9	17.0	
10.9	8	17.0	
11.0	9	17.0	2.2
11.1	9	17.0	
11.2	8	16.9	
11.3	9	18.3	
11.4	11	20.3	
11.5	11	18.9	
11.6	7	16.2	
11.7	7	12.9	
11.8	6	11.6	
11.9	5	9.5	
12.0	4	8.9	2.7
12.1	5	7.5	
12.2	3	7.6	
12.3	4	6.9	
12.4	4	9.6	
12.5	7	12.9	
12.6	9	13.6	
12.7	5	12.9	
12.8	6	9.6	
12.9	4	8.3	
13.0	3	6.3	2.4
13.1	3	4.9	
13.2	2	4.9	
13.3	3	4.9	
13.4	3	5.6	
13.5	3	5.6	
13.6	3	6.9	
13.7	5	8.9	
13.8	6	11.6	
13.9	7	11.6	
14.0	5	10.2	2.6
14.1	4	7.6	
14.2	3	6.2	
14.3	3	6.2	
14.4	4	6.2	
14.5	3	6.2	
14.6	3	6.2	
14.7	4	6.9	
14.8	4	8.2	
14.9	5	8.9	
15.0	5	8.9	2.5
15.1	4	9.0	
15.2			
15.3			
15.4			
15.5			
15.6			
15.7			
15.8			
15.9			
16.0			
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16.8			
16.9			
17.0			
17.1			
17.2			
17.3			
17.4			
17.5			
17.6			
17.7			
17.8			
17.9			
18.0			
18.1			
18.2			
18.3			
18.4			
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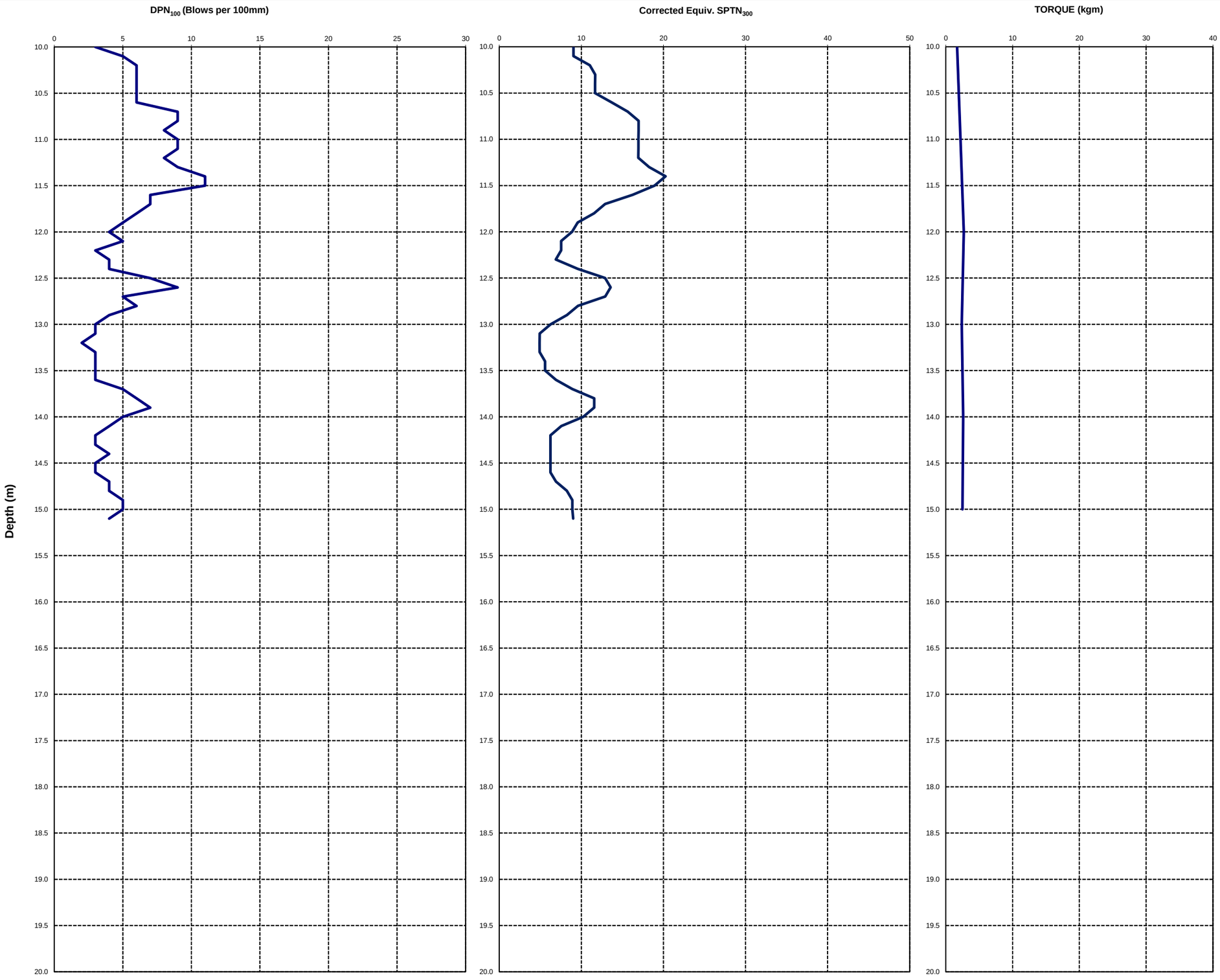

GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 10-20m**

LOCATION	**HDCP8**
JOB NUMBER	**160488**

DATE	**7/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	1.00	6.0	
0.2	5.00	6.6	
0.3	4.00	7.9	
0.4	3.00	5.9	
0.5	2.00	4.5	
0.6	2.00	4.4	
0.7	3.00	4.4	
0.8	2.00	4.4	
0.9	2.00	3.7	
1.0	2.00	3.6	1.1
1.1	2.00	4.5	
1.2	3.00	4.3	
1.3	2.00	4.3	
1.4	2.00	3.6	
1.5	2.00	2.9	
1.6	1.00	2.9	
1.7	2.00	2.2	
1.8	1.00	2.9	
1.9	2.00	2.2	
2.0	1.00	2.8	1.5
2.1	2.00	4.8	
2.2	5.00	8.1	
2.3	6.00	11.5	
2.4	7.00	15.5	
2.5	11.00	19.5	
2.6	12.00	21.7	
2.7	10.00	19.1	
2.8	7.00	15.1	
2.9	6.00	12.4	
3.0	6.00	15.7	1.7
3.1	12.00	18.4	
3.2	10.00	21.7	
3.3	11.00	21.1	
3.4	11.00	22.4	
3.5	12.00	23.7	
3.6	13.00	24.4	
3.7	12.00	24.4	
3.8	12.00	24.4	
3.9	13.00	24.4	
4.0	12.00	27.7	1.5
4.1	17.00	37.0	
4.2	27.00	46.4	
4.3	26.00	50.3	
4.4	23.00	46.3	
4.5	21.00	45.6	
4.6	25.00	44.2	
4.7	21.00	39.5	
4.8	14.00	30.8	
4.9	12.00	25.5	
5.0	13.00	29.4	3.3
5.1	20.00	32.1	
5.2	16.00	33.5	
5.3	15.00	31.5	
5.4	17.00	34.8	
5.5	21.00	35.5	
5.6	16.00	32.2	
5.7	12.00	24.2	
5.8	9.00	20.2	
5.9	10.00	19.5	
6.0	11.00	21.5	2.7
6.1	12.00	25.5	
6.2	16.00	36.2	
6.3	27.00	44.1	
6.4	24.00	44.1	
6.5	16.00	33.4	
6.6	11.00	29.4	
6.7	18.00	30.0	
6.8	17.00	31.3	
6.9	13.00	25.3	
7.0	9.00	19.9	4.3
7.1	9.00	16.7	
7.2	7.00	14.0	
7.3	5.00	16.0	
7.4	12.00	31.3	
7.5	30.00	42.0	
7.6			
7.7			
7.8			
7.9			
8.0			
8.1			
8.2			
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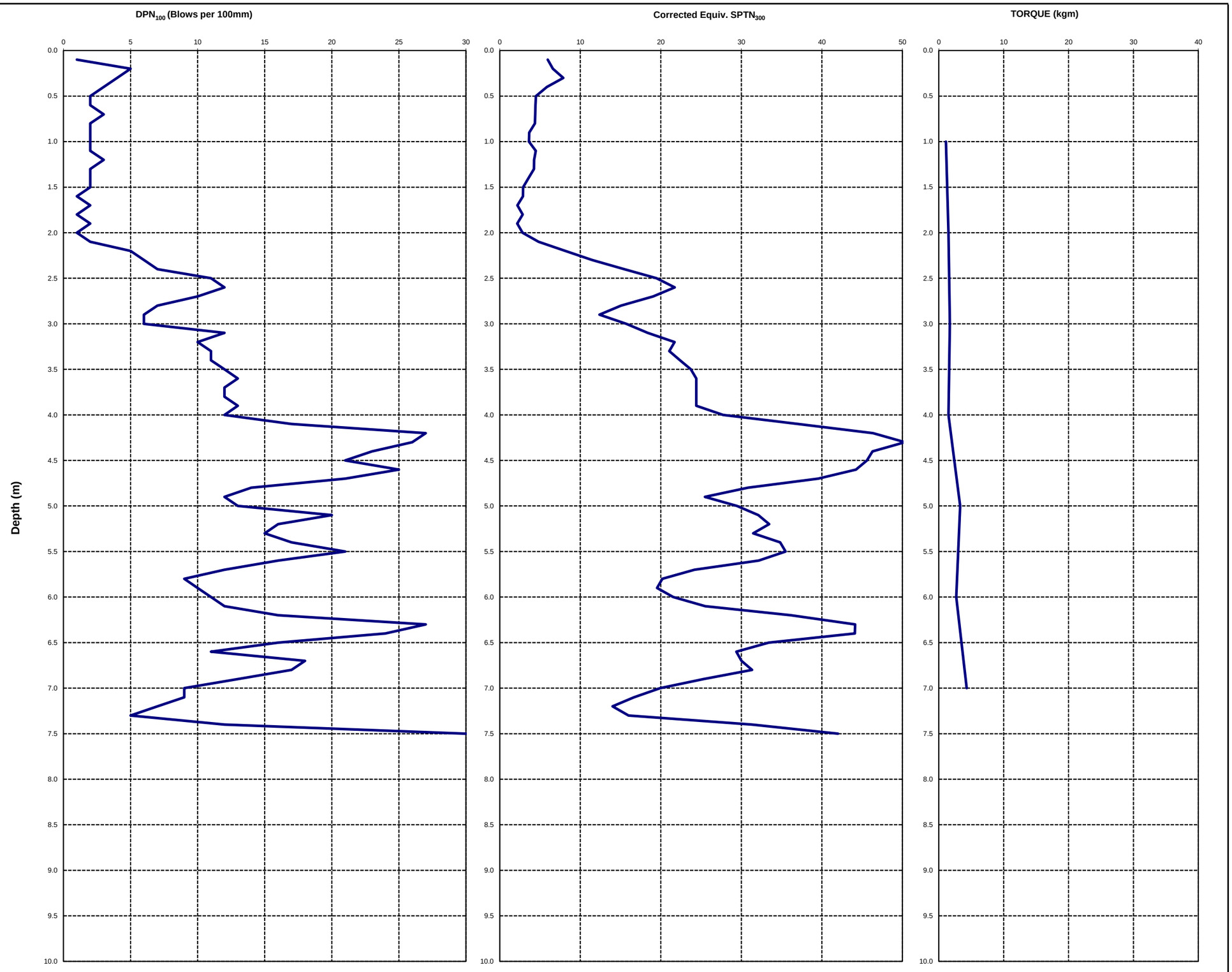

GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**

LOCATION	**HDCP9**
JOB NUMBER	**160488**

DATE	**8/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	0.50	0.9	
0.2	0.50	1.2	
0.3	1.00	2.2	
0.4	2.00	2.4	
0.5	1.00	2.4	
0.6	1.00	2.3	
0.7	2.00	2.9	
0.8	2.00	2.9	
0.9	1.00	4.1	
1.0	4.00	6.1	1.7
1.1	5.00	7.4	
1.2	3.00	6.8	
1.3	3.00	4.8	
1.4	2.00	4.2	
1.5	2.00	4.2	
1.6	3.00	4.9	
1.7	3.00	5.5	
1.8	3.00	6.2	
1.9	4.00	8.9	
2.0	7.00	18.3	1.2
2.1	17.00	29.6	
2.2	21.00	39.6	
2.3	22.00	40.9	
2.4	19.00	41.8	
2.5	22.00	43.1	
2.6	24.00	45.1	
2.7	22.00	45.7	
2.8	23.00	46.4	
2.9	25.00	46.4	
3.0	22.00	43.0	1.7
3.1	18.00	35.7	
3.2	14.00	28.4	
3.3	11.00	23.0	
3.4	10.00	19.1	
3.5	8.00	15.7	
3.6	6.00	11.7	
3.7	4.00	11.1	
3.8	7.00	14.4	
3.9	11.00	18.4	
4.0	10.00	20.4	1.6
4.1	10.00	19.7	
4.2	10.00	19.0	
4.3	9.00	21.7	
4.4	14.00	24.4	
4.5	14.00	25.7	
4.6	11.00	22.4	
4.7	9.00	19.0	
4.8	9.00	18.3	
4.9	10.00	21.0	
5.0	13.00	24.3	2
5.1	14.00	25.0	
5.2	11.00	24.3	
5.3	12.00	24.3	
5.4	14.00	29.0	
5.5	18.00	37.6	
5.6	25.00	46.9	
5.7	28.00	50.9	
5.8	24.00	51.6	
5.9	26.00	52.2	
6.0	29.00	52.2	2.6
6.1	24.00	47.6	
6.2	19.00	37.6	
6.3	14.00	29.6	
6.4	12.00	24.3	
6.5	11.00	24.3	
6.6	14.00	27.0	
6.7	16.00	29.6	
6.8	15.00	29.0	
6.9	13.00	25.0	
7.0	10.00	21.7	2
7.1	10.00	20.3	
7.2	11.00	21.0	
7.3	11.00	19.7	
7.4	8.00	17.7	
7.5	8.00	16.3	
7.6	9.00	18.3	
7.7	11.00	18.3	
7.8	8.00	15.6	
7.9	5.00	11.6	
8.0	5.00	12.3	2.1
8.1	9.00	21.3	
8.2	18.00	38.0	
8.3	30.00	48.0	
8.4			
8.5			
8.6			
8.7			
8.8			
8.9			
9.0			
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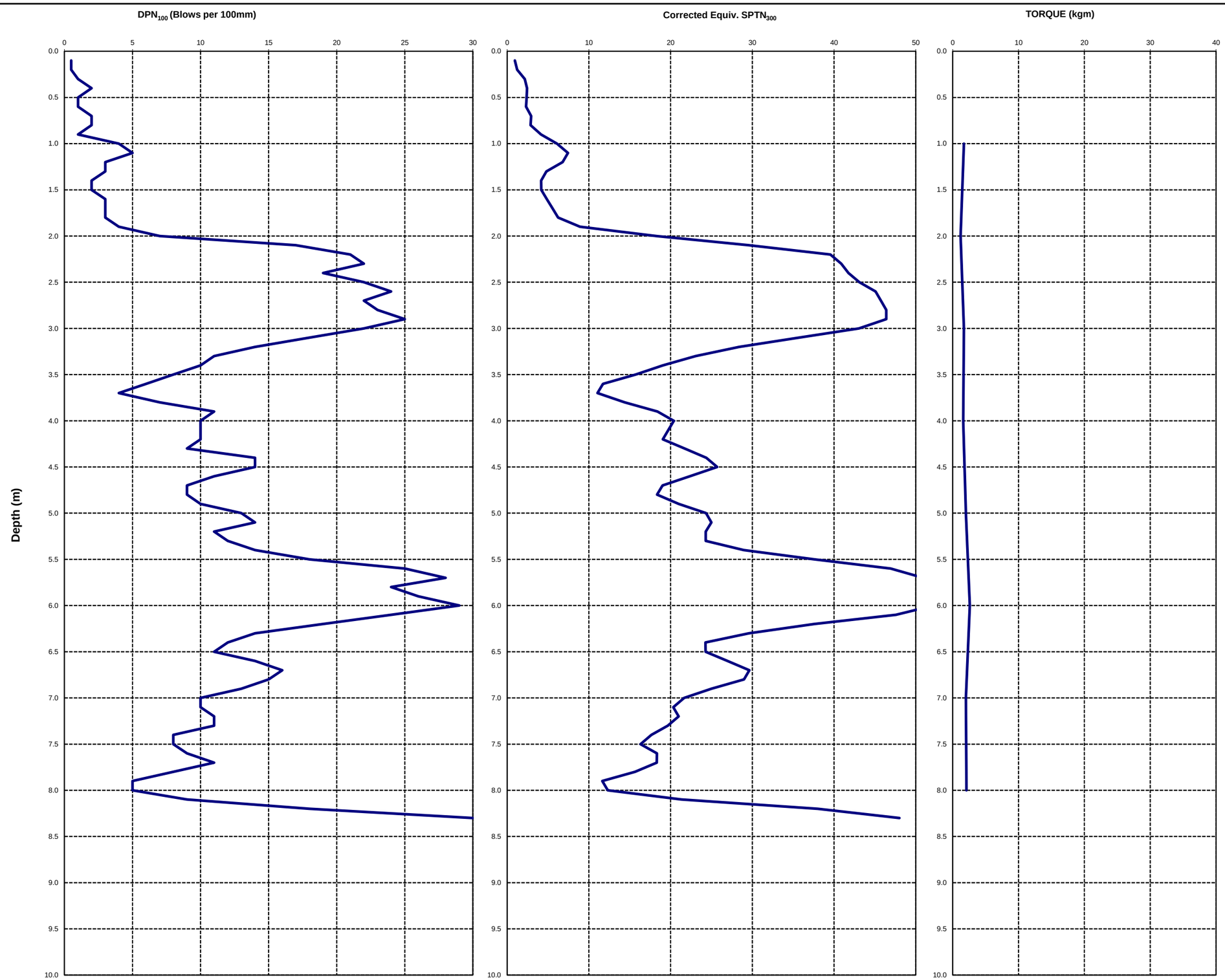

GeoSolve

CLIENT	Coronation Holdings Ltd
PROJECT	1 Hansen Rd, Queenstown
DESCRIPTION	HDCP results 0-10m
LOCATION	HDCP10
JOB NUMBER	160488
DATE	8/09/2016
LOGGED BY	RC
ANALYSED BY	RC
CHECKED BY	GXS

Depth (m)	DPN_{100}	Corrected Equiv. SPT N	Torque
0.1	2.00	6.0	
0.2	4.00	5.3	
0.3	2.00	5.9	
0.4	3.00	4.5	
0.5	2.00	5.1	
0.6	3.00	4.4	
0.7	2.00	4.4	
0.8	2.00	3.7	
0.9	2.00	3.6	
1.0	2.00	4.3	1.2
1.1	3.00	4.3	
1.2	2.00	4.3	
1.3	2.00	2.9	
1.4	1.00	2.9	
1.5	2.00	2.9	
1.6	2.00	3.6	
1.7	2.00	3.6	
1.8	2.00	3.6	
1.9	2.00	3.6	
2.0	2.00	3.6	1.2
2.1	2.00	3.6	
2.2	2.00	3.6	
2.3	2.00	3.5	
2.4	2.00	2.9	
2.5	1.00	2.8	
2.6	2.00	3.5	
2.7	3.00	4.1	
2.8	2.00	3.5	
2.9	1.00	2.8	
3.0	2.00	2.8	1.7
3.1	2.00	3.4	
3.2	2.00	3.4	
3.3	2.00	2.8	
3.4	1.00	2.8	
3.5	2.00	2.1	
3.6	1.00	2.8	
3.7	2.00	2.8	
3.8	2.00	2.8	
3.9	1.00	2.1	
4.0	1.00	2.2	1.5
4.1	2.00	5.5	
4.2	6.00	9.4	
4.3	7.00	11.4	
4.4	5.00	9.4	
4.5	3.00	6.1	
4.6	2.00	6.0	
4.7	5.00	9.3	
4.8	8.00	13.3	
4.9	8.00	13.3	
5.0	5.00	12.6	2.1
5.1	7.00	14.7	
5.2	10.00	22.0	
5.3	16.00	30.7	
5.4	20.00	44.0	
5.5	30.00	50.0	
5.6			
5.7			
5.8			
5.9			
6.0			
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7.0			
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7.8			
7.9			
8.0			
8.1			
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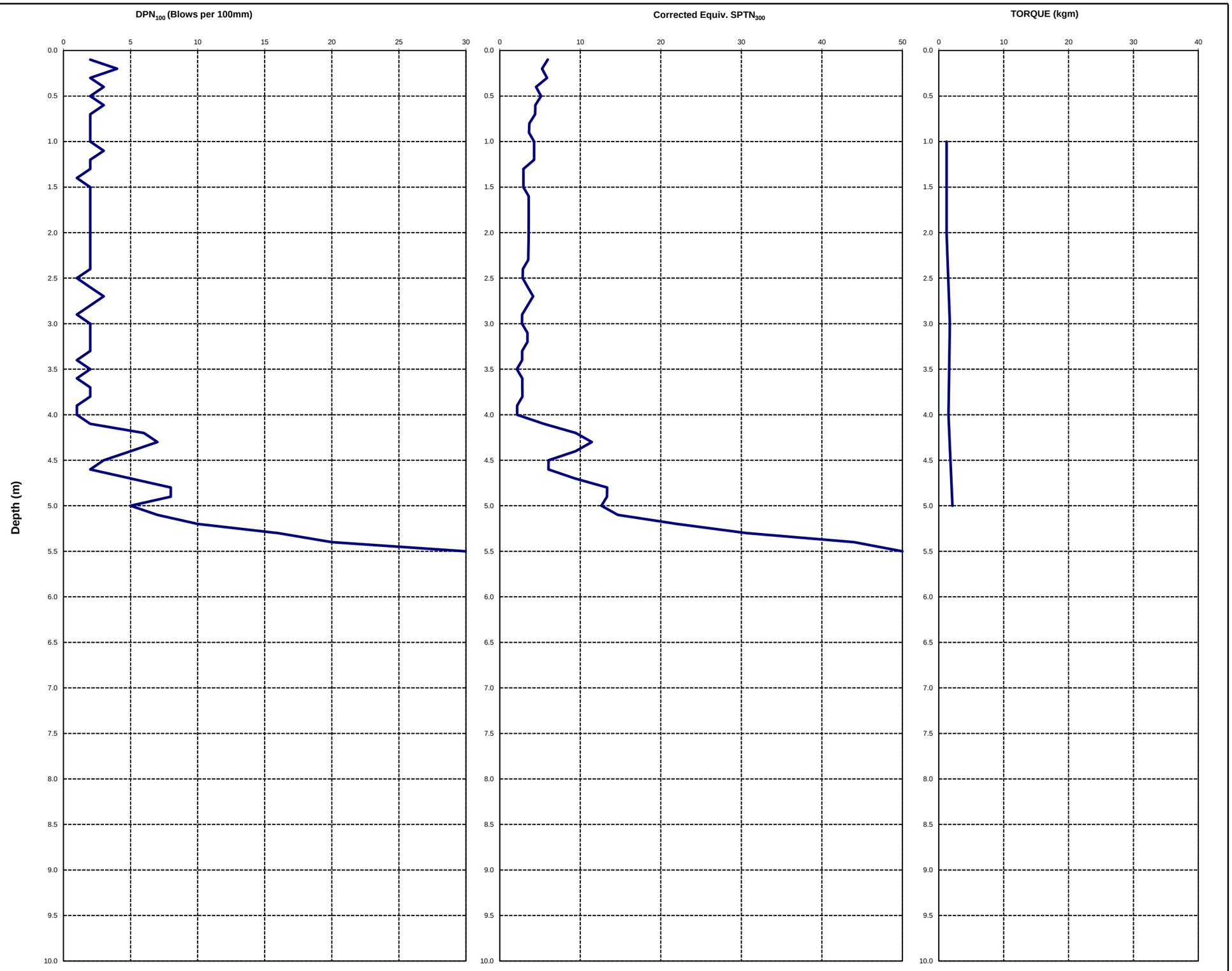

GEOSOLVE

CLIENT	**Coronation Holdings Ltd**
PROJECT	**1 Hansen Rd, Queenstown**
DESCRIPTION	**HDCP results 0-10m**
LOCATION	**HDCP11**
JOB NUMBER	**160488**
DATE	**8/09/2016**
LOGGED BY	**RC**
ANALYSED BY	**RC**
CHECKED BY	**GXS**

Graham J

From: Graham J s 9(2)(a) on behalf of Graham J
Sent: Thursday, 5 August 2021 7:02 PM
To: Graham J
Subject: FW: 1 Hansen Road - Request for Report

From: Fraser Wilson s 9(2)(a)
Sent: Wednesday, 14 July 2021 4:37 PM
To: Graham J s 9(2)(a)
Subject: RE: 1 Hansen Road - Request for Report

Hi Graham,

I've reviewed your email below.

There will be no change to the conclusions in our original geotech report.

There is no liquefaction risk and this won't change with the land use change.

The current report is still relevant.

Regards,
Fraser

Fraser Wilson
Senior Engineering Geologist
Ph +64 3 451 0172 | s 9(2)(a)
829 Frankton Road, Frankton Marina | PO Box 1780, Queenstown 9300