REPORT ON:

STAGE 6, LYNDHURST ROAD SUBDIVISION, FRIMLEY, HASTINGS (LOTS 45-63)

PROJECT:

GEOTECHNICAL ASSESSMENT

CLIENT: GREENSTONE LAND DEVELOPMENTS LTD.

GREENSTONE LAND DEVELOPMENTS LTD.

P O BOX 1200

HASTINGS 4122

EXECUTIVE SUMMARY

Greenstone Land Developments Ltd. (Greenstone) engaged Resource Development Consultants Ltd (RDCL) to undertake a geotechnical assessment for Stage 6 Lyndhurst Road, Frimley in Hastings; including:

- Liquefaction assessment for the subdivision; and
- Site specific shallow testing for each of nineteen (19) proposed lots for subdivision and building consent.

Stage 6 of the development covers an area of approximately 13,500 m^2, with nineteen residential lots accessed by a new road branching off Mackay Close (Figure 1).

The site is surrounded by and comprises generally flat land. Site levels across the stage 6 development have been altered by minor cut (<0.3m in the southern corner) and fill (<1.0 m in the northeast end).

The results of shallow investigations suggest the site, including Lots 45-63, is generally underlain in the near surface by:

- Silty and clayey TOPSOIL to between 0.15-0.8 m bgl; overlying
- Firm to stiff SILT and medium-dense SAND, with
- lenses of soft clayey SILT and CLAY occurring below approximately 1.4-2.0 m bgl

Based on our liquefaction assessment, the site is considered to have:

- Low risk of liquefaction during a SLS earthquake event, and
- Very high risk of liquefaction during an ULS event; with
  - Expected vertical settlements on the order of 250 mm.

Based on the results of these investigations, we consider:

- All sites are suitable for residential development subject to specific design of foundations to account for:
  - Potential for liquefaction induced vertical settlements; and
  - Bearing capacity ≤ 200kPa in some cases.

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FIGURES

APPENDICES

1 OVERVIEW

Greenstone Land Developments Ltd. (Greenstone) engaged Resource Development Consultants Ltd (RDCL) to undertake a geotechnical assessment for Stage 6 of the Greenstone Subdivision on Lyndhurst Road in Hastings; including:

- Liquefaction assessment for the subdivision; and
- Site specific shallow testing for each of nineteen (19) proposed lots for subdivision and building consent.

1.1 PURPOSE OF THIS REPORT

The purpose of this report is to provide sufficient information to support subdivision and building consent at individual Lot Level.

A structural engineer will need to be engaged individually to undertake specific design to meet the requirements of this report.

1.2 UNDERSTANDING OF THE PROJECT

We understand the intent is to subdivide nineteen (19) residential lots from previously undeveloped land (Legal Description: LOT 400 DP 518970); comprising Lots 45-63 as indicated on Greenstone Land Developments Stage 6 Sale Plan, prepared by Zorn Surveying (Job No: 16-EQH; Plan No: S6 Sale, dated 25 January 2017).

The site is located in a zone of "high liquefaction vulnerability", as mapped by Hawke's Bay Emergency Management Group (2017); requiring assessment of liquefaction potential and likely ground settlements under seismic conditions.

RDCL has previously completed site specific shallow investigations for Stages 2-5 of the Greenstone development, comprising 48 residential lots in neighbouring sections on Arbuckle & Lyndhurst Roads. Those previous RDCL reports (R170602050_02, and R170602050_03) suggest:

- In situ near surface soils generally comprise soft silt and clay with ultimate bearing capacity ≤ 200 kPa; and
- The area is generally prone to liquefaction induced vertical settlements.

1.3 SCOPE OF WORK

Work was undertaken in general accordance with RDCL proposal 18109.1, dated 9 March 2018.

2 SITE DESCRIPTION

Stage 6 of the development covers an area of approximately 13,500 m^2, with nineteen residential lots accessed by a new road branching off Mackay Close (Figure 1).

The site is surrounded by and comprises generally flat land. Site levels across the stage 6 development have been altered by minor cut (<0.3m in the southern corner) and fill (<1.0 m in the northeast end).

Topsoil was stripped from the site prior to fill placement, and redistributed to surface the reshaped development area.

Fill materials, generally comprising SILT and silty SAND with minor gravel, were obtained from three local sources, including:

- Greenstone Stages 3-5, excavated from roadside service trenches;
- Lyndhurst Road, excavated for new storm water pipe installation; and
- Maraekakaho Road stockpile, originating from Railway Road water pipe excavations.

2.1 REGIONAL GEOLOGY

Regional geology maps indicate the site is underlain by Holocene river deposits; comprising poorly consolidated alluvial gravel, sand and mud (GNS Science, 2011).

2.1.1 ACTIVE FAULTS

The site is located approximately 2.5 km southeast of the active trace of the Awanui Fault, as identified in the GNS Science Active Faults Database (2016).

3 SUBSOIL INVESTIGATION

Site specific testing completed for each of the nineteen (19) lots comprised at a minimum:

- Engineering geological logging of materials recovered by hand auger; and
- Four (4) dynamic cone penetrometer (DCP) tests.

Subsurface investigations for the assessment of liquefaction potential across the Stage 6 development comprised:

- Three (3) Cone Penetration Tests (CPT) to 20 m bgl or refusal.

Results of subsurface investigations for individual lots are attached as Appendix A; with CPT Logs attached as Appendix B.

3.1 SUBSOIL CONDITIONS

The results of shallow investigations suggest the site, including Lots 45-63, is generally underlain in the near surface by:

- Silty and clayey TOPSOIL to between 0.15-0.8 m bgl; overlying
- Firm to stiff SILT and medium-dense SAND, with
- lenses of soft clayey SILT and CLAY occurring below approximately 1.4-2.0 m bgl

The results of CPT investigations suggest the site is generally underlain by

- Medium dense silty SAND and sandy SILT with lenses of clay to approximately 10 – 12 m bgl; underlain by
- Soft to firm CLAY with lenses of sand and silt to at least 15 m bgl.

3.2 SHALLOW BEARING

Dynamic Cone Penetrometer test results indicate variation in the bearing capacity of soils, laterally and with depth. In some test locations soft soils, with DCP blows of 0-3 blows per 100mm penetration, are present to depth on the order of 2 m bgl; while in other areas DCP blows are generally >3 per 100 mm penetration from depths on the order of 0.7 m bgl.

Further, interlayering of soft and firm soils are frequently observed; with localised decreases to DCP blows <3 per 100 mm penetration occurring at up to 2.2 m bgl, and on a ~0.5m scale in the upper 2 metres.

Correlation of DCP results (Stockwell, 1977) suggests:

- ≥200 kPa Ultimate Bearing Capacity is generally available on finished lots at a depth stripped of topsoil and/or unsuitable materials; with
- Some localised areas of lower bearing capacity are identified, particularly:
  - In the southern corner (Lots 50 & 51) where soft in situ soils exhibit reduced bearing capacity relative to near surface soils having undergone compaction.

4 LIQUEFACTION ASSESSMENT

4.1 SEISMIC SOIL CLASSIFICATION

The site is classified as site subsoil "Class D – Deep or Soft Soil Site" in accordance with NZS1170.5:2004, part 5: Earthquake Actions – New Zealand.

The sites subsoil class was determined based on conservative review of the Hawkes Bay well database.

- The Hawkes Bay well database indicates ground conditions are variable in the area, such that the site can be expected to be underlain by deep soils; specifically:
  - Well 2008 consists of clay to 14.6 m bgl, with silt to 19.8 m, interlayered gravel and clay 31 m and gravel to at least 40 m bgl;
  - Well 5554 consists of silty clay to 1.1 m, and clay to at least 5 m bgl;
  - Well 671 consists of clay to 29 m bgl, with gravel to 32 m bgl, and clay to 44 m bgl overlying gravel to at least 47 m bgl.
  - Well 10847 consists of sand and clay to 42 m bgl, overlying gravel to at least 44 m bgl; and
  - Well 8474 consists of silt to 4.6 m bgl, with clay and sand to 38 m bgl, overlying gravel and sand to at least 44 m bgl.

4.2 GROUNDWATER

Groundwater was not encountered at depths between 1.5-2.6 m bgl during shallow investigations.

Groundwater levels are expected to vary seasonally, and could be expected to be encountered at up to 1.0 m bgl in extreme wet seasons.

4.3 LIQUEFACTION ASSESSMENT

A liquefaction assessment was carried out on CPT results. The site is considered to have:

- Low risk of liquefaction during a SLS earthquake event, and
- Very high risk of liquefaction during an ULS event; with
  - Expected vertical settlements on the order of 250 mm.

Liquefaction potential and induced settlement results are summarised in Table 1; lateral displacements are not expected due to the generally flat relief across the site and surrounding area.

The output results of our liquefaction assessment are presented in Appendix C.

TABLE 1: LIQUEFACTION POTENTIAL AND INDUCED SETTLEMENT

SLS Event	Liquefaction Potential Index	Estimated Vertical Settlement (mm)
181090602_CPT01	Low Risk	14
181090602_CPT02	Low Risk	30
181090602_CPT03	Low Risk	22
ULS Event	**Liquefaction Potential Index**	**Estimated Vertical Settlement (mm)**
181090602_CPT01	Very High Risk	199
181090602_CPT02	Very High Risk	278
181090602_CPT03	Very High Risk	253

4.3.1 BASIS OF ASSESSMENT

The liquefaction analyses for the site were assessed using CLiq, accepted industry software package (Geoligismiki, 2014), CPT data of current ground conditions, soil logs from Test Pit investigations and the following input parameters (NZS1170.5 section 3.1.3 , 2004):

- PGA = 0.11g (SLS) & 0.44g (ULS), with:
  - Magnitude (M) = 7.5 (SLS & ULS)
  - Z=0.39 (Hastings),
  - C=1.12 (Class D Soil), and
  - R=0.25 (SLS) & 1.3 (ULS).
- Ground water table 2.0 m bgl.

The design earthquake was chosen on the basis of probability of recurrence. The probability is based on historical earthquakes. A 7.5 magnitude earthquake for an importance level category 3 correlates with a 25 year return period (SLS) and 1000 year return period (ULS). A 50 year design life was assigned.

5 GEOTECHNICAL CONSIDERATIONS

Recommendations and opinions contained in this report are based on data from site investigations as outlined in Section 3. Inferences about the nature and continuity of subsurface geology and ground conditions are made but cannot be guaranteed.

5.1 SUITABILITY OF FILL FOR CONSTRUCTION

Site levels have been modified by minor placement of fill up to <1.0 m depth in the northeast end of the development, compacted by pneumatic tyre pressure from loaded truck traffic.

Suitability of materials proposed for reuse in engineered fill has been confirmed by RDCL based on:

- Visual inspection of stockpiles; and
- Laboratory testing of representative samples (completed by Opus) for particle size distribution, atterberg limits, and standard compaction testing (Appendix D).

The results of NDM testing (Appendix D) across the site, completed by Opus, suggest:

- Fill has achieved sufficient compaction in accordance with NZS4431:1989 – Earthfill for residential development.

5.2 SITE SPECIFIC ENGINEERING REQUIRED ON ALL LOTS

Based on the results of these investigations, we consider:

- All sites are suitable for residential development subject to specific design of foundations to account for:
  - Potential for liquefaction induced vertical settlements; and
  - Bearing capacity ≤ 200kPa in some cases.

5.3 FOUNDATION RECOMMENDATIONS

For lightweight timber framed structures, we consider a suitable foundation solution to be:

- Enhanced rib-raft type foundations designed for:
  - Specific bearing capacity tested in each lot; and considering potential for
  - Liquefaction induced deformation.

Examples of appropriate foundation options and specifications are shown in figures 2 & 3.

The footprint of each foundation should be stripped of organic, loose and deleterious materials prior to construction.

Indicative depths likely required to strip unsuitable materials for each lot are presented in Table 2.

TABLE 2. INDICATIVE DEPTH TO 200KPA ULTIMATE BEARING CAPACITY, LOTS 45 - 63

Lot Number	Available Ultimate Bearing Capacity	Indicative depth of strip	Lot Number	Available Ultimate Bearing Capacity	Indicative depth of strip
Lot 45	200 kPa	0.3 m	Lot 55	200 kPa	0.3 m
Lot 46	200 kPa	0.3 m	Lot 56	300 kPa	0.35 m
Lot 47	200 kPa	0.45 m	Lot 57	300 kPa	0.55 m
Lot 48	200 kPa	0.5 m	Lot 58	300 kPa	0.3 m
Lot 49	200 kPa	0.5 m	Lot 59	300 kPa	0.5 m
Lot 50*	150 kPa	0.25 m	Lot 60	200 kPa	0.2 m
Lot 51*	150 kPa	0.35 m	Lot 61	200 kPa	0.4 m
Lot 52	200 kPa	0.4 m	Lot 62	200 kPa	0.3 m
Lot 53	200 kPa	0.8 m	Lot 63	200 kPa	0.5 m
Lot 54	200 kPa	0.6 m			

*200 kPa generally available at 1.0 m depth.

6 REFERENCES

GNS Science. (2004). Active Faults Database. *Institute of Geological and Nuclear Sciences*. GNS Science.

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NZS1170.5. (2004, December 22). NZS1170.5:2004 - Structural Design Actions; Part 5: Earthquake actions - New Zealand. Standards New Zealand.

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M.J. Stockwell, Determination of allowable bearing pressure under small structures, 15 June 1977, New Zealand Engineering, 32,6 p 132-135

7 LIMITATIONS

- This report has been prepared for the particular purpose outlined in the project scope and no responsibility is accepted for the use of any part in other contexts or for any other purpose.
- Ground conditions assessed in this report are inferred from published sources, site inspection and the investigation described. Variations from the interpreted conditions may occur, and special conditions relating to the site may not have been revealed by this investigation, and which are therefore not taken into account. No warranty is included either expressed or implied that the actual conditions will conform to the interpretation contained in this report.
- No responsibility is accepted by Resource Development Consultants Ltd for inaccuracies in data supplied by others. Where data has been supplied by others, it has been assumed that this information is correct.
- Groundwater conditions can vary with season or due to other events. Any comments on groundwater conditions are based on observation at the time.
- This report is provided for use by the client, section owners, and Hastings District Council and is confidential to the client and their professional advisors. No responsibility whatsoever for the contents of this report shall be accepted for any person other than the client.

8 CLOSURE

We trust this meets your current needs. Should you wish to discuss any aspect of the contents of this document please contact the undersigned on 06 877-1652.

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Principal

FIGURES

1928500 1928600 1928700

5607800 5607700

N

Lot61 DCP51 DCP50 HA21
Lot60 DCP47 DCP46
Lot59 DCP43 DCP42 HA20 DCP48 HA16 HA19 HA17 DCP44 DCP45 HA18 DCP41
Lot58 DCP35 DCP34
Lot57 DCP31 HA13 CPT03 DCP30 DCP27
Lot56 DCP26 HA08 DCP23 HA12 DCP36 DCP33 DCP32
Lot55 DCP62 DCP22 HA09 HA10 DCP29 DCP28
Lot54 HA07 HA11 DCP25 DCP24 DCP21 DCP61
Lot53 HA27 DCP66 DCP63 DCP67 HA26 DCP64 DCP65 DCP69
Lot52 DCP70 HA25 DCP72 DCP68 DCP40 DCP73 DCP39 HA14 DCP37 DCP71 HA15 DCP38 DCP74 DCP76 CPT02
Lot51 DCP75
Lot50
Lot49 DCP19
Lot48 DCP18 DCP15
Lot47 DCP14 DCP11 DCP17 HA05 DCP20 HA06 DCP16
Lot46 DCP10 DCP07 CPT01
Lot45 DCP09 DCP08 HA02 HA03 DCP03 DCP06 DCP12 DCP13 HA04
Lot63 DCP05 DCP04 HA01 DCP02 DCP01 DCP59
Lot62 DCP58 DCP56 DCP57 HA24 DCP55 DCP60 DCP54 HA22 HA23 DCP53 DCP49 DCP52

Legend

CPT
DCP
HA

0 10 20 30 40 50 m

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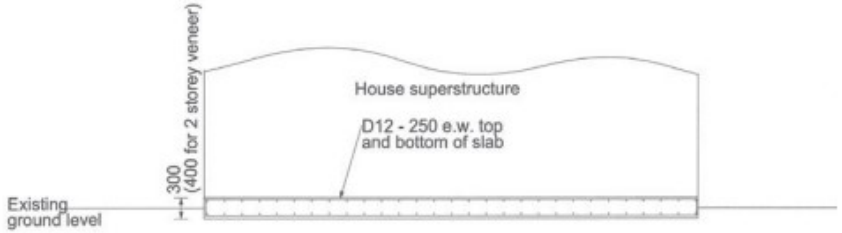
Title	Investigation Layout	Drawn By TS	Date 17/07/18	Drawing Size- A3
Project	181090602- Stage 6 Lyndhurst	Checked By EC	Date 17/07/18	File Name
Client	Greenstone Land Development Ltd	Approved By BM	Date 17/07/18	Figure Number: 1

Images sourced from MBIE Guidelines (2017)

Option 2 – Construct a thick slab foundation over the existing soil.

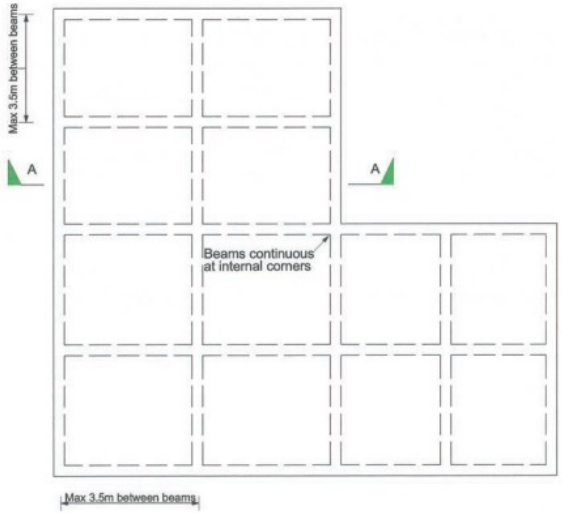
Figure 5.6: Enhanced foundation slab – Option 2



Note: NZS ground clearances adjacent to house foundation must be complied with. DPC omitted for clarity.

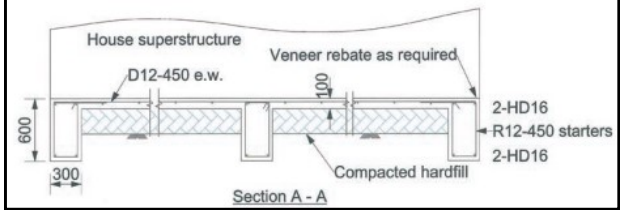
Option 3 – Construct a generic beam grid and slab foundation.

Figure 5.7: Enhanced foundation slab – Option 3 plan



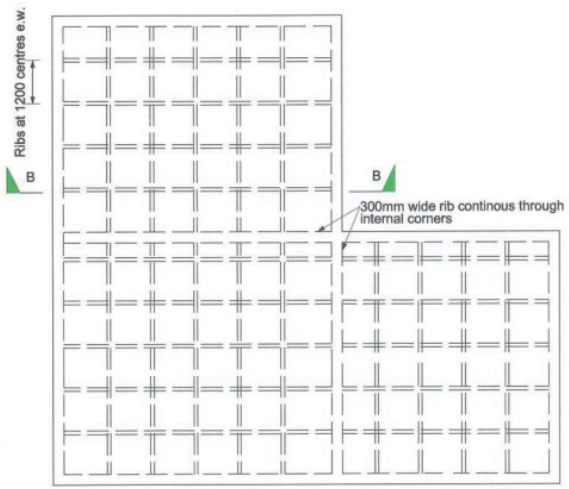
Note: Reinforcing details are not sufficient for two-storey heavy-weight cladding (brick veneer) with a heavy roof but can be used for a two-storey heavy-weight cladding with a light-weight roof.

Figure 5.8: Enhanced foundation slab – Option 3 cross-section



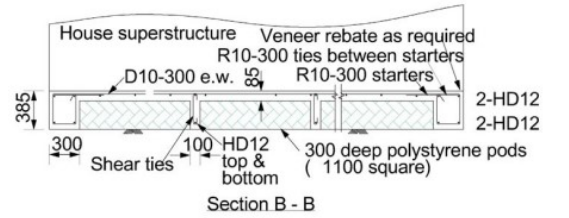
Option 4 – Construct a waffle slab over the existing soil

Figure 5.10: Enhanced foundation slab – Option 4 plan



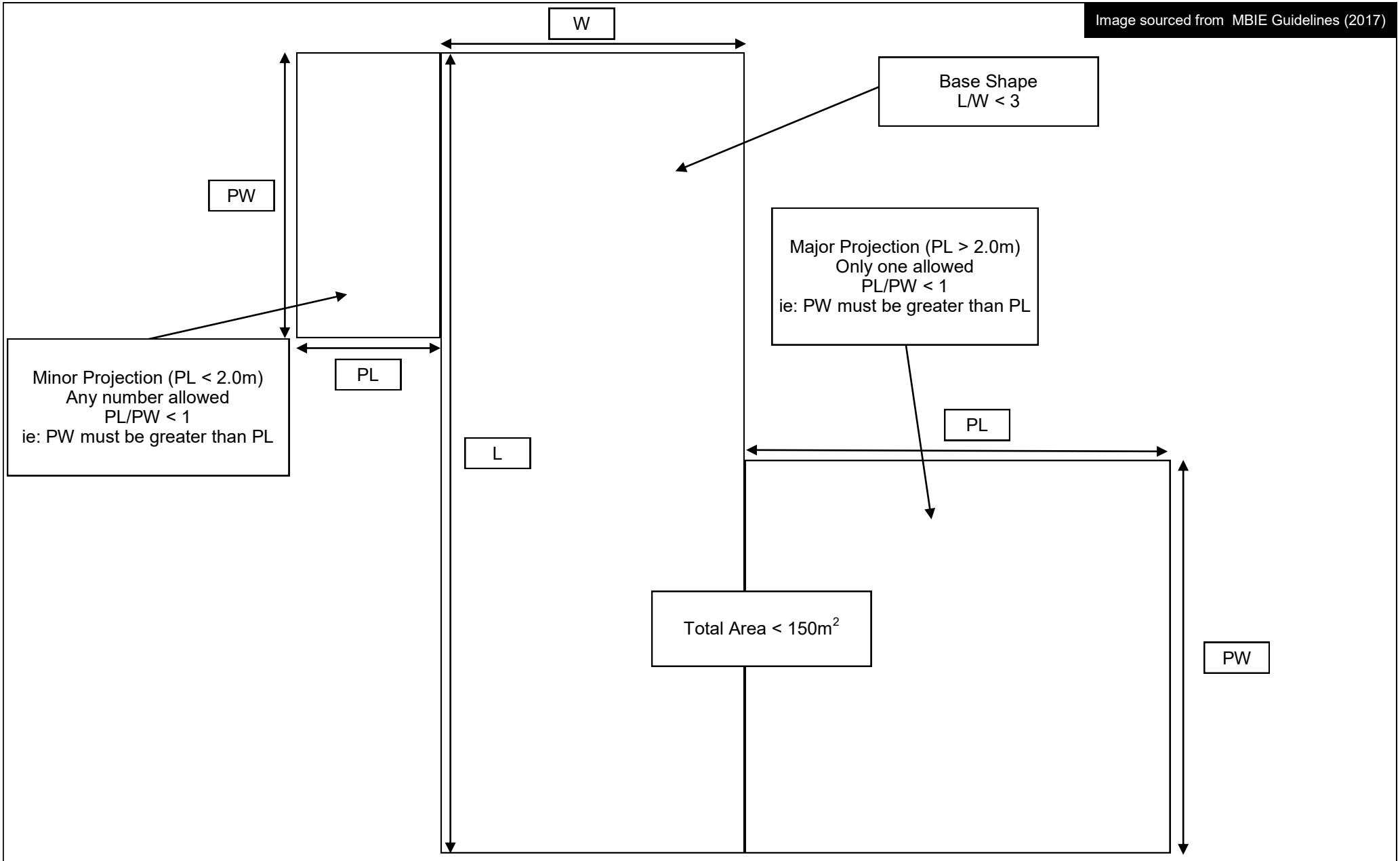
Note: Reinforcing details are not sufficient for two-storey heavy-weight cladding (brick veneer) with either a heavy or light roof.

Figure 5.11: Enhanced foundation slab – Option 4 cross-section



TITLE	Enhanced Foundation Slab Options	PROJECT	181090602			
PROJECT	Greenstone Stage 6, Lyndhurst Road	DRAWN BY	JJN	DATE	07/06/18	FIG
CLIENT	Greenstone Land Developments Ltd	CHECKED BY	CAW	DATE	8/06/18	02

Image sourced from MBIE Guidelines (2017)



RDCL	TITLE	Foundation Layout Restrictions	PROJECT	181090602			
	PROJECT	Greenstone Stage 6, Lyndhurst Road	DRAWN BY	JJN	DATE	07/06/18	FIG
	CLIENT	Greenstone Land Developments Ltd.	CHECKED BY	CAW	DATE	8/06/18	03

APPENDIX A – HAND AUGER & DCP LOGS

HAND AUGER LOG

HA01

SHEET 1 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928596.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607793.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BB	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			Silty sandy TOPSOIL; dark brown. Soft; non-plastic; moist; some rootlets.		S				
0.5	-0.5			SILT, with trace sand and gravel; brown . Firm; low plasticity; moist; gravel, fine, subround.		FM				
1.0	-1.0			SILT, with trace clay and sand; brown, grey & orange mottling. Stiff; low plasticity; moist.	M	SF				
1.5	-1.5			SAND, with some silt; brown, grey & orange mottling. Medium dense; non-plastic; moist; sand, fine; non.		MD				
				CLAY, with some silt, with trace sand; brown, grey mottling. Firm; moderate plasticity; saturated.	S	FM				
				EOH: 1.75m						
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groundwater at 1.5 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA02

SHEET 2 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928579.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607782.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BB	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
				Silty TOPSOIL, with trace sand and gravel; dark brown. Firm; non-plastic; moist; trace rootlets.	M	FM				
0.5	-0.5			EOH: 0.30m Termination: HA refusal on gravel						
1.0	-1.0									
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA03

SHEET 3 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928581.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607779.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BB	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.5	-0.5			Silty TOPSOIL; dark brown. Firm; low plasticity; moist; trace rootlets.	M	FM				
				SILT, with some sand and gravel; brown . Firm; non-plastic; moist; gravel, fine, subround.						
				EOH: 0.55m Termination: HA refusal on gravel						
1.0	-1.0									
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA04

SHEET 4 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928563.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607766.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BB	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			TOPSOIL, with trace sand; dark brown. Firm; moist; low plastic, trace rootlets.						
0.5	-0.5			SILT, with some sand; light brown. Firm; non-plastic; moist.		FM				
				SILT, with trace clay and sand; brown, grey mottling. Firm; low plasticity; moist.	M					
1.0	-1.0			SAND; brown. Medium dense; moist; sand, fine to medium; non plastic.		MD				
1.5	-1.5			SAND, with some silt; brown, grey and orange mottling. Medium dense; moist; sand, fine to medium; non plastic.						
				SILT, with trace sand; brown . Firm; moderate plasticity; moist.		FM				
2.0	-2.0			Clayey SILT, with trace gravel; greyish brown, grey and orange mottling. Firm; high plasticity; wet; gravel, fine, angular; trace amorphous organic materials, saturated @ 2m.	W S					
2.5	-2.5			Clayey SILT, with trace amorphous organic material and gravel; greyish brown, grey and orange mottling. Firm; high plasticity; saturated; gravel, fine, angular.						
3.0	-3.0			EOH: 2.05m						
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.0 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA05

SHEET 5 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928547.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607755.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BB	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			Clayey silty TOPSOIL, with some sand; dark brown. Firm; low plasticity; moist; trace rootlets.						
0.5	-0.5			SILT, with trace sand; brown . Firm; low plasticity; moist.	M	FM				
1.0	-1.0			SILT, with some clay; brown, grey mottling. Firm; low plasticity; moist.						
1.5	-1.5			SILT, with some sand, with trace clay; brown, grey mottling. Firm; moderate plasticity; wet.	W S					
2.0	-2.0			SILT, with some clay; brown, grey orange mottling. Firm; moderate plasticity; saturated.						
2.5	-2.5			EOH: 1.80m						
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 1.8 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA06

SHEET 6 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928535.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607748.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BB	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			TOPSOIL; dark brown. Firm; moist; trace rootlets; non plastic.						
0.5	-0.5			TOPSOIL; brown, grey mottling. Firm; moist; trace rootlets; non plastic.	M	FM				
1.0	-1.0									
1.5	-1.5			Silty SAND; brown . Medium dense; non-plastic; moist; sand, fine.		MD				
				SILT, with trace clay and sand; brown, grey and orange mottling. Firm; low plasticity; wet; Amorphous organic material.	W	FM				
						S				
2.0	-2.0				S	FM				
				SILT, with some clay; brown, orange mottling. Soft; moderate plasticity; wet.						
2.5	-2.5			Clayey SILT, with trace gravel; greyish brown, orange mottling. Firm; high plasticity; saturated; gravel, fine, subround.						
3.0	-3.0			EOH: 1.95m						
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 1.95 m

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA07

SHEET 7 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928523.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607790.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/DJ	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0		TS	TOPSOIL; dark brown. Firm; moist; non plastic; trace rootlets.						
0.5	-0.5			SILT, with trace clay and sand; brown, grey mottling. Firm; low plasticity; moist.	M	FM				
1.0	-1.0									
				Silty SAND; brown grey mottling. Medium dense; non-plastic; moist; sand, fine.		MD				
1.5	-1.5			SAND, with some silt; brown, grey mottling. Medium dense; non-plastic; moist; sand, fine.						
2.0	-2.0			SILT, with trace clay and sand; brown, grey and orange mottling. Firm; moderate plasticity; wet.	W	FM				
				CLAY, with trace amorphous organic material and silt and sand; brown, orange and grey mottling. Soft; high plasticity; moist.	M	S				
2.5	-2.5			CLAY, with trace amorphous organic material and silt and sand; brown with orange and grey mottling. Soft; high plasticity; saturated.	S					
3.0	-3.0			EOH: 2.60m						
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.6 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA08

SHEET 8 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928531.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607808.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/DJ	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
			T	TOPSOIL, with some gravel; dark brown. Soft; wet; gravel, fine; low plasticity.	W	S				
0.5	-0.5			EOH: 0.30m Termination: HA refusal on gravel						
1.0	-1.0									
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA09

SHEET 9 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928535.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607802.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/DJ	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
				TOPSOIL, with trace gravel; dark brown. Firm; moist; gravel, fine, subround; non plastic.	M	FM				
0.5	-0.5			EOH: 0.35m Termination: HA refusal on gravel						
1.0	-1.0									
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA10

SHEET 10 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928539.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607798.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/DJ	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
				TOPSOIL, with trace gravel. Firm; moist; non plastic.	M	FM				
				EOH: 0.35m Termination: HA refusal on gravel						
0.5	-0.5									
1.0	-1.0									
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA11

SHEET 11 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928542.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607792.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/DJ	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
			T	TOPSOIL; dark brown. Firm; moist; non plastic.	M	FM				
0.5	-0.5			SILT, with some gravel, with trace sand; brown . Firm; non-plastic; moist; gravel, fine, subangular.						
1.0	-1.0			EOH: 0.25m Termination: HA refusal on gravel						
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA12

SHEET 12 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928549.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607811.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/DJ	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			Clayey TOPSOIL; brown . Firm; low plasticity; moist; rootlets.	M	FM				
0.3	-0.3			Clayey TOPSOIL; dark brown. Firm; low plasticity; moist; trace rootlets.						
0.5	-0.5			SILT, with trace clay and sand; brown, grey and orange mottling. Stiff; low plasticity; wet.	W					
1.0	-1.0			SILT, with some sand; brown, grey mottling. Stiff; non-plastic; moist.	M	SF				
1.5	-1.5			SILT, with trace sand; brown, grey mottling. Firm; low plasticity; moist.		FM				
1.9	-1.9			SILT, with trace sand. Soft; moderate plasticity; wet.	W	S				
2.0	-2.0			SILT, with trace amorphous organic material and clay and gravel; brown with orange mottling. Firm; moderate plasticity; moist; gravel, fine, subround.	M	FM				
2.2	-2.2				S					
2.5	-2.5			SILT, with trace amorphous organic material and clay and gravel; brown with orange mottling. Firm; moderate plasticity; saturated; gravel, fine, subround.						
3.0	-3.0			EOH: 2.40m						
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.4 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA13

SHEET 13 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928563.00	STARTED: 15/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607822.00	FINISHED: 15/06/2018
	DATUM:	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/DJ	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			Clayey TOPSOIL; dark brown. Firm; moist.		FM				
0.5	-0.5			SAND, with trace silt; greyish brown. Medium dense; non-plastic; moist; sand, fine.		MD				
				SILT, with trace gravel; brown . Firm; non-plastic; moist; gravel, fine, subround.						
1.0	-1.0			SILT; brown . Firm; low plasticity; moist.	M	FM				
1.5	-1.5									
2.0	-2.0			SILT, with some clay; greyish brown, grey and orange mottling. Stiff; moderate plasticity; moist.		SF				
				Clayey SILT, with trace sand; greyish brown. Firm; moderate plasticity; moist.		FM				
2.5	-2.5			SILT, with trace amorphous organic material and clay and gravel; greyish brown, grey and orange mottling. Firm; high plasticity; saturated; gravel, fine, subround.	S					
3.0	-3.0			EOH: 2.50m						
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.5 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA14

SHEET 14 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928501.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607743.00	FINISHED: 19/06/2018
	DATUM:	LOGGED BY: SD DATE: 19/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0		T	TOPSOIL; dark brown. Firm; moist; rootlets, non plastic.						
0.5	-0.5			SILT, with trace clay; brown with grey and orange mottling. Firm; low plasticity; moist.	M	FM				
1.0	-1.0			SILT, with some clay; brown with grey and orange mottling. Stiff; moderate plasticity; moist.		SF				
				SAND, with trace silt; brown. Medium dense; non-plastic; moist; sand, fine to medium.		MD				
1.5	-1.5			SILT, with some sand; brown. Firm; low plasticity; moist; sand, fine.	W	FM				
				SILT, with some clay, with trace sand; brown. Firm; moderate plasticity; wet; orange and grey mottling.	S	S				
2.0	-2.0			CLAY, with some silt, with trace amorphous organic material and sand; brown with orange mottling. Soft; high plasticity; saturated.						
2.5	-2.5			EOH: 1.95m						
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 1.95 m

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA15

SHEET 15 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928481.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607736.00	FINISHED: 19/06/2018
	DATUM:	LOGGED BY: SD DATE: 19/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0		TS	TOPSOIL; dark brown. Stiff; moist; non plastic, trace rootlets.						
0.5	-0.5			SILT, with some sand; brown with grey and orange mottling. Stiff; non-plastic; moist; sand, fine.	M	SF				
1.0	-1.0			SILT, with trace clay; brown. Firm; low plasticity; moist; grey and orange mottling.		FM				
1.5	-1.5			Sandy SILT; brown with orange mottling. Firm; non-plastic; wet.	W					
				SILT, with some clay, with trace sand; brown with grey and orange mottling. Soft; moderate plasticity; wet; sand, fine.	S	S				
2.0	-2.0			Clayey SILT; brown with orange mottling. Soft; high plasticity; saturated; orange mottling.						
2.5	-2.5			EOH: 1.80m						
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 1.75 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA16

SHEET 16 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928573.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607841.00	FINISHED: 19/06/2018
	DATUM:	LOGGED BY: SD DATE: 19/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.5	-0.5			Silty TOPSOIL; dark brown. Firm; moist; non plastic, some rootlets.	M	FM				
				SILT, with some gravel; brown. Stiff; low plasticity; moist; gravel, fine, subround.		SF				
1.0	-1.0			EOH: 0.70m Termination: HA refusal on gravel						
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA17

SHEET 17 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928576.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607837.00	FINISHED: 19/06/2018
	DATUM:	LOGGED BY: SD DATE: 19/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0		TS	Topsoil; dark brown. Firm; moist; non plastic.	M	FM				
0.5	-0.5			SAND, with some silt and gravel; brown with grey mottling. Medium dense; non-plastic; moist; gravel, fine.		MD				
				EOH: 0.50m Termination: HA refusal on gravel						
1.0	-1.0									
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA18

SHEET 18 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928582.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607834.00	FINISHED: 19/06/2018
	DATUM:	LOGGED BY: SD DATE: 19/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0		TS	Clayey TOPSOIL; dark brown. Firm; low plasticity; moist.		FM				
0.5	-0.5			SAND, with some silt and gravel; brown. Medium dense; non-plastic; moist; gravel, fine, subround.		MD / FM				
				SILT, with some organic silt, with trace gravel; greyish brown with brown mottling. Firm; low plasticity; moist; gravel, fine.	M	SF				
1.0	-1.0			SILT, with some gravel, with trace sand; brown. Stiff; non-plastic; moist; gravel, fine to medium, subround.						
				SILT, with trace clay and sand; brown with grey and orange mottling. Firm; low plasticity; moist.						
1.5	-1.5			SILT, with some clay; brown with grey and orange mottling. Firm; moderate plasticity; wet.	W	FM				
2.0	-2.0			Clayey SILT, with trace sand; brown with grey and orange mottling. Firm; high plasticity; saturated.	S					
				EOH: 2.05m						
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.05 m

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA19

SHEET 19 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928591.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607844.00	FINISHED: 19/06/2018
	DATUM:	LOGGED BY: SD DATE: 19/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.5	-0.5		T	TOPSOIL, with trace gravel; dark brown. Firm; moist; low plasticity.	M	FM				
				SAND, with some gravel, with trace silt; greyish brown. Medium dense; non-plastic; moist; sand, fine; gravel, subangular.		MD				
				SILT, with some gravel, with trace sand; brown. Stiff; non-plastic; moist.		SF				
1.0	-1.0			EOH: 0.80m Termination: HA refusal on gravel						
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA20

SHEET 20 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928591.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607844.00	FINISHED: 19/06/2018
	DATUM:	LOGGED BY: SD DATE: 19/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			Clayey TOPSOIL; dark brown. Firm; low plasticity; moist; trace rootlets.	M	FM				
0.3	-0.3			SILT; brown. Firm; low plasticity; moist.						
0.5	-0.5			SAND, with some gravel, with trace silt; greyish brown. Medium dense; non-plastic; moist; gravel, fine to medium.		MD				
0.8	-0.8			SILT, with some gravel, with trace sand; brown. Stiff; low plasticity; moist; gravel, fine, subround; sand, fine.		SF				
1.0	-1.0			EOH: 0.95m Termination: HA refusal on gravel						
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA21

SHEET 21 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928604.00	STARTED: 28/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607864.00	FINISHED: 28/06/2018
	DATUM:	LOGGED BY: SD/BR DATE: 28/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			Silty TOPSOIL; dark brown. Firm; non-plastic; moist; trace rootlets.	M	FM				
0.5	-0.5			SAND, with trace gravel; dark grey. Medium dense; wet; sand, fine; gravel, fine, subround; non plastic.	W	MD				0.4m - 1.0m: HA grinding
1.0	-1.0			SILT, with some sand, with trace gravel; brown. Stiff; non-plastic; moist; sand, fine; gravel, fine, subround.	M	SF				
				SILT, with trace sand; brown. Stiff; low plasticity; moist; sand, fine.						
1.5	-1.5			SILT, with trace sand; brown. Firm; low plasticity; moist; sand, fine.		FM				
2.0	-2.0			SILT, with trace clay and gravel; brown. Soft; moderate plasticity; moist; gravel, fine, subround.		S				
2.5	-2.5			Clayey SILT, with trace sand; greyish brown with orange mottling. Firm; moderate plasticity; moist.	W	FM				
3.0	-3.0			Clayey SILT, with some sand; brown with orange mottling. Firm; high plasticity; wet; sand, fine to coarse.	S					
3.5	-3.5			Clayey SILT, with some sand; brown with dark brown mottling. Firm; high plasticity; saturated; sand, fine to coarse.						
4.0	-4.0			EOH: 3.20m						
4.5	-4.5									

REMARKS

Groudwater at 3.2 m

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA22

SHEET 22 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928640.00	STARTED: 28/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607840.00	FINISHED: 28/06/2018
	DATUM:	LOGGED BY: SD/BR DATE: 28/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.5	-0.5		T	Clayey TOPSOIL, with trace gravel. Firm; moderate plasticity; moist; gravel, fine, subround.	M	FM				
				SAND, with trace silt and gravel; dark grey with orange mottling. Medium dense; non-plastic; moist; gravel, fine, subround.		MD				
				SILT, with some sand and gravel; brown. Firm; non-plastic; moist; gravel, fine.		FM				
1.0	-1.0			EOH: 0.95m Termination: HA refusal on gravel						
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA23

SHEET 23 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928640.00	STARTED: 28/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607834.00	FINISHED: 28/06/2018
	DATUM:	LOGGED BY: SD/BR DATE: 28/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.5	-0.5		TS	Clayey TOPSOIL. Firm; moderate plasticity; moist.	M	FM				
				SAND, with trace gravel; greyish brown with grey mottling. Medium dense; moist; gravel, fine, subround.		MD				
				SILT, with some gravel, with trace sand; brown. Stiff; non-plastic; moist; gravel, fine.		SF				
1.0	-1.0			EOH: 0.90m Termination: HA refusal on gravel						
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA24

SHEET 24 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928613.00	STARTED: 28/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607829.00	FINISHED: 28/06/2018
	DATUM:	LOGGED BY: SD/BR DATE: 28/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.5	-0.5			Silty TOPSOIL; dark brown with light brown mottling. Firm; low plasticity; moist; some rootlets.	M	FM				
1.0	-1.0			SAND, with some silt, with trace gravel; drak greyish brown with light brown mottling. Medium dense; low plasticity; wet; gravel, fine, subround.	W	MD				
				SILT, with trace sand and gravel; light brown with orange mottling. Stiff; low plasticity; moist.	M	SF				
				EOH: 1.05m Termination: HA refusal on gravel; no recovery						
1.5	-1.5									
2.0	-2.0									
2.5	-2.5									
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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HAND AUGER LOG

HA25

SHEET 25 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928461.00	STARTED: 28/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607750.00	FINISHED: 28/06/2018
	DATUM:	LOGGED BY: SD/BR DATE: 28/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0		TS	TOPSOIL; dark brown. Firm; moist; non plastic; some fibrous organic material.						
0.5	-0.5			SILT, with trace clay and sand; light brown with grey and orange mottling. Firm; low plasticity; moist.	M	FM				
1.0	-1.0									
				Sandy SILT; brown with grey and orange mottling. Stiff; non-plastic; moist; sand, fine.		SF				
1.5	-1.5			SAND, with trace silt; brown with orange and dark brown mottling. Medium dense; non-plastic; moist; sand, fine.		MD				
				SILT, with some sand; brown with grey and orange mottling. Stiff; low plasticity; moist.		SF				
2.0	-2.0			Clayey SILT, with some sand; brown with orange mottling. Soft; high plasticity; wet.	W	S				
				Clayey SILT, with trace sand; brown with orange mottling. Soft; high plasticity; saturated.	S					
2.5	-2.5			EOH: 2.20m						
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.1 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA26

SHEET 26 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928485.00	STARTED: 28/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607765.00	FINISHED: 28/06/2018
	DATUM:	LOGGED BY: SD/BR DATE: 28/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.5	-0.5		TS	Silty TOPSOIL; dark brown. Stiff; non-plastic; moist; trace rootlets.		SF				
1.0	-1.0			SILT, with some sand; brown. Firm; low plasticity; moist; sand, fine.	M	FM				
				SILT, with trace clay; brown. Stiff; low plasticity; moist.		SF				
1.5	-1.5			SAND, with trace silt; brown with grey mottling. Medium dense; non-plastic; moist.		MD				
				SILT, with some sand; greyish brown with grey and orange mottling. Stiff; low plasticity; moist; sand, fine.		SF				
2.0	-2.0			SILT, with some sand; greyish brown with grey and orange mottling. Firm; moderate plasticity; moist; sand, fine.		FM				
				Silty CLAY, with trace sand; brown. Firm; high plasticity; saturated; sand, coarse.	S					
2.5	-2.5			EOH: 2.25m						
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.1 m

SYMBOLS

▼ Standing Water Level

◁ Out flow

▷ In flow

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HAND AUGER LOG

HA27

SHEET 27 OF 27

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928493.00	STARTED: 28/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607784.00	FINISHED: 28/06/2018
	DATUM:	LOGGED BY: SD/BR DATE: 28/06/2018
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	DIAMETER: 0mm	STATUS: Final data
CONTRACTOR:	OPERATOR: SD/BR	

DEPTH (m)	RL (m)	WATER	GRAPHIC LOG	ROCK / SOIL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY / DENSITY	CLASSIFICATION	DCP BLOWS	SAMPLES & TESTS	ADDITIONAL REMARKS
0.0	0.0			Silty TOPSOIL; dark brown with brown mottling. Firm; low plasticity; moist; trace rootlets.		FM				
0.5	-0.5			SILT, with trace sand; brown. Stiff; low plasticity; moist.		SF				
1.0	-1.0			SILT, with trace sand; brown with grey and orange mottling. Stiff; moderate plasticity; moist.	M					
1.5	-1.5			SAND; brownish grey with brown mottling. Medium dense; moist; non plastic.		MD				
2.0	-2.0			SILT, with trace sand; brown with orange mottling. Firm; low plasticity; moist.		FM				
				Clayey SILT, with trace amorphous organic material and sand and gravel; greyish brown with grey and orange mottling. Firm; moderate plasticity; saturated; gravel, fine, subangular.	S					
2.5	-2.5			EOH: 2.25m						
3.0	-3.0									
3.5	-3.5									
4.0	-4.0									
4.5	-4.5									

REMARKS

Groudwater at 2.1 m

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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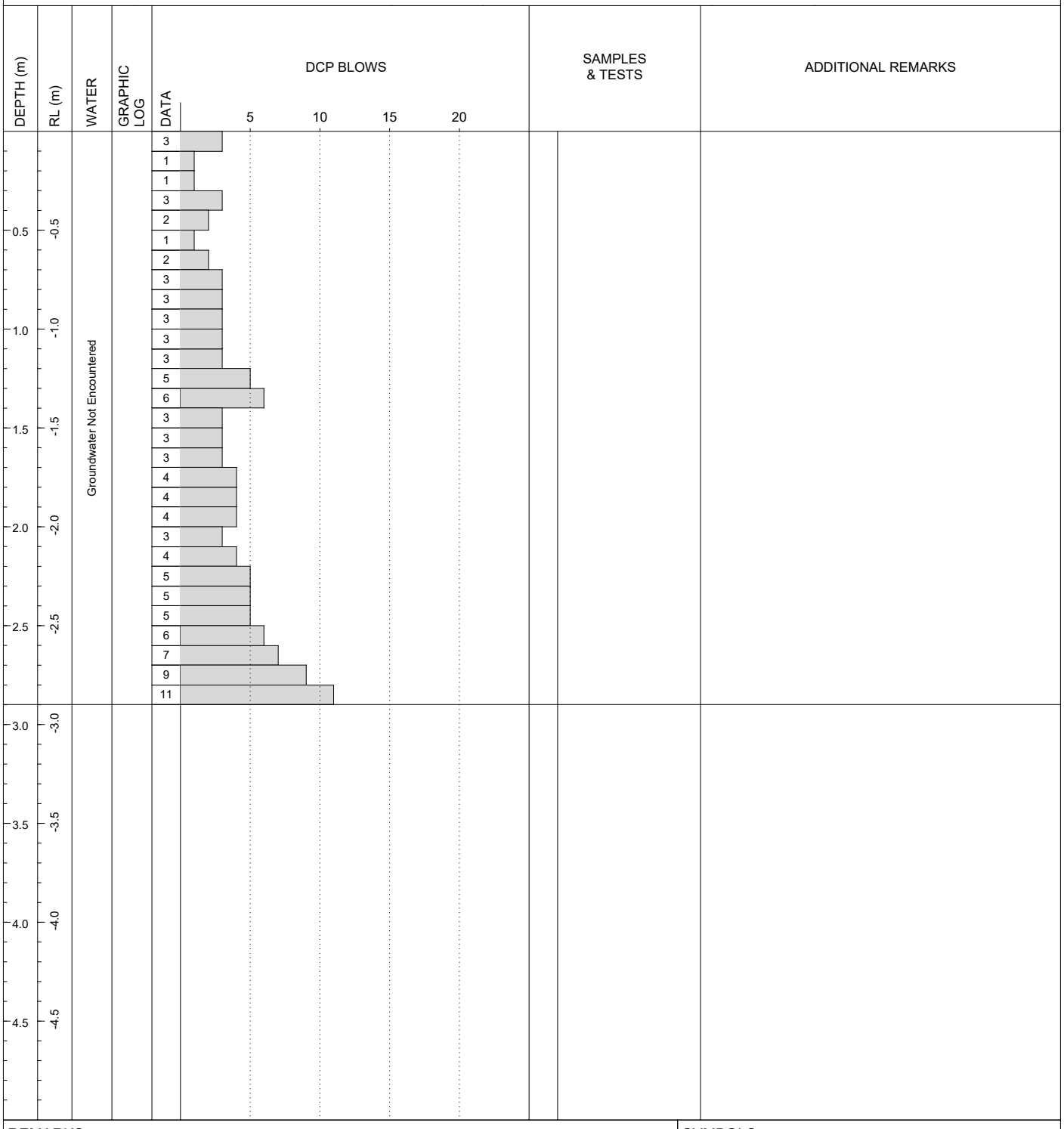
DCP LOG

DCP01

SHEET 1 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928596.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607802.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 45

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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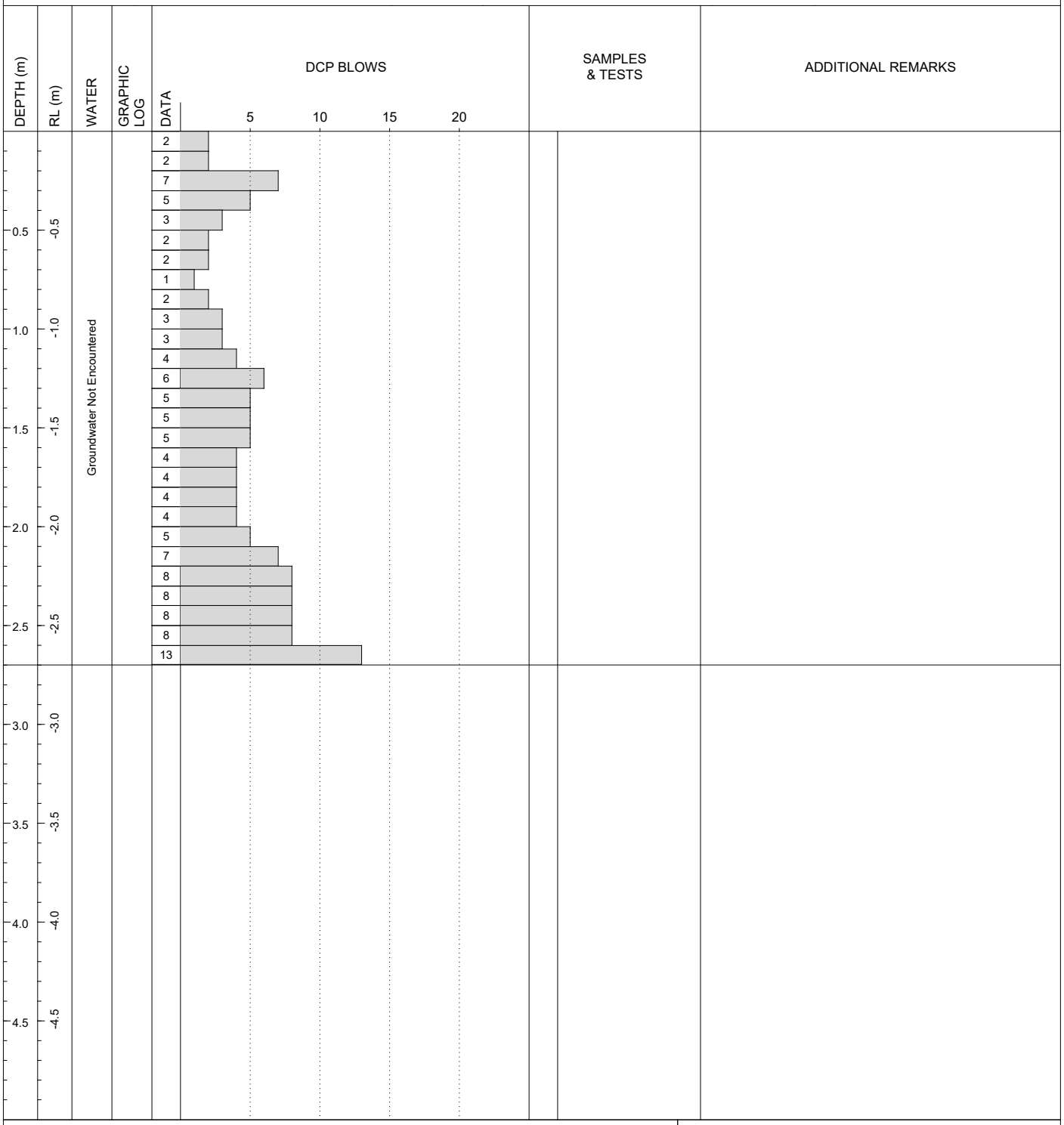
DCP LOG

DCP02

SHEET 2 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928607.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607790.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 45

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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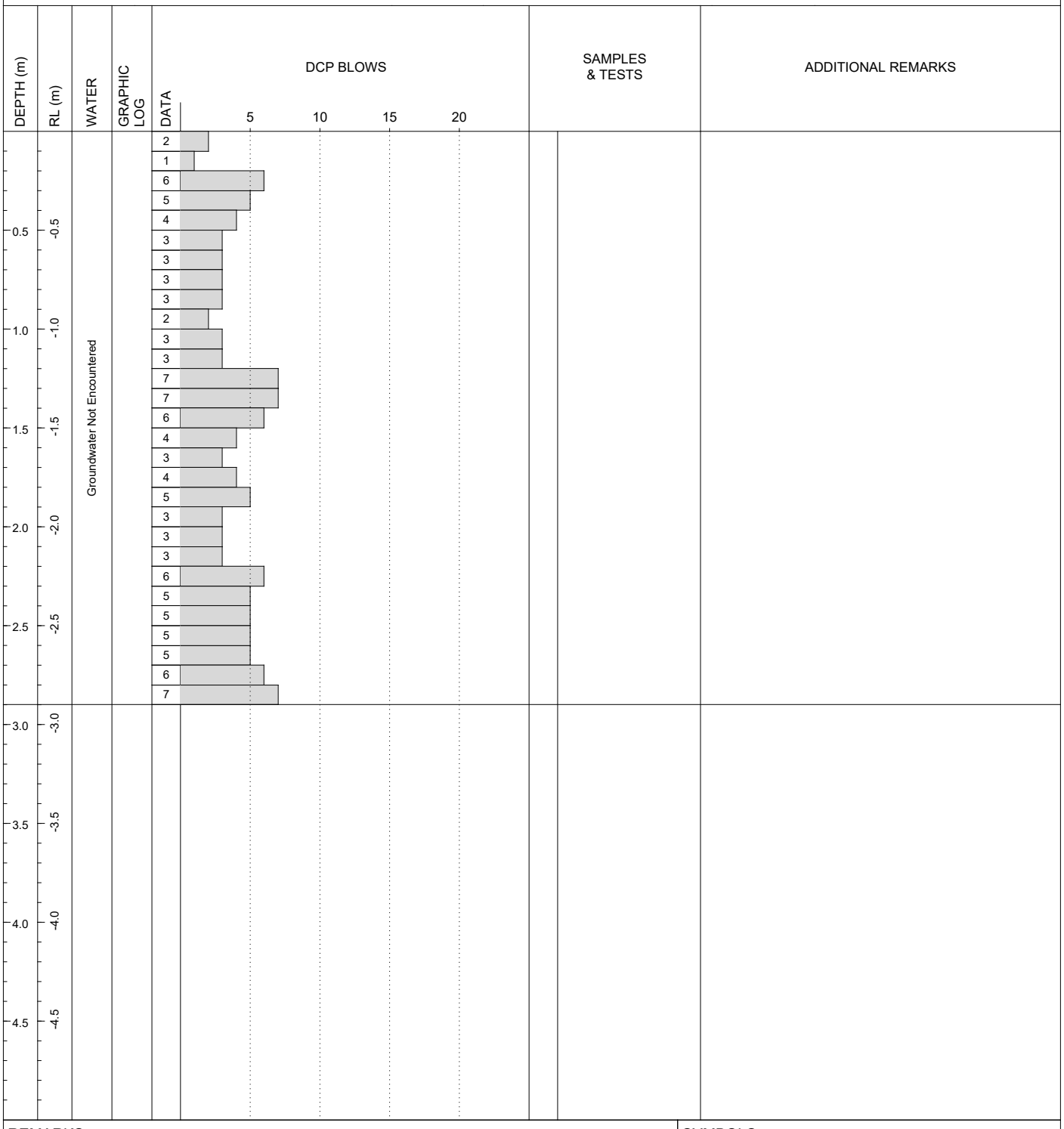
DCP LOG

DCP03

SHEET 3 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928597.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607780.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 45

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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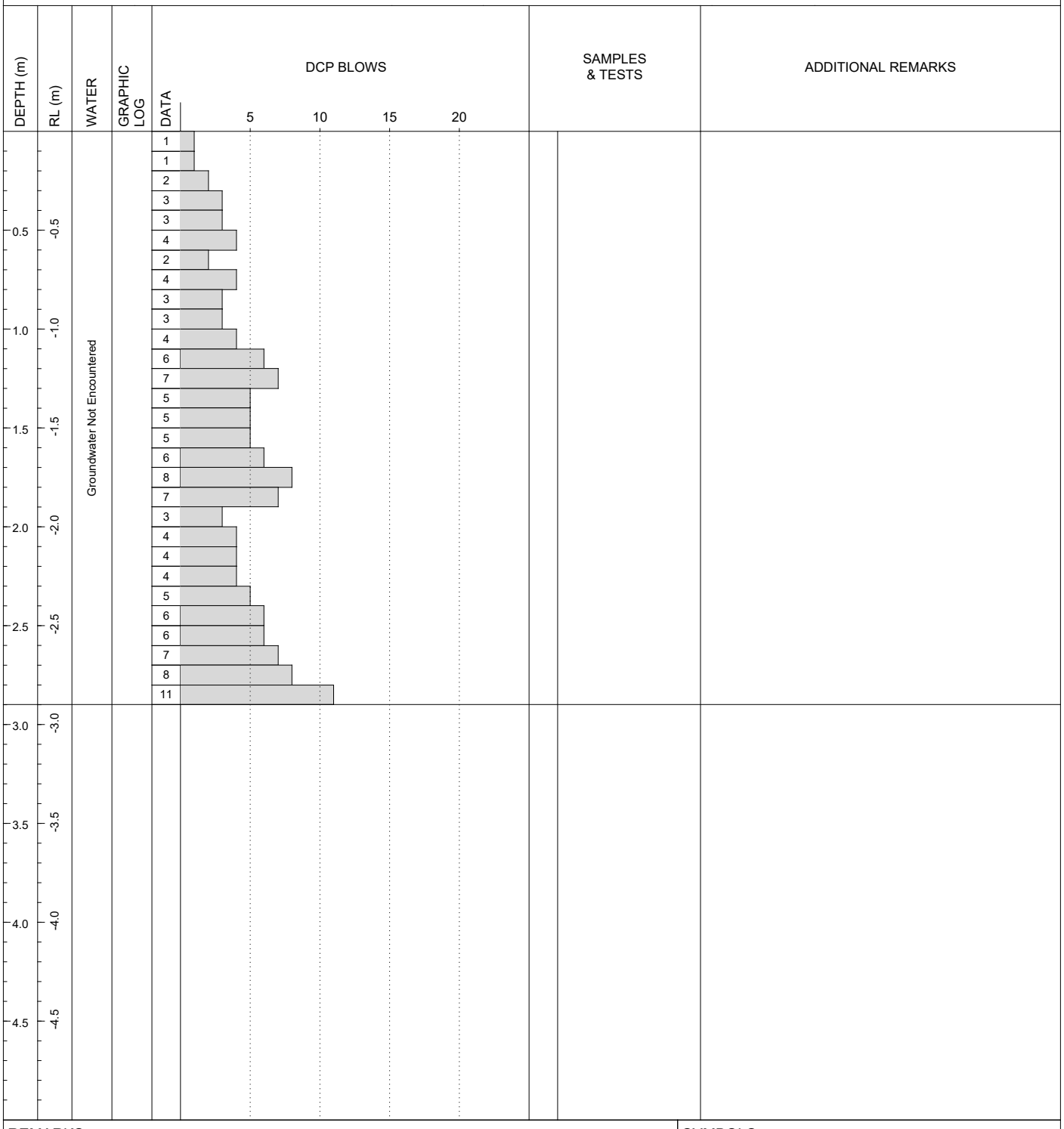
DCP LOG

DCP04

SHEET 4 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928587.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607795.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 45

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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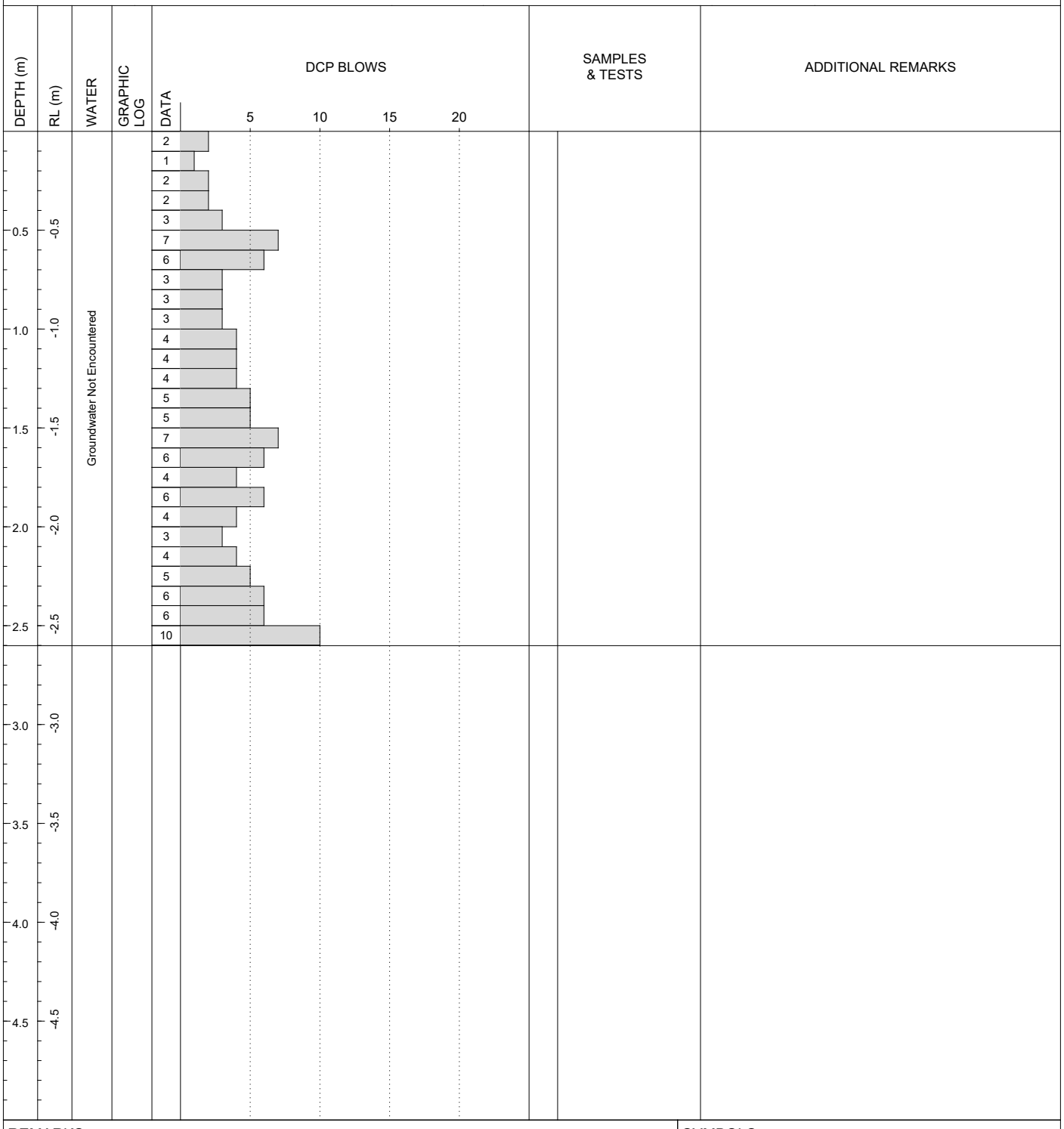
DCP LOG

DCP05

SHEET 5 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928577.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607792.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 46

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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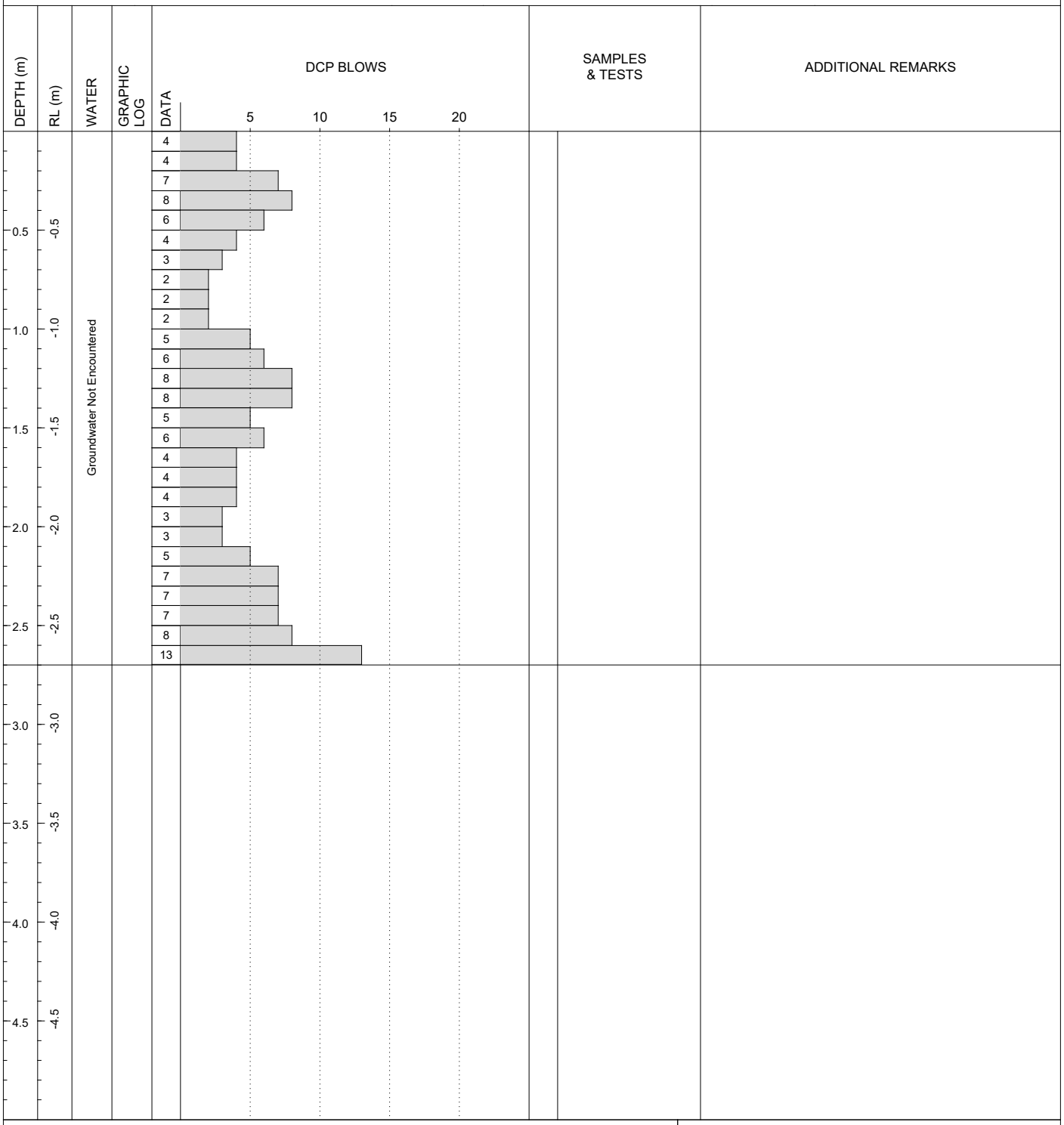
DCP LOG

DCP06

SHEET 6 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928593.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607777.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 46

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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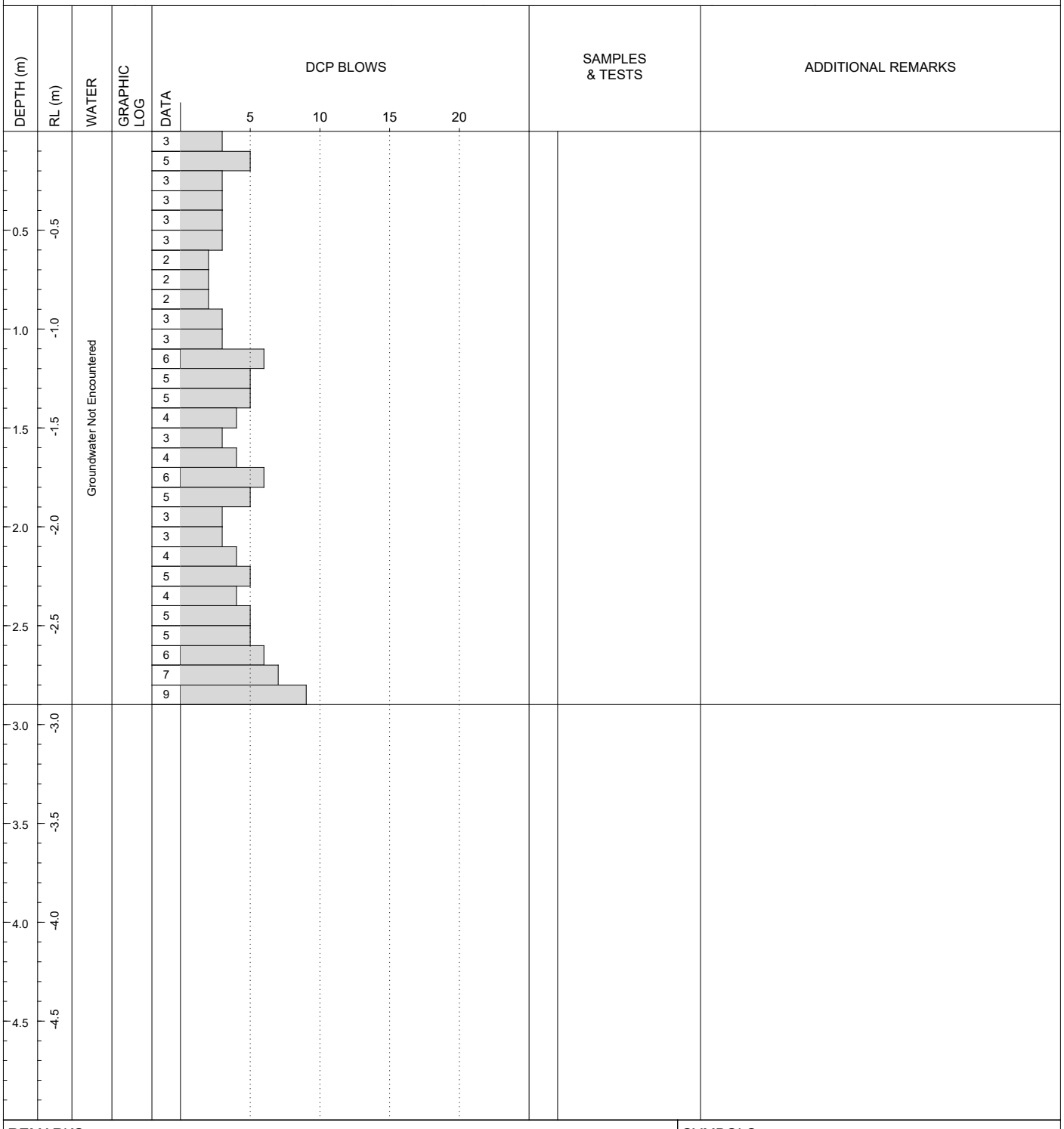
DCP LOG

DCP07

SHEET 7 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928583.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607766.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 46

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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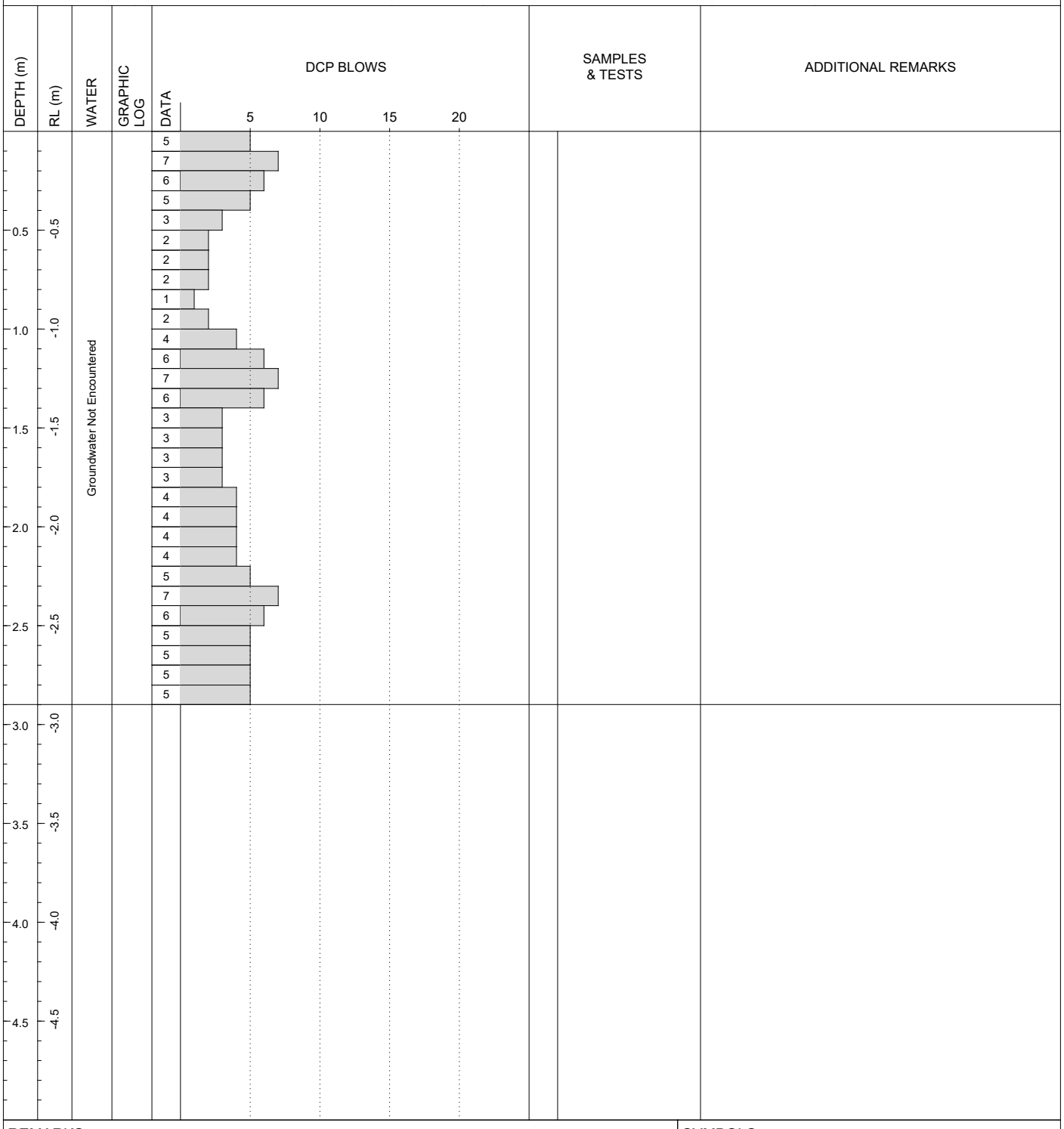
DCP LOG

DCP08

SHEET 8 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928570.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607783.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 46

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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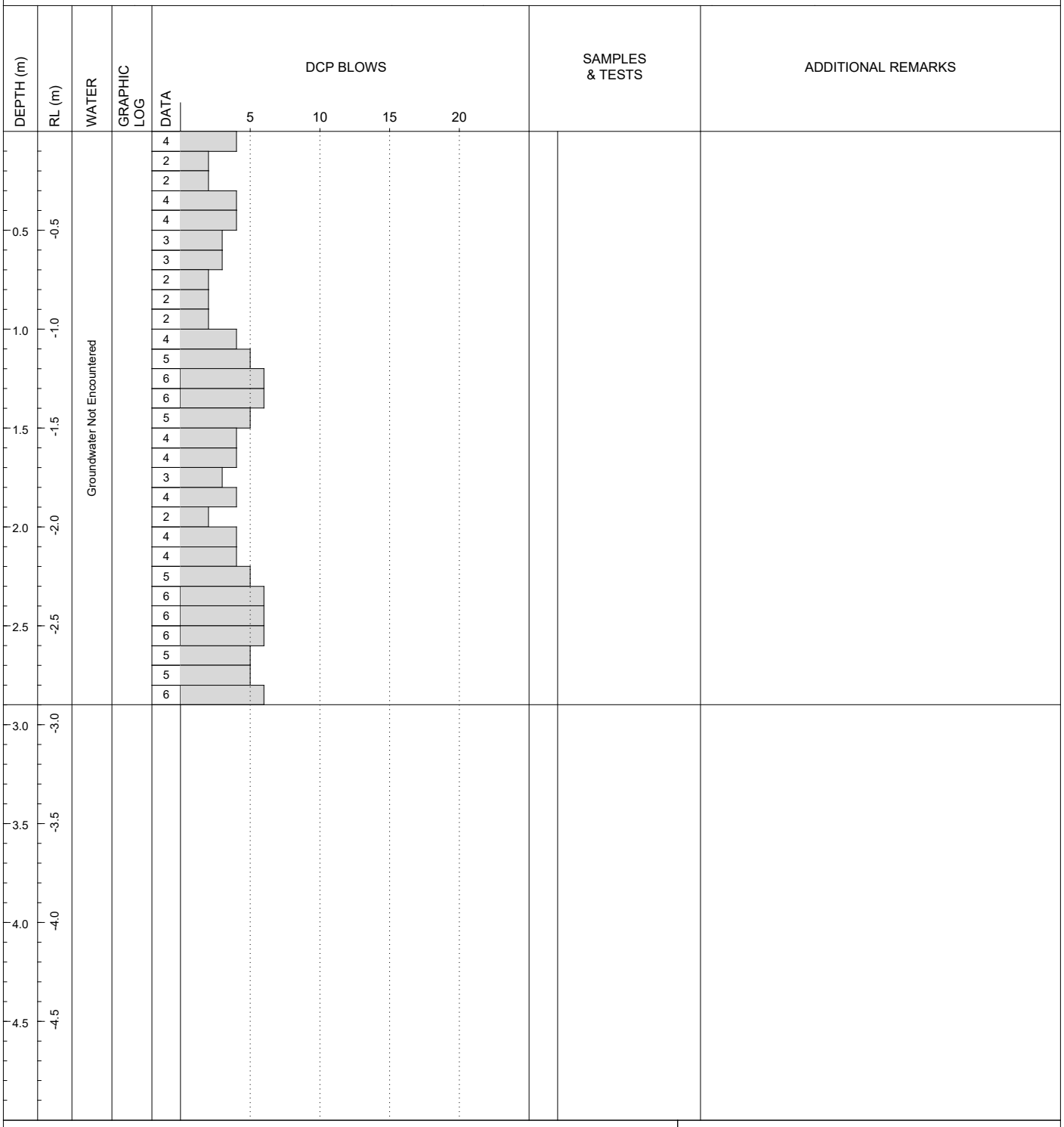
DCP LOG

DCP09

SHEET 9 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928562.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607780.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 47

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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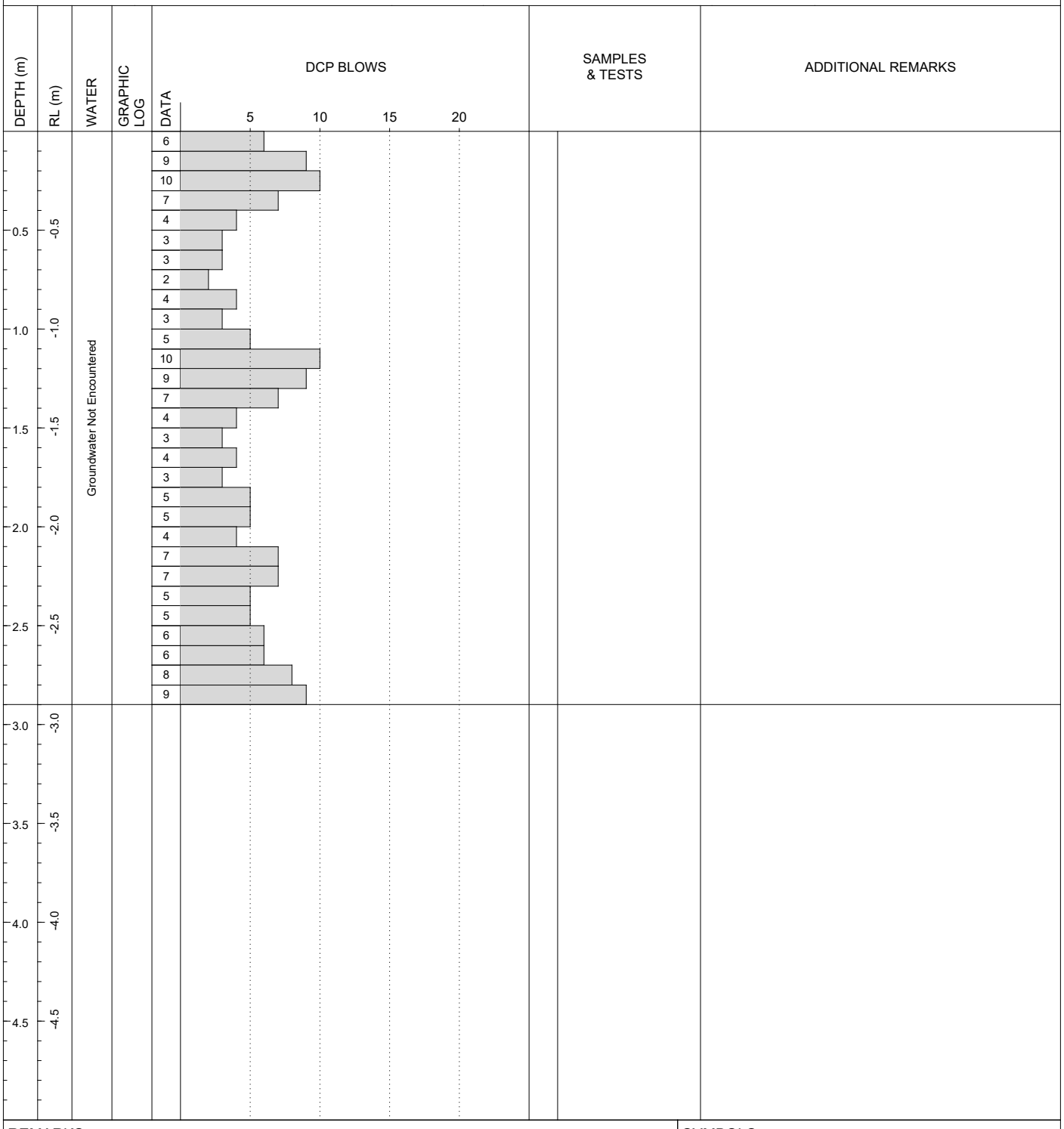
DCP LOG

DCP10

SHEET 10 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928574.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607762.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 47

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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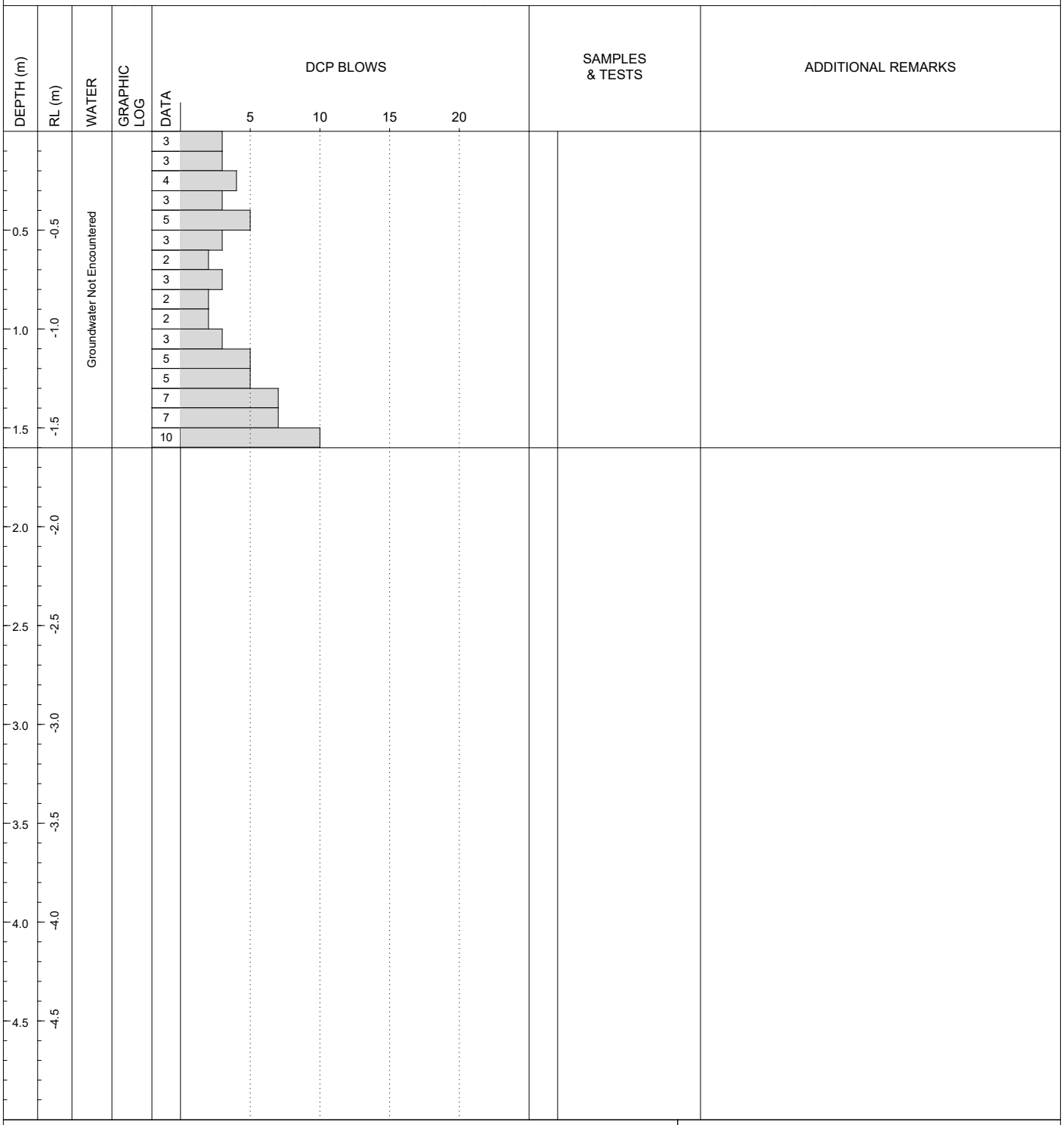
DCP LOG

DCP11

SHEET 11 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928568.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607755.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 47

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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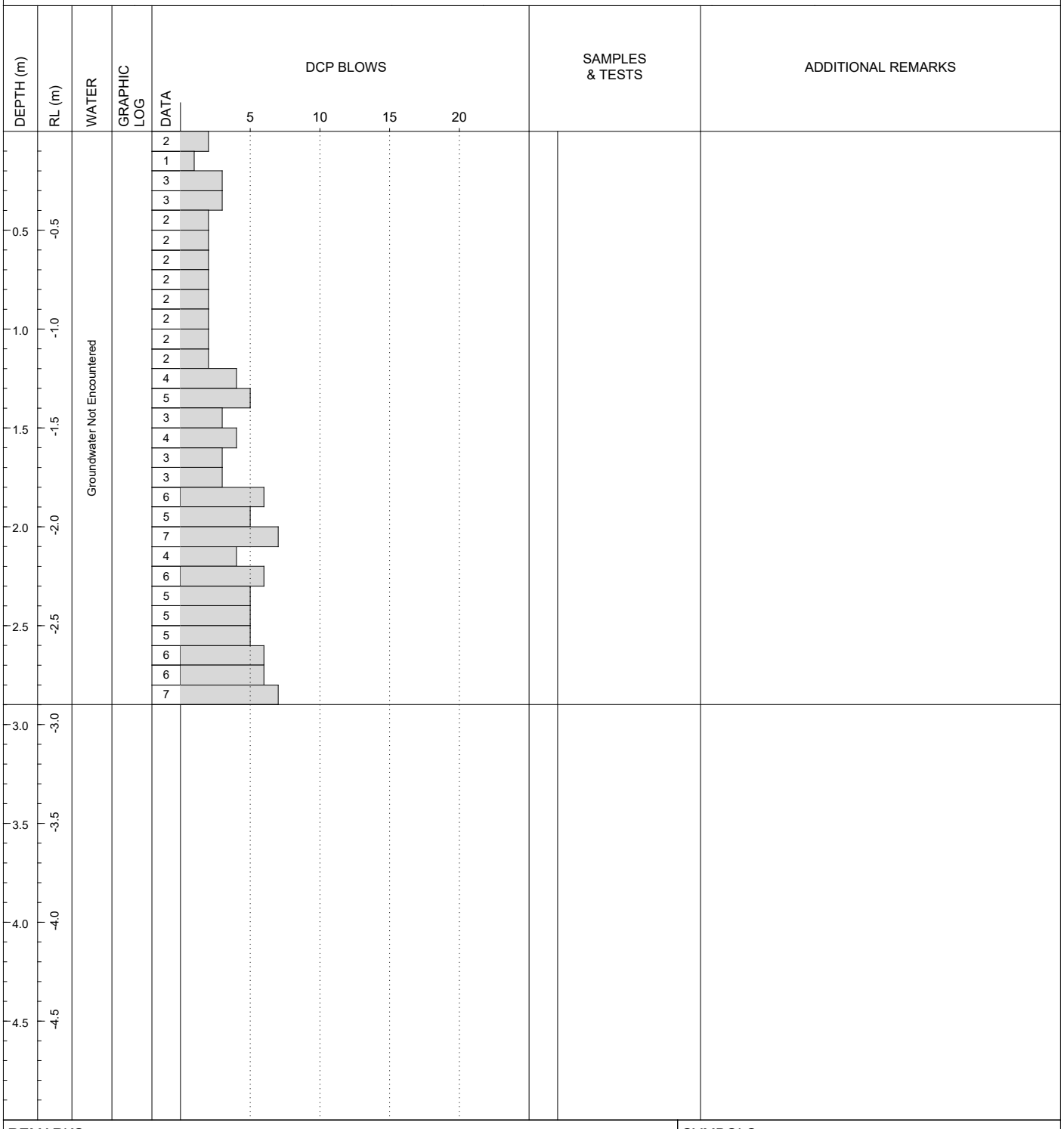
DCP LOG

DCP12

SHEET 12 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928554.00	STARTED: 01/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607771.00	FINISHED: 01/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BB



REMARKS

Lot 47

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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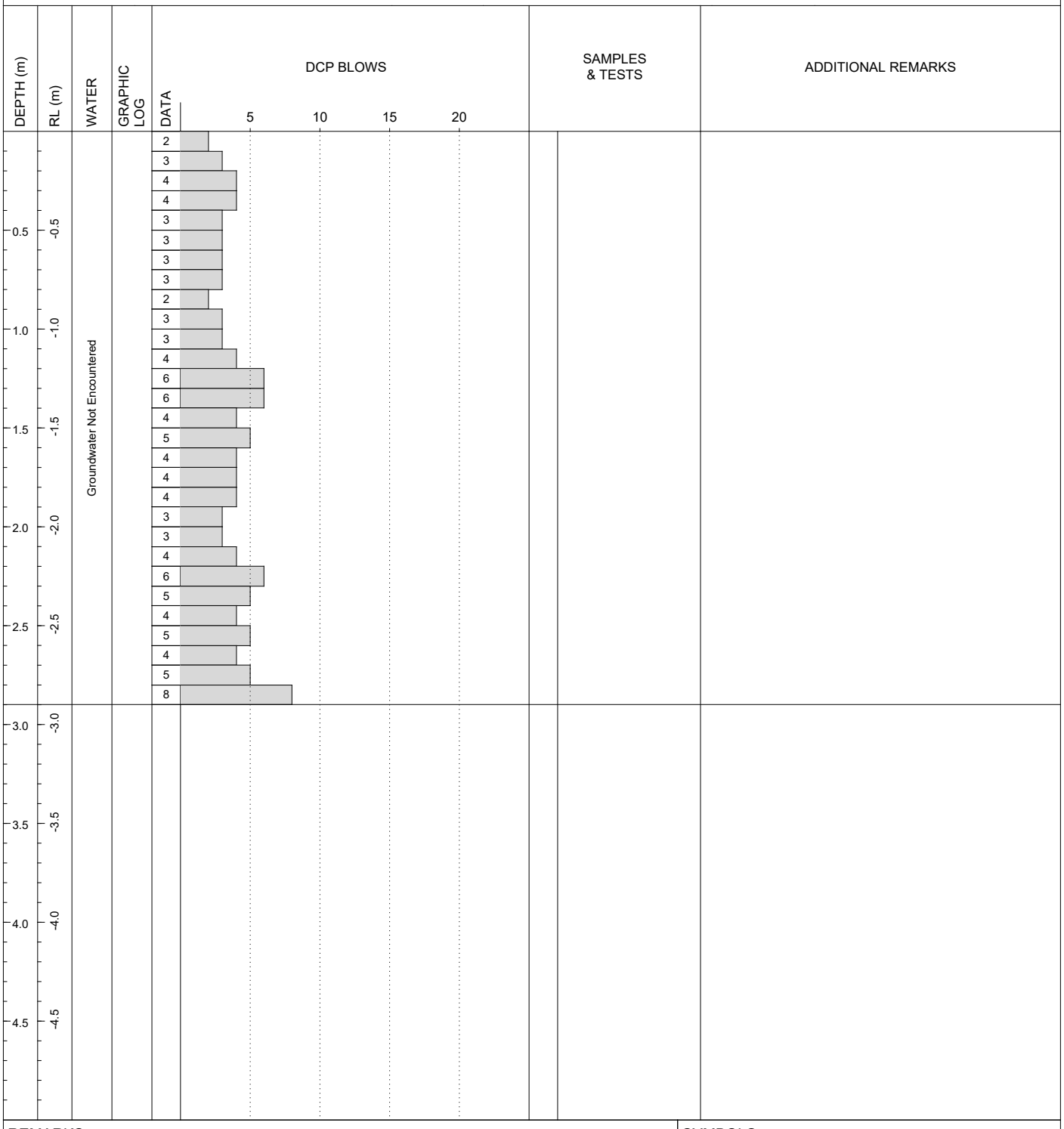
DCP LOG

DCP13

SHEET 13 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928550.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607769.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 48

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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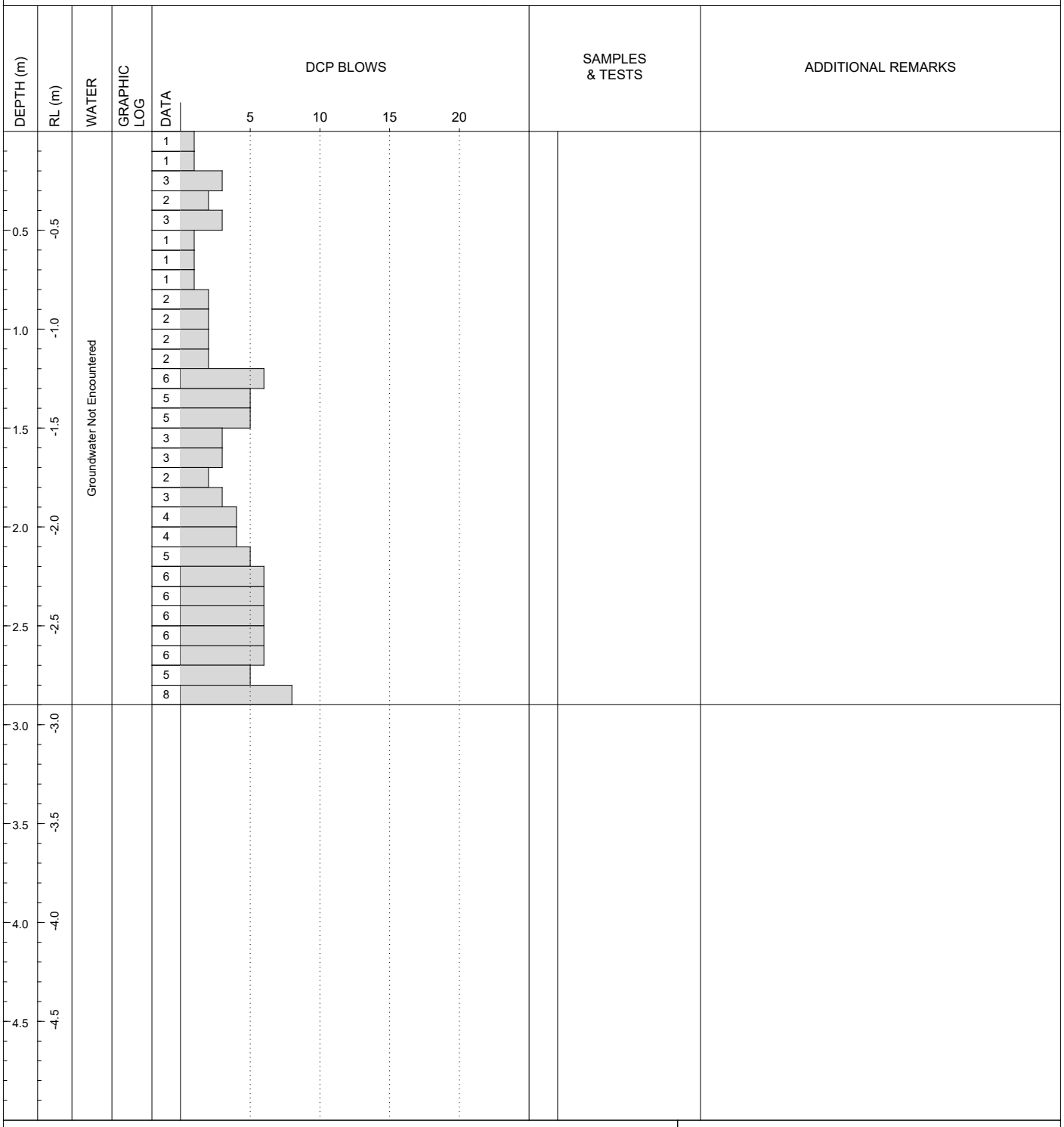
DCP LOG

DCP14

SHEET 14 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928562.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607753.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 48

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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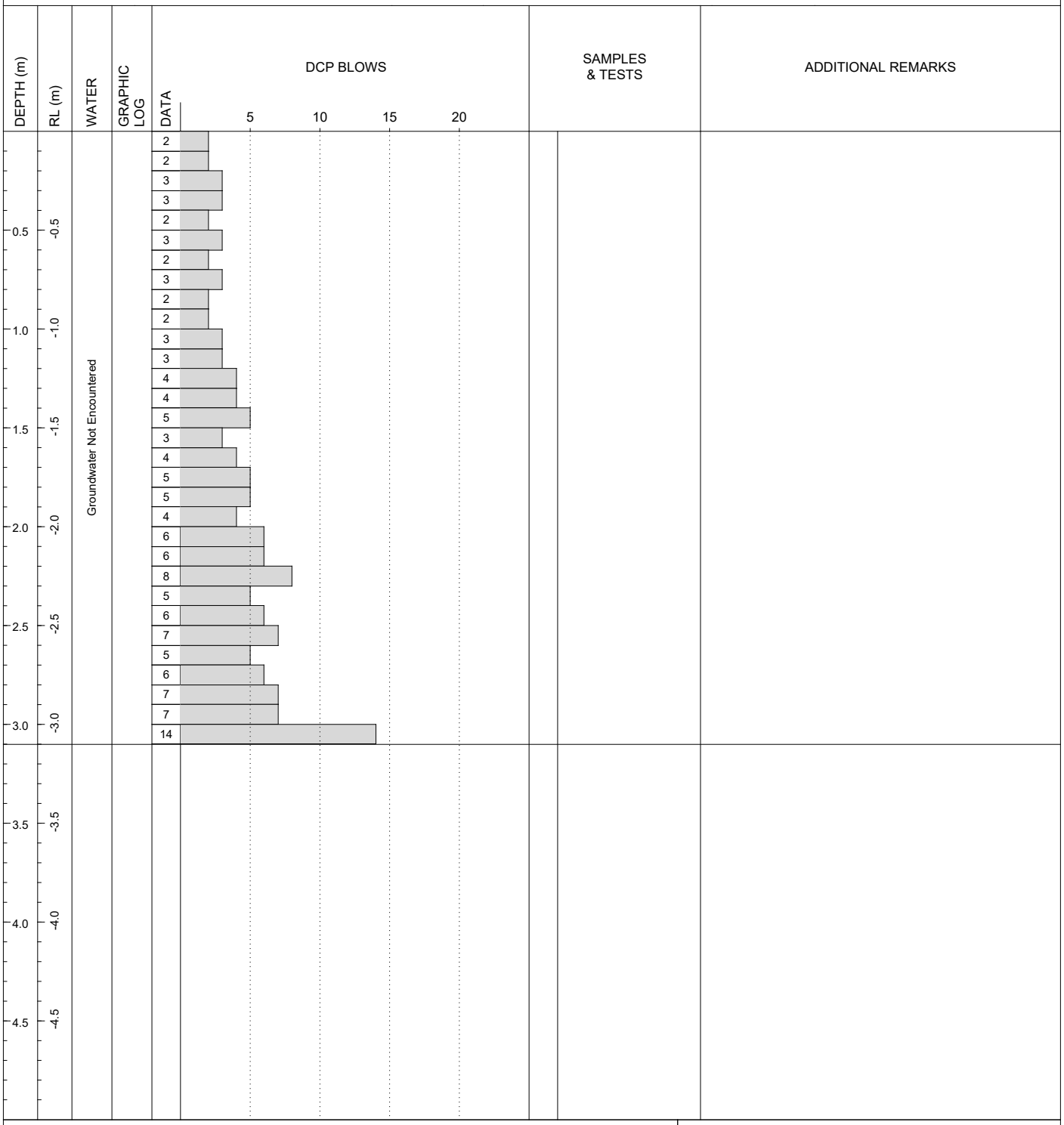
DCP LOG

DCP15

SHEET 15 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928551.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607745.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 48

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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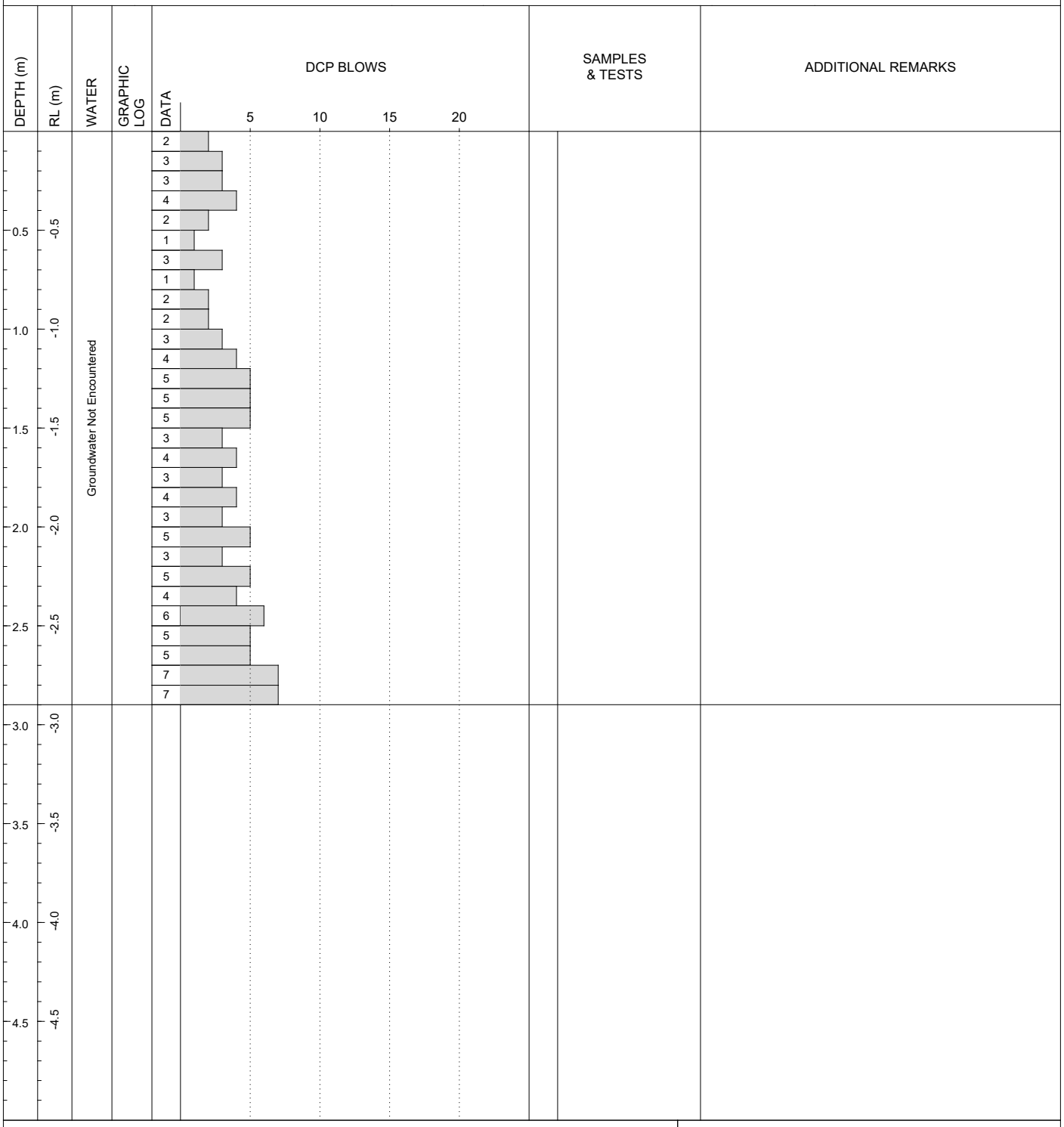
DCP LOG

DCP16

SHEET 16 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928539.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607759.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 48

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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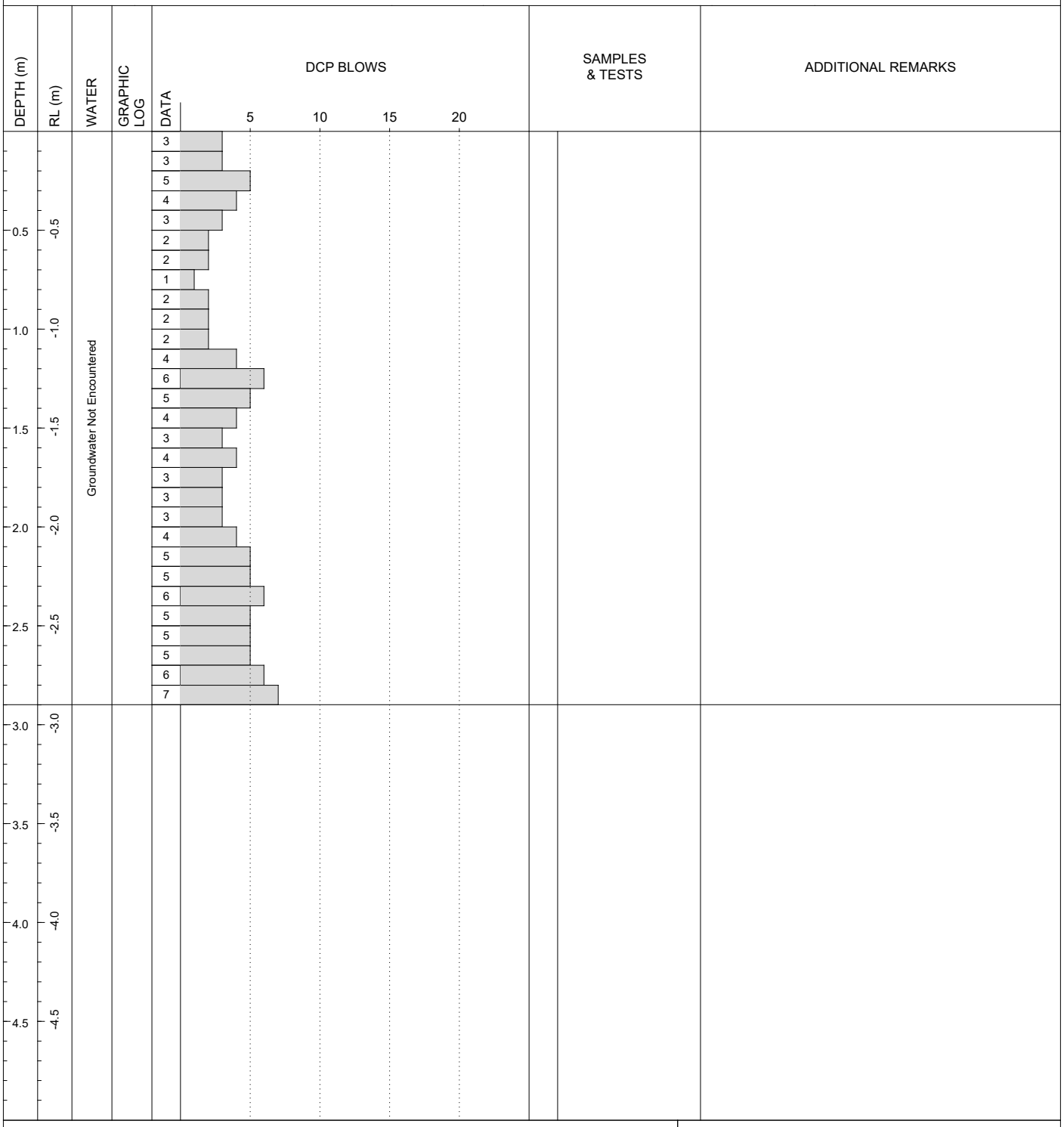
DCP LOG

DCP17

SHEET 17 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928533.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607756.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 49

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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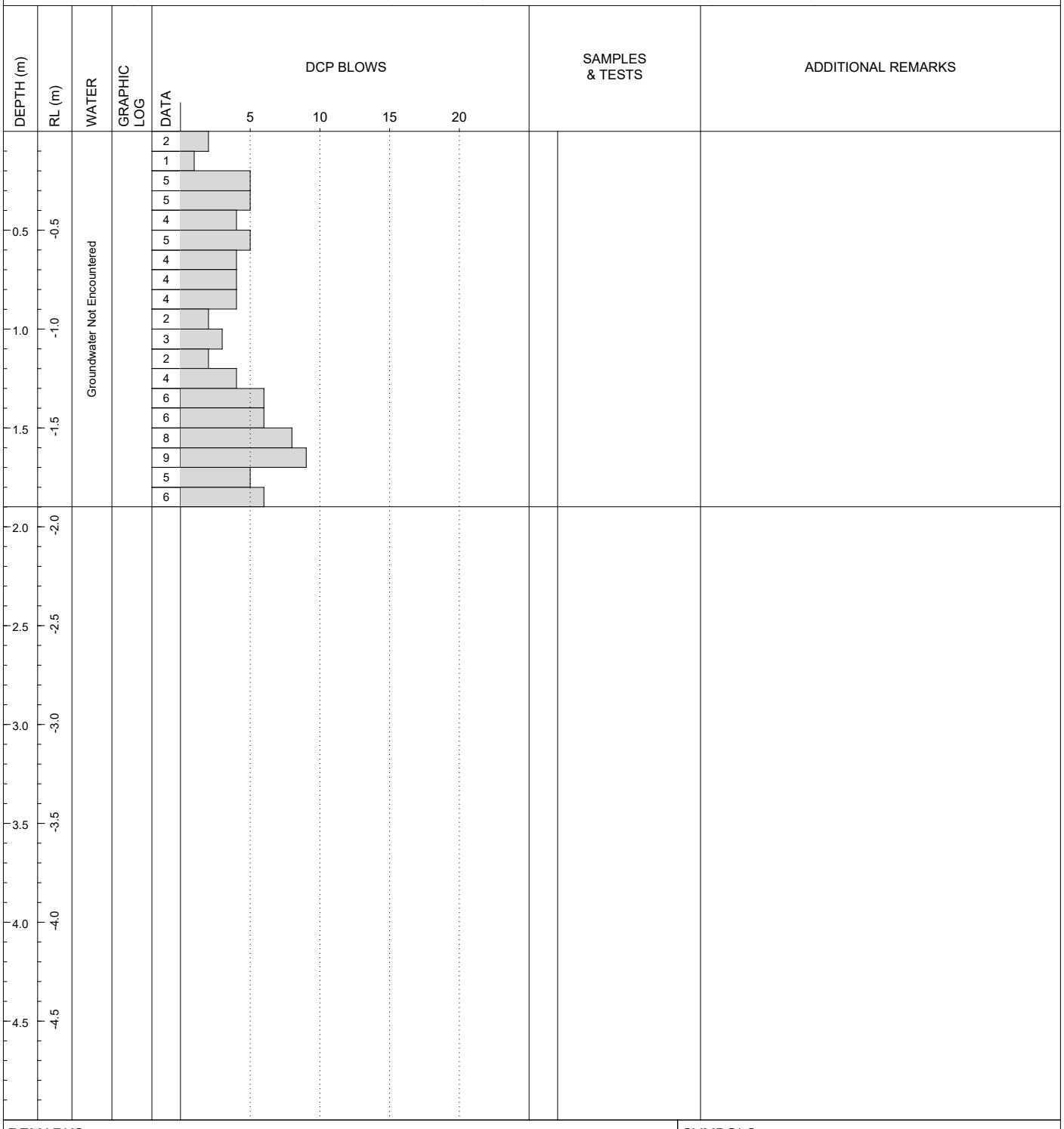
DCP LOG

DCP18

SHEET 18 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928545.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607740.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 49

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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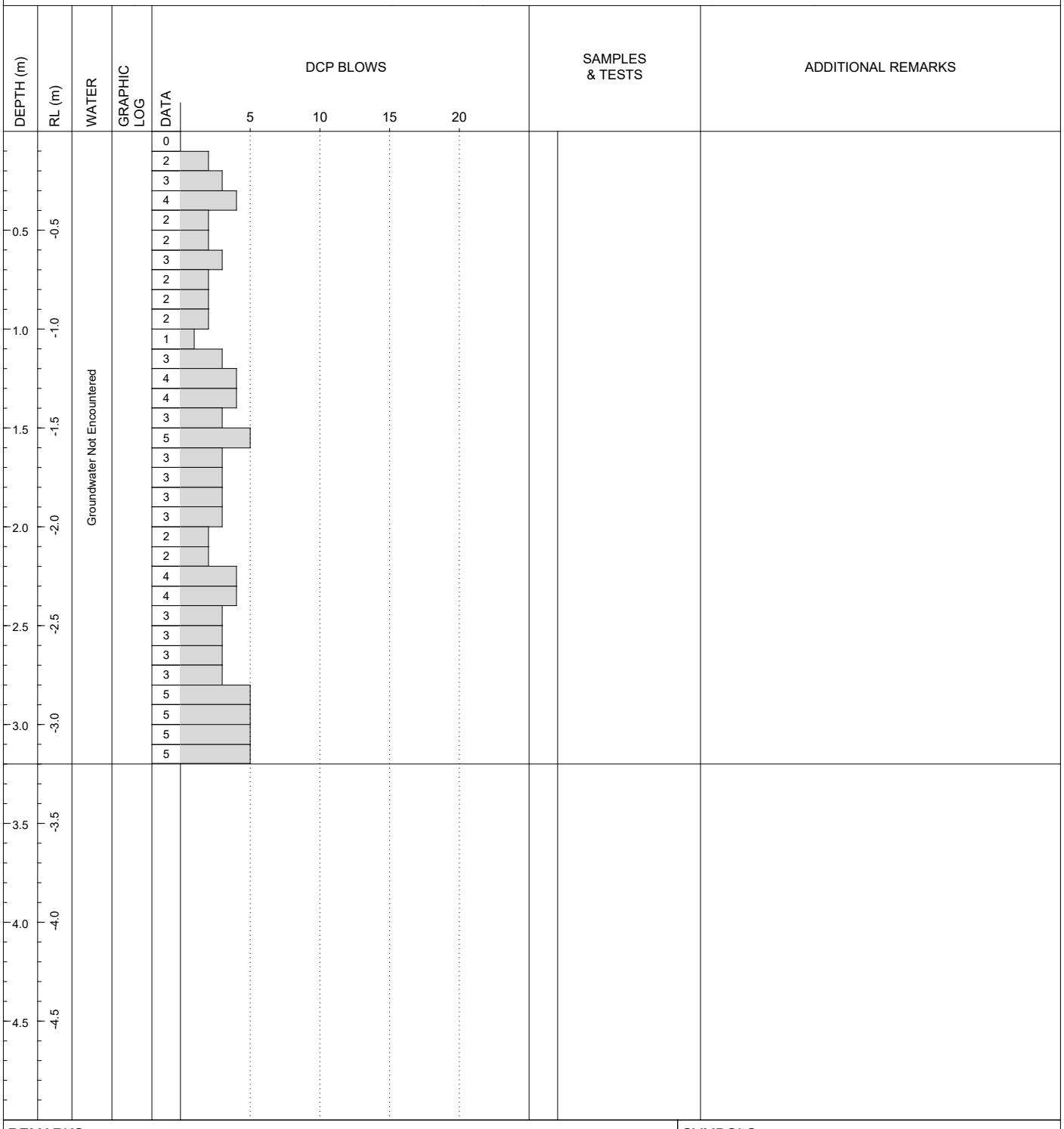
DCP LOG

DCP19

SHEET 19 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928537.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607735.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 49

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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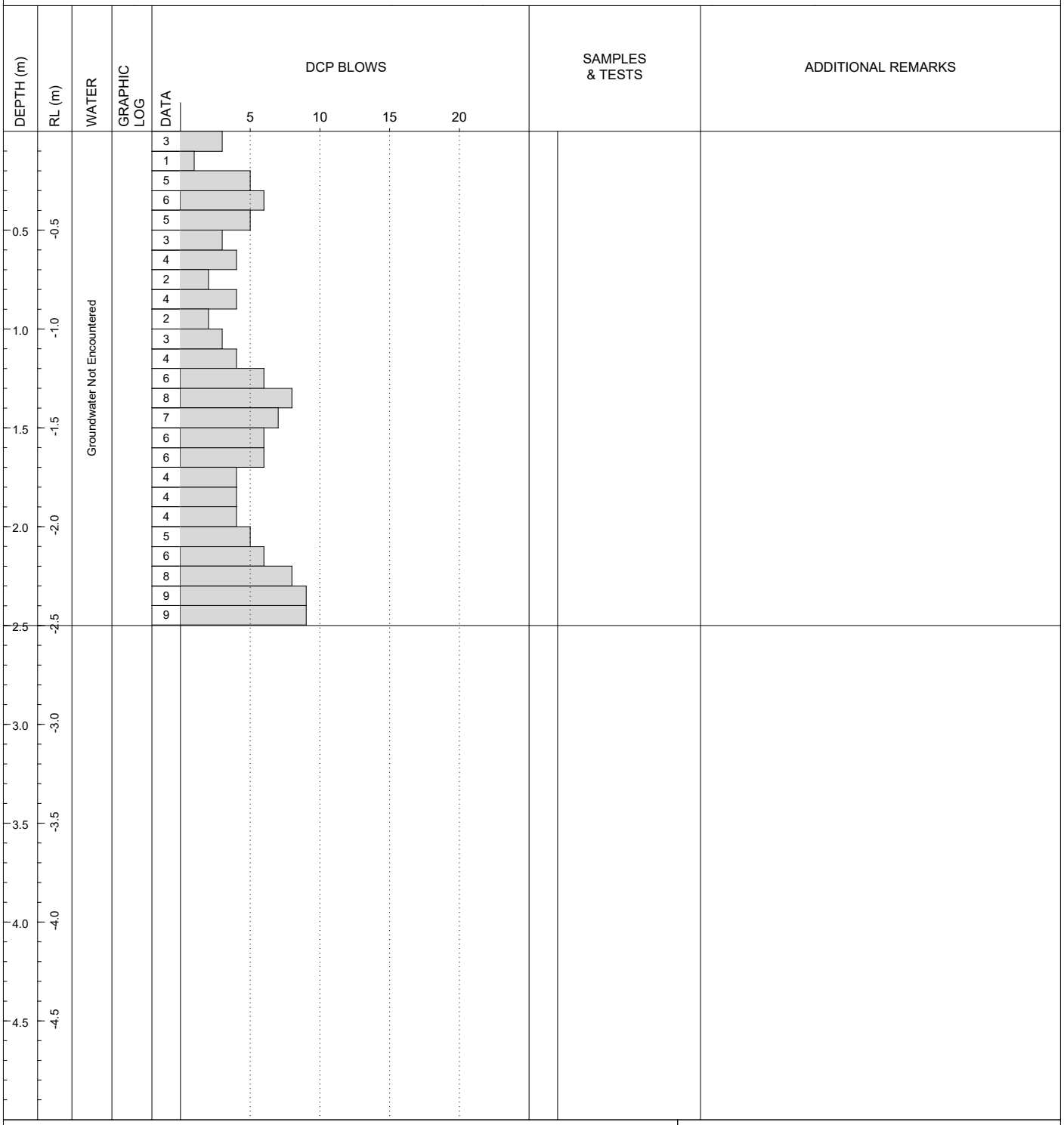
DCP LOG

DCP20

SHEET 20 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928526.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607748.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 49

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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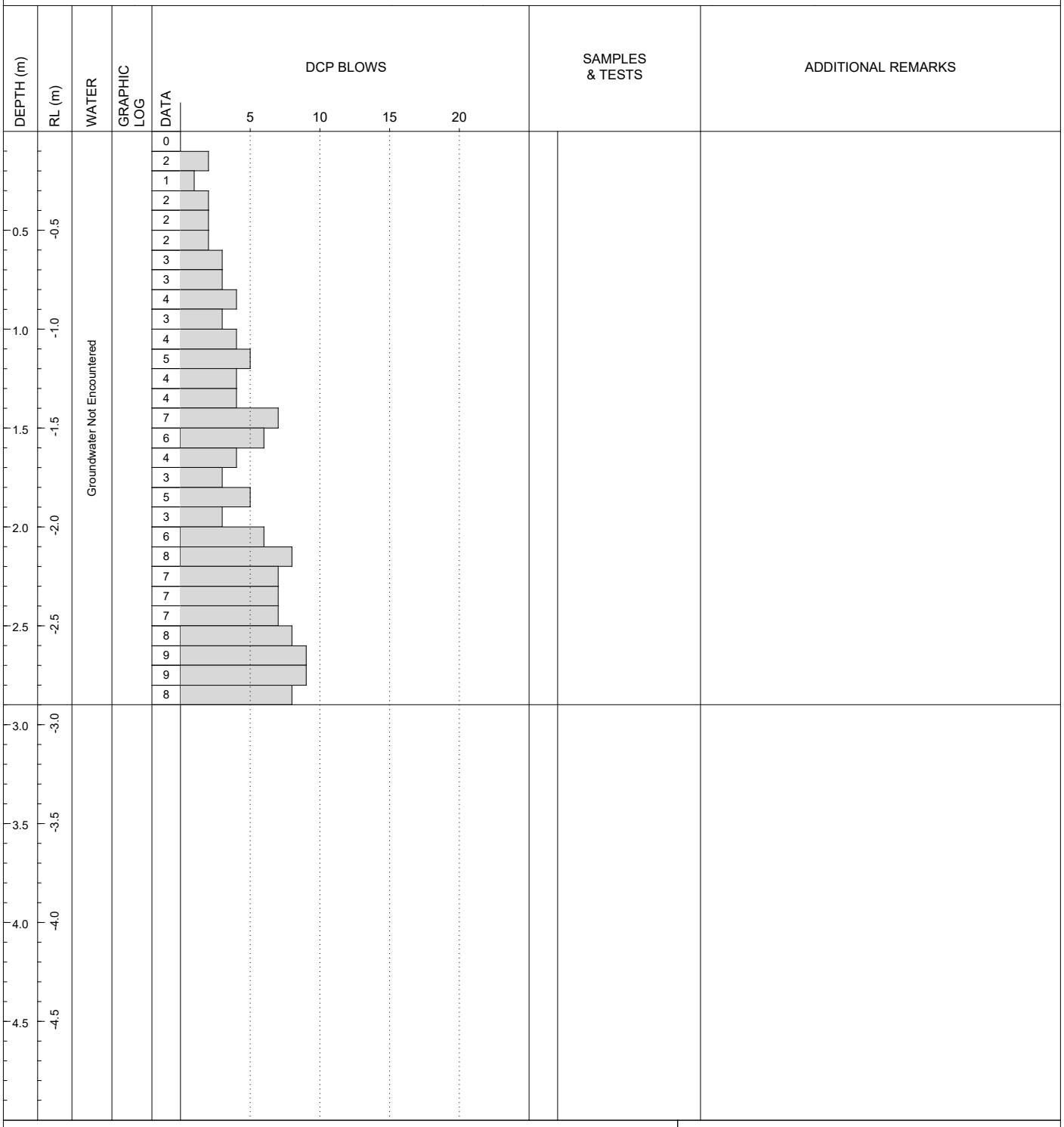
DCP LOG

DCP21

SHEET 21 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928520.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607780.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 55

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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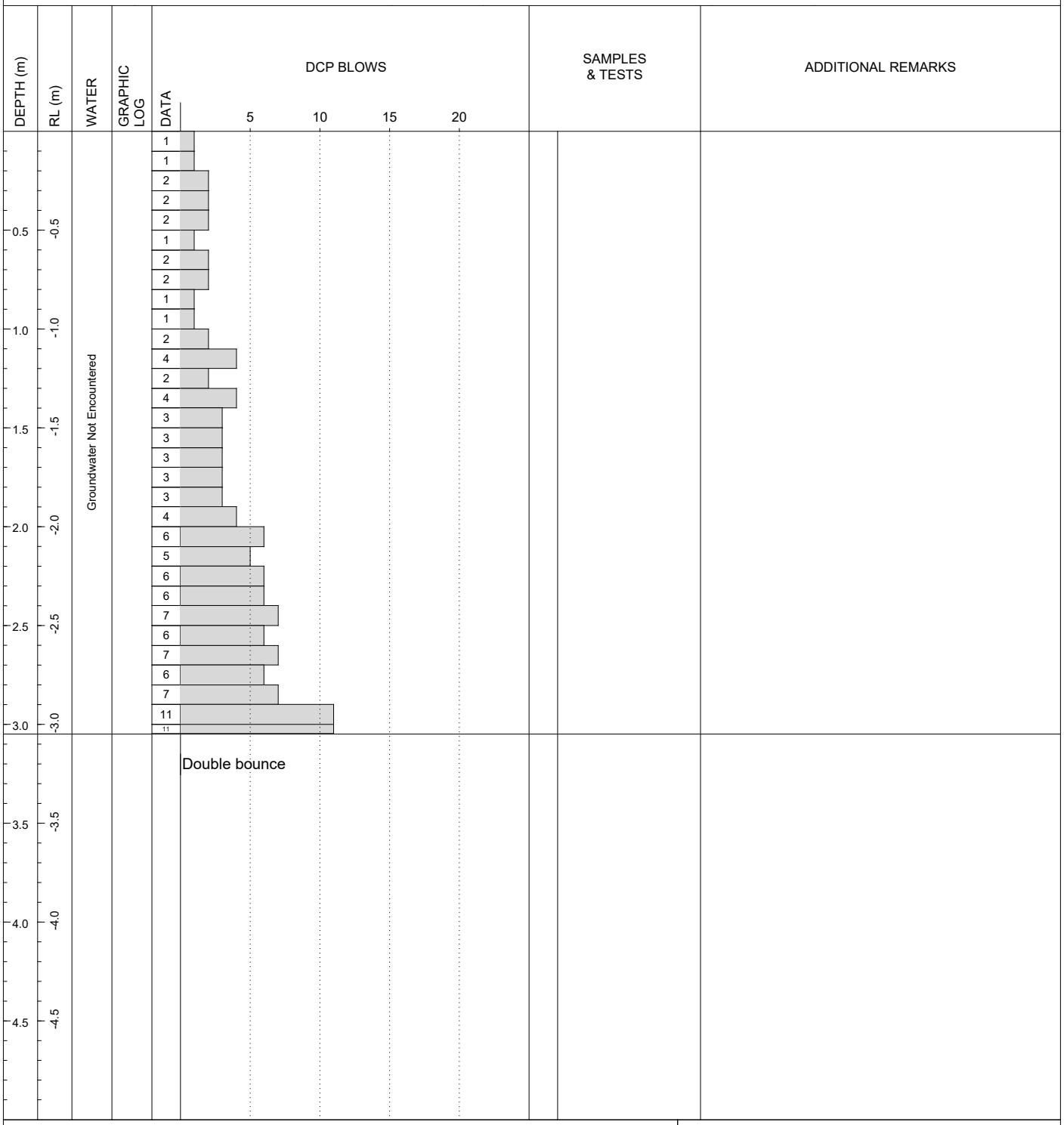
DCP LOG

DCP22

SHEET 22 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928507.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607796.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 55

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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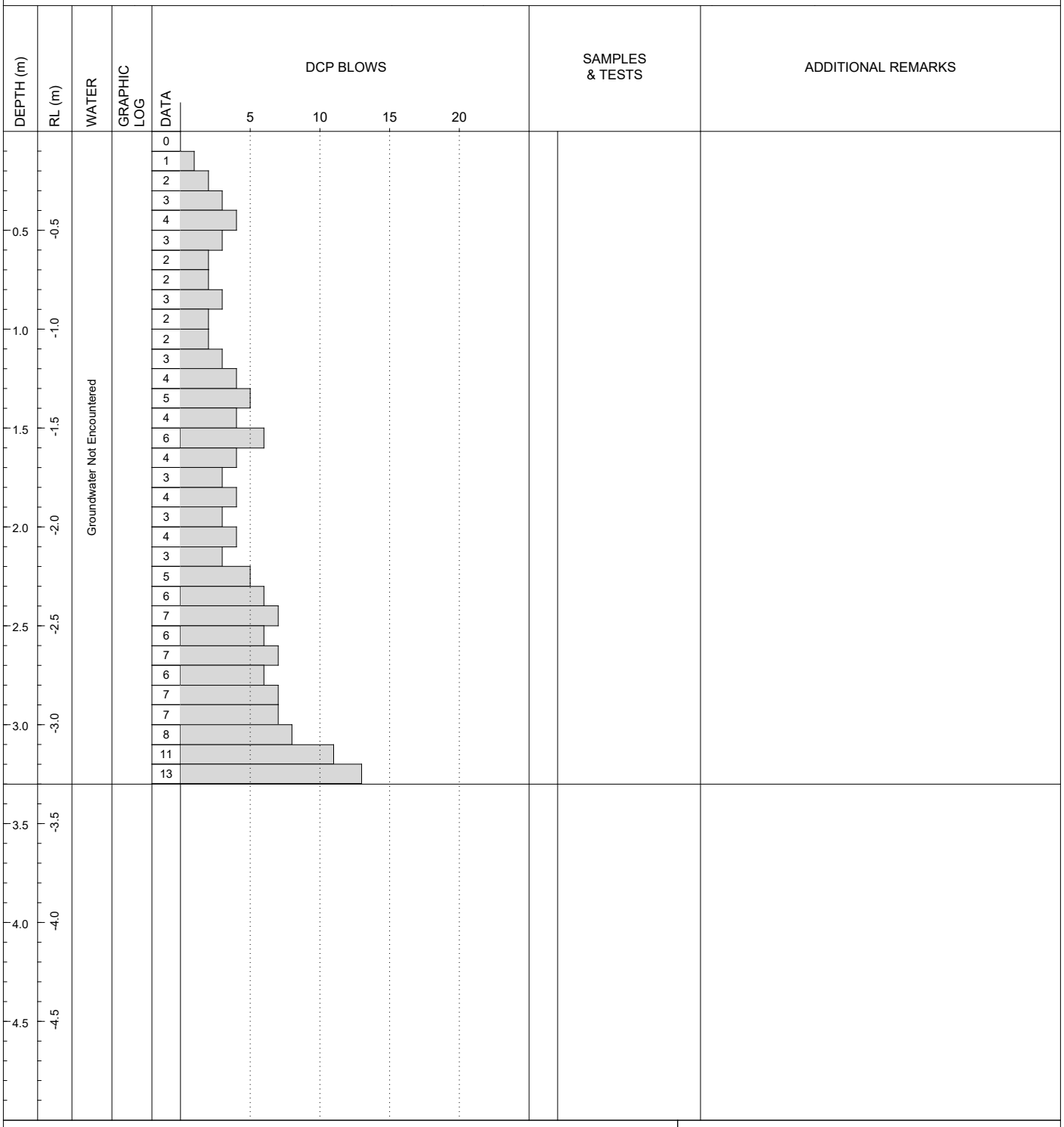
DCP LOG

DCP23

SHEET 23 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928518.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607804.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 55

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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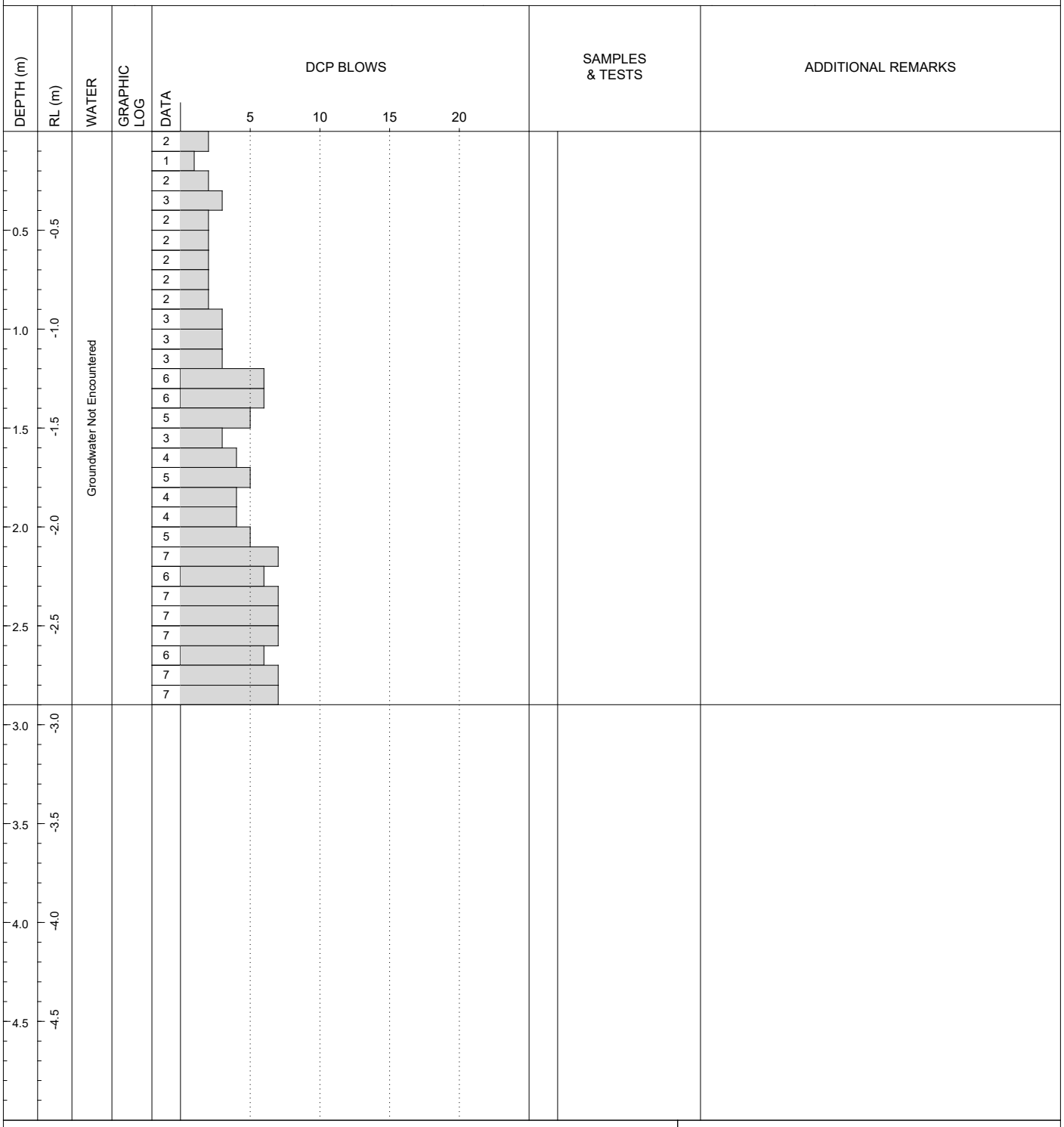
DCP LOG

DCP24

SHEET 24 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928535.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607782.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 55

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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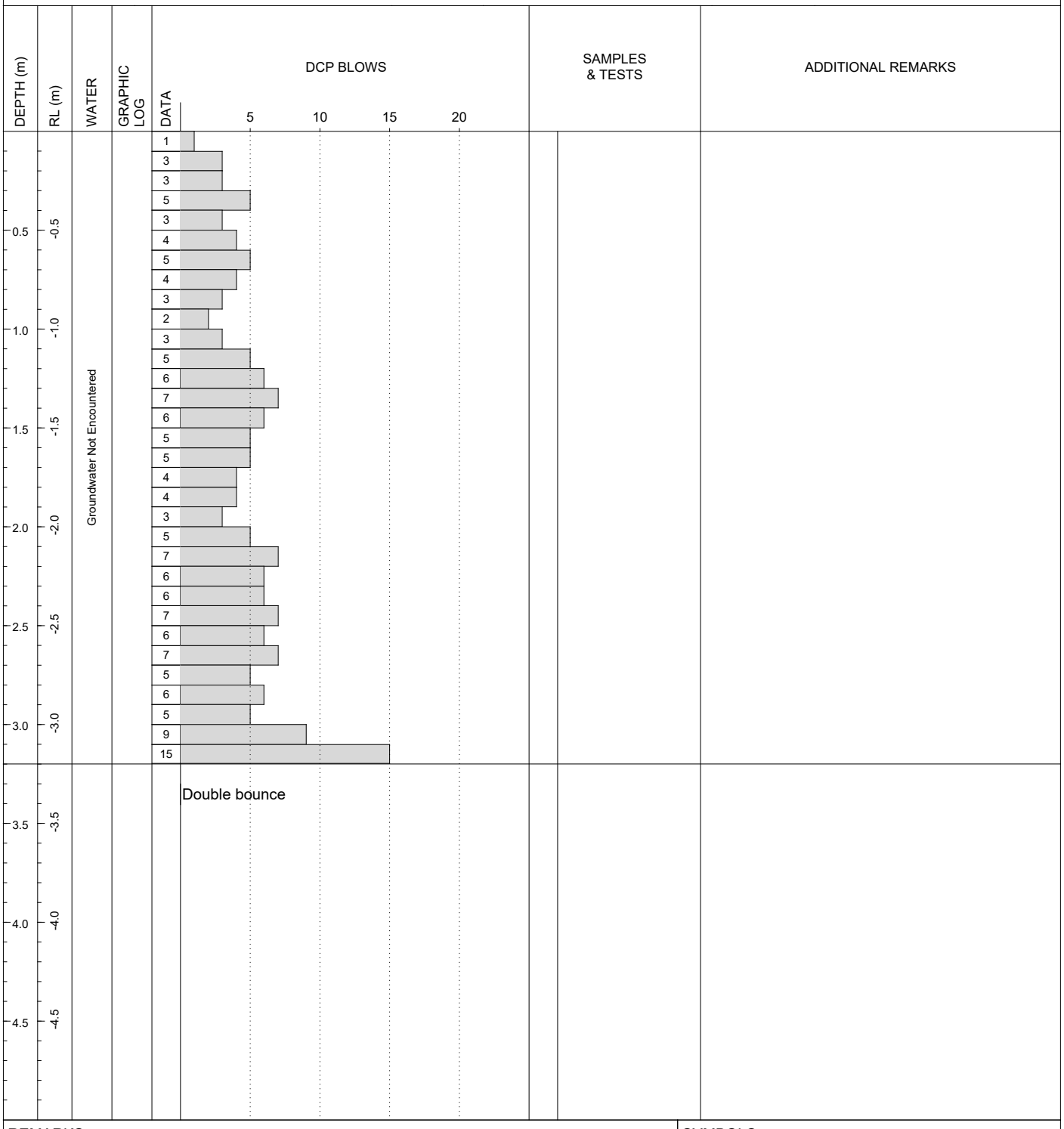
DCP LOG

DCP25

SHEET 25 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928543.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607786.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 56

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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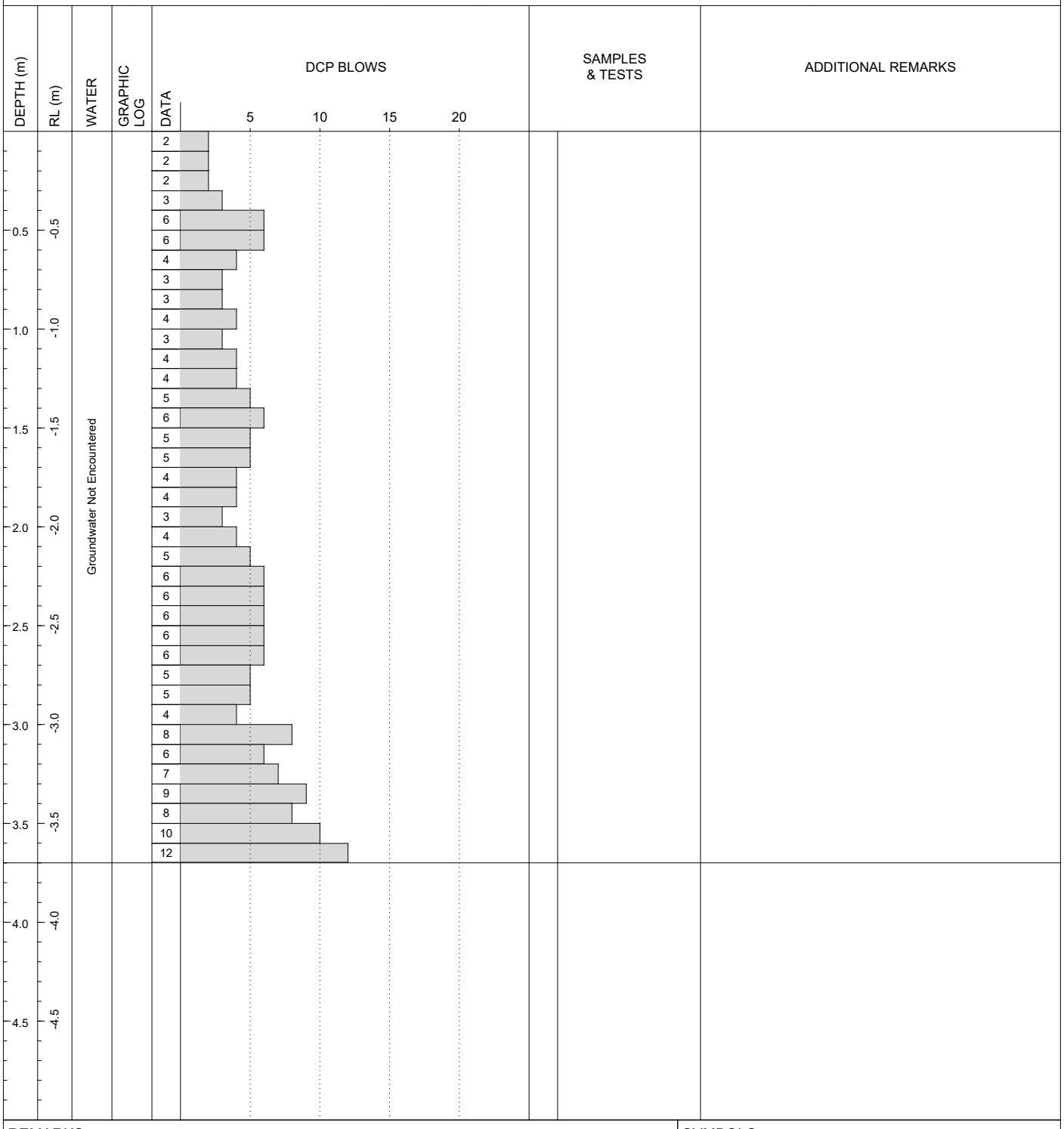
DCP LOG

DCP26

SHEET 26 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928524.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607810.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 56

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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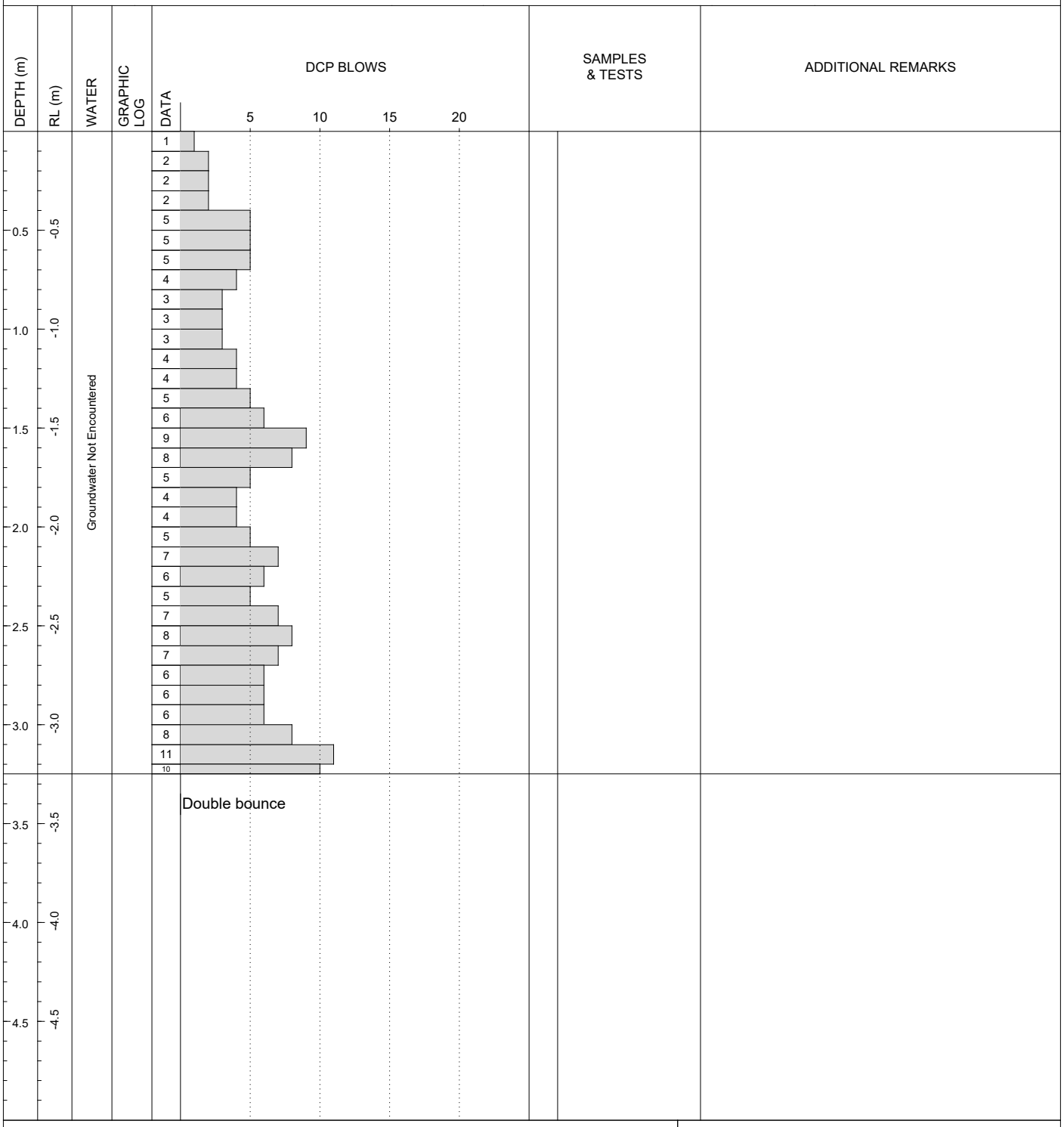
DCP LOG

DCP27

SHEET 27 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928533.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607815.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 56

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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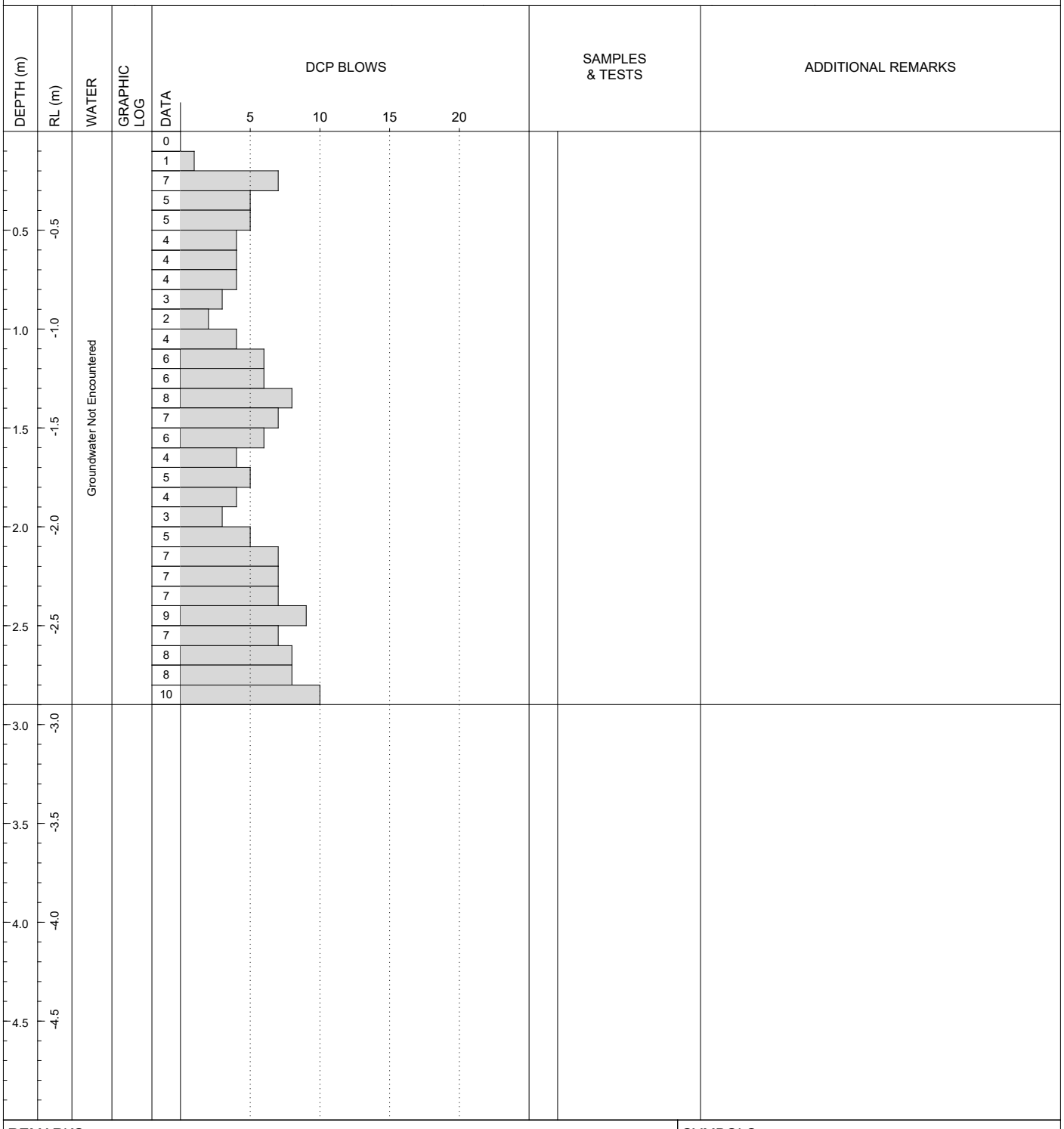
DCP LOG

DCP28

SHEET 28 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928552.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607793.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 56

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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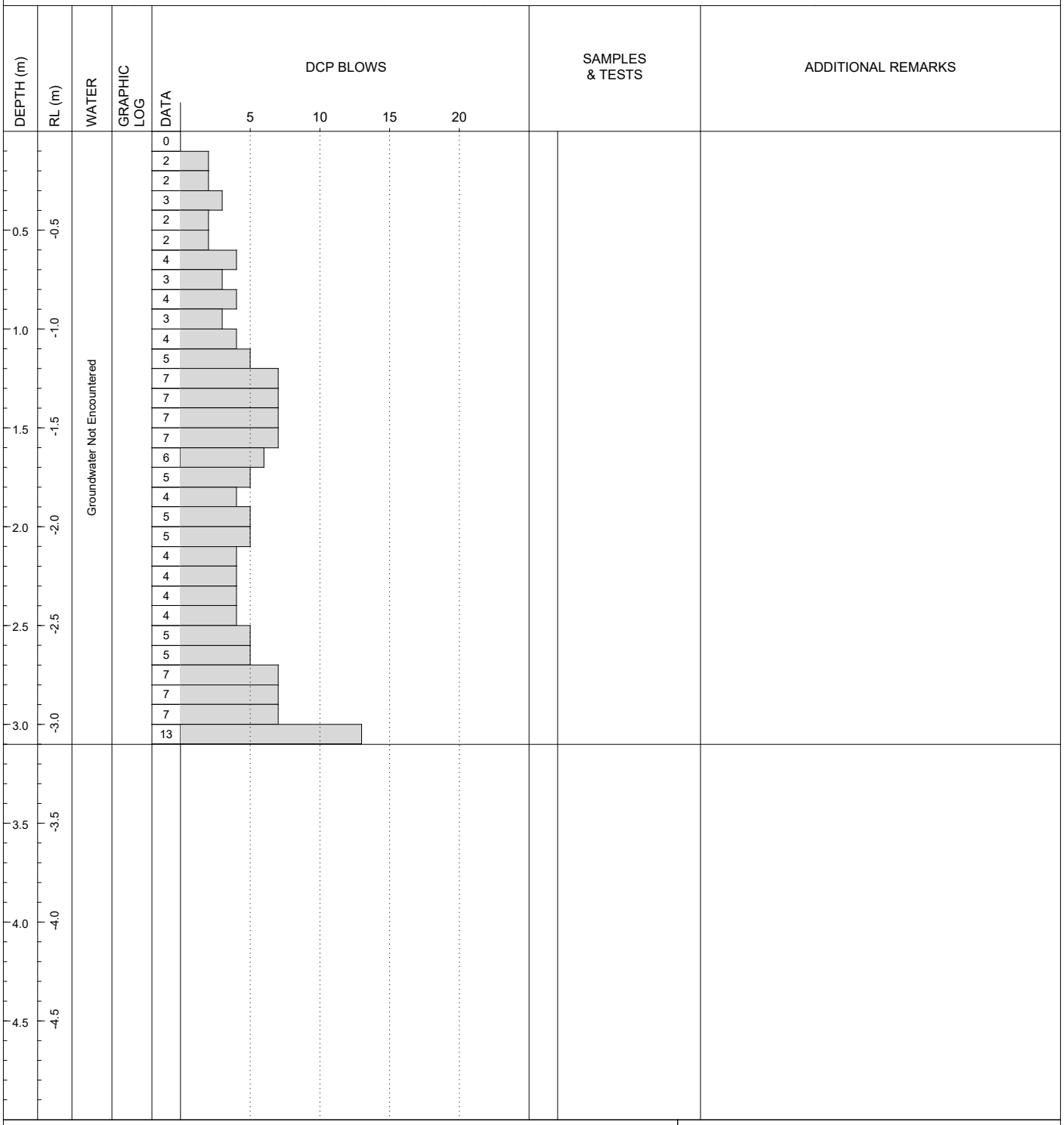
DCP LOG

DCP29

SHEET 29 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928557.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607796.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 57

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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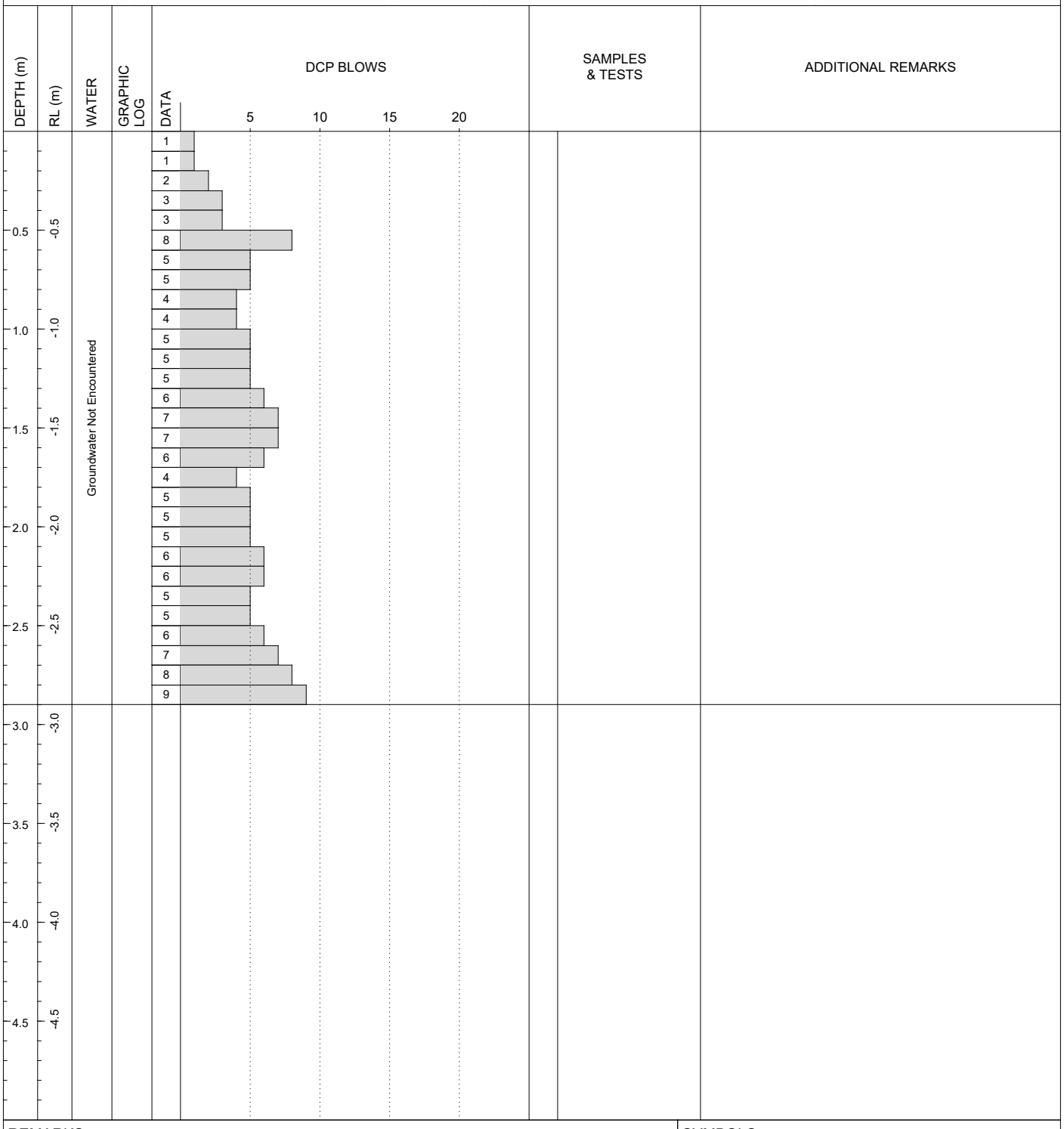
DCP LOG

DCP30

SHEET 30 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928539.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607821.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 57

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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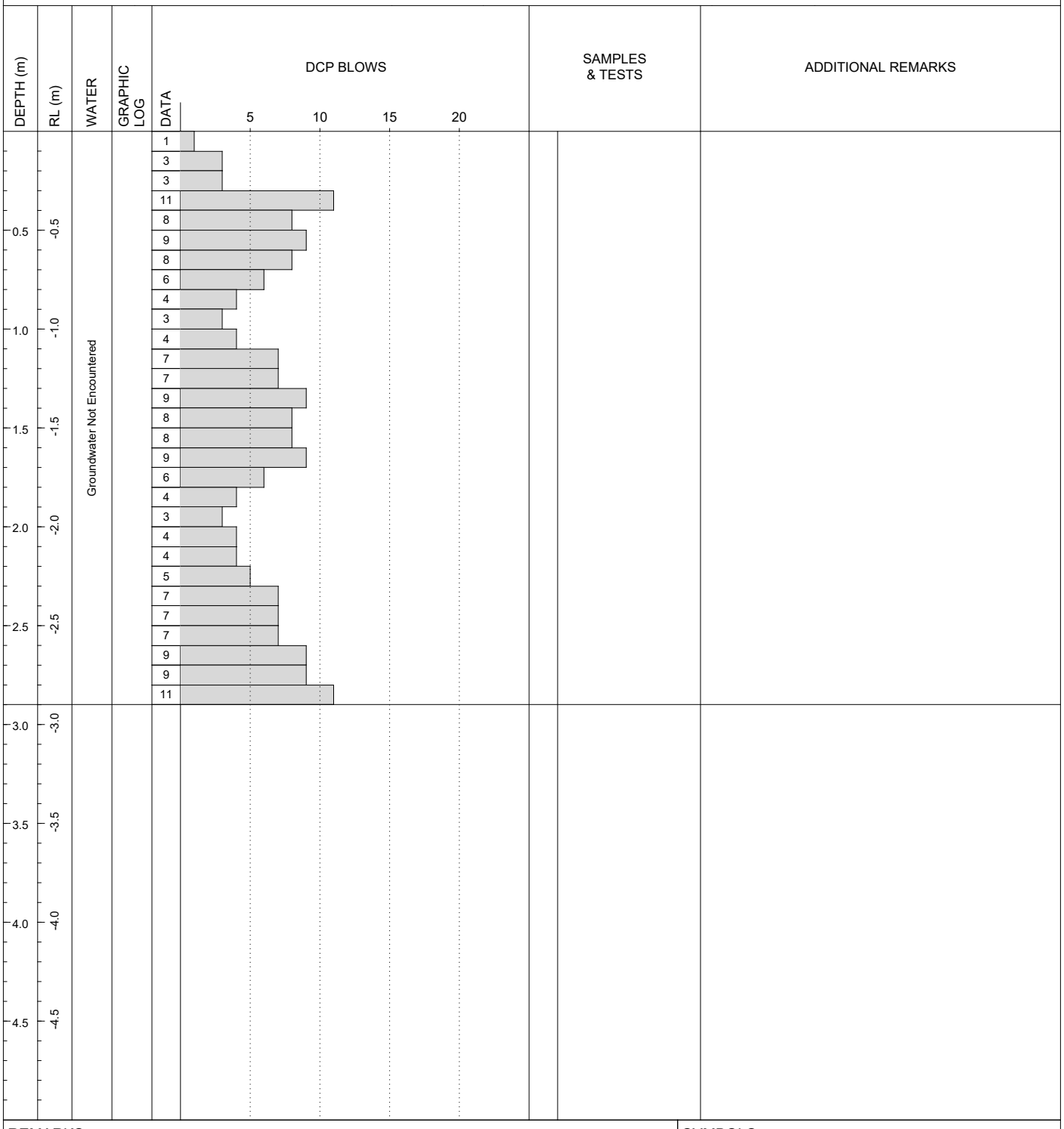
DCP LOG

DCP31

SHEET 31 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928545.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607825.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 57

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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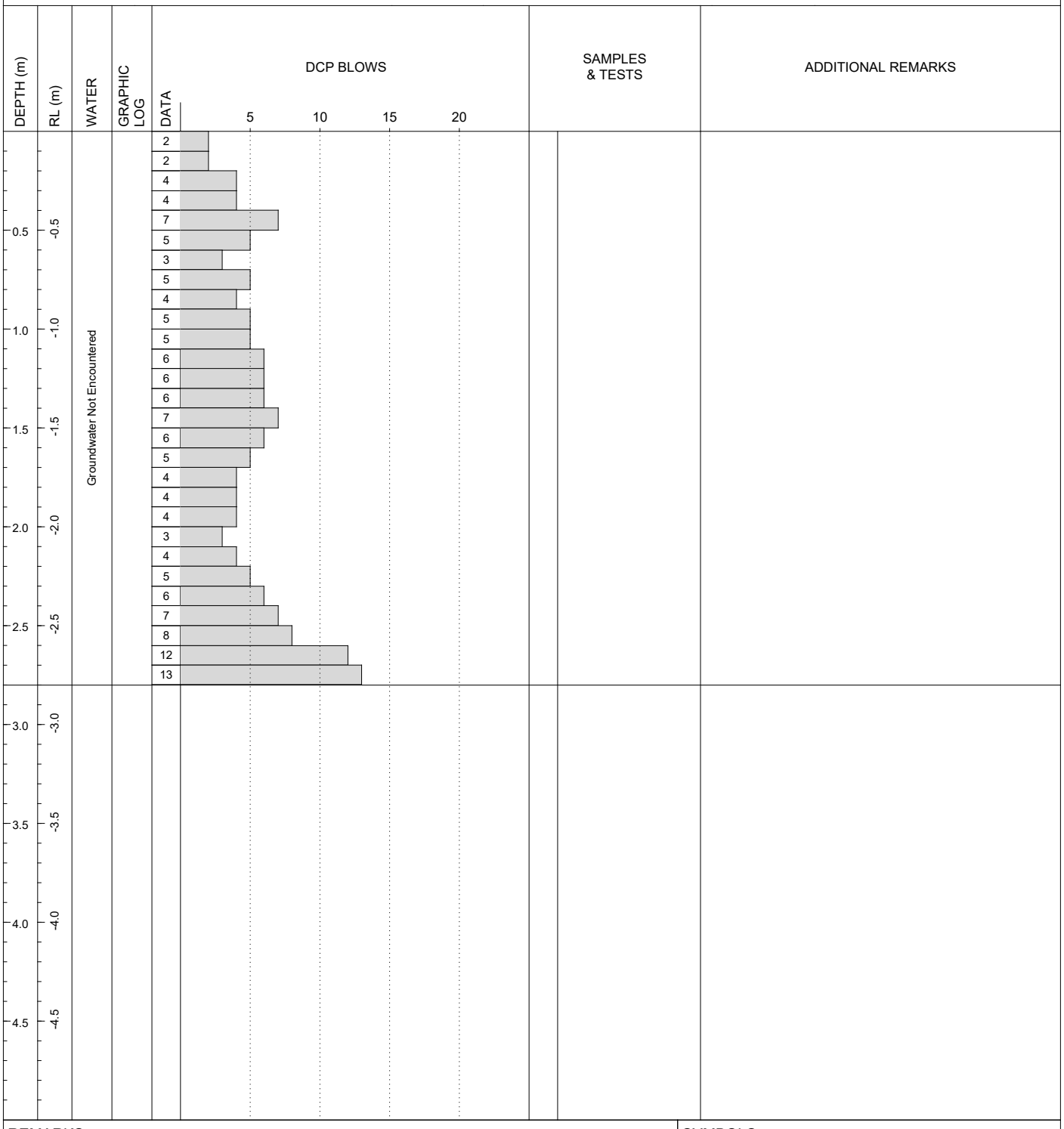
DCP LOG

DCP32

SHEET 32 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928567.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607802.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 57

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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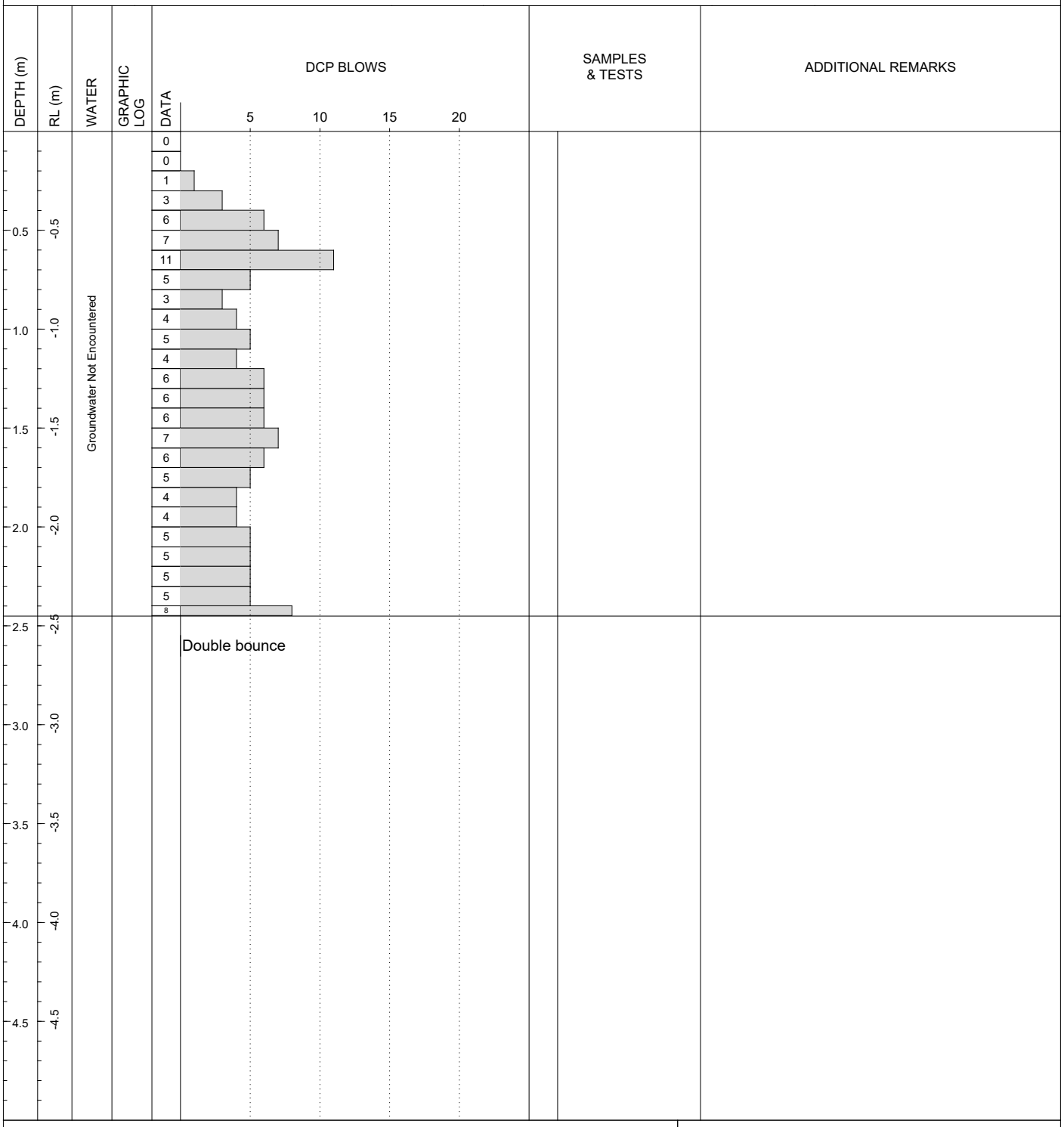
DCP LOG

DCP33

SHEET 33 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928573.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607808.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 58

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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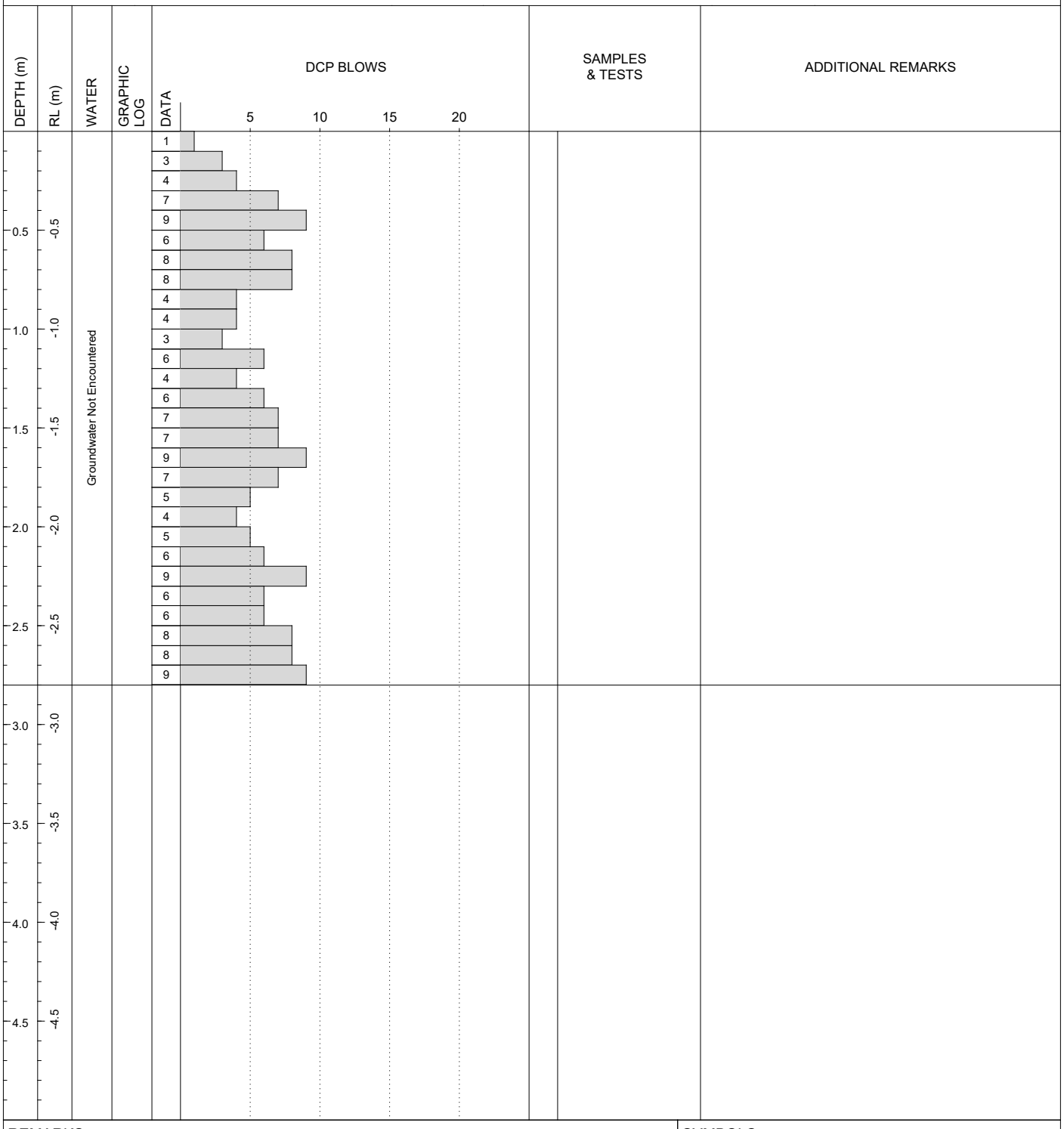
DCP LOG

DCP34

SHEET 34 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928551.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607830.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 58

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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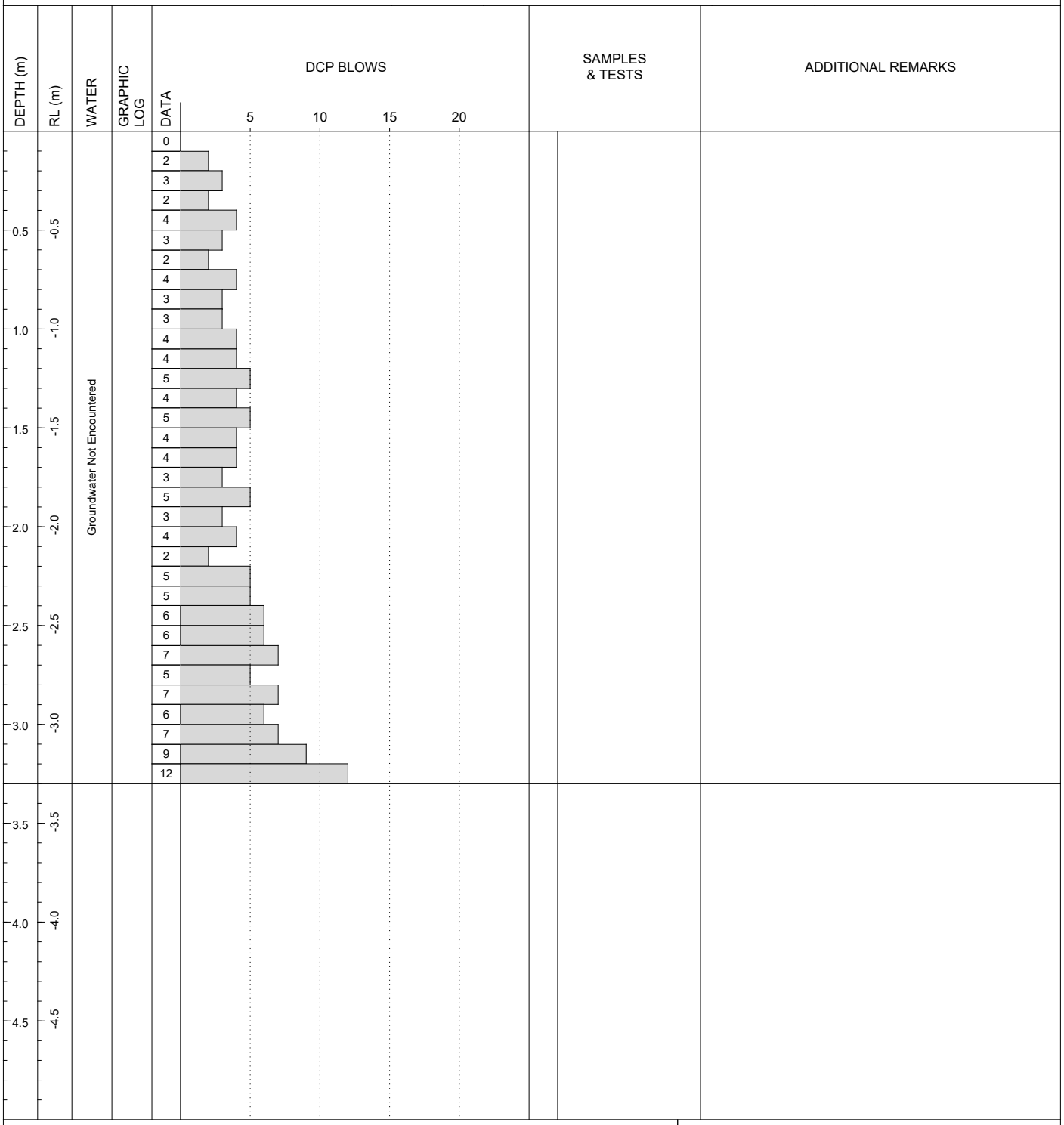
DCP LOG

DCP35

SHEET 35 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928557.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607838.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 58

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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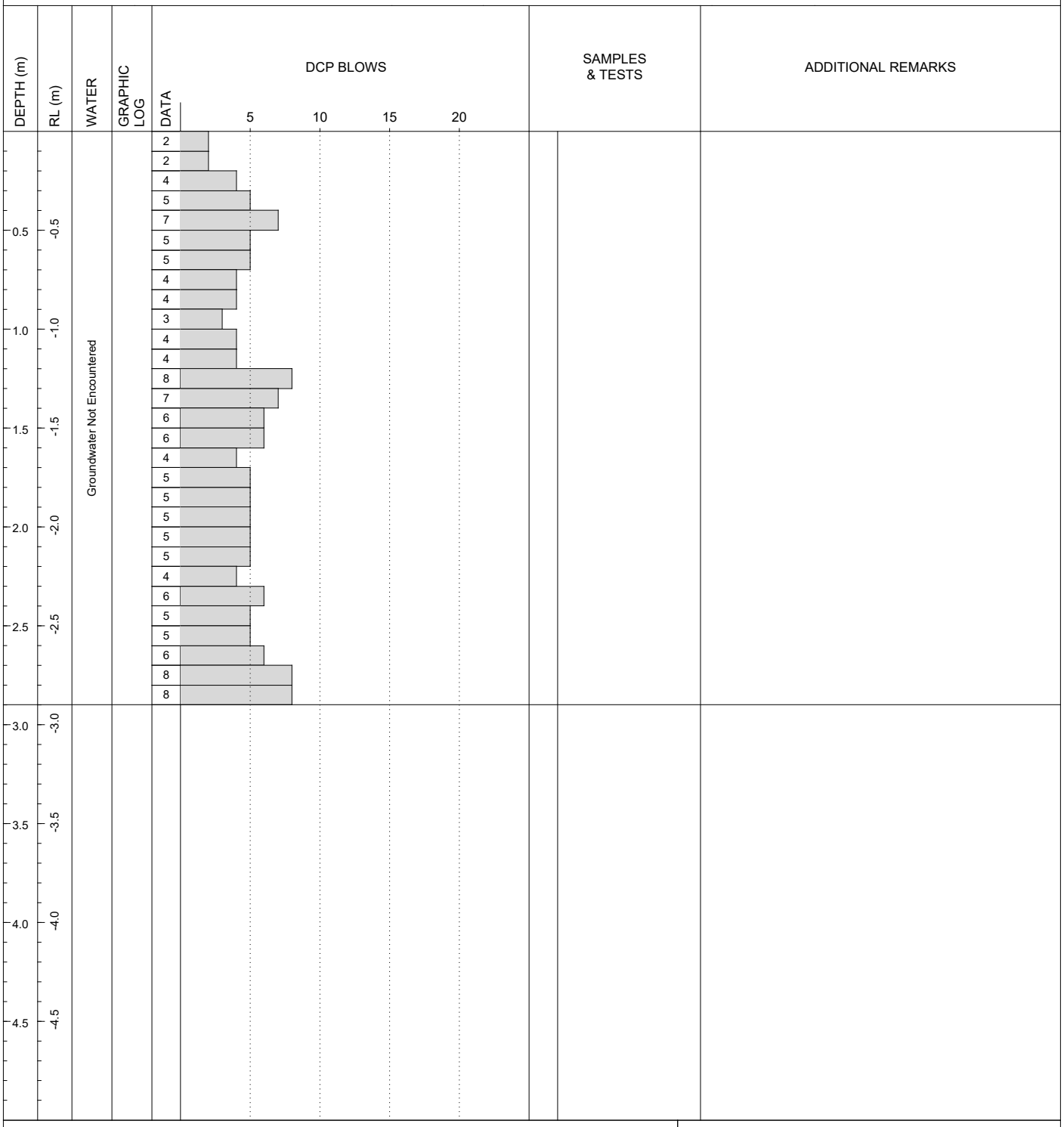
DCP LOG

DCP36

SHEET 36 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928580.00	STARTED: 14/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607814.00	FINISHED: 14/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BB DATE: 06/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 58

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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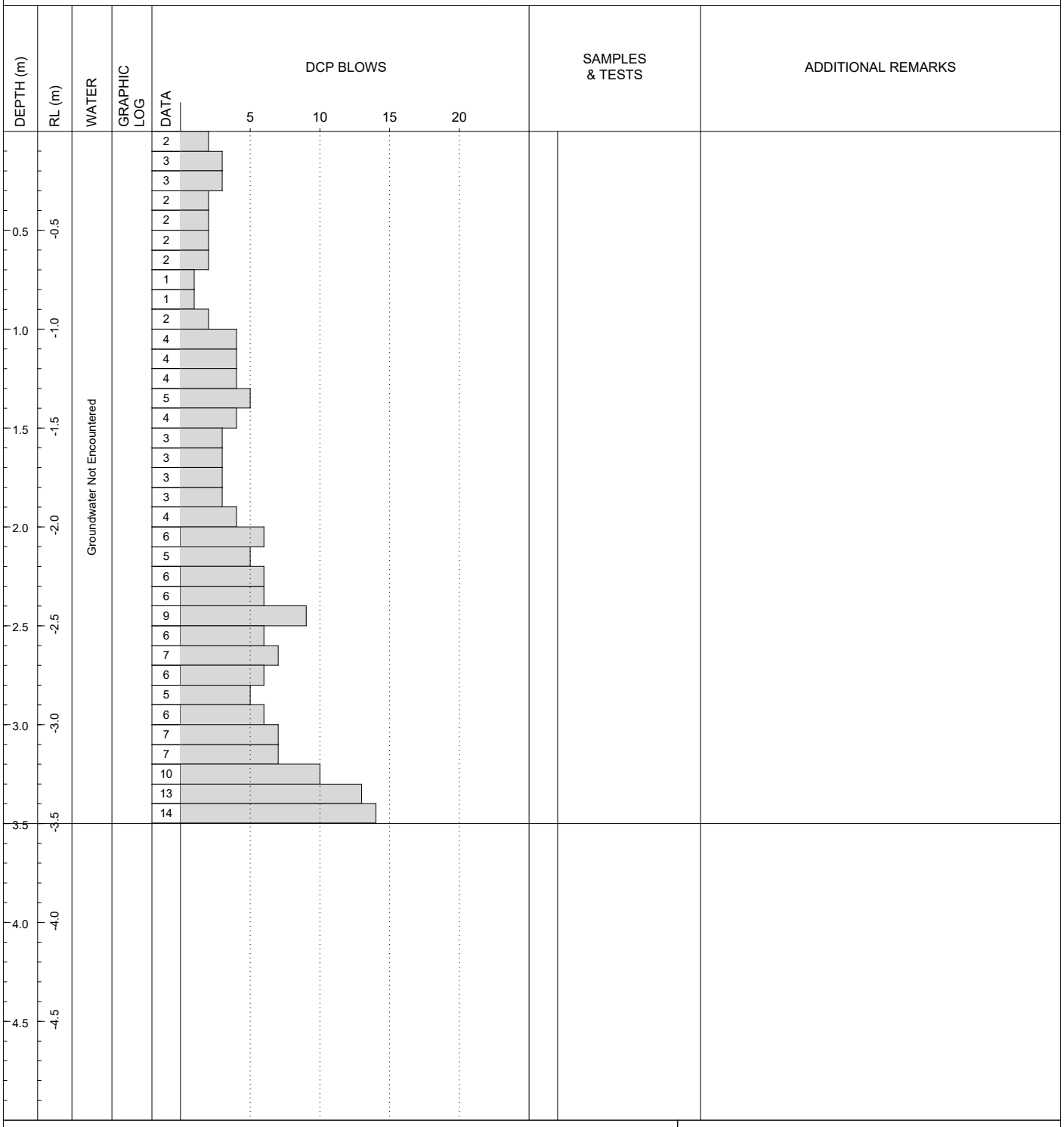
DCP LOG

DCP37

SHEET 37 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928515.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607745.00	FINISHED: 19/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BR



REMARKS

Lot 50

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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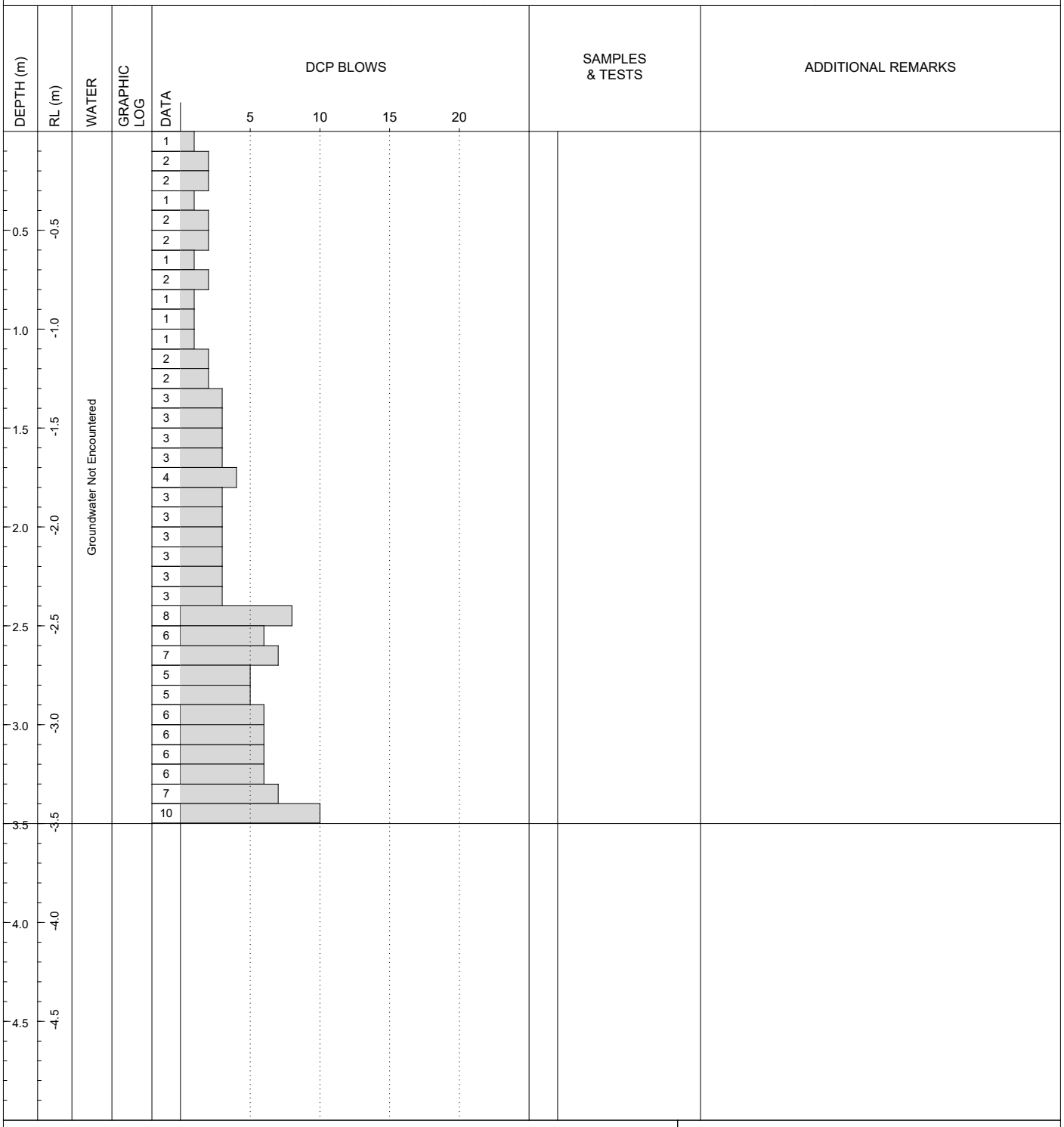
DCP LOG

DCP38

SHEET 38 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928496.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607736.00	FINISHED: 19/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BR



REMARKS

Lot 50

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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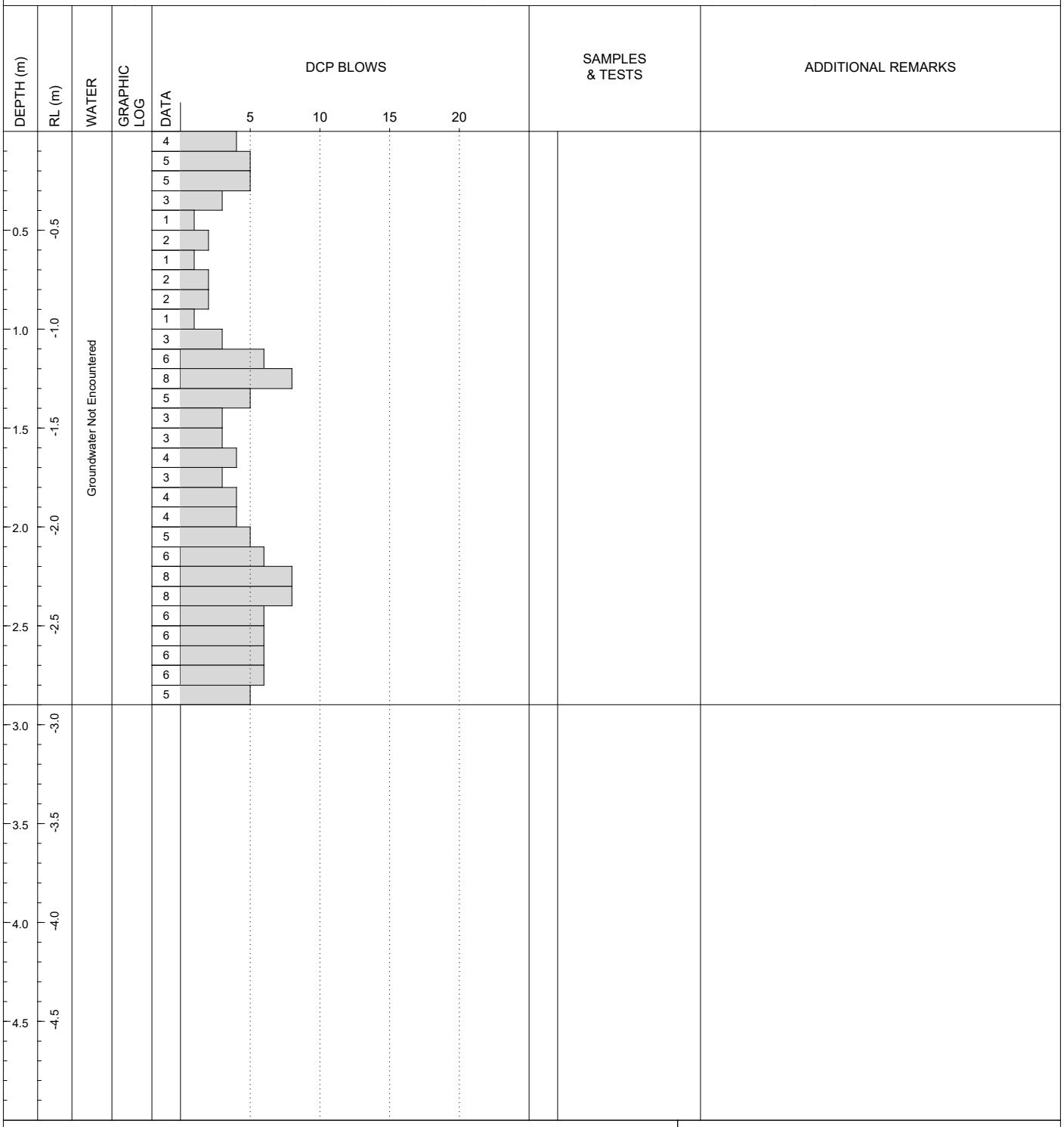
DCP LOG

DCP39

SHEET 39 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928493.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607742.00	FINISHED: 19/06/2018
	DATUM: NZVD2016	LOGGED BY: BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BR



REMARKS

Lot 50

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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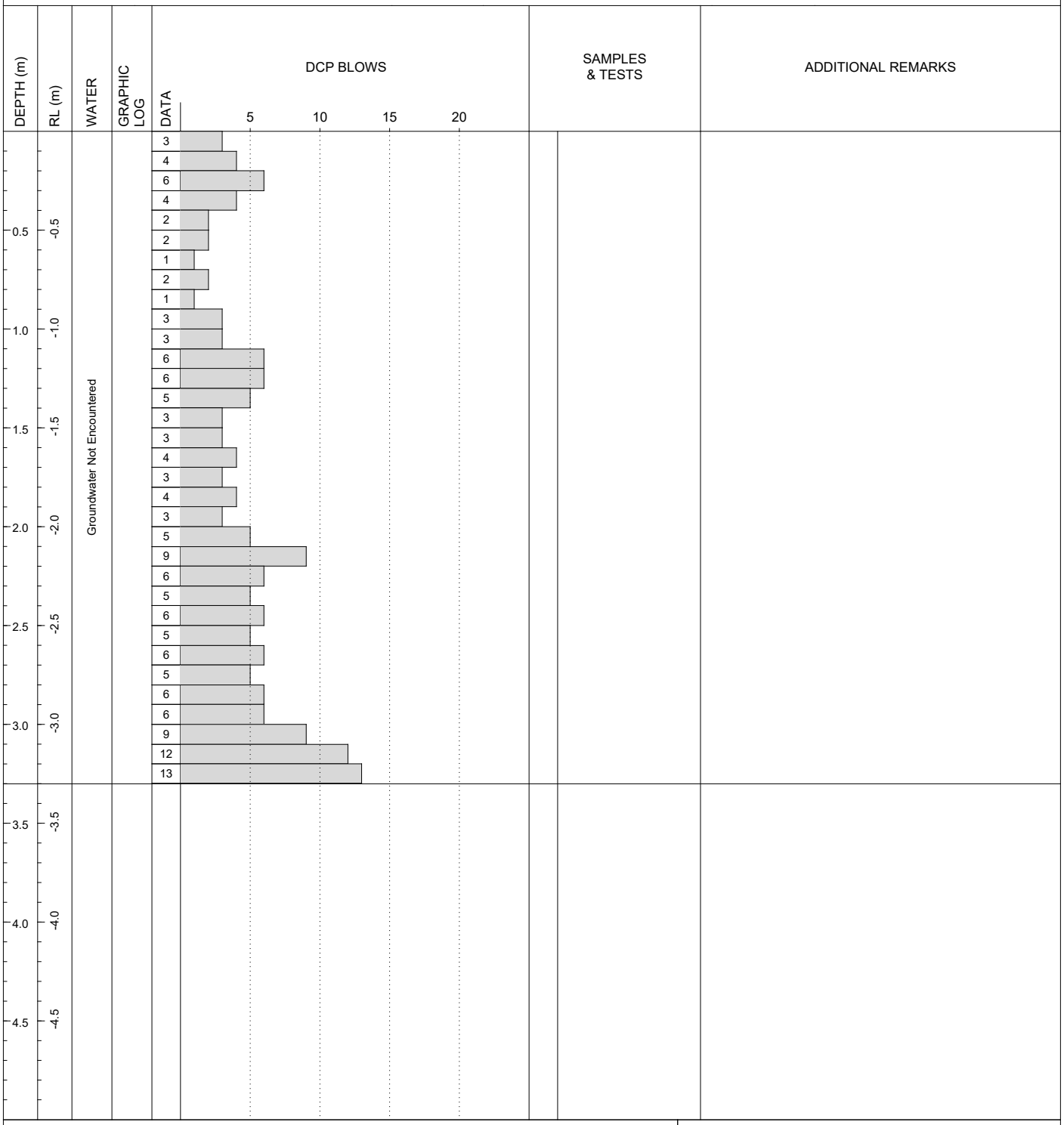
DCP LOG

DCP40

SHEET 40 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928509.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607752.00	FINISHED: 19/06/2018
	DATUM: NZVD2016	LOGGED BY: BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BR



REMARKS

Lot 50

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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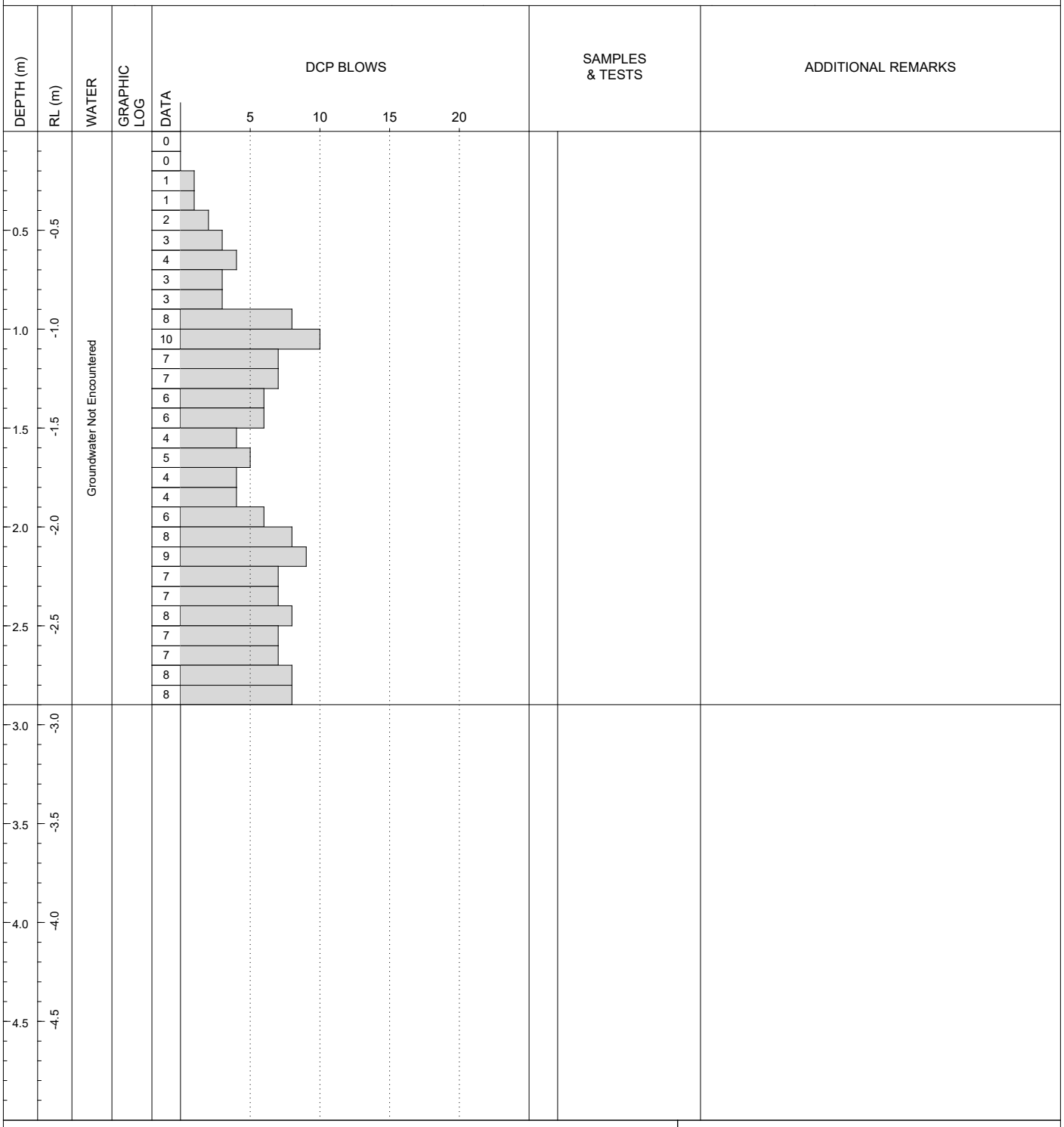
DCP LOG

DCP41

SHEET 41 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928577.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607833.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 59

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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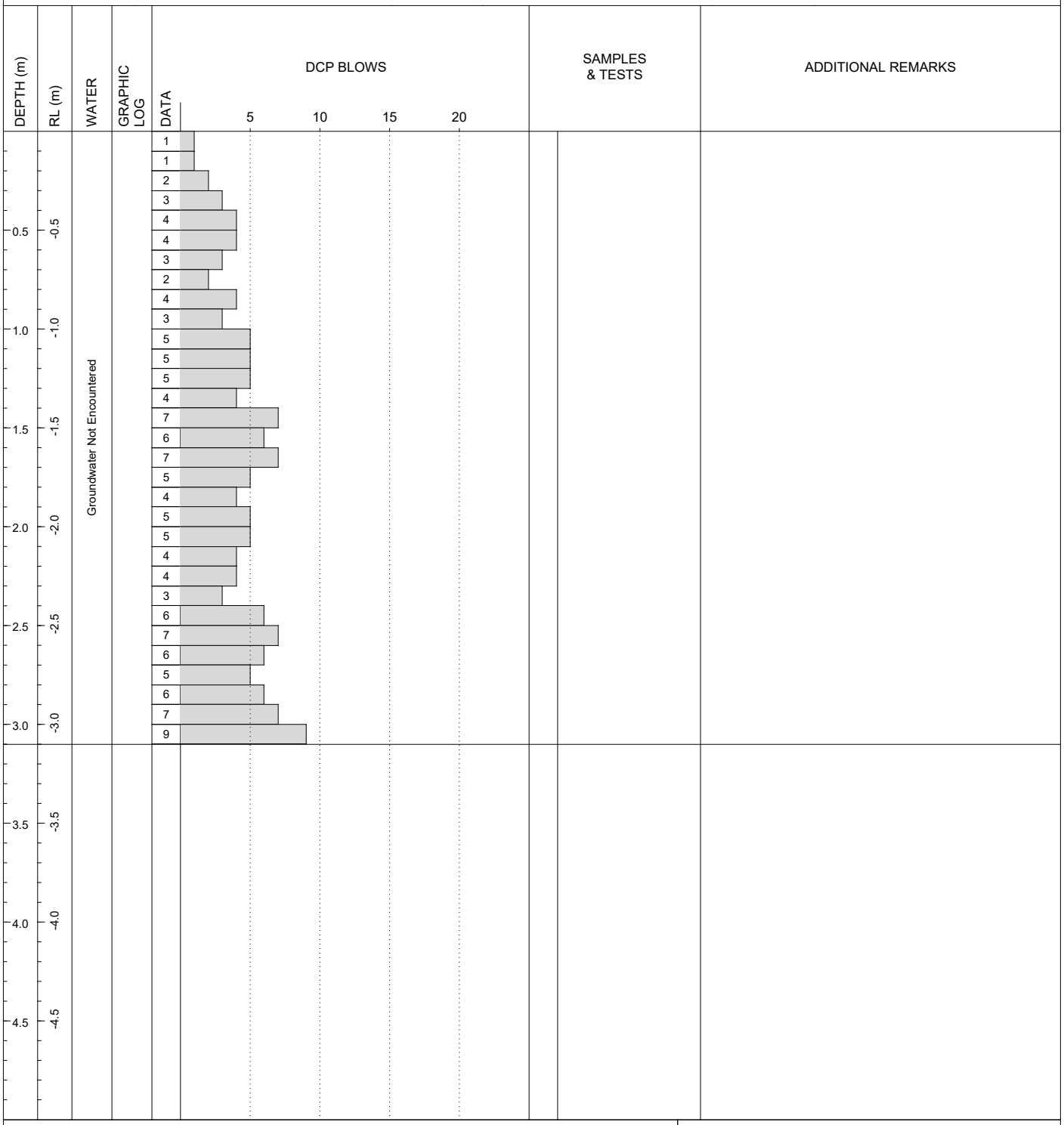
DCP LOG

DCP42

SHEET 42 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928569.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607847.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 59

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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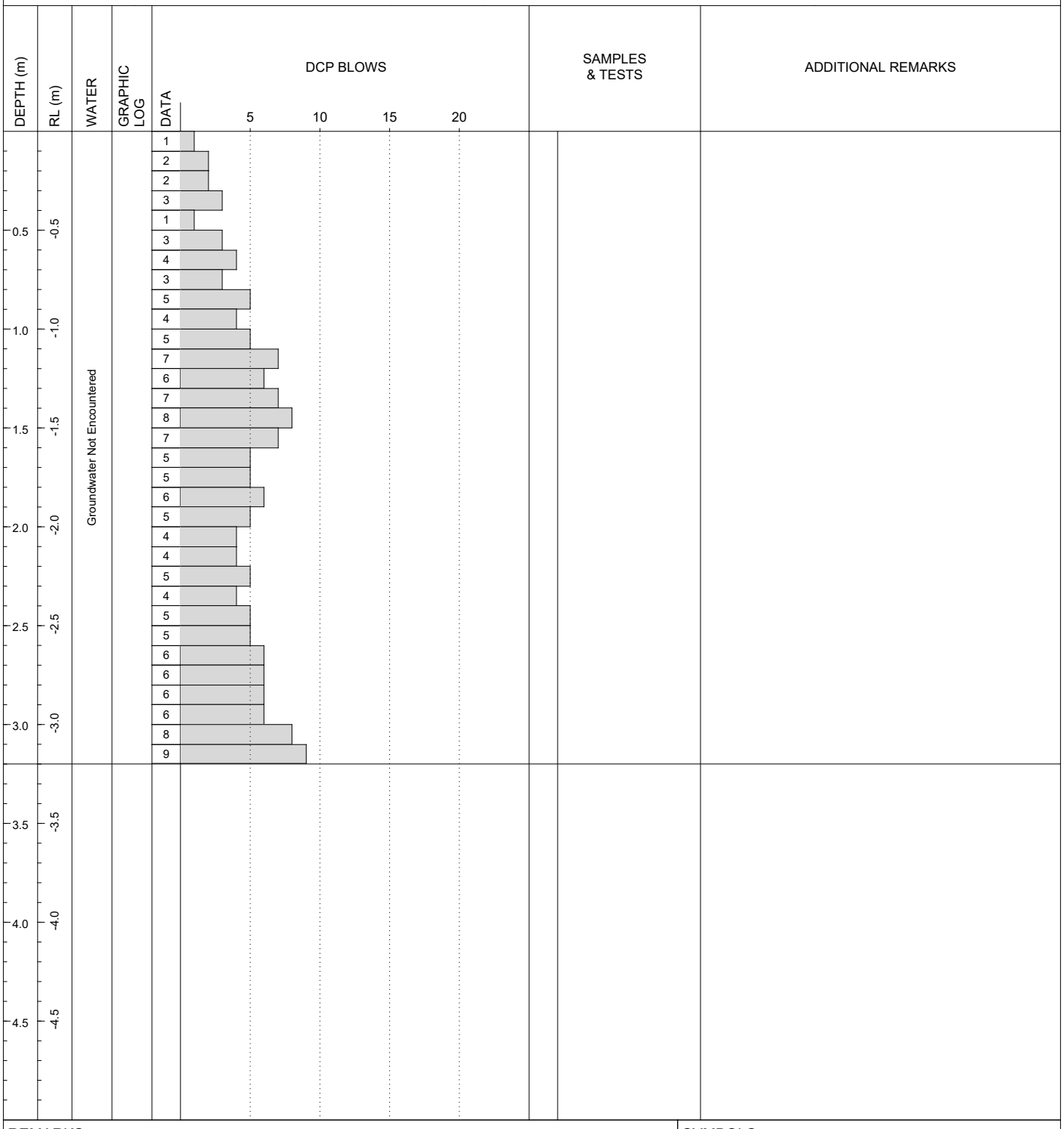
DCP LOG

DCP43

SHEET 43 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928576.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607851.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 59

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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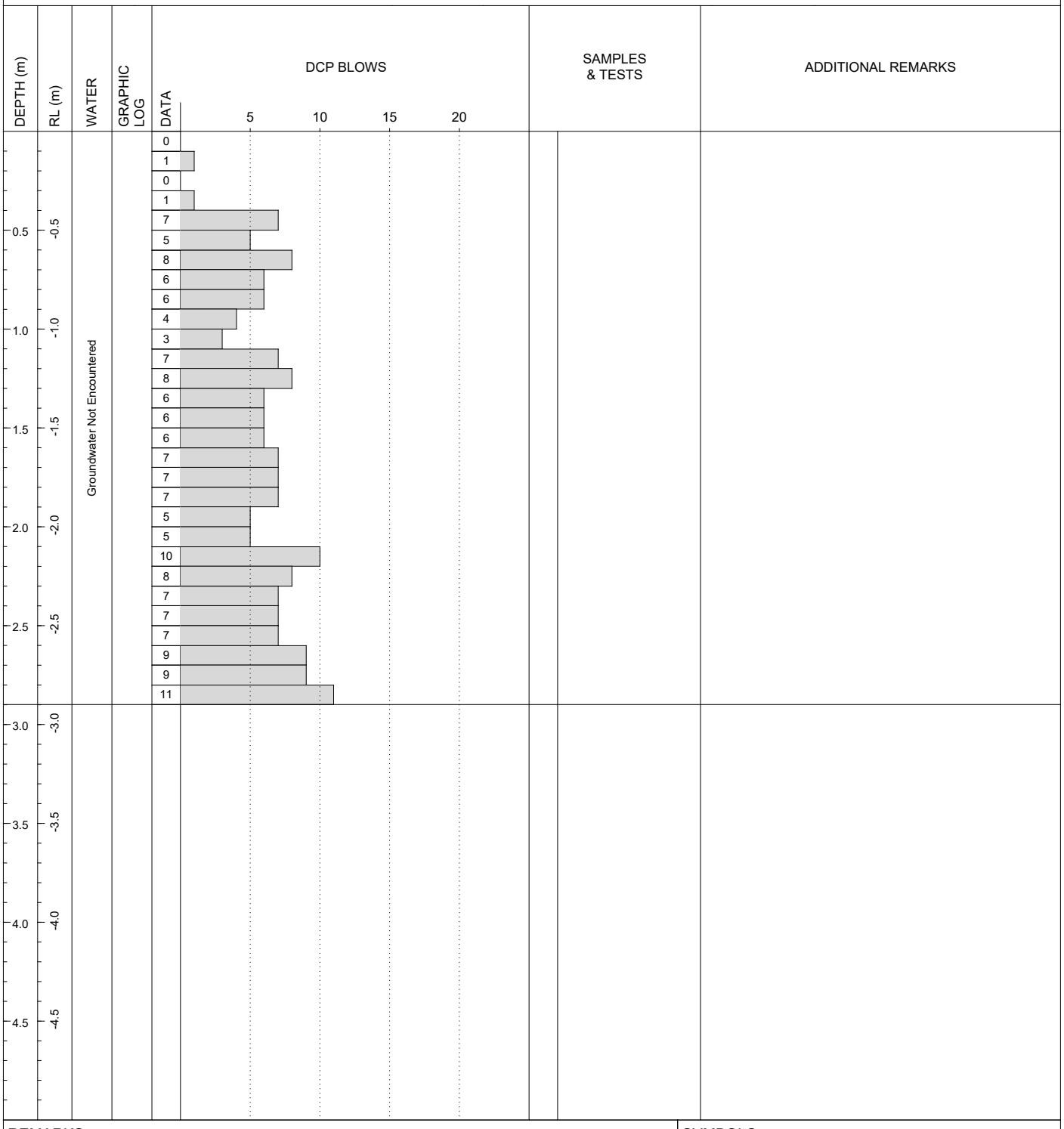
DCP LOG

DCP44

SHEET 44 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928587.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607837.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 59

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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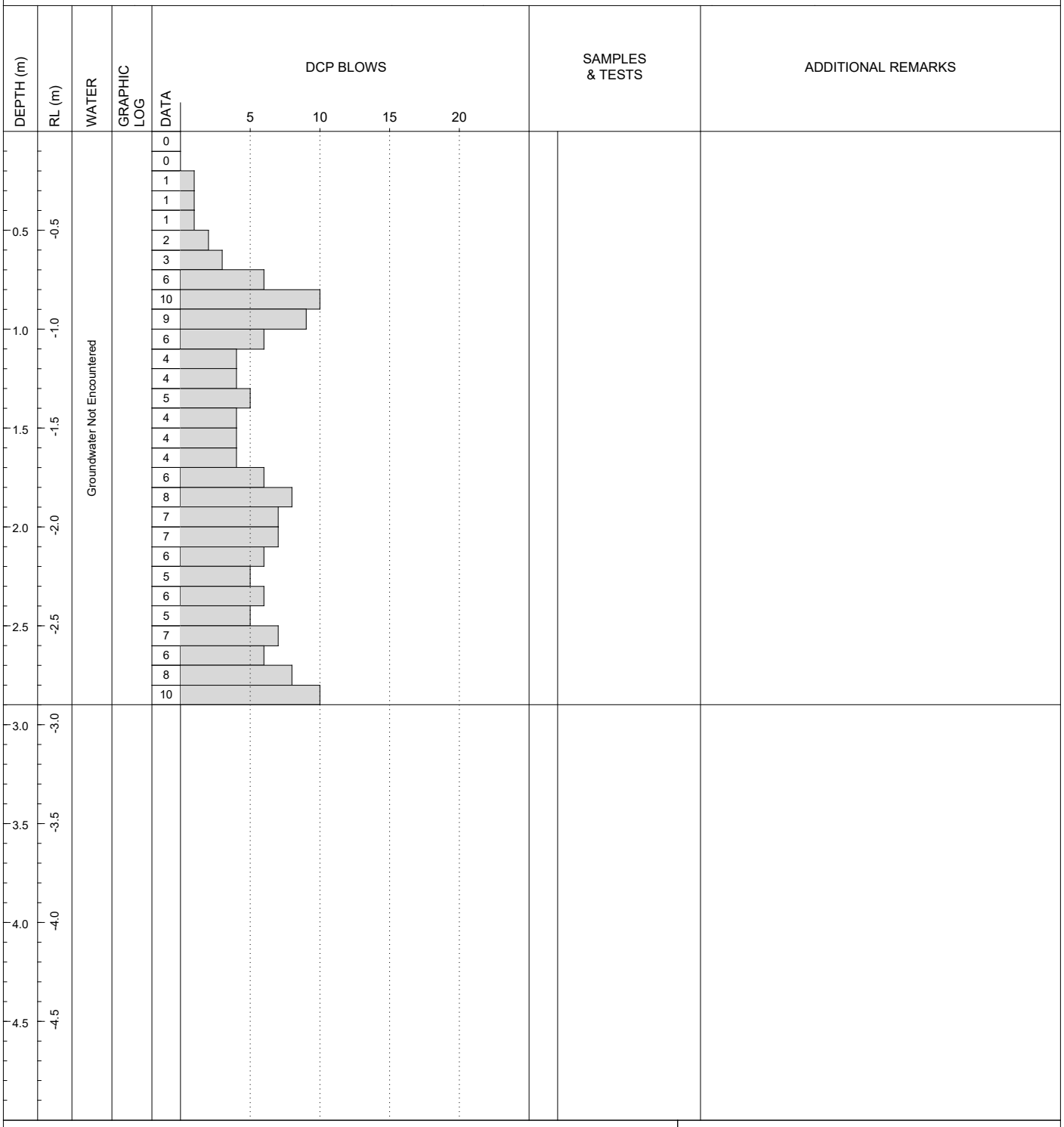
DCP LOG

DCP45

SHEET 45 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928593.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607838.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 60

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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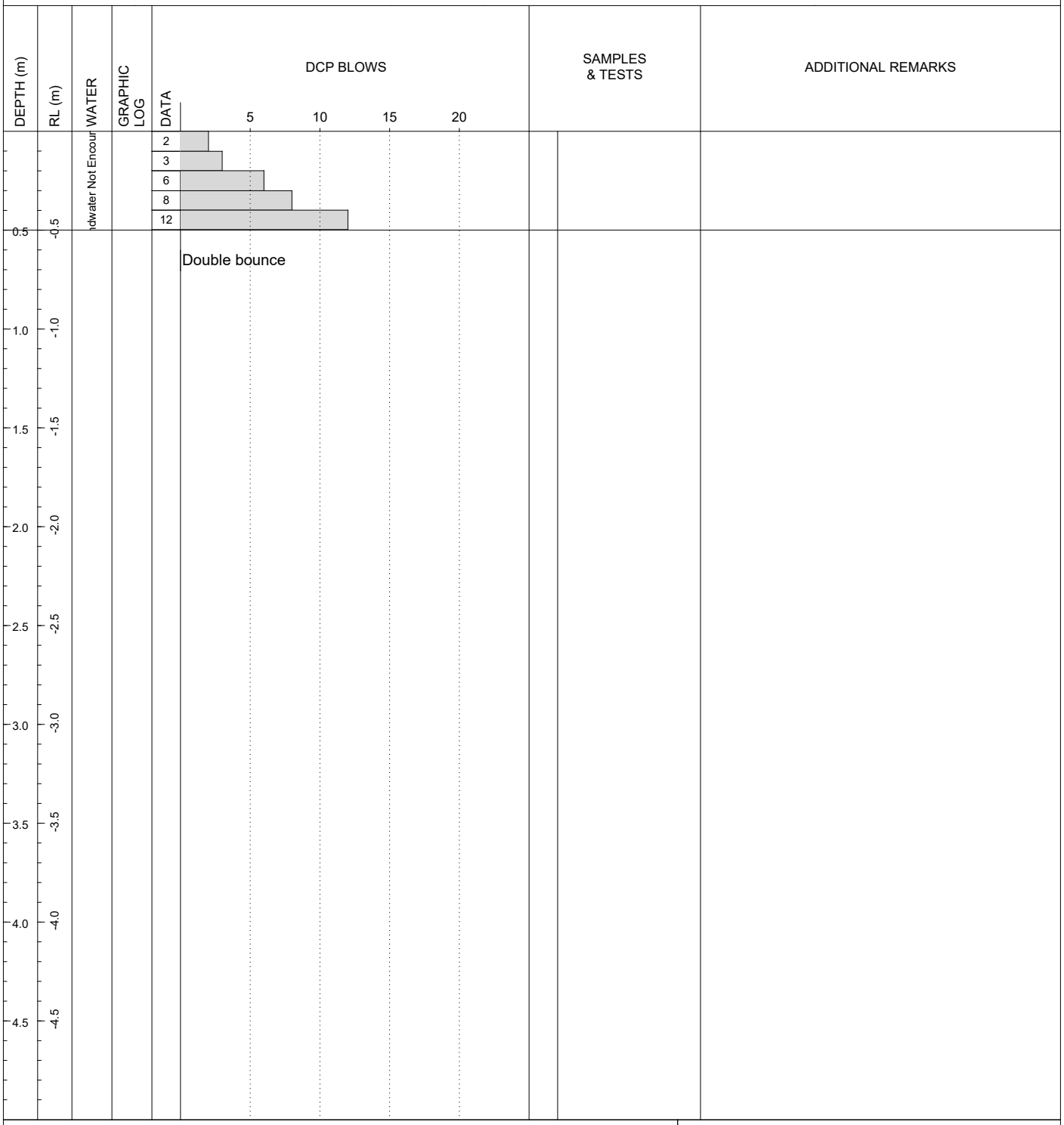
DCP LOG

DCP46

SHEET 46 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928581.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607854.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 60

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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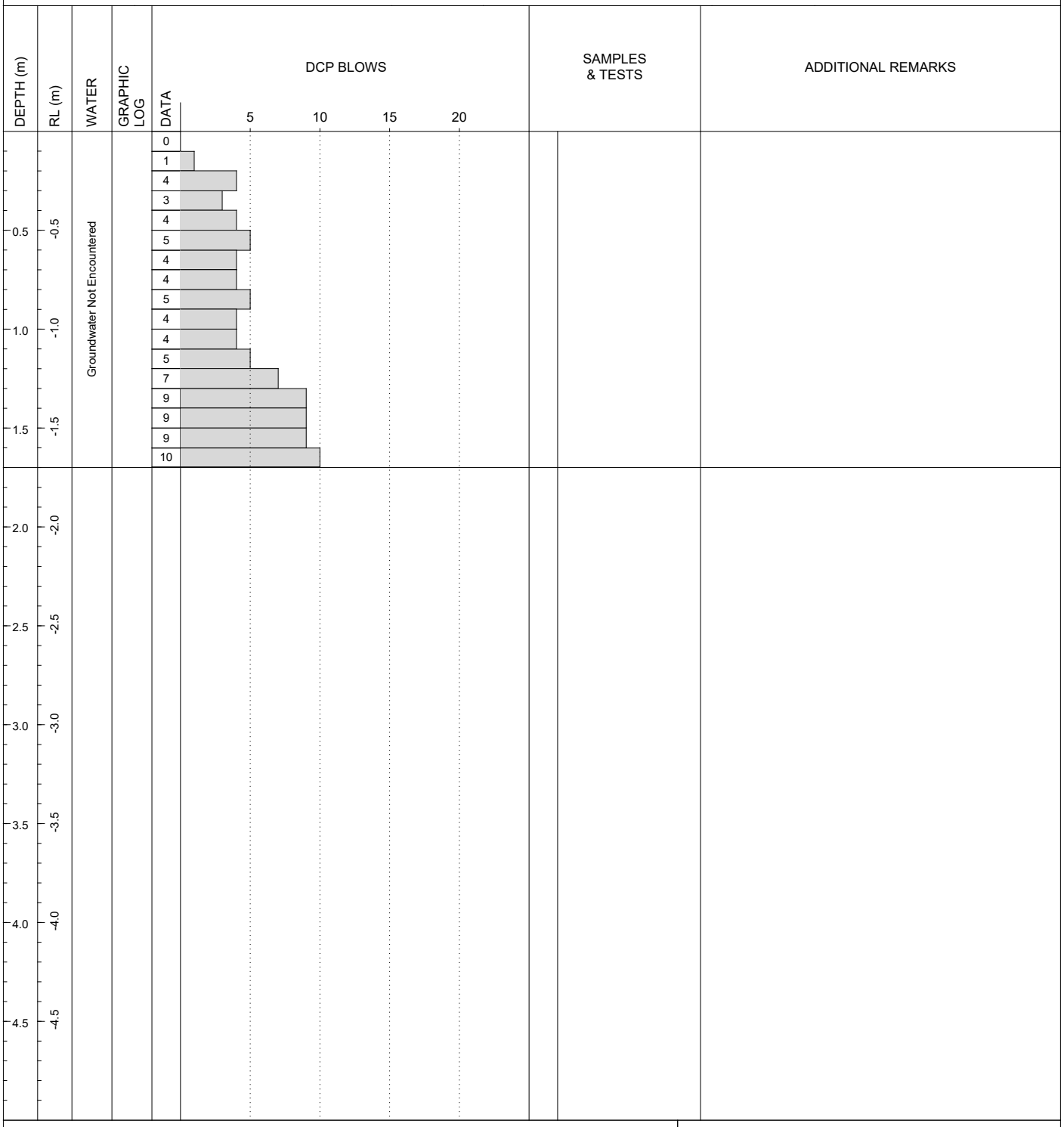
DCP LOG

DCP47

SHEET 47 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928588.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607859.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 60

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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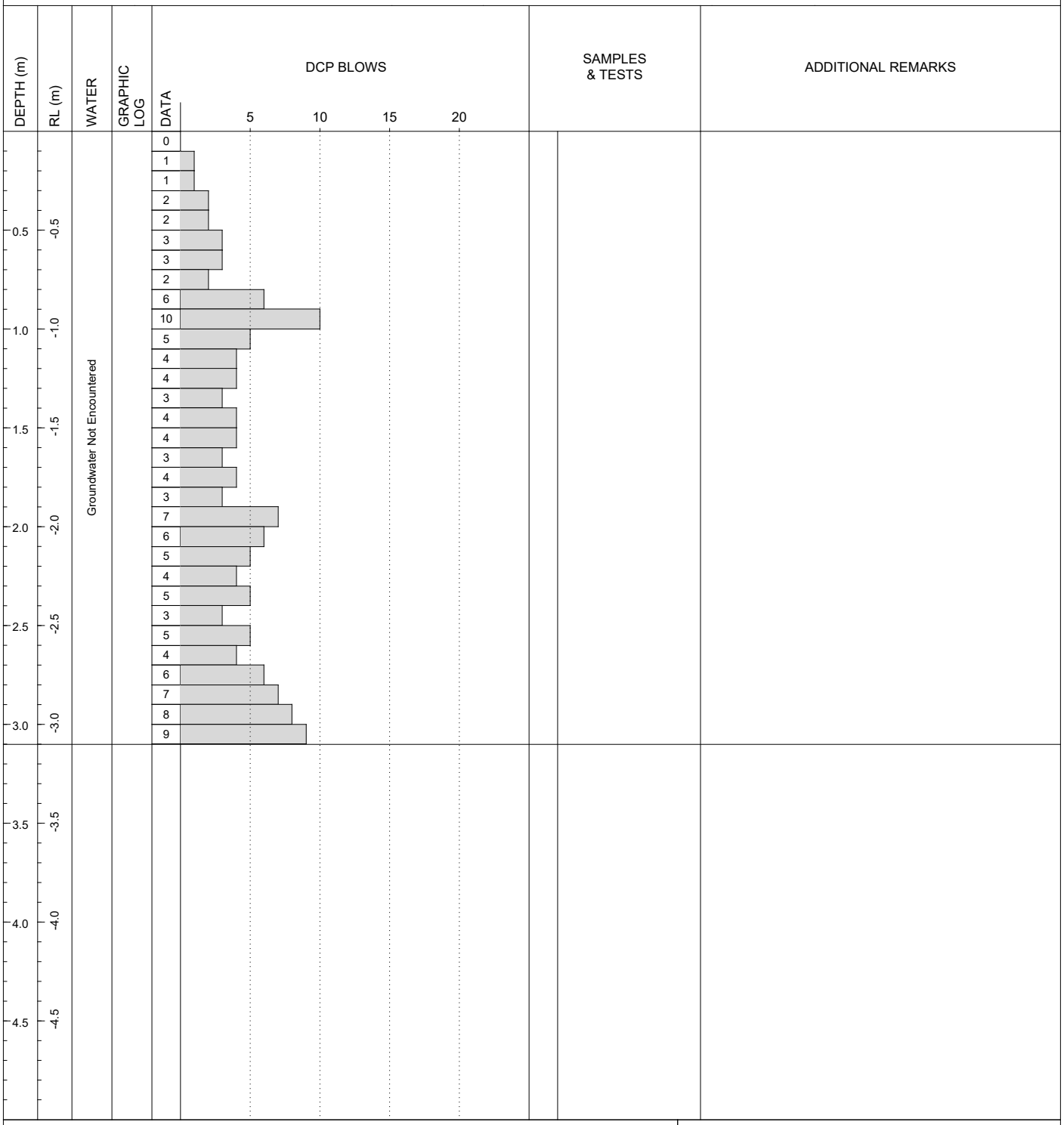
DCP LOG

DCP48

SHEET 48 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928598.00	STARTED: 21/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607845.00	FINISHED: 21/06/2018
	DATUM: NZVD2016	LOGGED BY: SD/BR DATE: 21/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: SD/BR



REMARKS

Lot 60

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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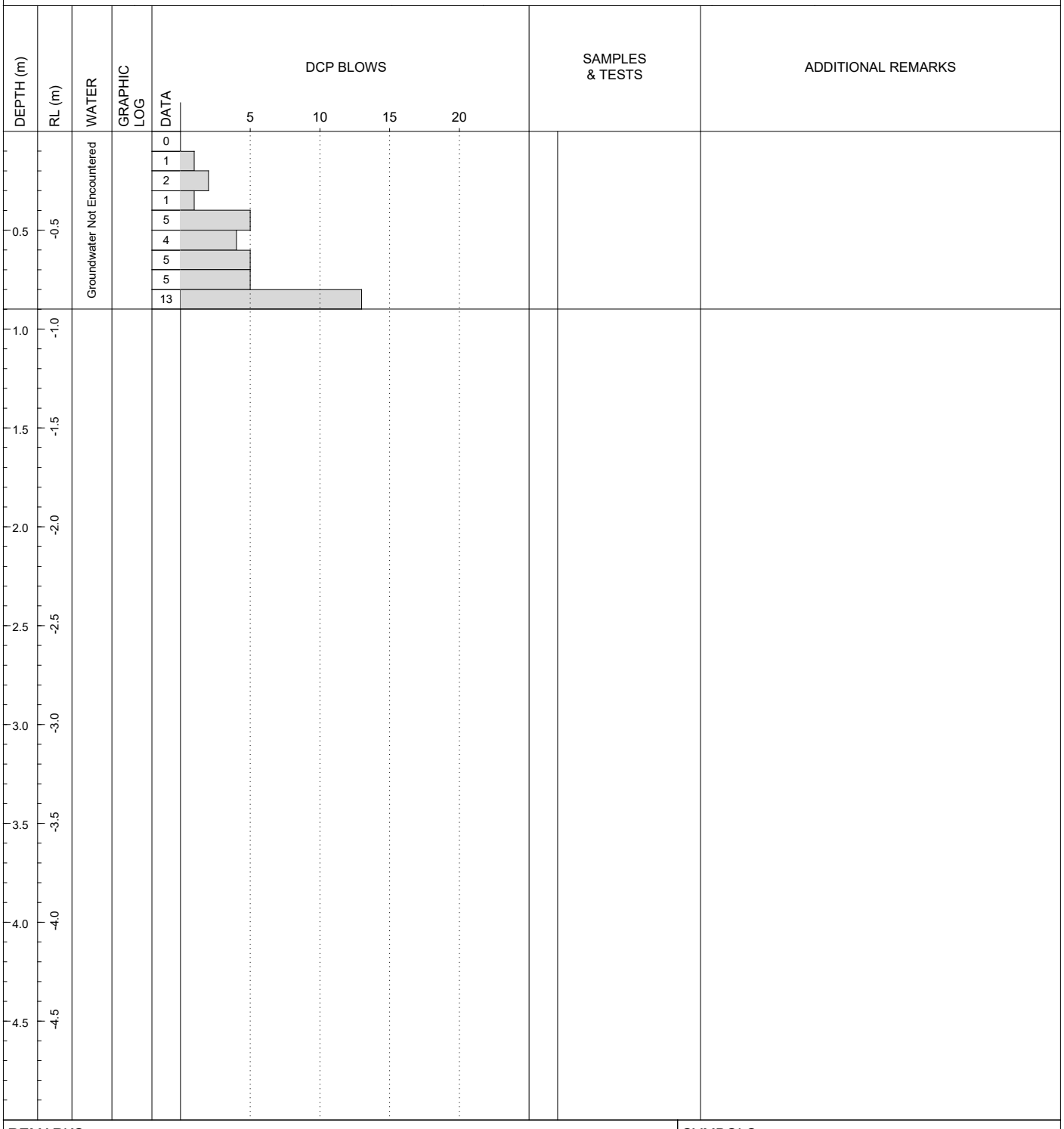
DCP LOG

DCP49

SHEET 49 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928612.00	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607850.00	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 61

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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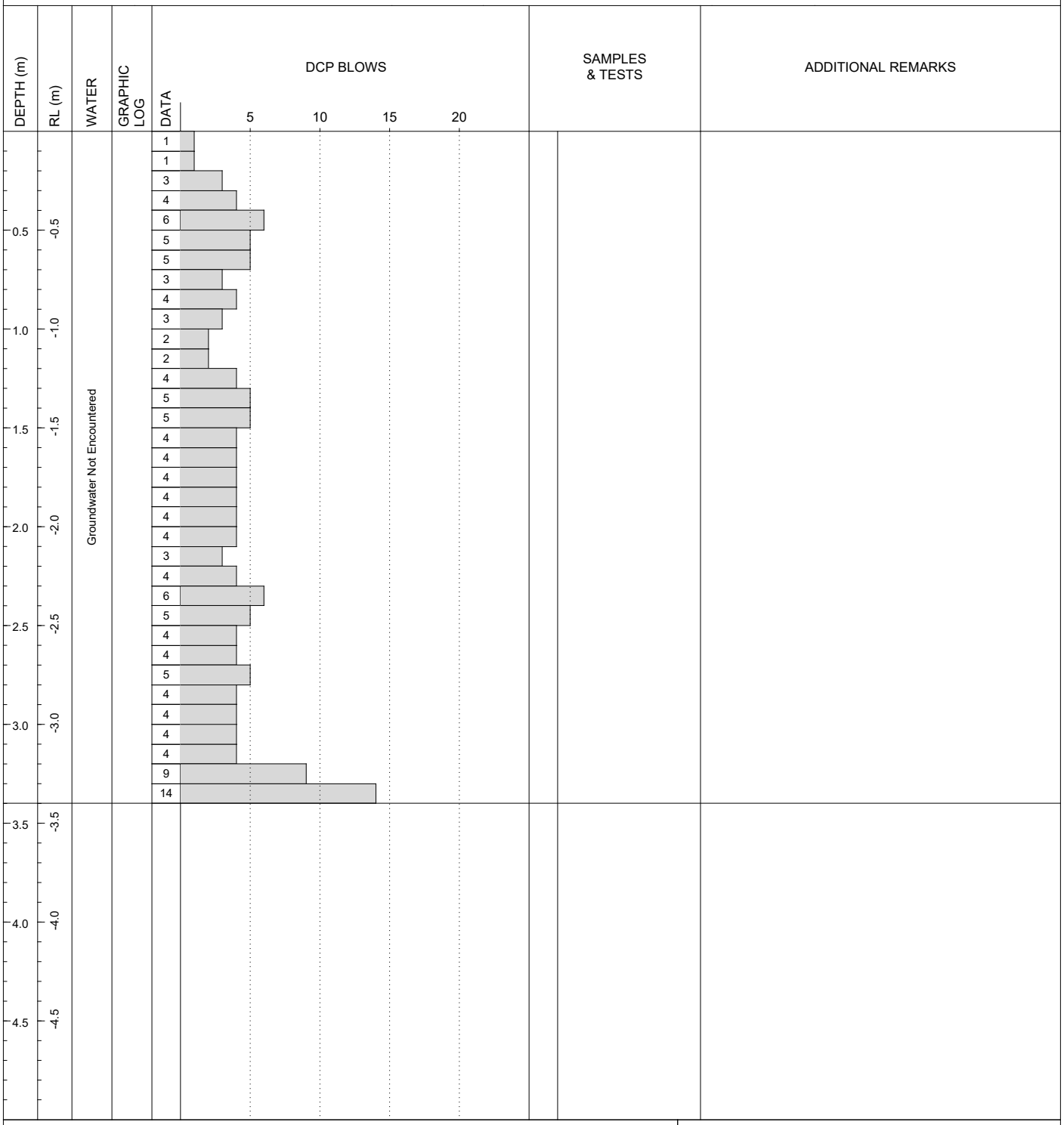
DCP LOG

DCP50

SHEET 50 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928596.92	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607865.28	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 61

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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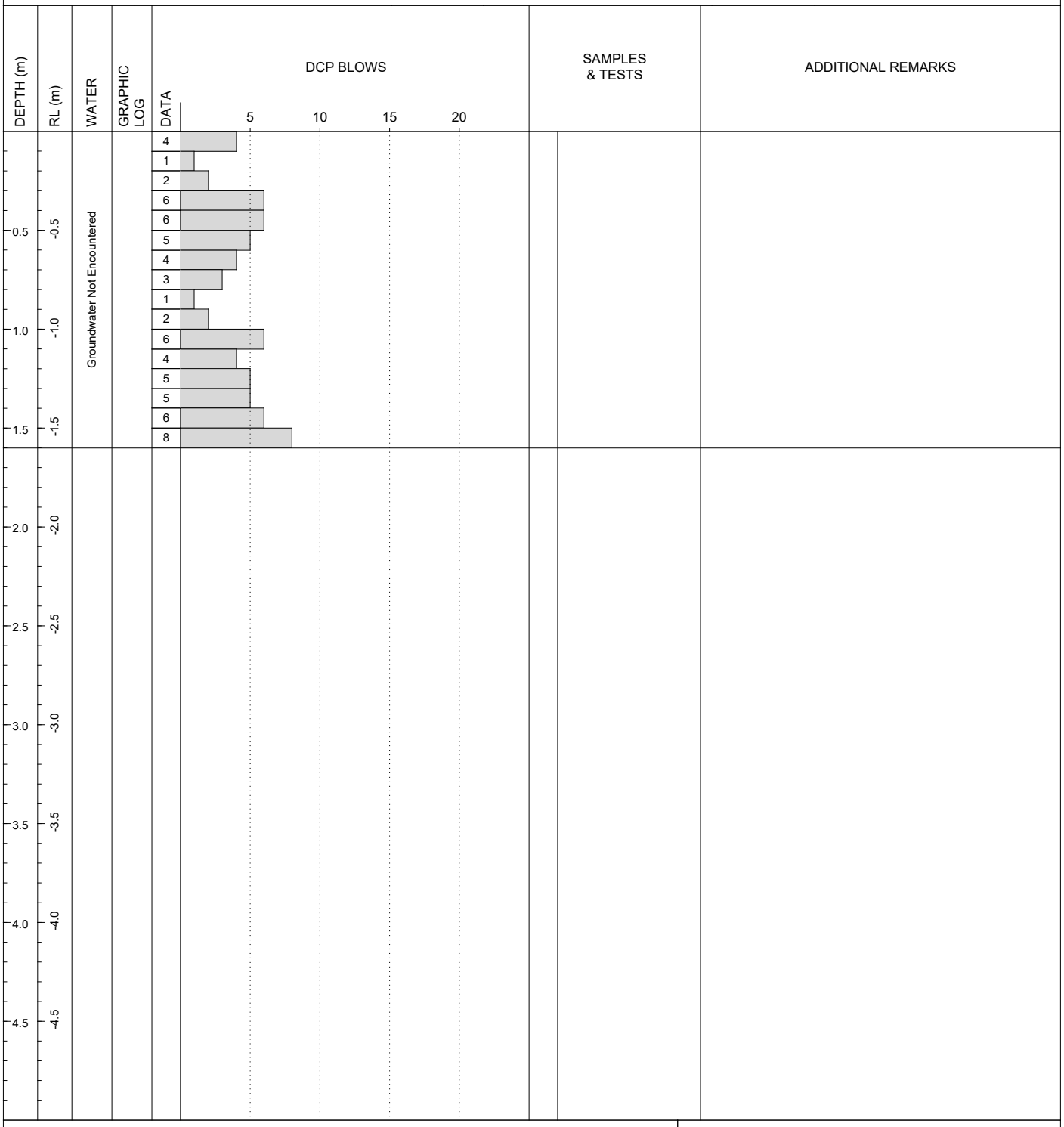
DCP LOG

DCP51

SHEET 51 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928606.32	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607871.14	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 61

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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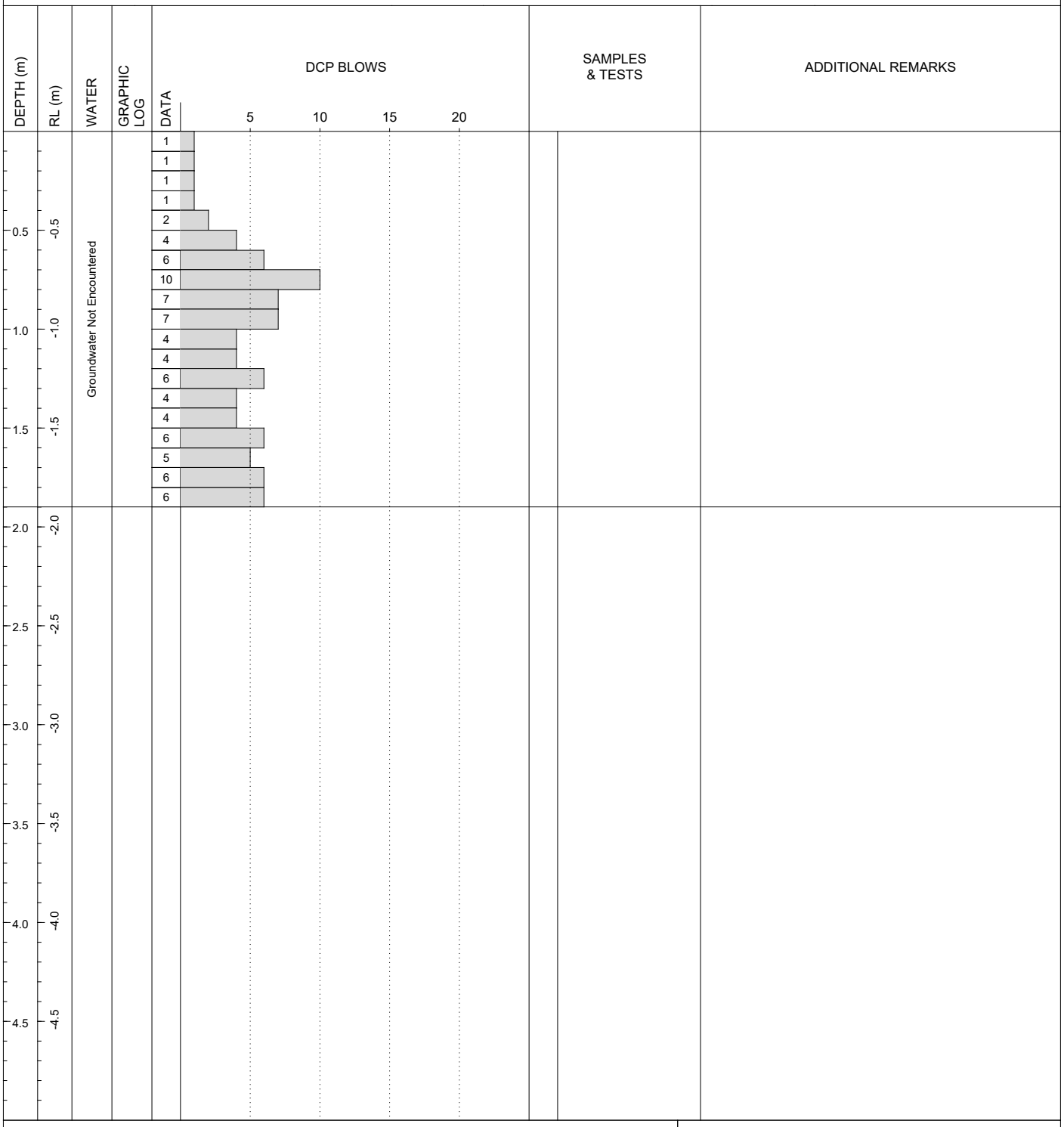
DCP LOG

DCP52

SHEET 52 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928623.43	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607851.57	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 61

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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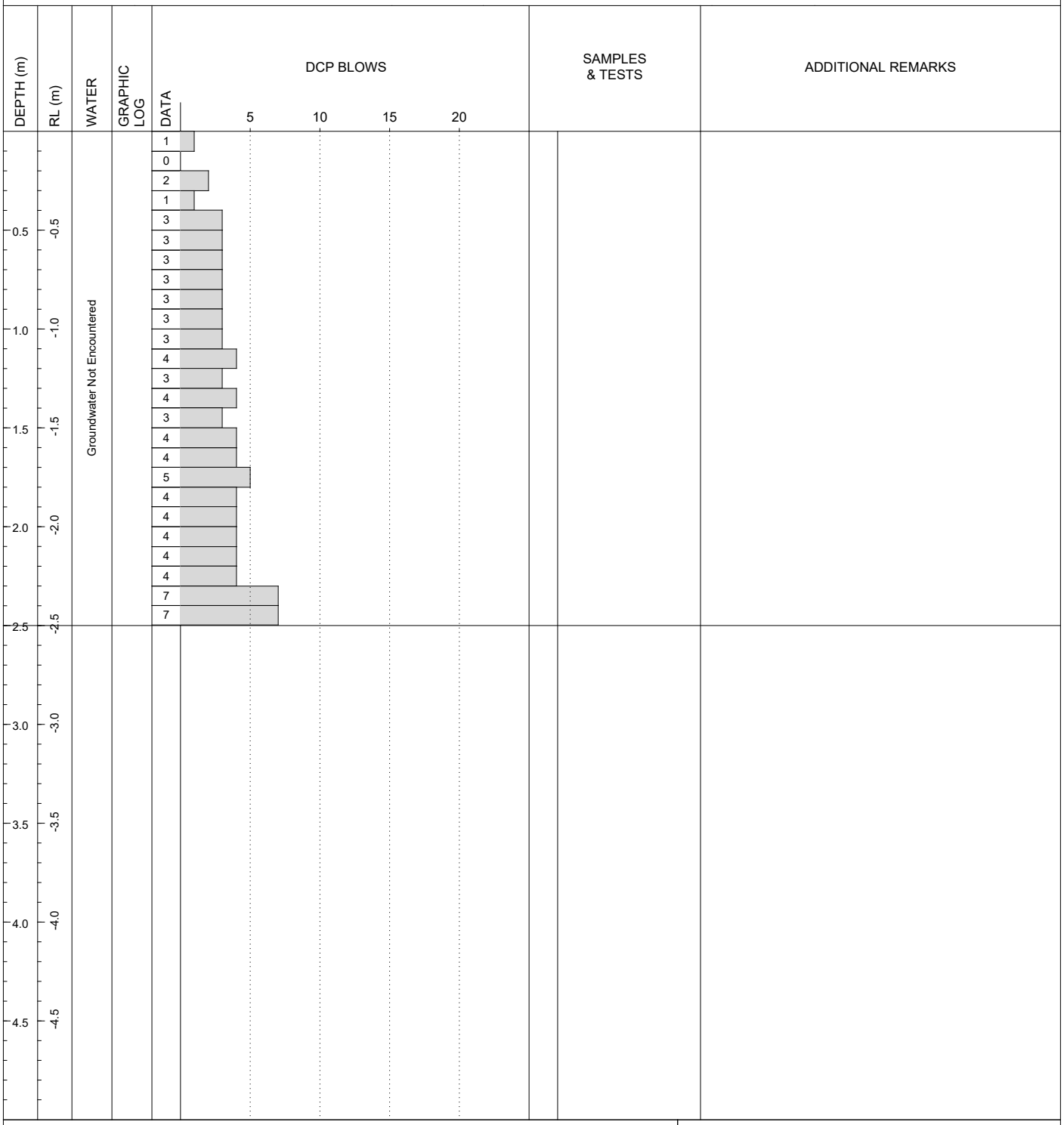
DCP LOG

DCP53

SHEET 53 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928631.91	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607847.25	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 62

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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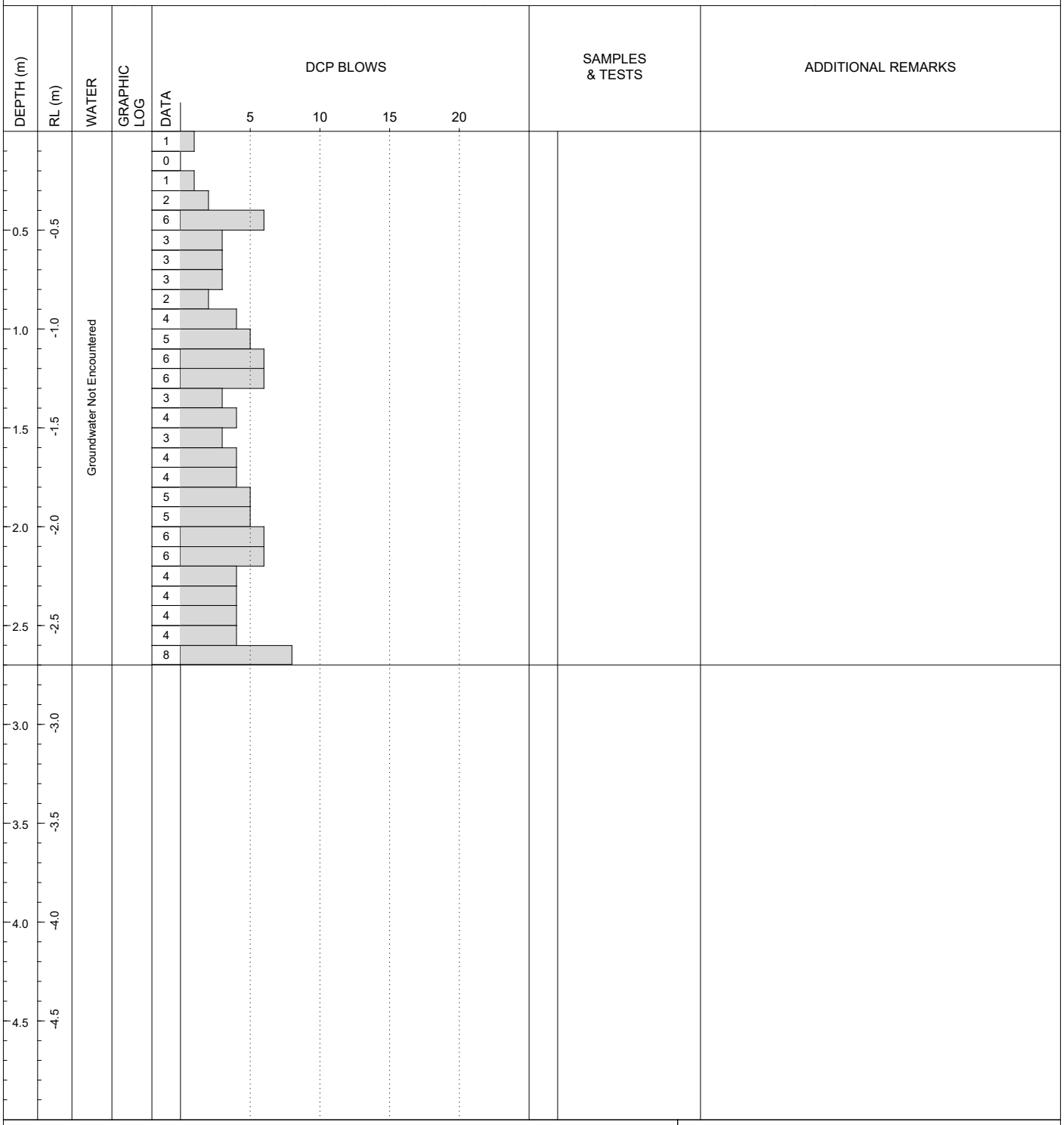
DCP LOG

DCP54

SHEET 54 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928645.79	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607829.52	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 62

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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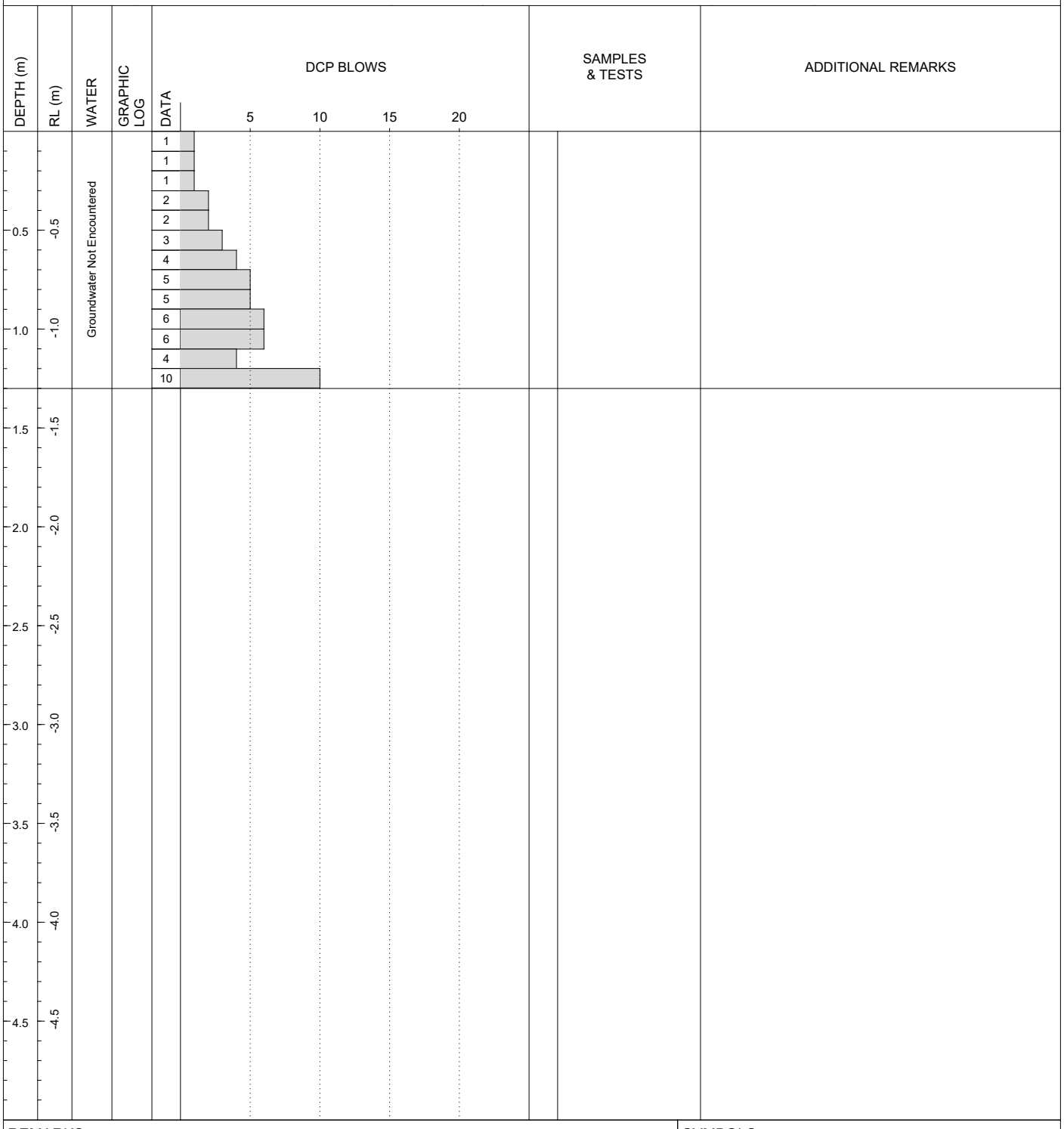
DCP LOG

DCP55

SHEET 55 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928633.45	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607821.04	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 62

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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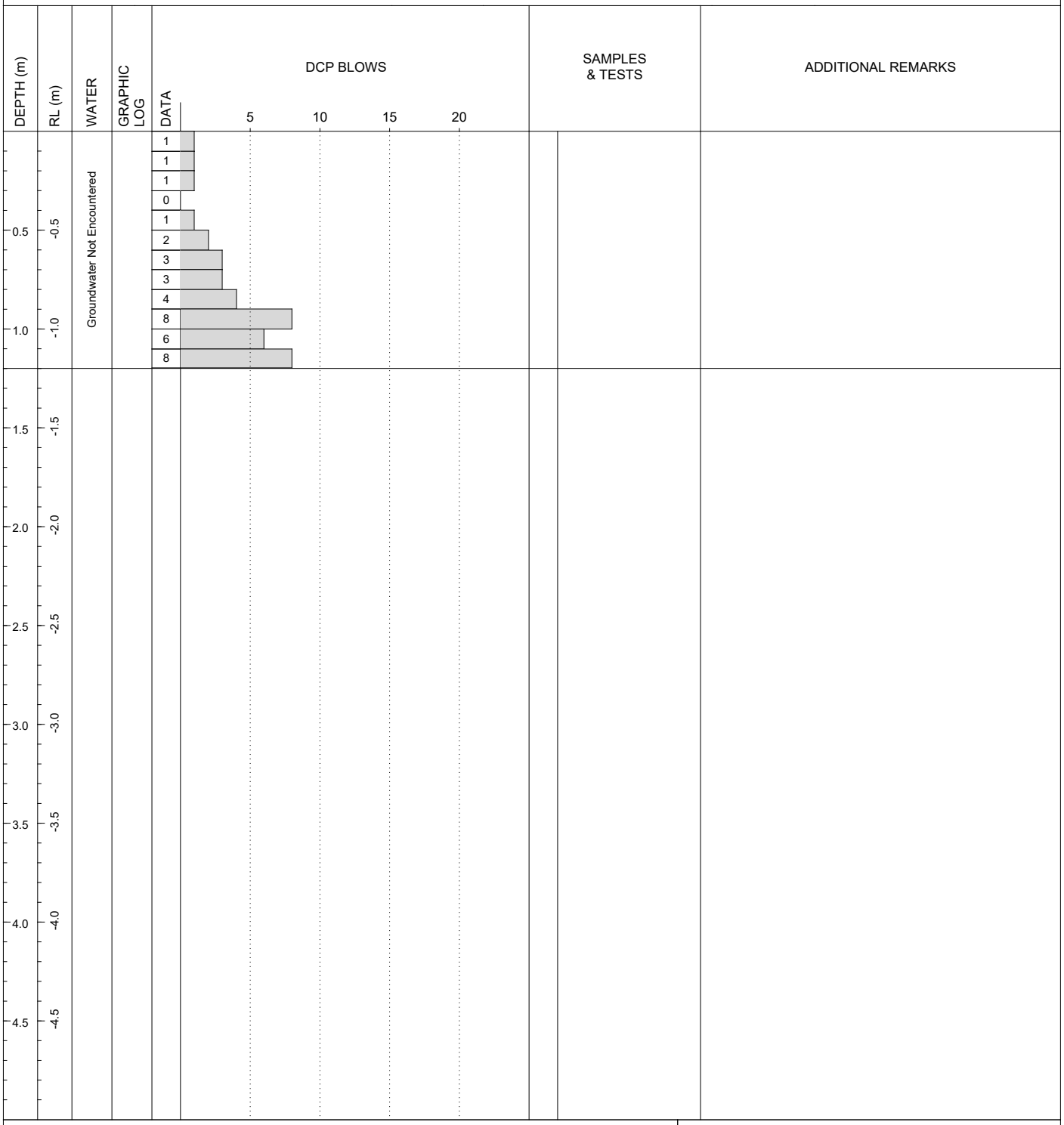
DCP LOG

DCP56

SHEET 56 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928620.81	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607835.69	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 62

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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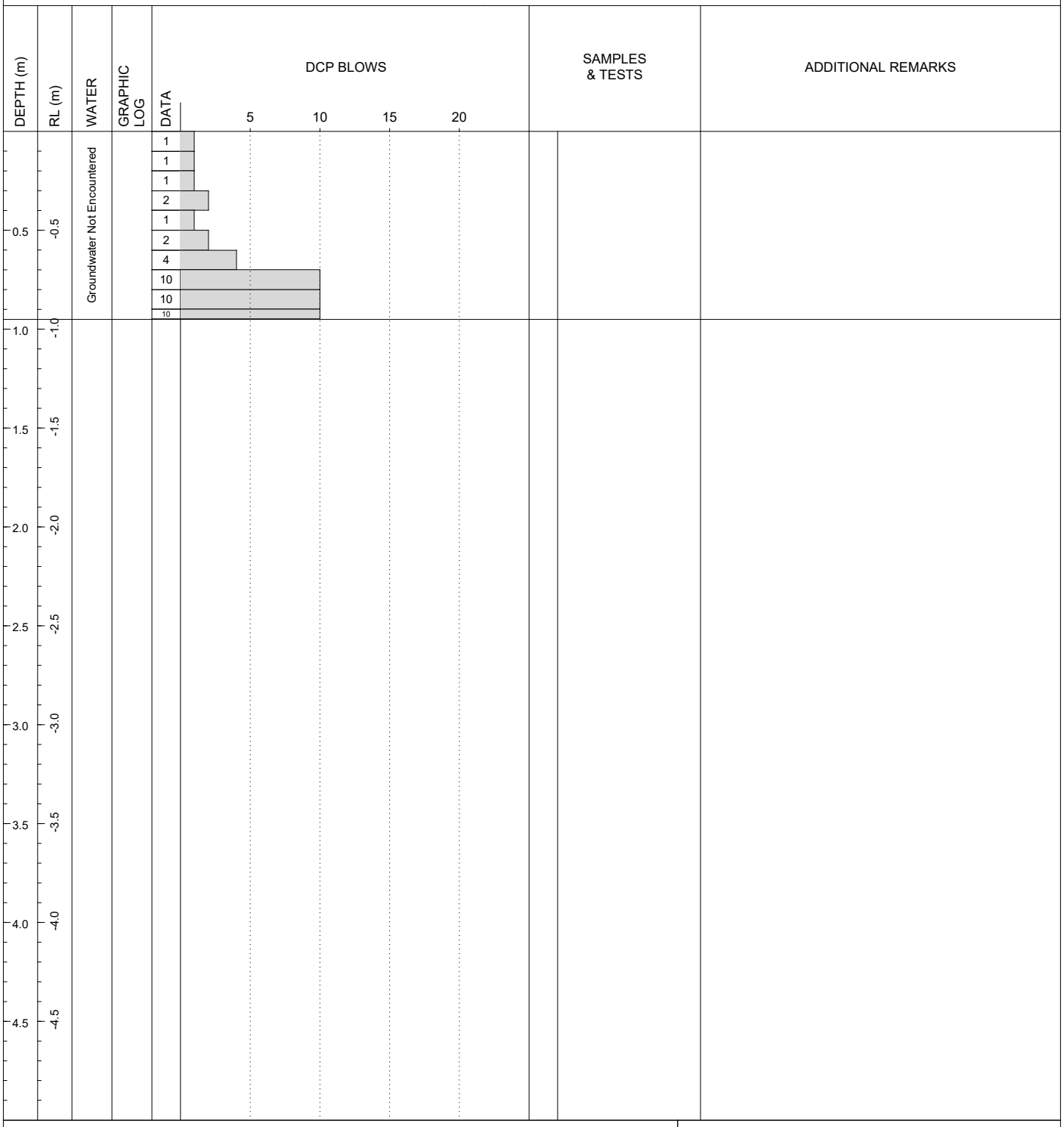
DCP LOG

DCP57

SHEET 57 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928616.81	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607831.99	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 63

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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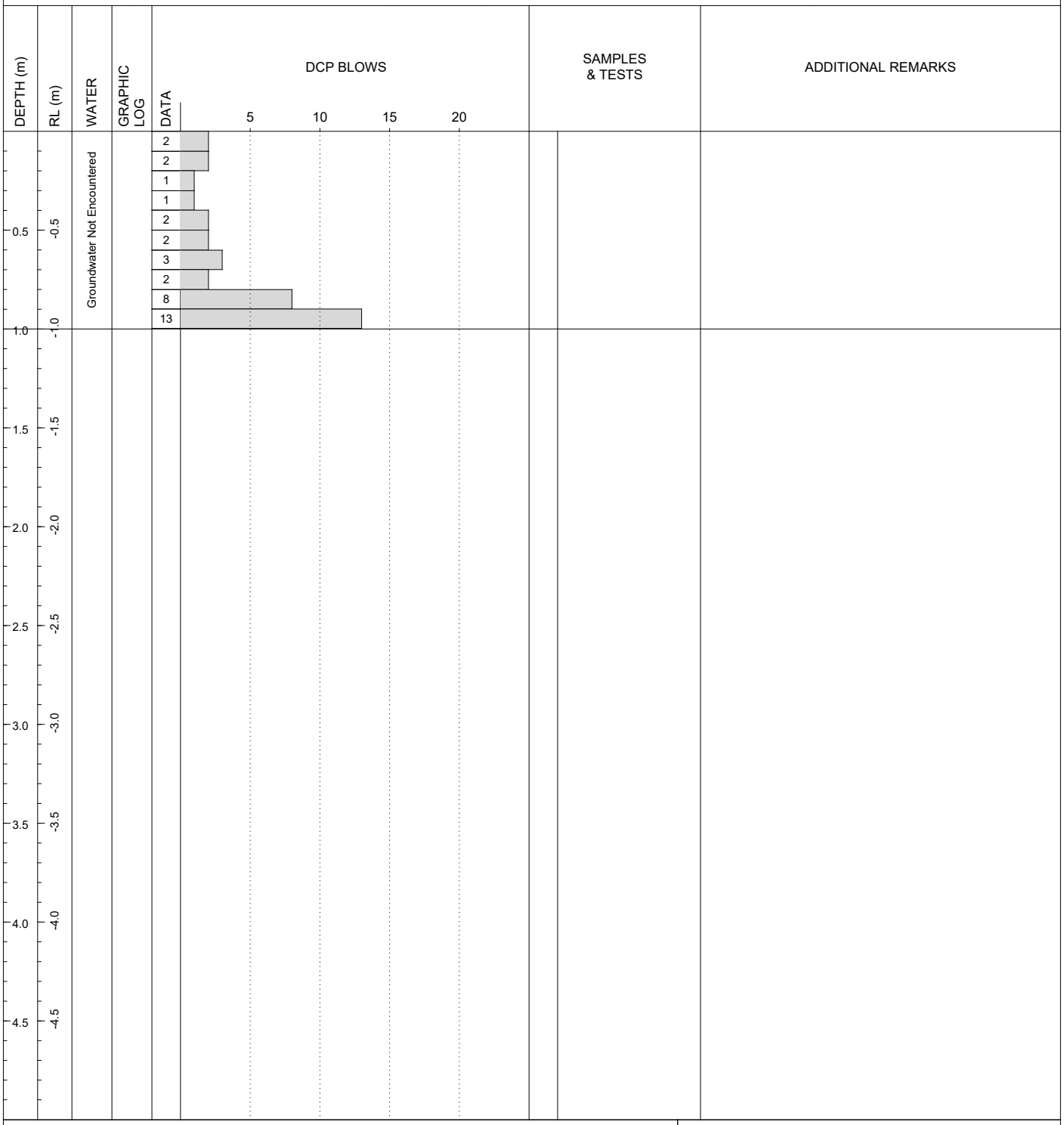
DCP LOG

DCP58

SHEET 58 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928604.94	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607822.28	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 63

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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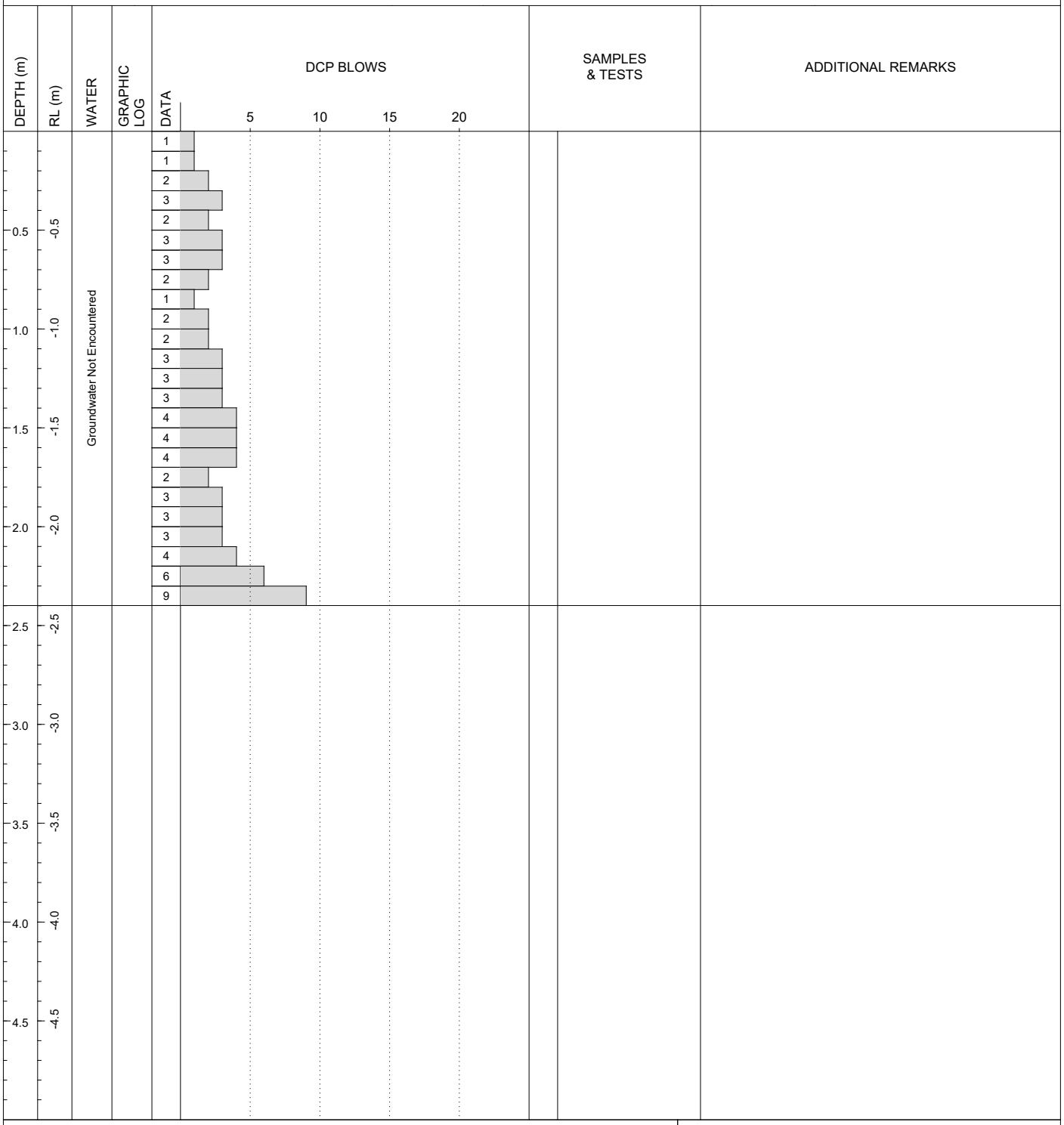
DCP LOG

DCP59

SHEET 59 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928616.04	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607803.63	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 63

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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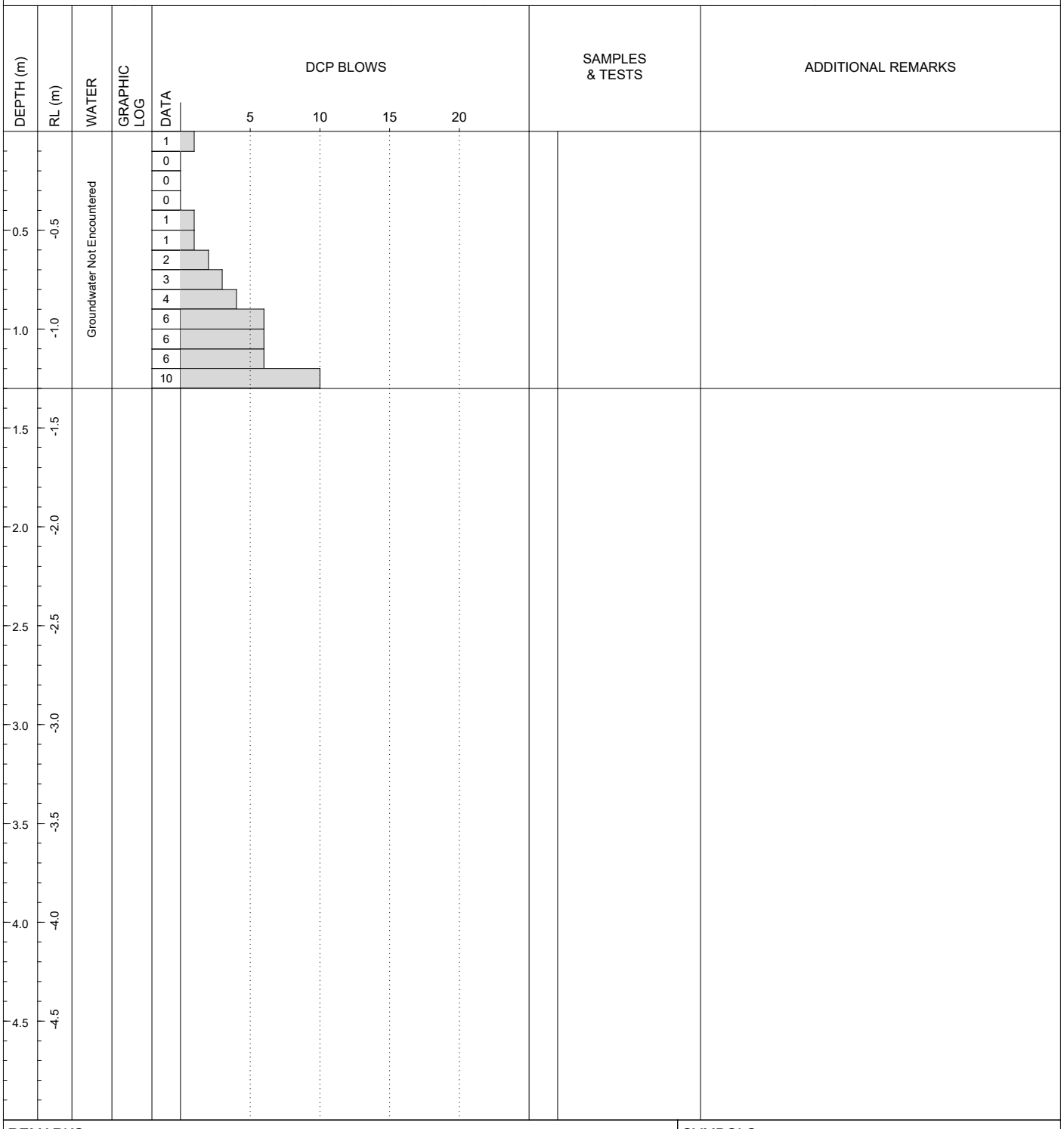
DCP LOG

DCP60

SHEET 60 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928630.06	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607815.50	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 63

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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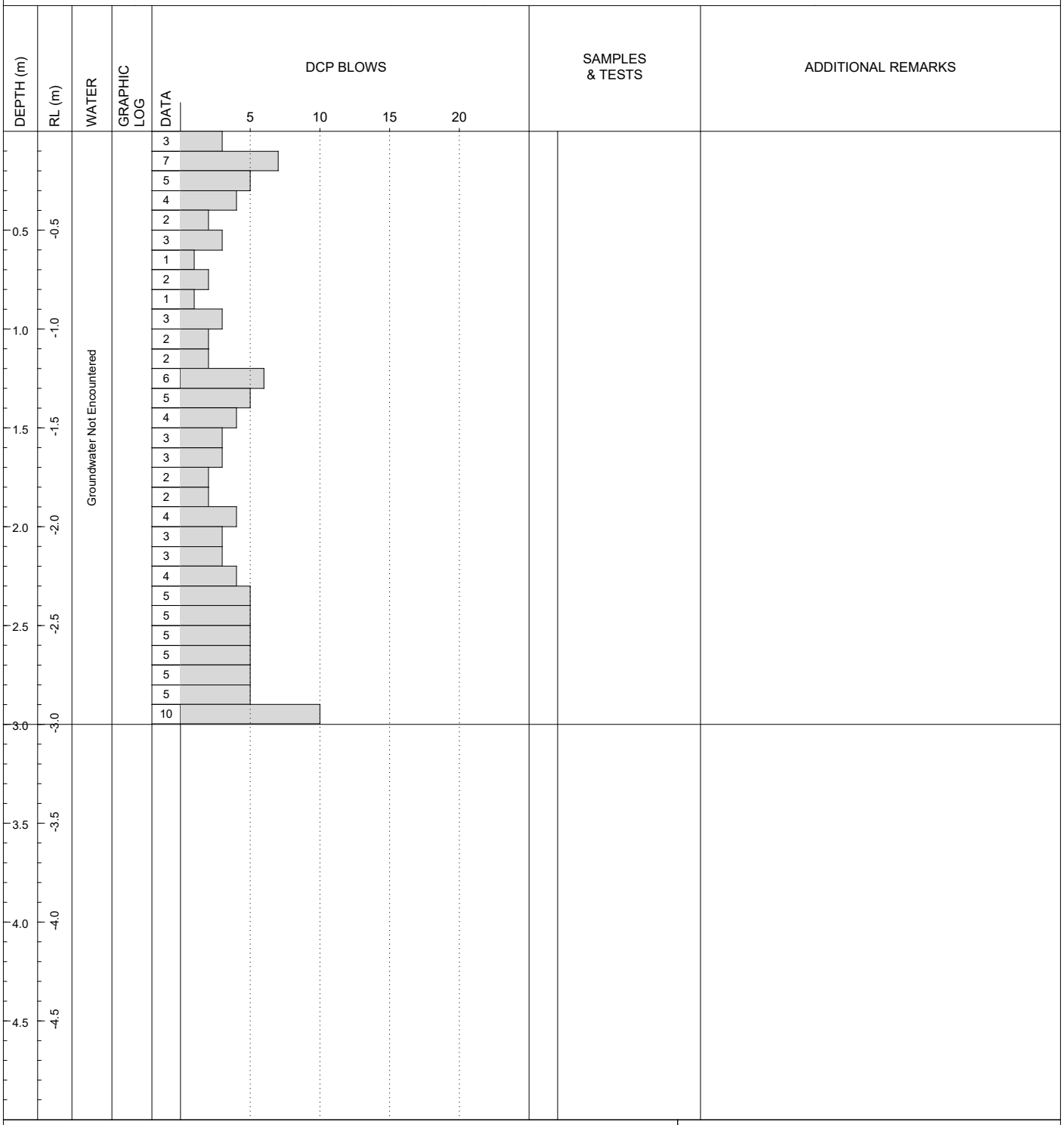
DCP LOG

DCP61

SHEET 61 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928515.69	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607778.50	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 54

SYMBOLS

- Standing Water Level
- Out flow
- In flow

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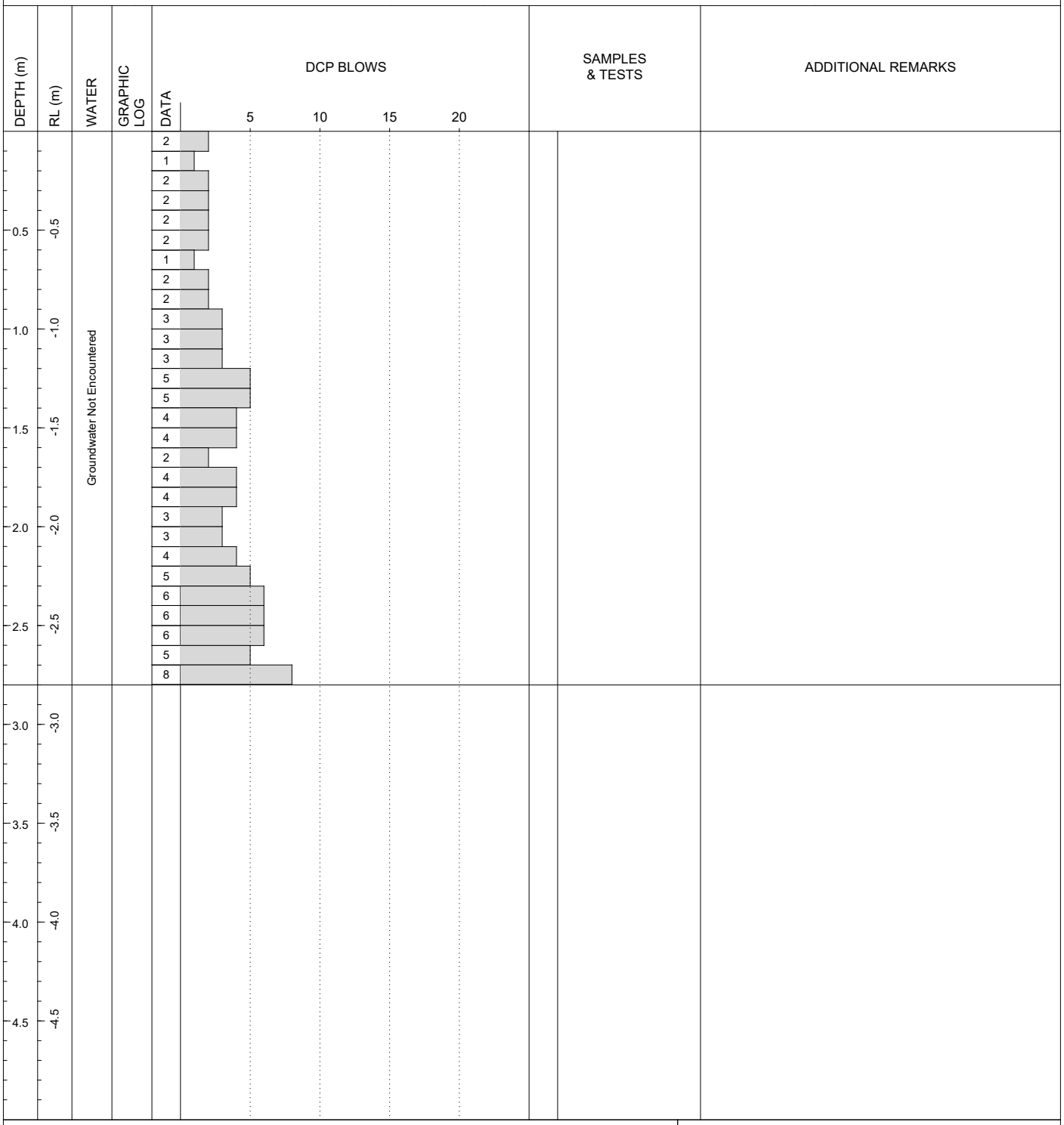
DCP LOG

DCP62

SHEET 62 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928499.96	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607796.53	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 54

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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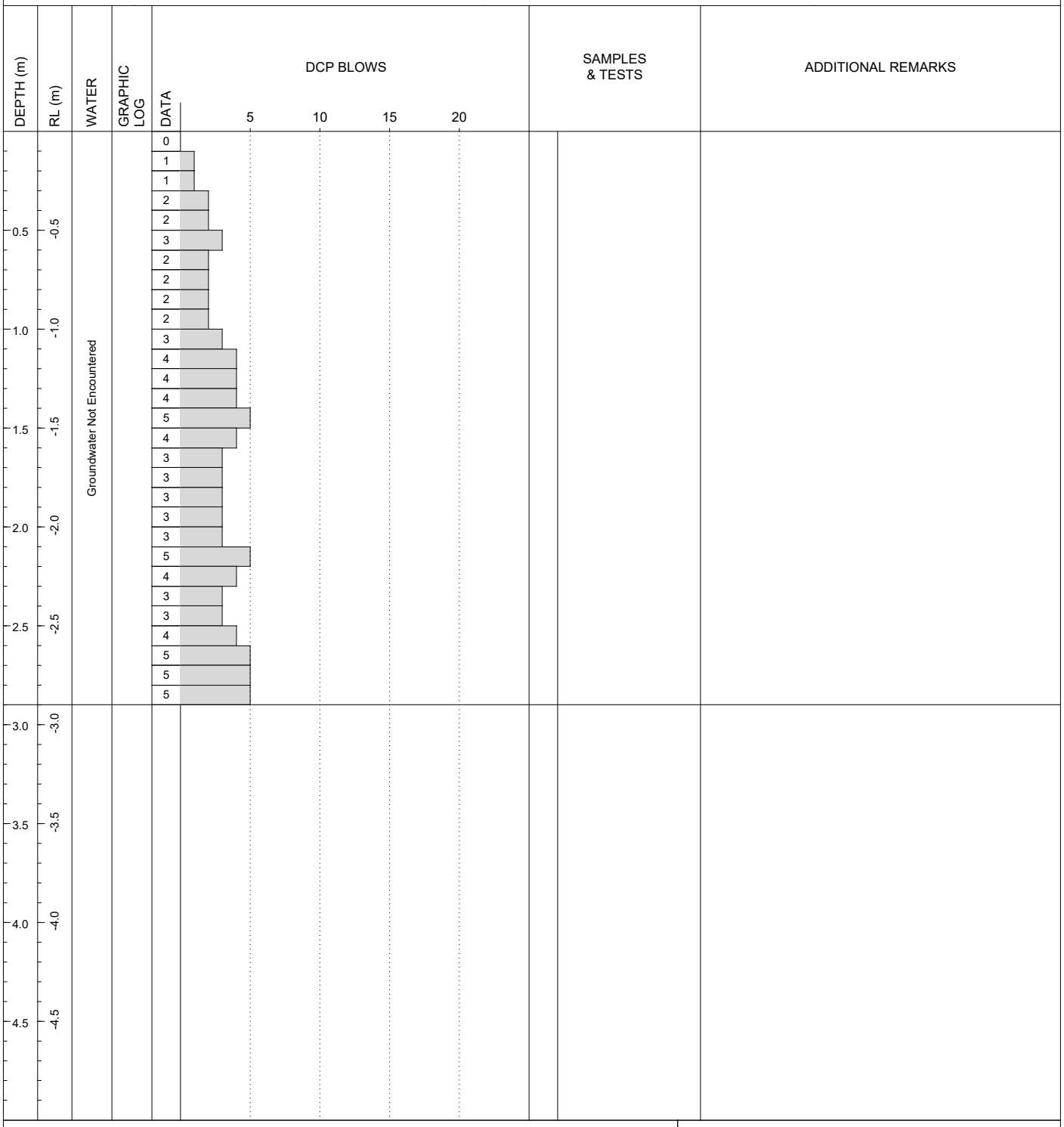
DCP LOG

DCP63

SHEET 63 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928489.17	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607782.97	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 54

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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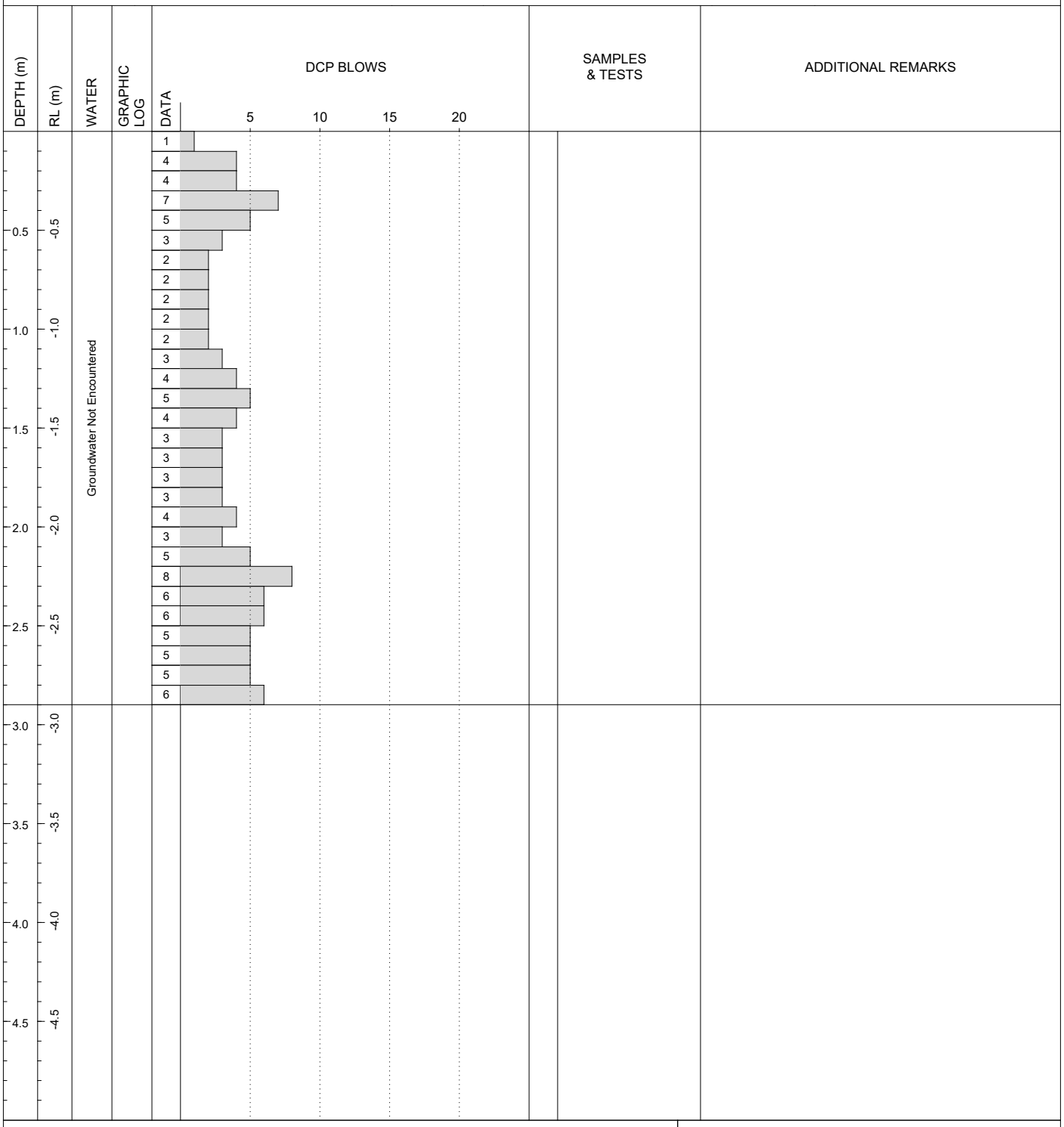
DCP LOG

DCP64

SHEET 64 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928501.35	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607768.02	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 54

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

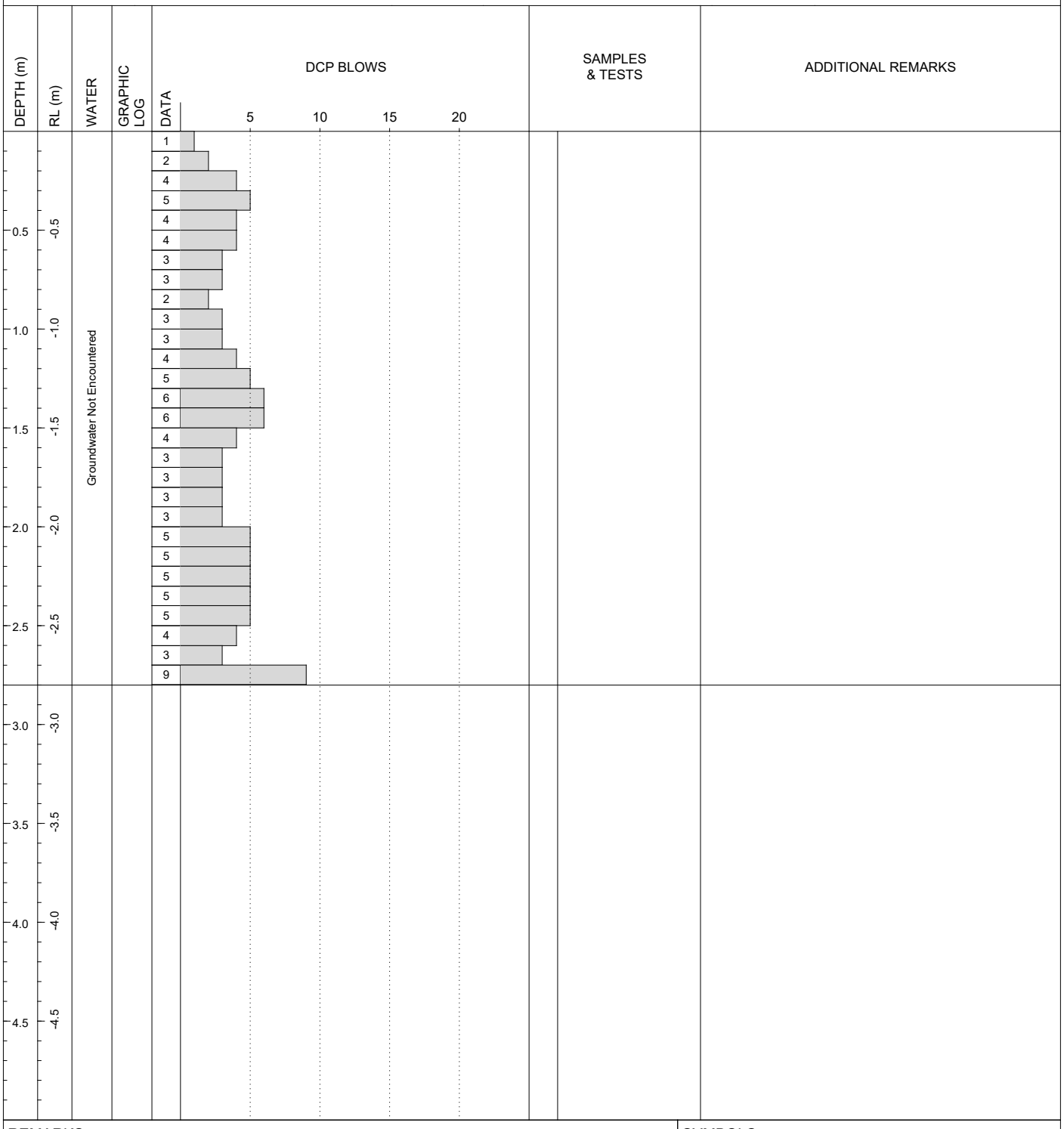
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP65

SHEET 65 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928495.34	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607763.24	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 53

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

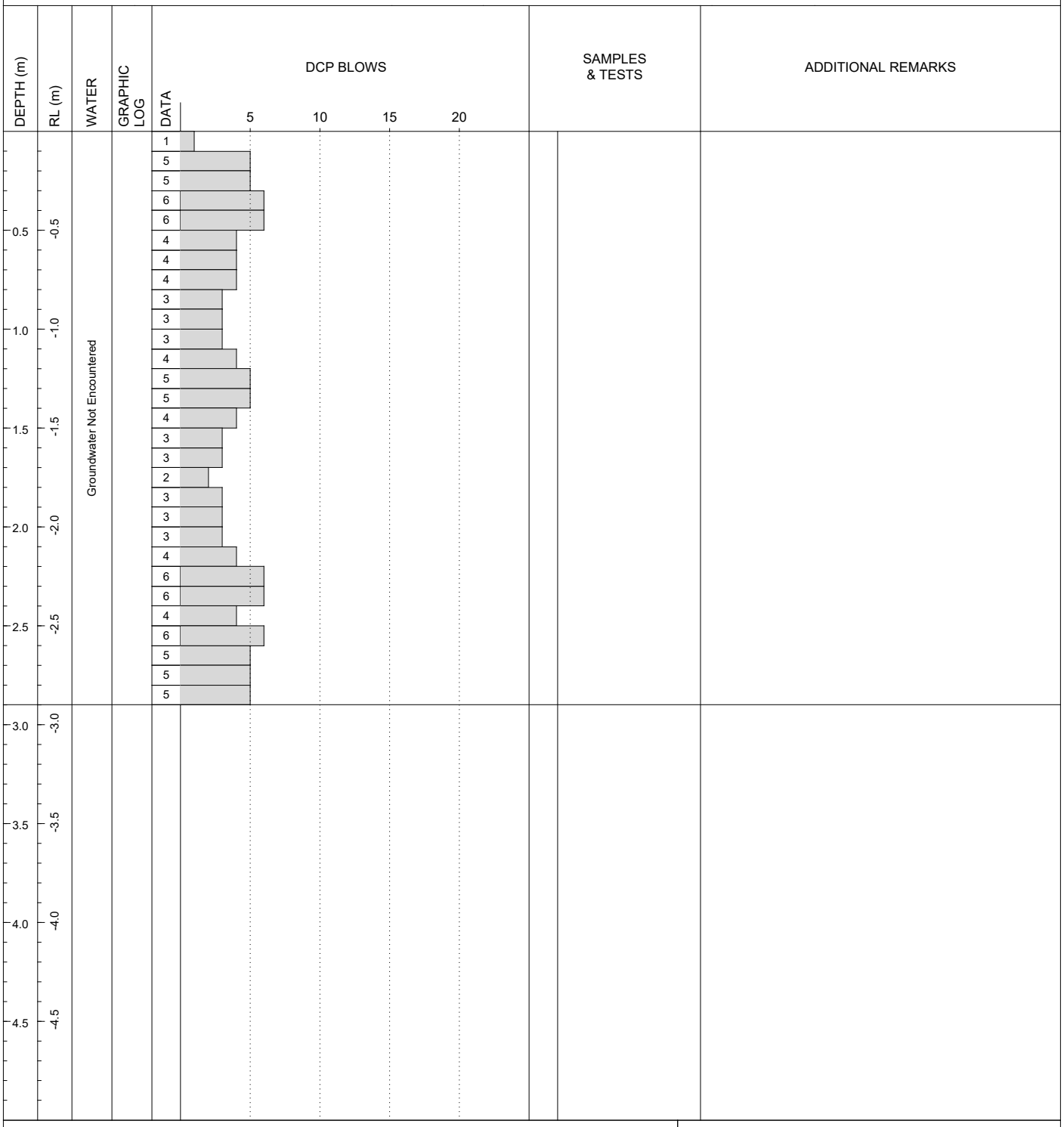
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP66

SHEET 66 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928481.46	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607780.66	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 53

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

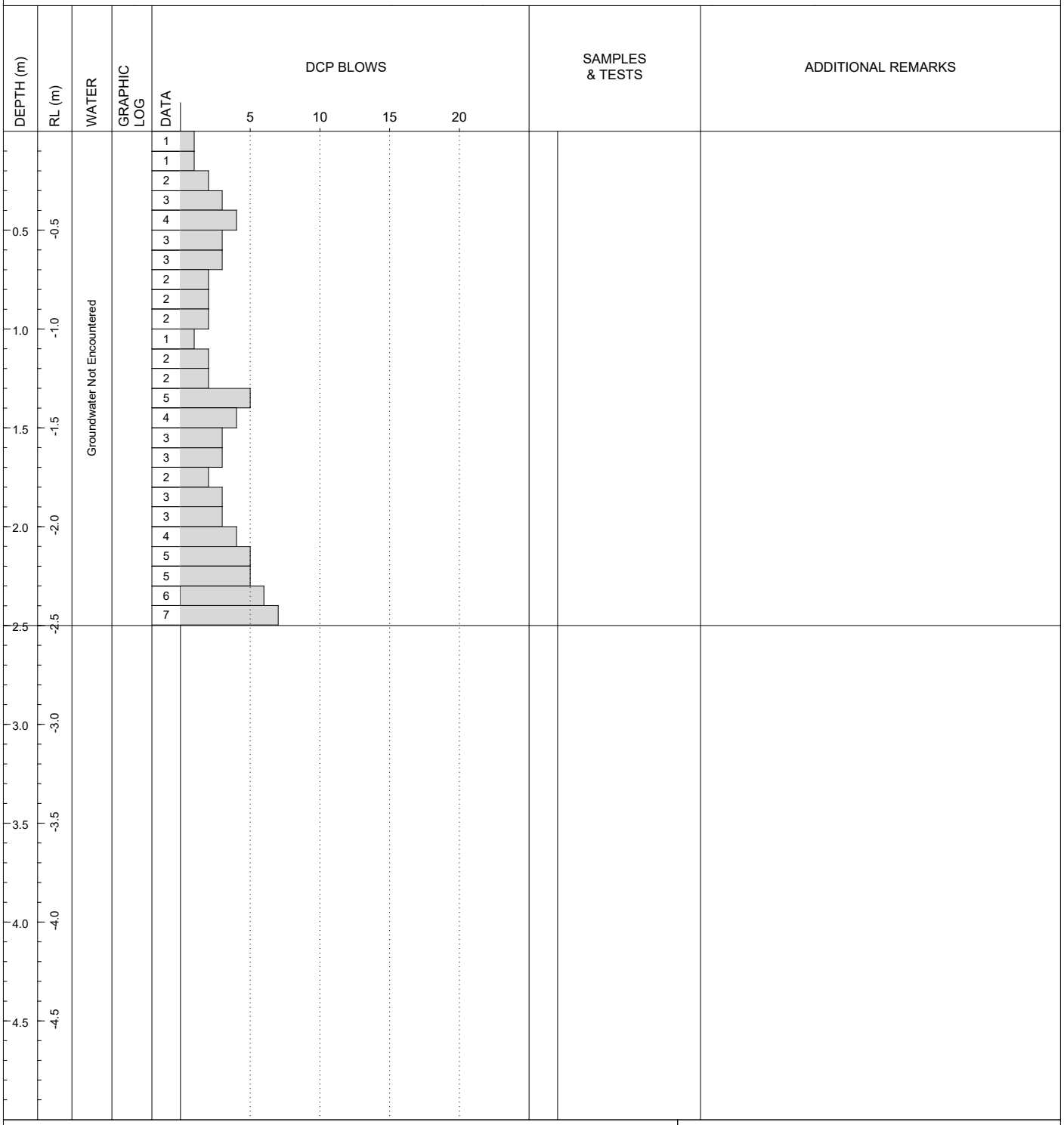
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP67

SHEET 67 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928470.52	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607770.64	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 53

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

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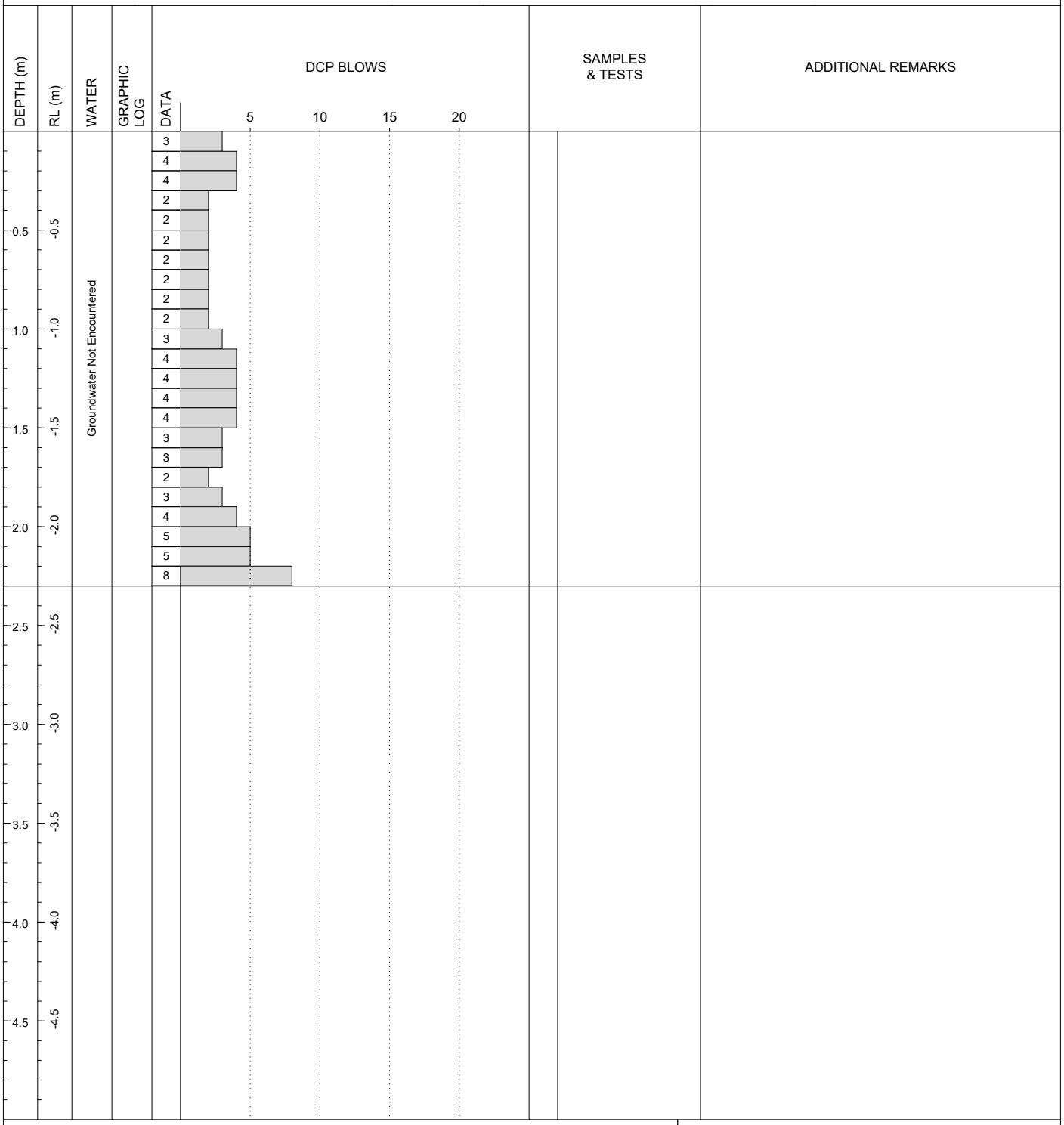
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP68

SHEET 68 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928483.01	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607752.60	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 53

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

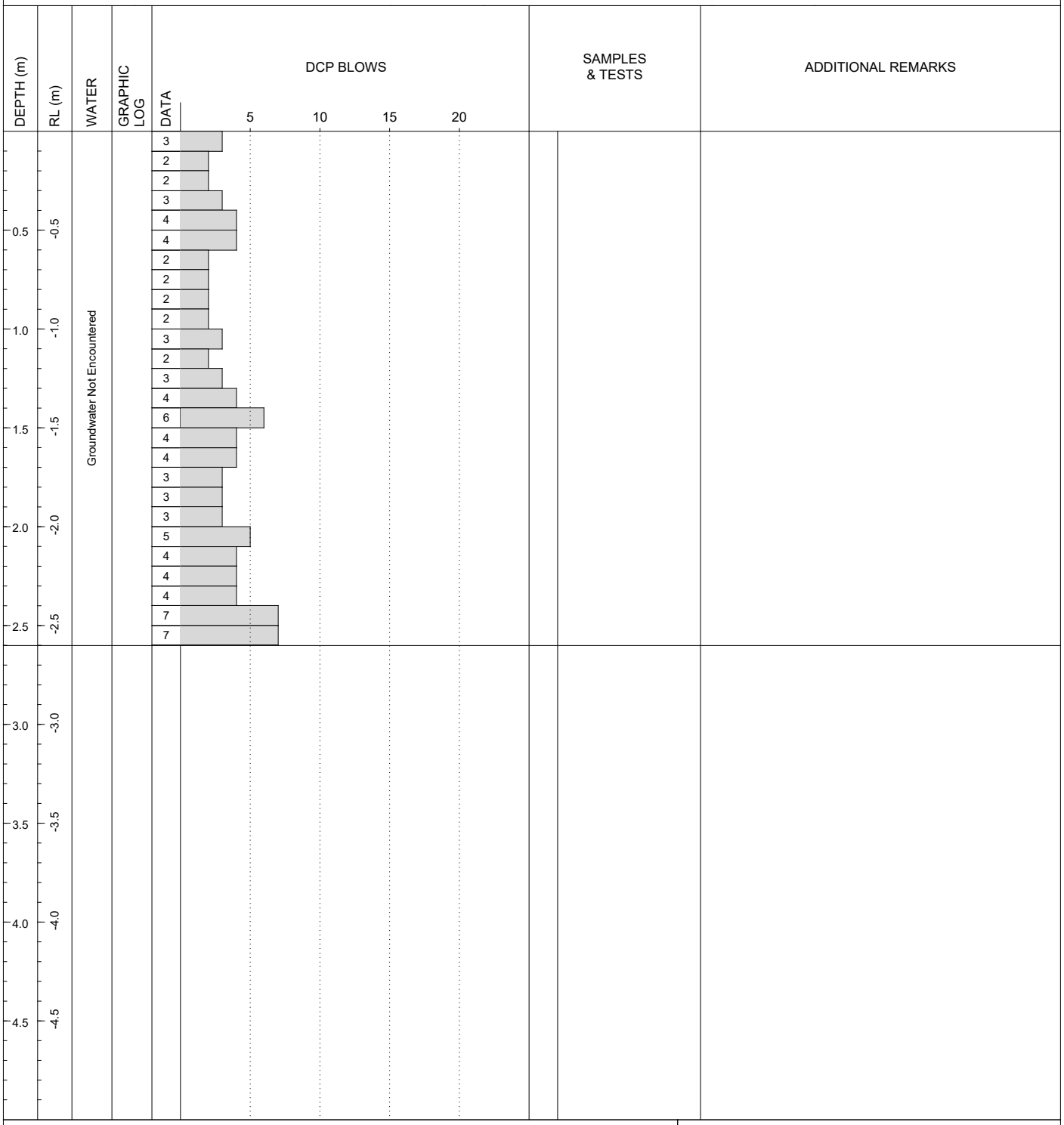
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP69

SHEET 69 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928466.67	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607762.31	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 52

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

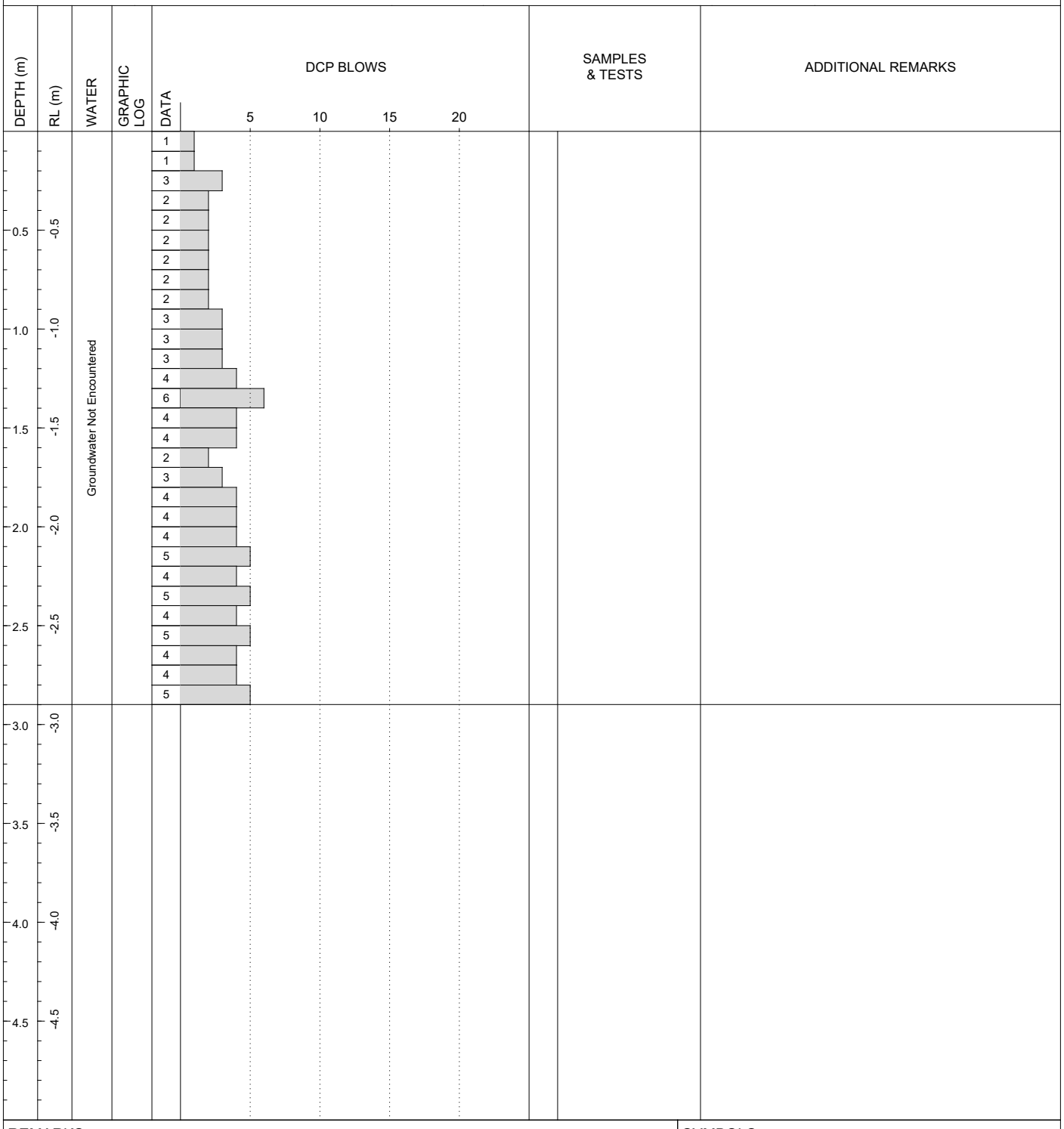
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP70

SHEET 70 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928450.64	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607751.06	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 52

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

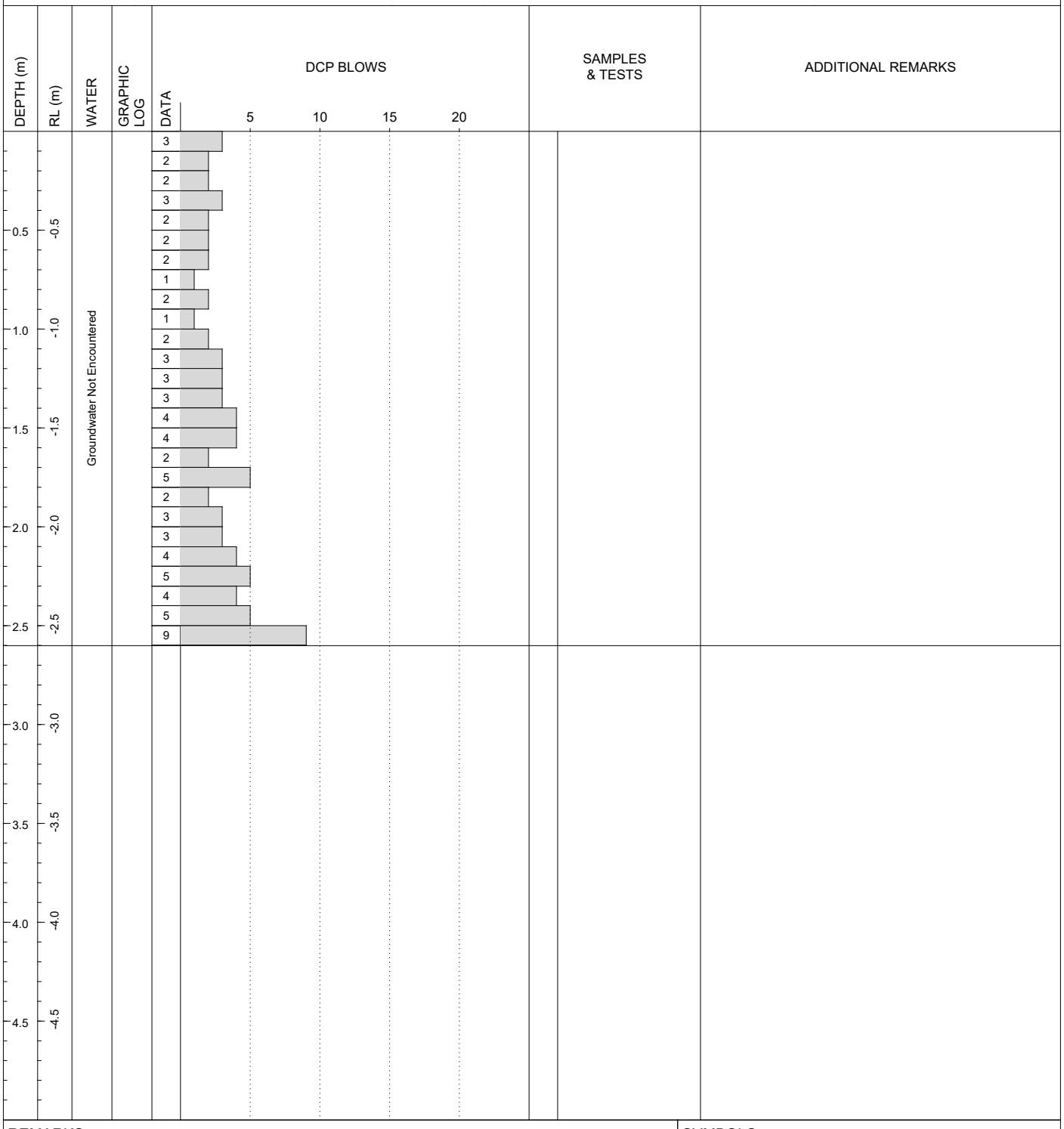
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP71

SHEET 71 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928460.19	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607737.03	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 52

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

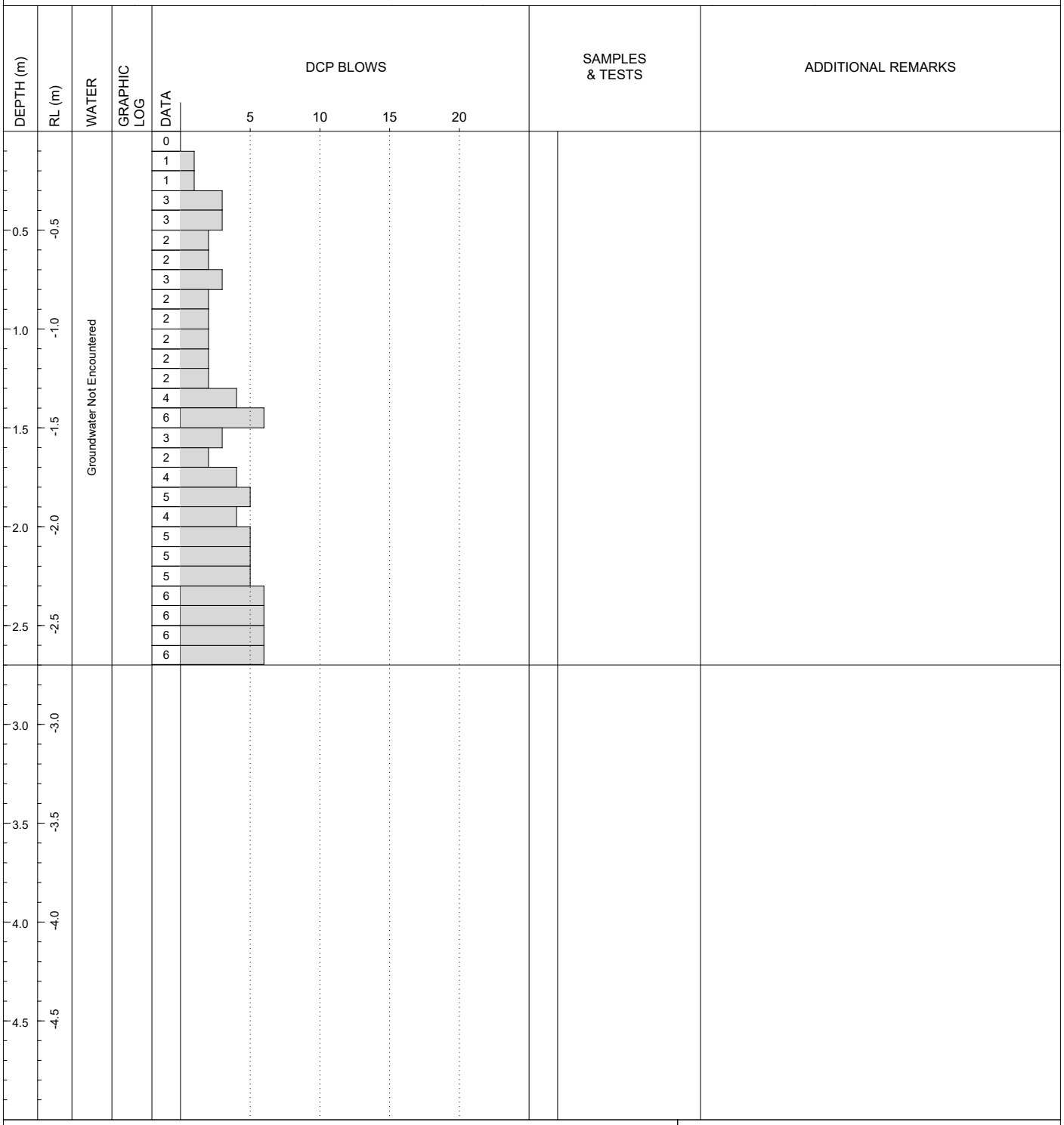
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP72

SHEET 72 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928477.92	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607747.82	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 52

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

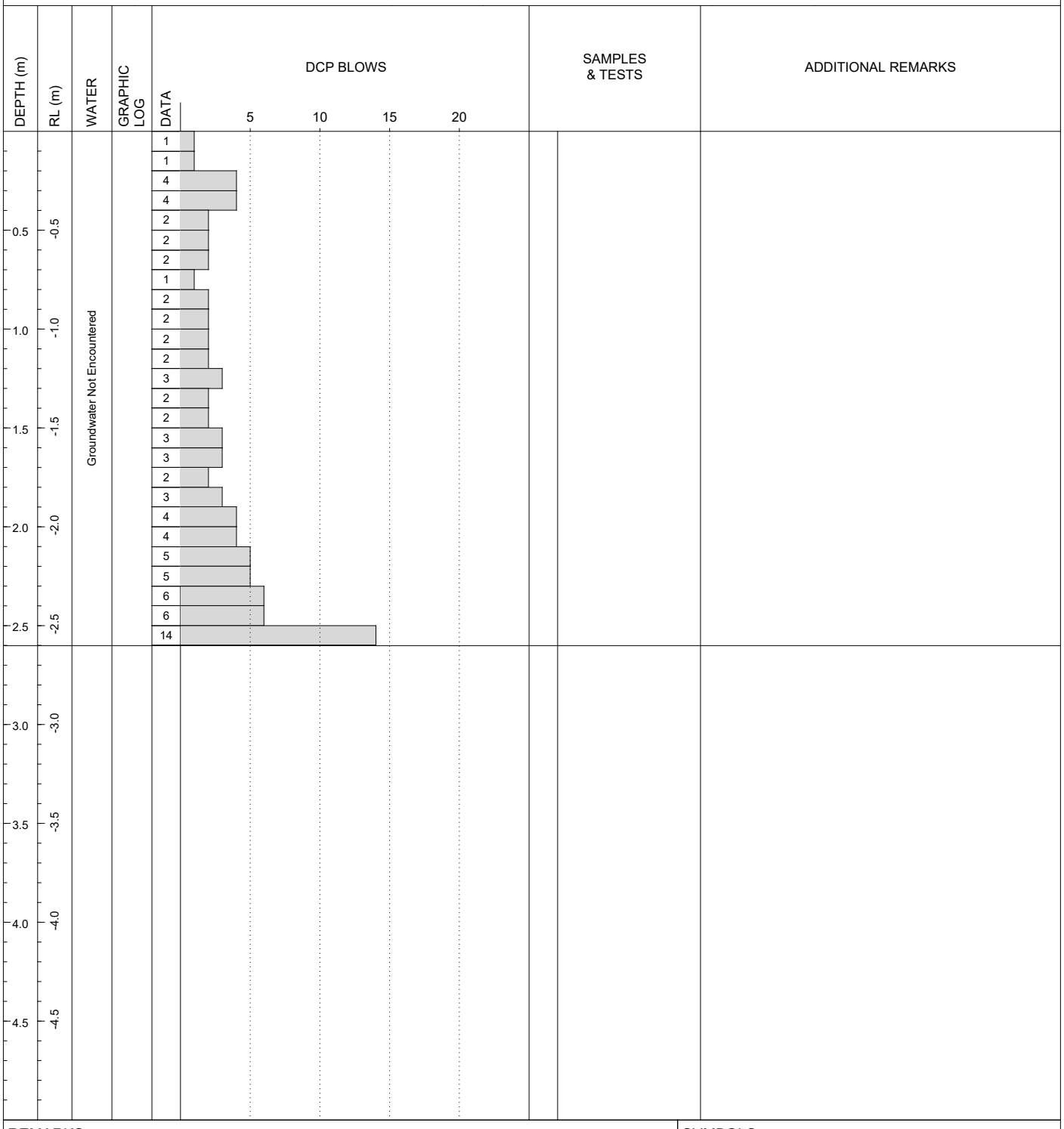
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP73

SHEET 73 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928482.39	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607745.67	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 51

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

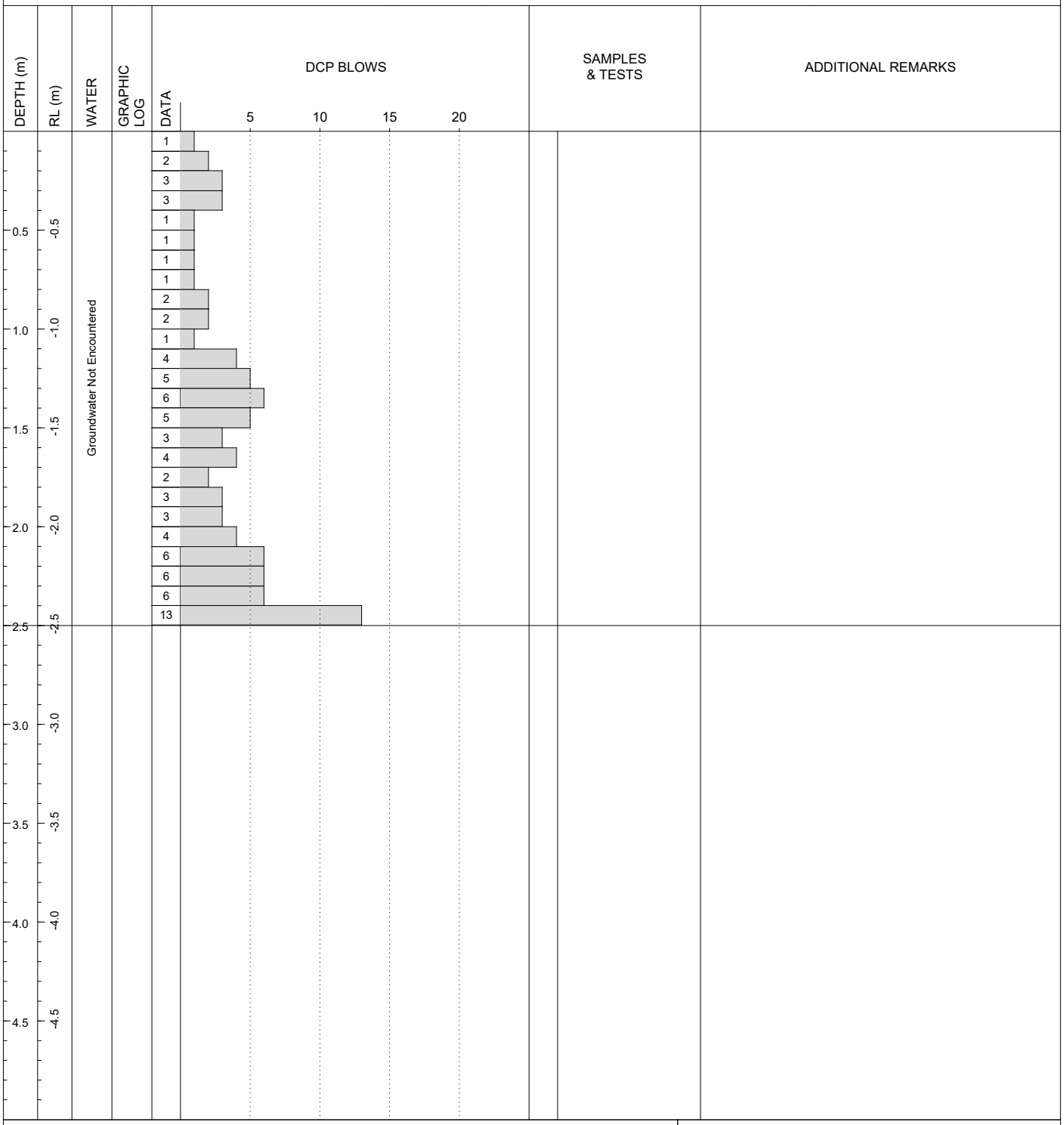
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP74

SHEET 74 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928460.65	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607731.02	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 51

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

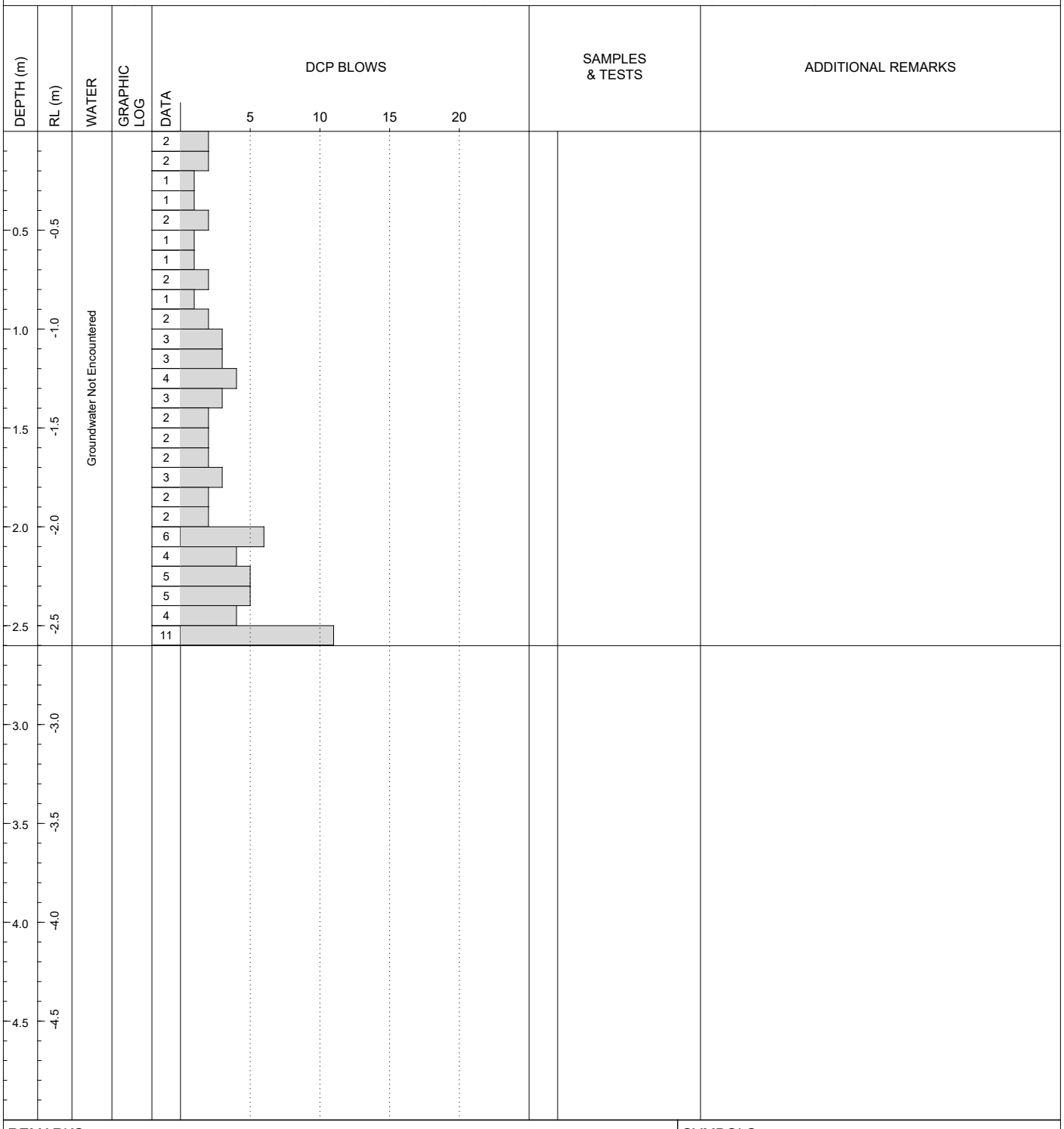
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP75

SHEET 75 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928475.76	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607715.76	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 51

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

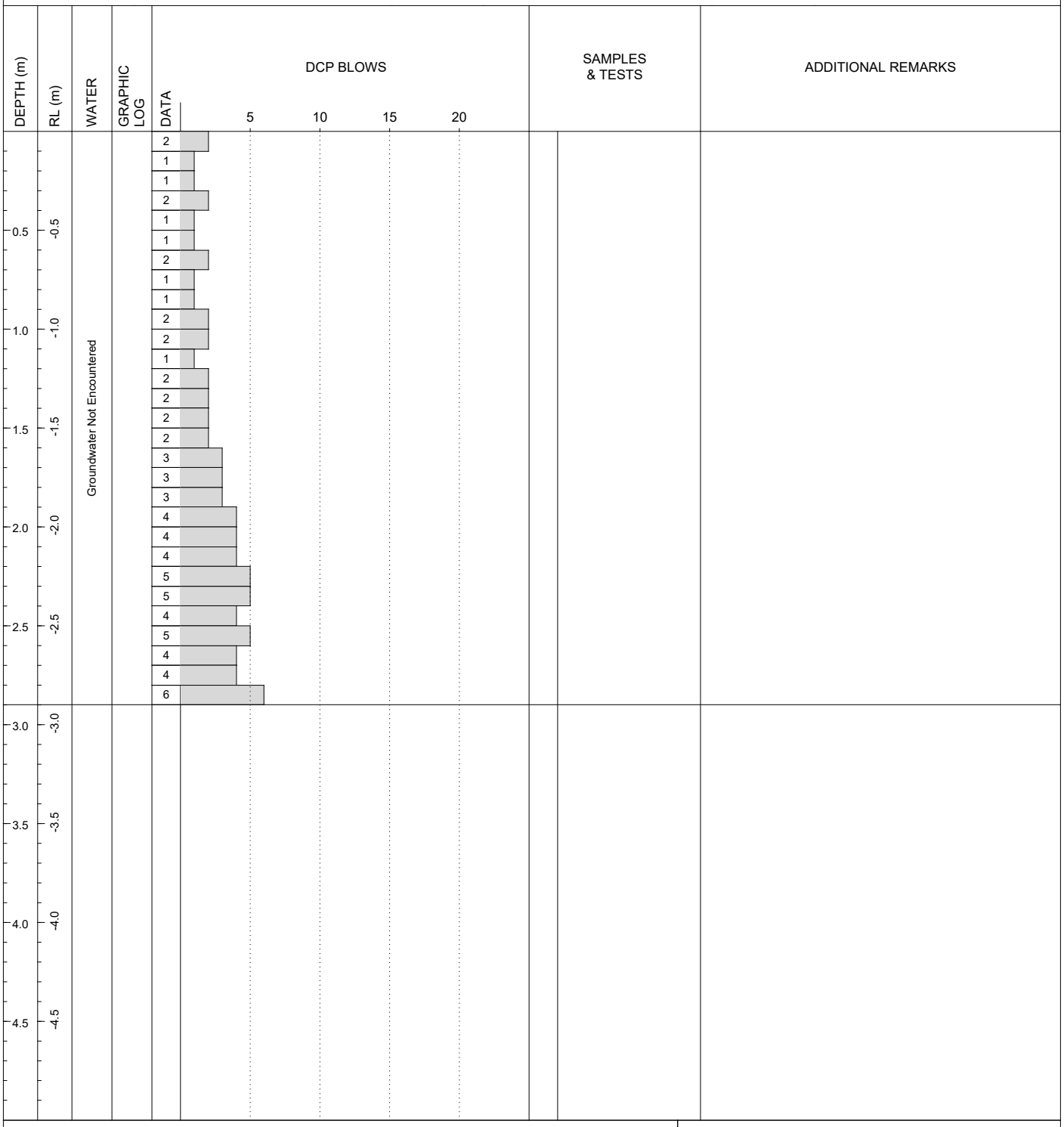
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

DCP LOG

DCP76

SHEET 76 OF 76

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928493.33	STARTED: 27/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607732.26	FINISHED: 27/06/2018
	DATUM: NZVD2016	LOGGED BY: BB/BR DATE: 27/06/2018
OFFICE: RDCL	ELEVATION:	CHECKED BY: SD DATE: 04/07/2018
ENGINEER: TB	AZUMITH: 0° PLUNGE: 90°	STATUS: Final data
CONTRACTOR:	MACHINE:	OPERATOR: BB/BR



REMARKS

Lot 51

SYMBOLS

- Standing Water Level
- Out flow
- In flow

RDCL

8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand

Ph: +64 6 8771652 | Email: info@rdcl.co.nz

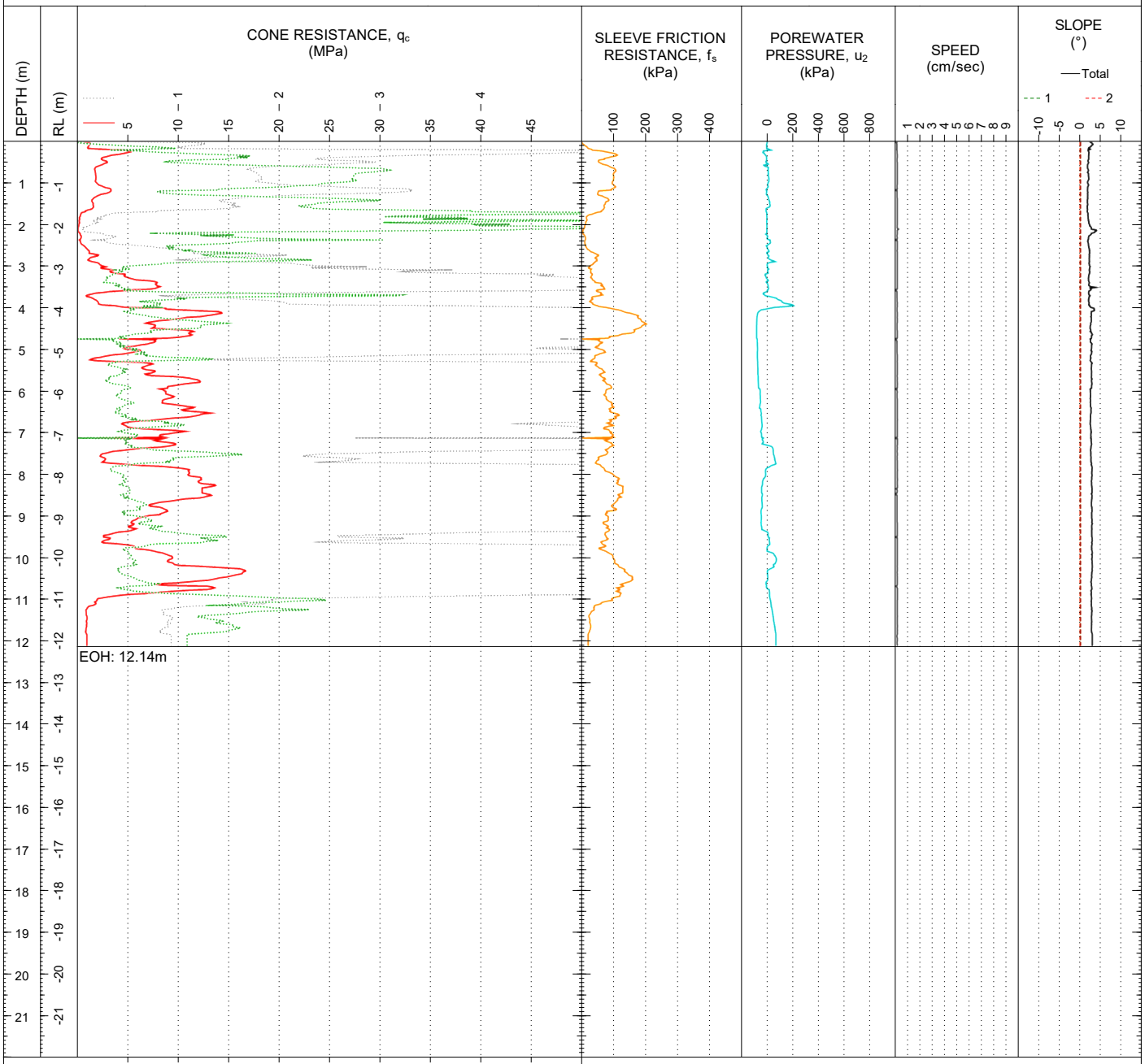
APPENDIX B – CPT LOGS

CONE PENETRATION TEST LOG

CPT01

SHEET 1 OF 1

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM2000	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928586.00	STARTED: 07/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607767.00	FINISHED: 07/06/2018
	DATUM: NZVD2016	
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: TS DATE: 19/06/2018
ENGINEER: TB	SWL: 0	STATUS: Final data
CONTRACTOR: RDCL	MACHINE: Geoprobe 54LT	OPERATOR: TS



CONE INFORMATION

CONE ID: 4447 CONE TYPE: -

	INITIAL	FINAL
CONE RESISTANCE:	7.6114	-0.0449
SLEEVE FRICTION RESISTANCE:	122.6	0.2
POREWATER PRESSURE:	240	1.6

REMARKS

SYMBOLS

▼ Water level

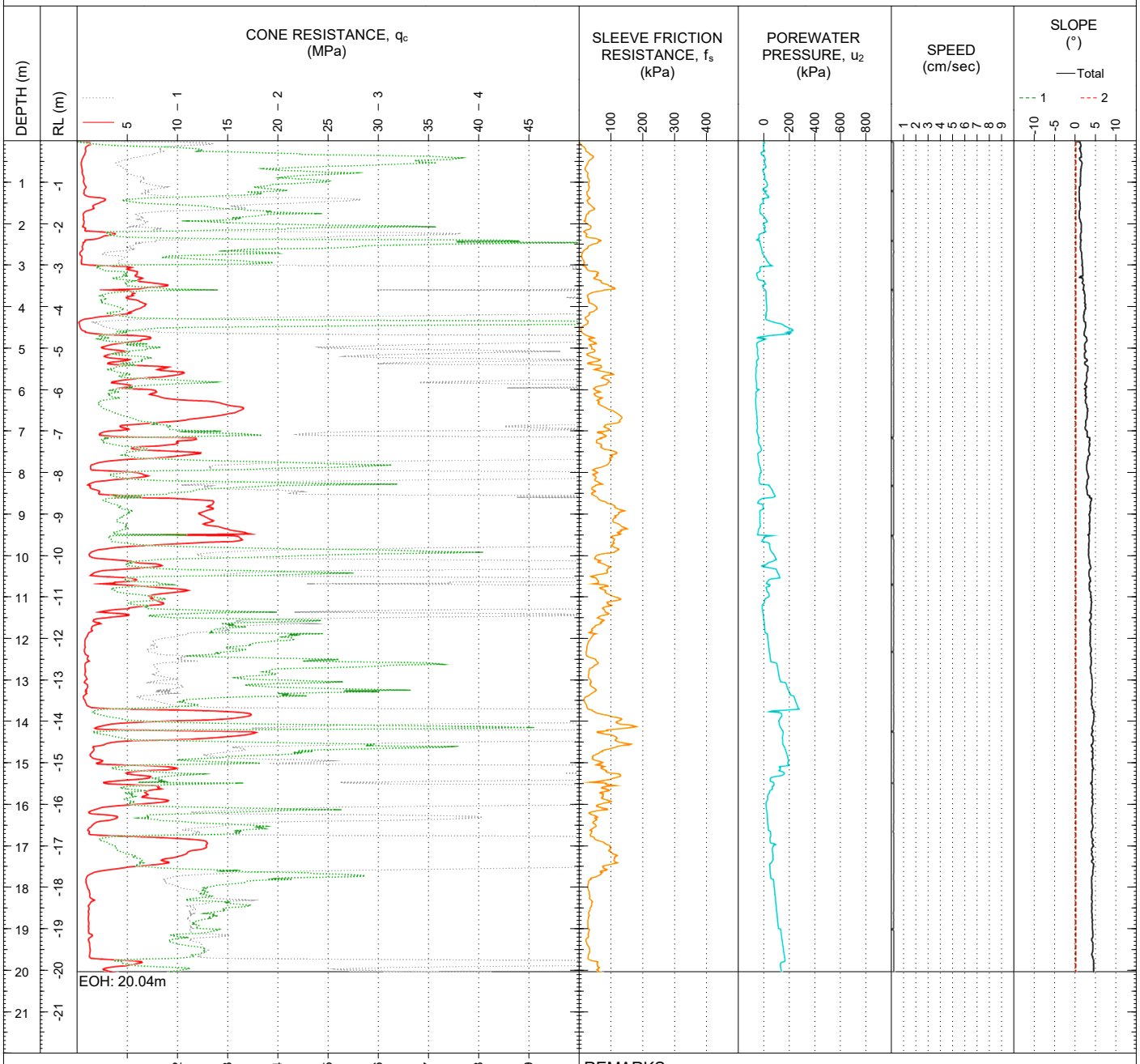
RDCL
8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

CONE PENETRATION TEST LOG

CPT02

SHEET 1 OF 1

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM2000	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928505.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607732.00	FINISHED: 19/06/2018
	DATUM: NZVD2016	
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: TS DATE: 19/06/2018
ENGINEER: TB	SWL: 0	STATUS: Final data
CONTRACTOR: RDCL	MACHINE: Geoprobe 54LT	OPERATOR: TS



CONE INFORMATION

CONE ID: 4447 CONE TYPE: -

	INITIAL	FINAL
CONE RESISTANCE:	7.6616	-0.1519
SLEEVE FRICTION RESISTANCE:	123.6	0.1
POREWATER PRESSURE:	239.7	2.5

REMARKS

SYMBOLS

▼ Water level

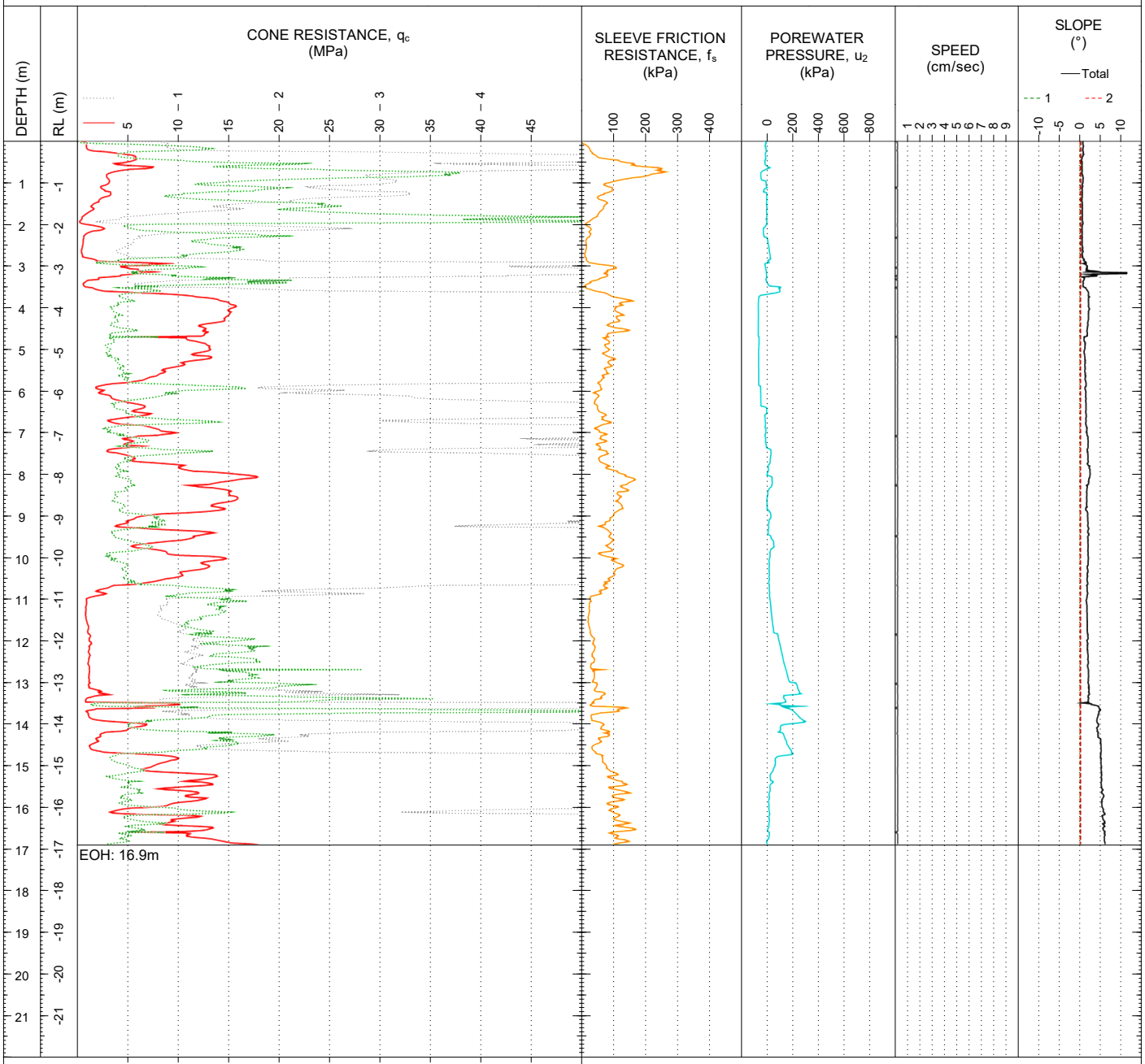
RDCL
8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

CONE PENETRATION TEST LOG

CPT03

SHEET 1 OF 1

CLIENT: Greenstone Land Developments Ltd	PROJECTION: NZTM2000	LOCATION: Lyndhurst Road Subdivision
PROJECT: 181090602	EASTING: 1928575.00	STARTED: 19/06/2018
LOCATION: Lyndhurst Road Subdivision Stage 6	NORTHING: 5607823.00	FINISHED: 19/06/2018
	DATUM: NZVD2016	
OFFICE: RDCL	ELEVATION: 0	CHECKED BY: TS DATE: 19/06/2018
ENGINEER: TB	SWL: 0	STATUS: Final data
CONTRACTOR: RDCL	MACHINE: Geoprobe 54LT	OPERATOR: TS



REMARKS

CONE INFORMATION

CONE ID: 4447 CONE TYPE: -

	INITIAL	FINAL
CONE RESISTANCE:	7.5659	-0.0609
SLEEVE FRICTION RESISTANCE:	123.2	0.2
POREWATER PRESSURE:	240	0.6

SYMBOLS

▼ Water level

RDCL
8/308 Queen St East, Hastings | PO Box 28057, Havelock North 4130 | New Zealand
Ph: +64 6 8771652 | Email: info@rdcl.co.nz

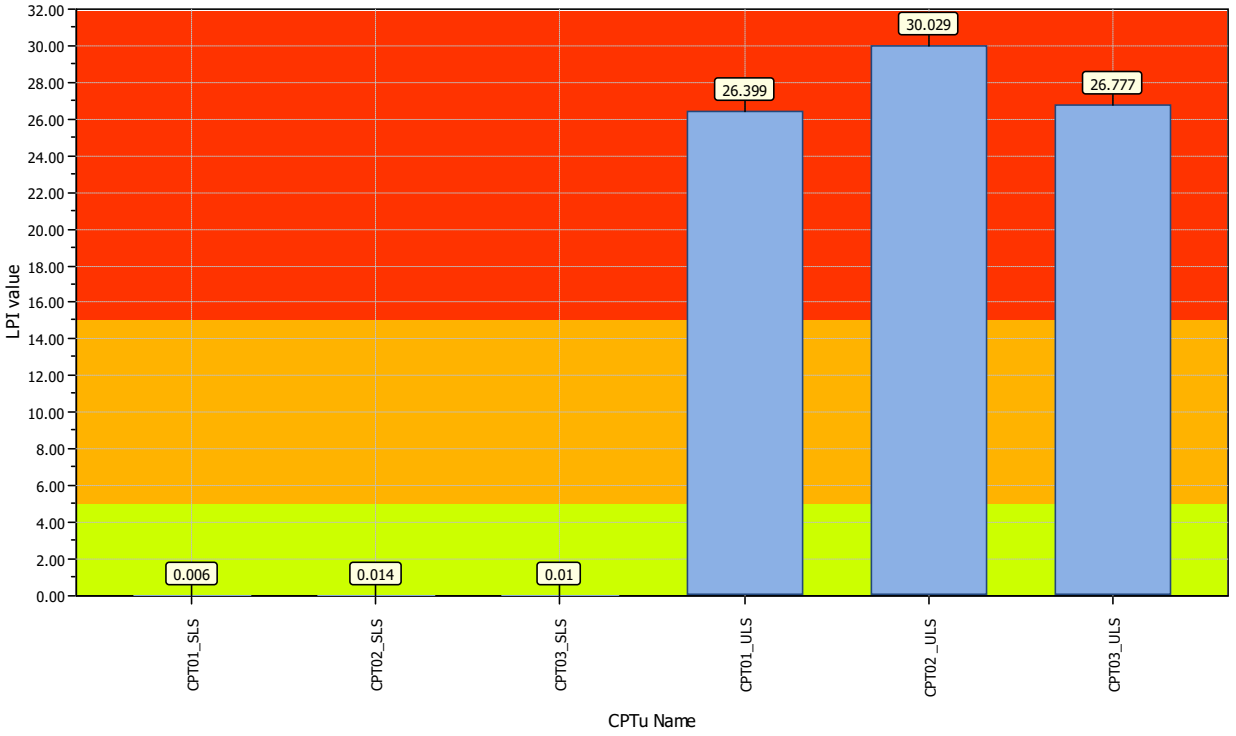
APPENDIX C – LIQUEFACTION ASSESSMENT OUTPUTS

RDCL
Geotechnical Engineers
1A/10 Surrey St, Tawa, Wellington
http://www.rdcl.co.nz

Project title : 181090602 Lyndhurst Arbuckle Subdivision - Stage 6

Location : Hastings

Overall Liquefaction Potential Index report



LPI color scheme

- Very high risk
- High risk
- Low risk

Basic statistics

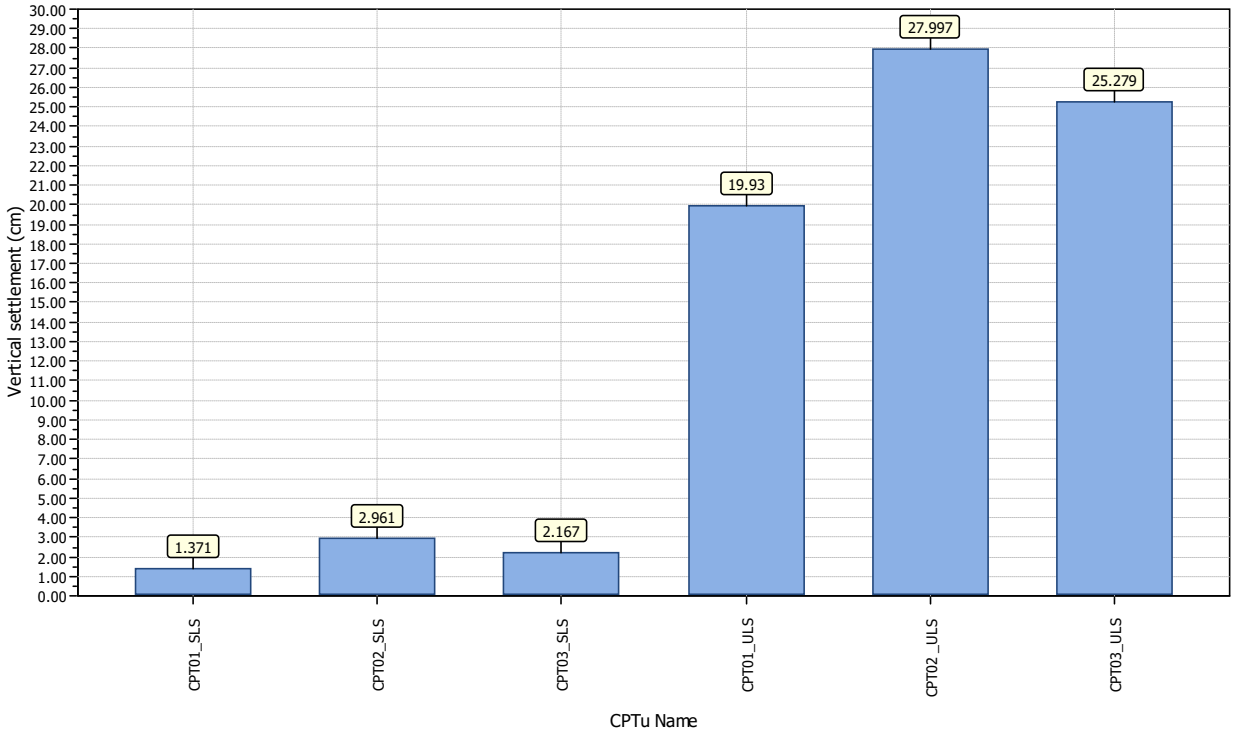
Total CPT number: 6
50.00% low risk
0.00% high risk
50.00% very high risk

RDCL
Geotechnical Engineers
1A/10 Surrey St, Tawa, Wellington
http://www.rdcl.co.nz

Project title : 181090602 Lyndhurst Arbuckle Subdivision

Location : Hastings

Overall vertical settlements report



RDCL
Geotechnical Engineers
1A/10 Surrey St, Tawa, Wellington
http://www.rdcl.co.nz

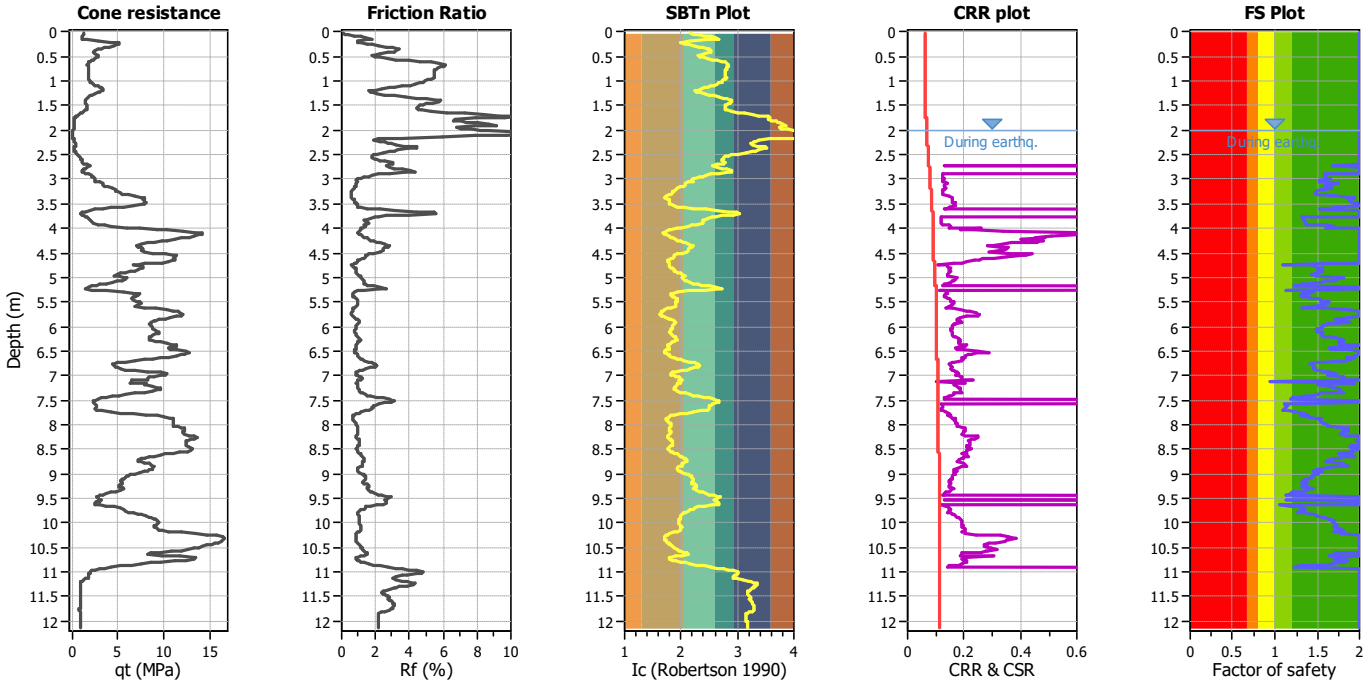
LIQUEFACTION ANALYSIS REPORT

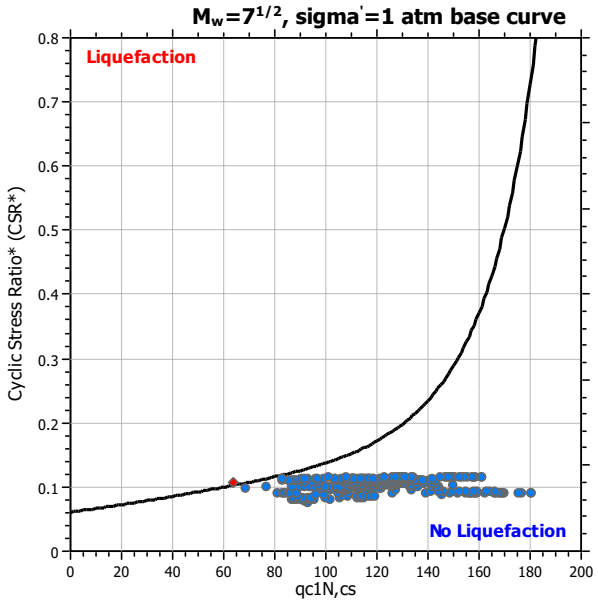
Project title : 181090602 Lyndhurst Arbuckle Subdivision **Location : Hastings**

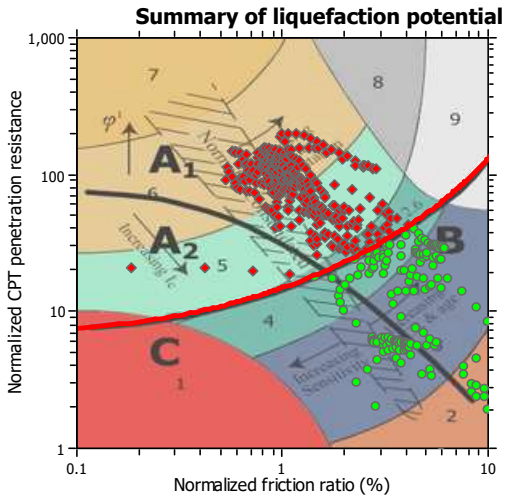
CPT file : CPT01_SLS

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.11	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

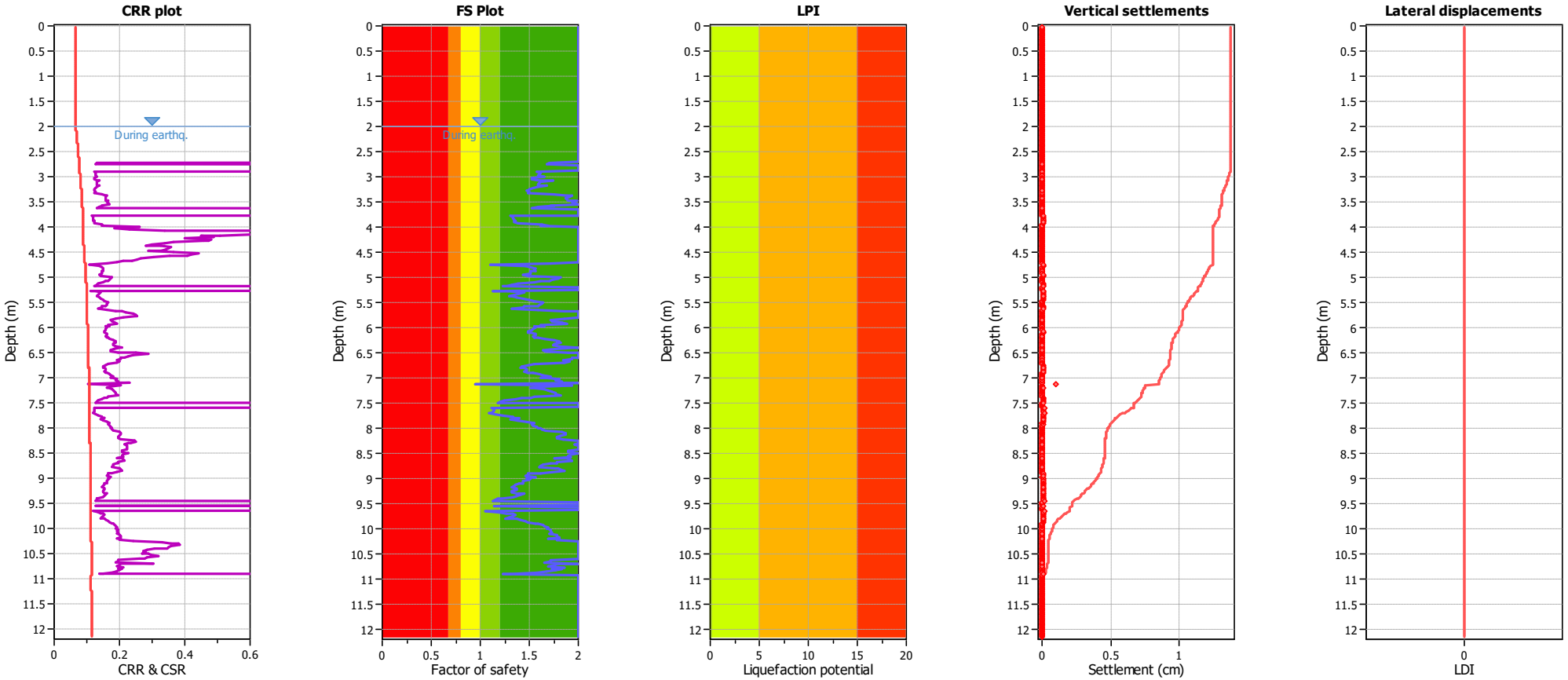






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.11	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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http://www.rdcl.co.nz

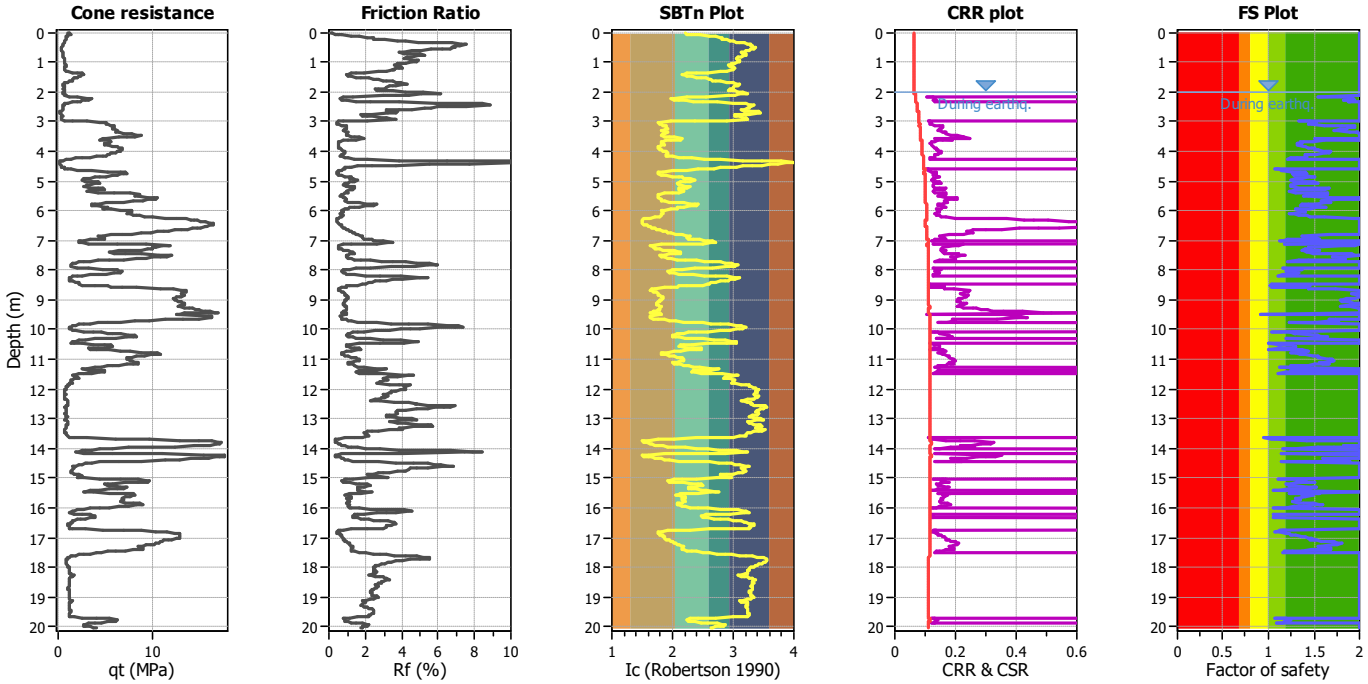
LIQUEFACTION ANALYSIS REPORT

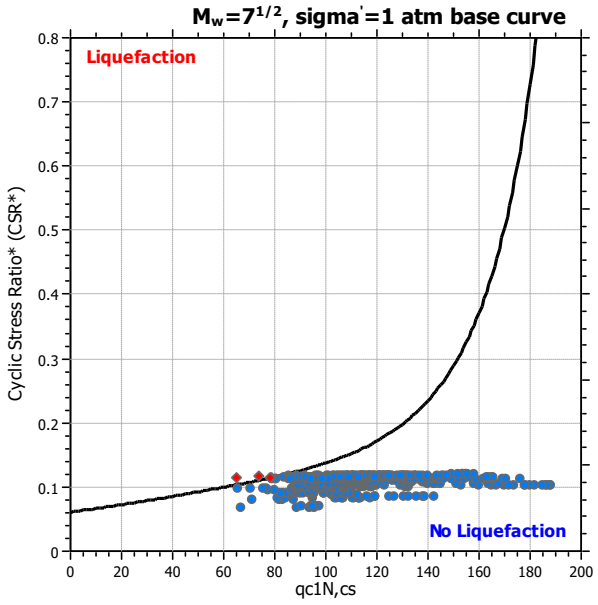
Project title : 181090602 Lyndhurst Arbuckle Subdivision **Location : Hastings**

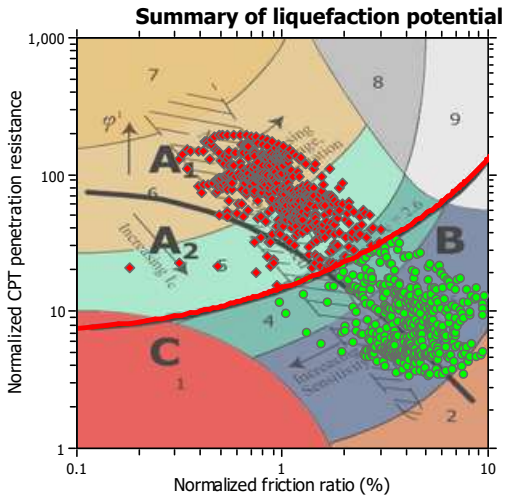
CPT file : CPT02_SLS

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.11	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

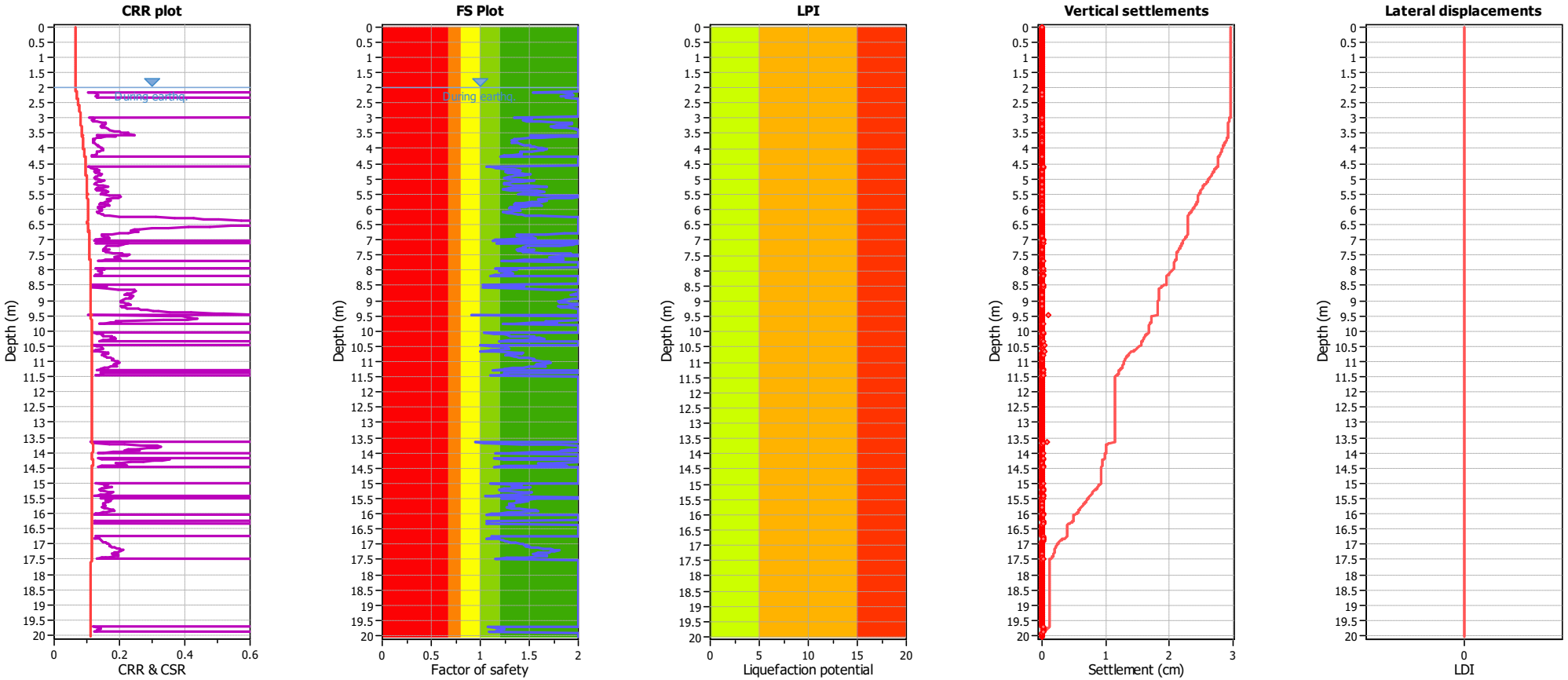






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.11	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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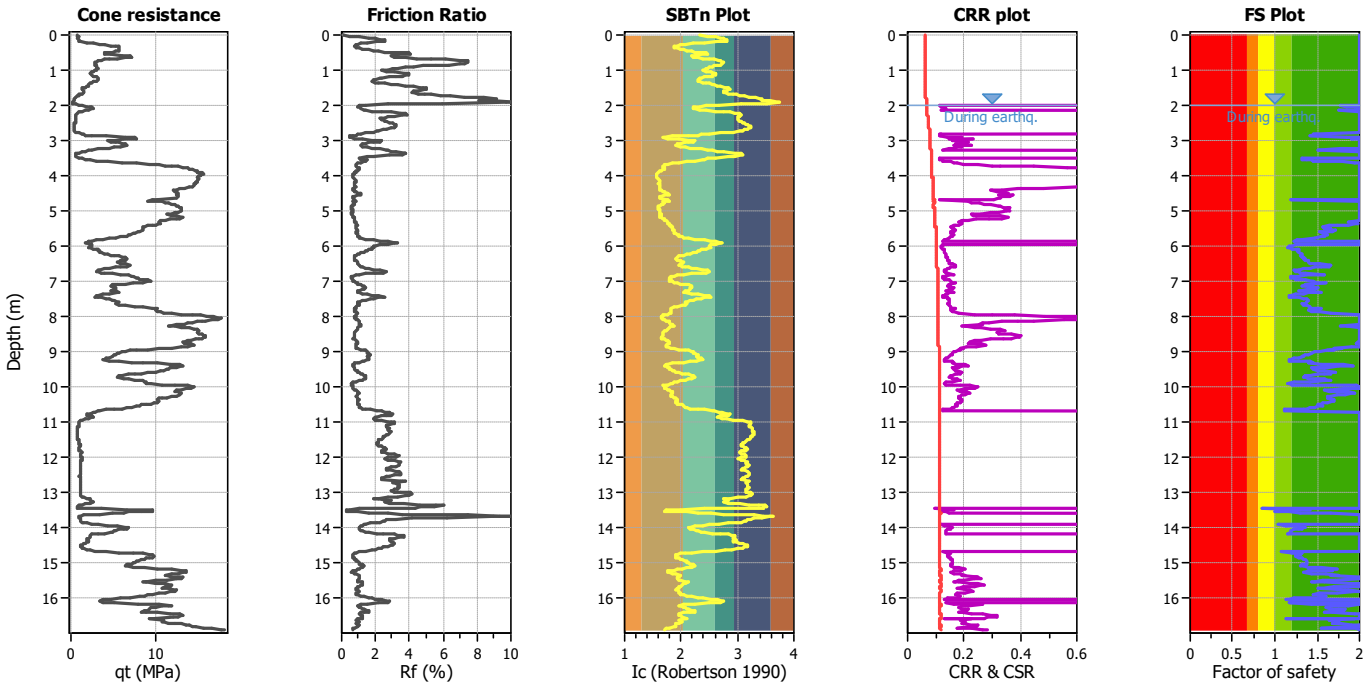
LIQUEFACTION ANALYSIS REPORT

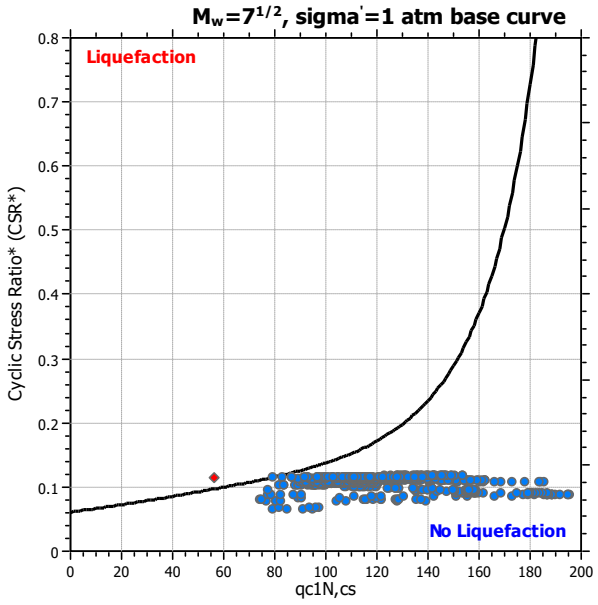
Project title : 181090602 Lyndhurst Arbuckle Subdivision **Location : Hastings**

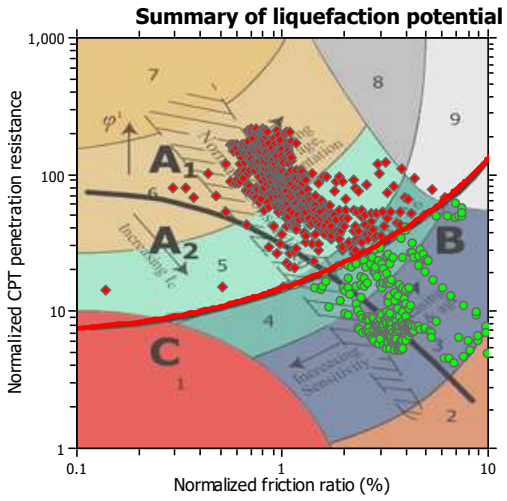
CPT file : CPT03_SLS

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.11	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

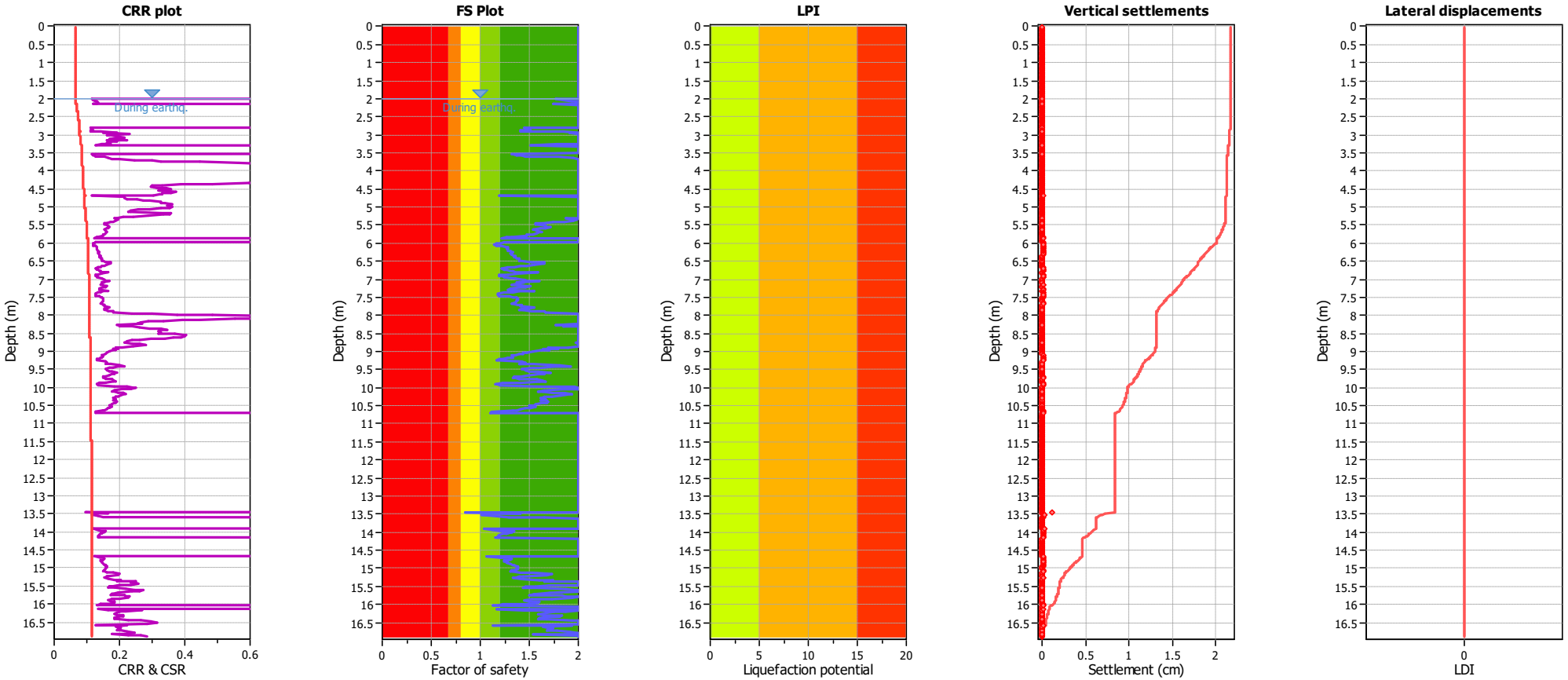






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.11	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

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- Very likely to liquefy
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- Unlike to liquefy
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LPI color scheme

- Very high risk
- High risk
- Low risk

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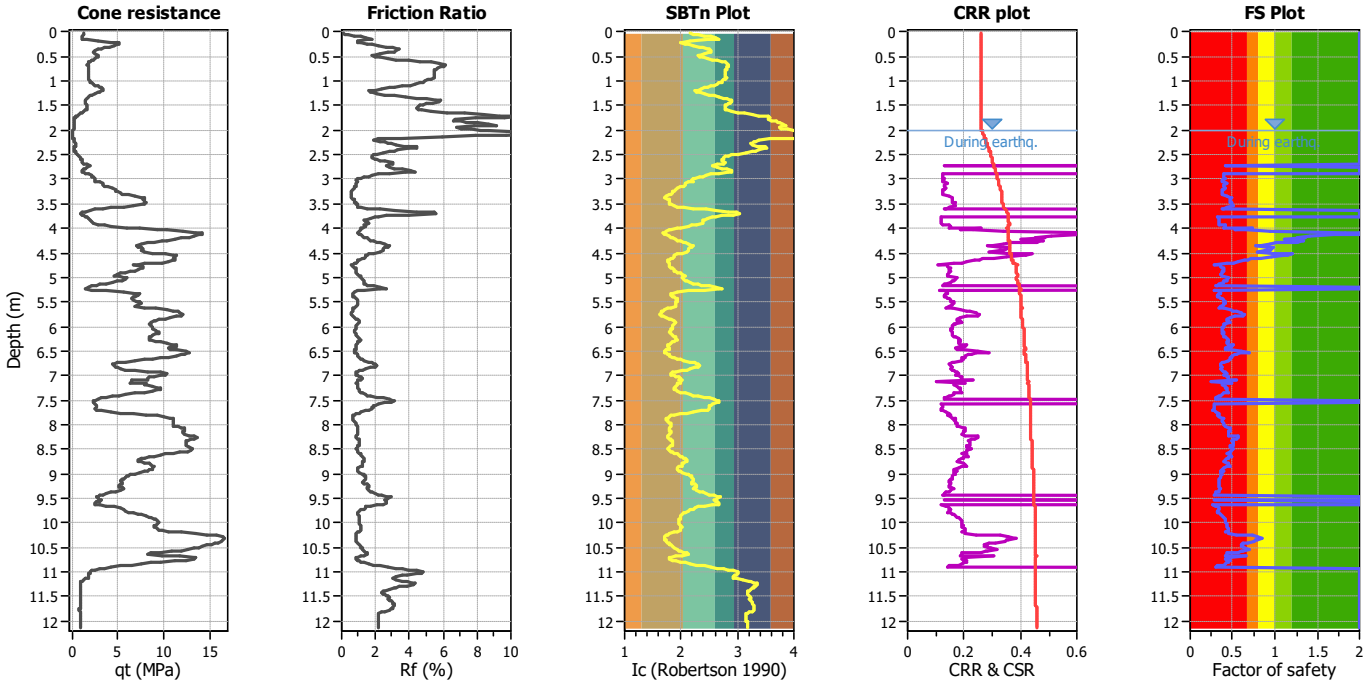
LIQUEFACTION ANALYSIS REPORT

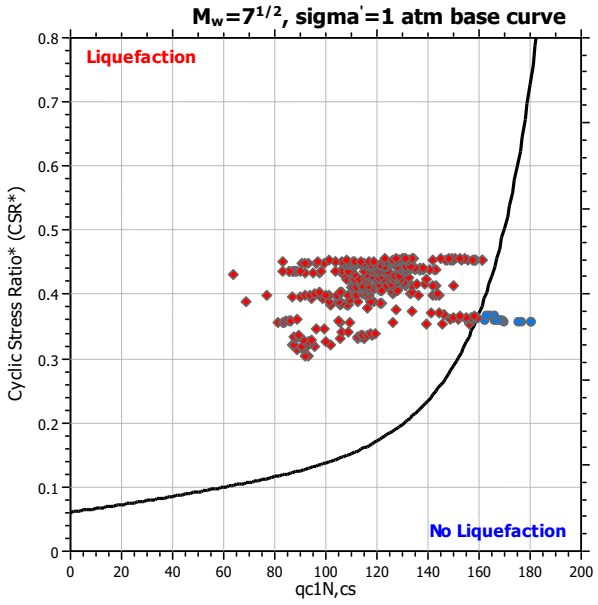
Project title : 181090602 Lyndhurst Arbuckle Subdivision **Location : Hastings**

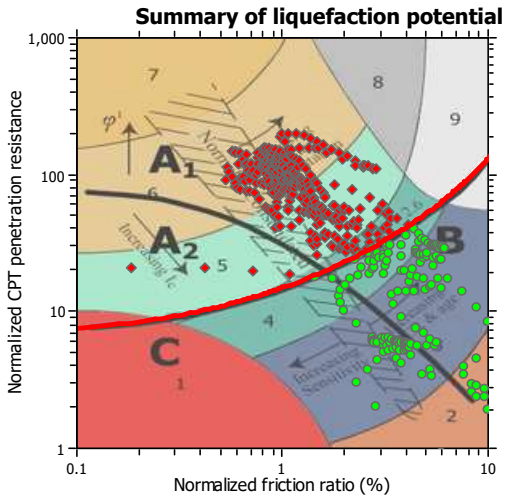
CPT file : CPT01_ULS

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

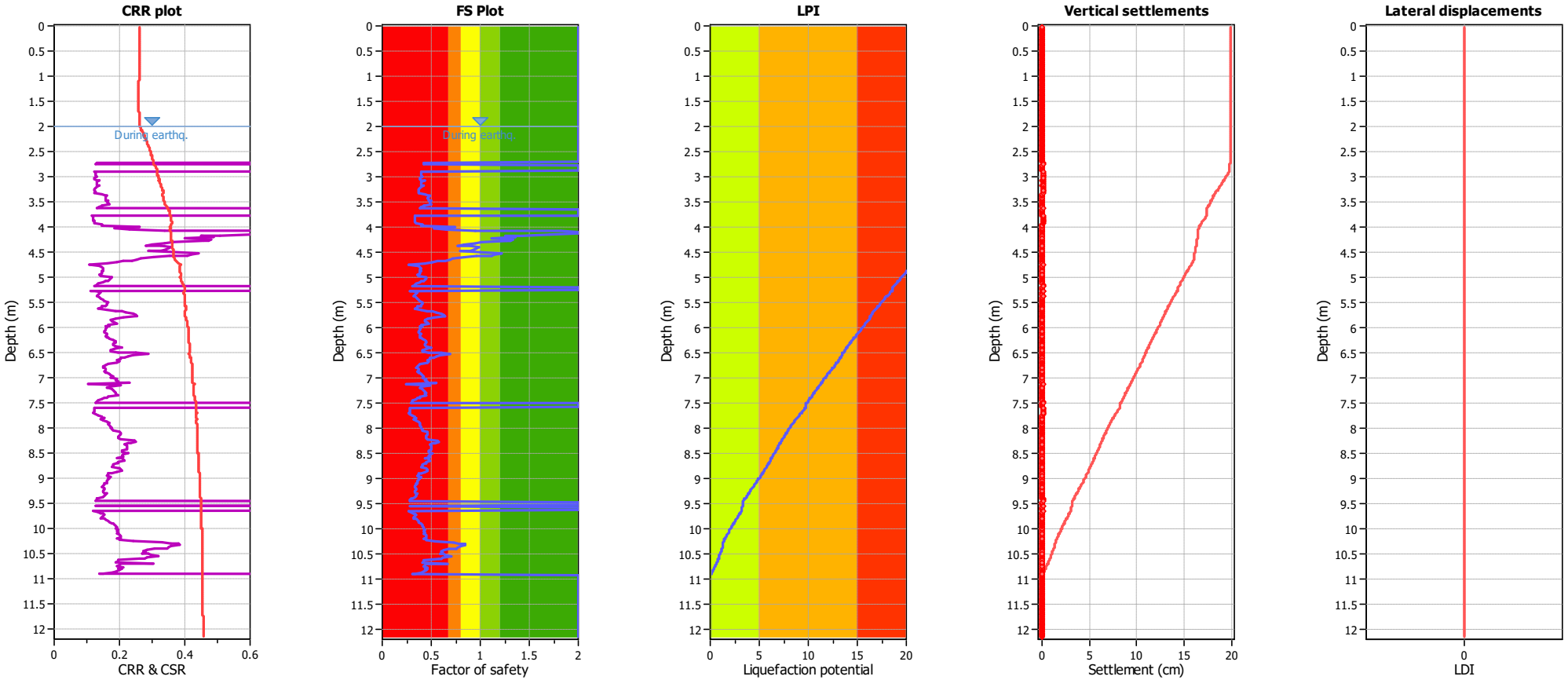






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

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LPI color scheme

- Very high risk
- High risk
- Low risk

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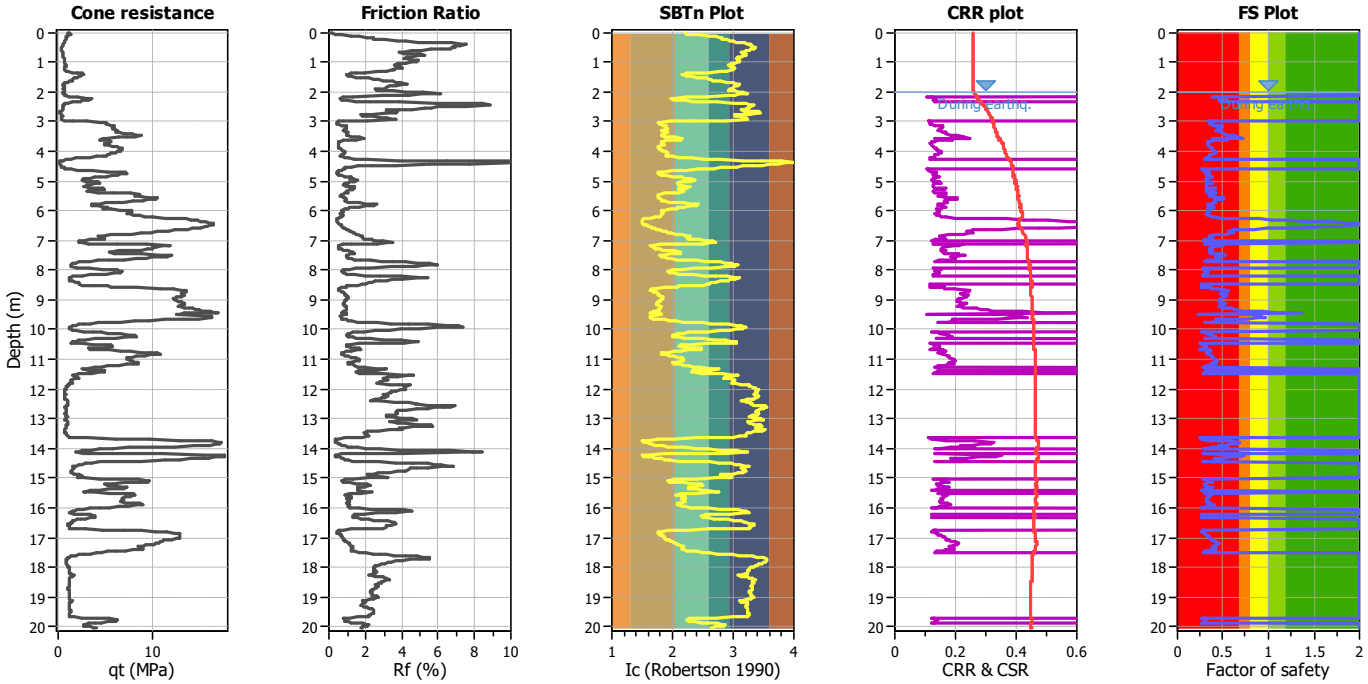
LIQUEFACTION ANALYSIS REPORT

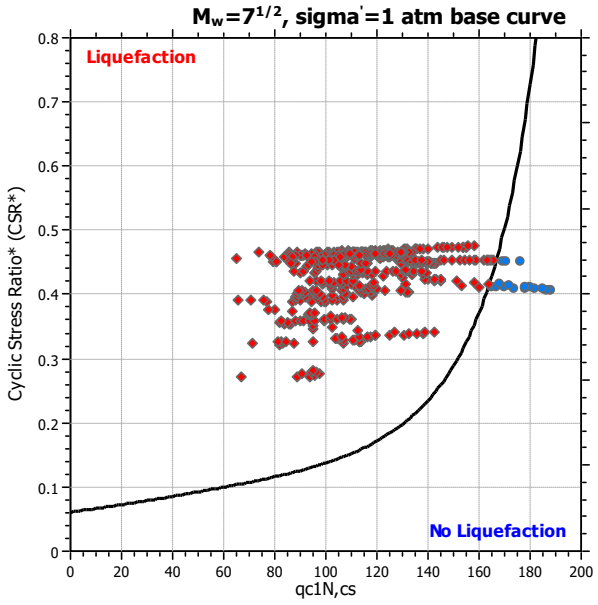
Project title : 181090602 Lyndhurst Arbuckle Subdivision **Location : Hastings**

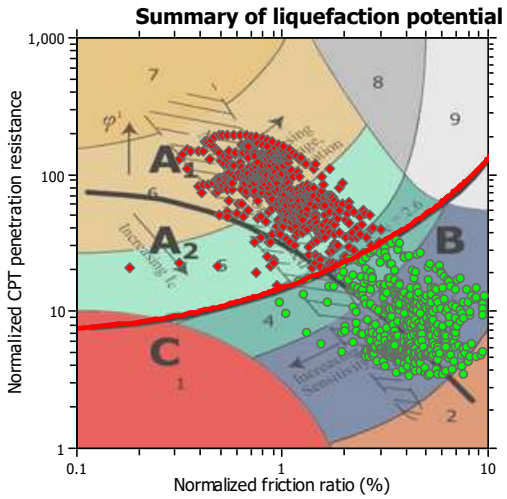
CPT file : CPT02 _ULS

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
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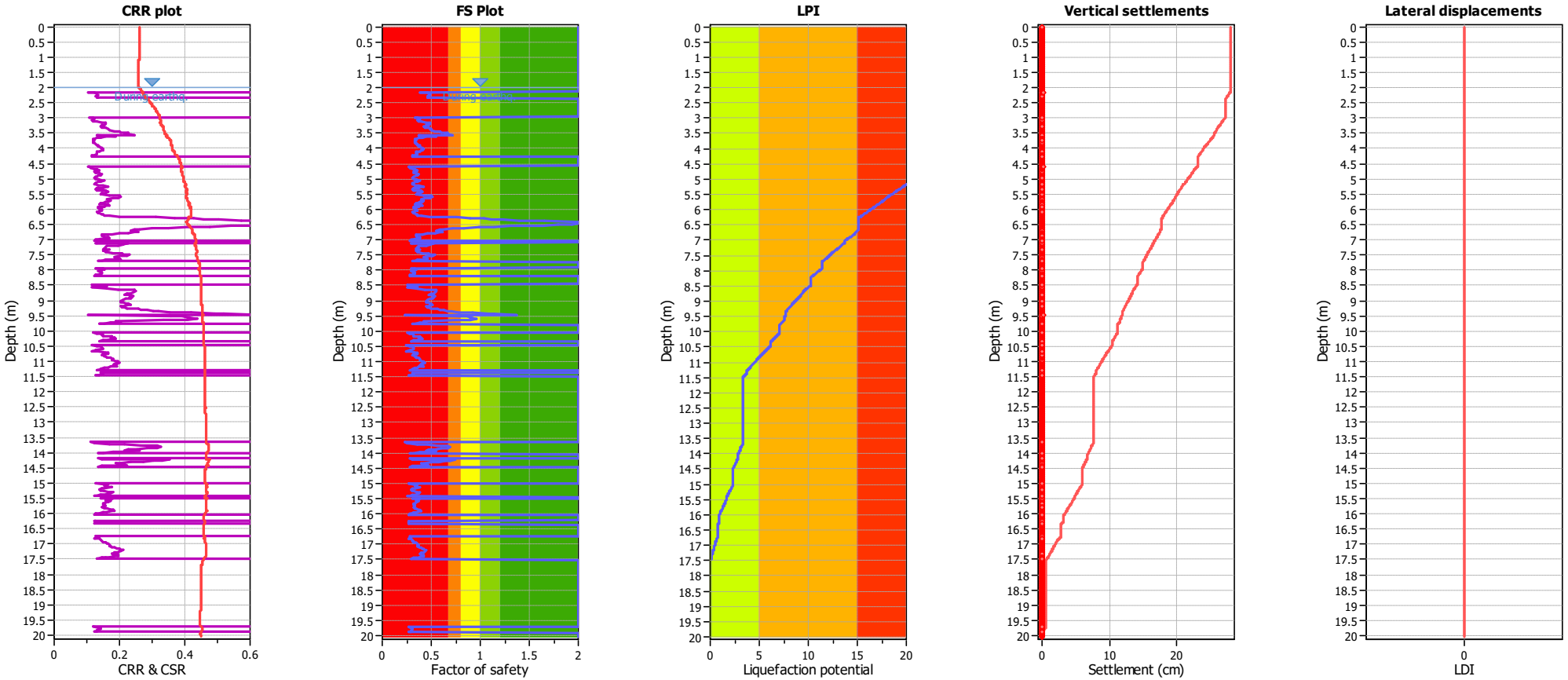
Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

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LPI color scheme

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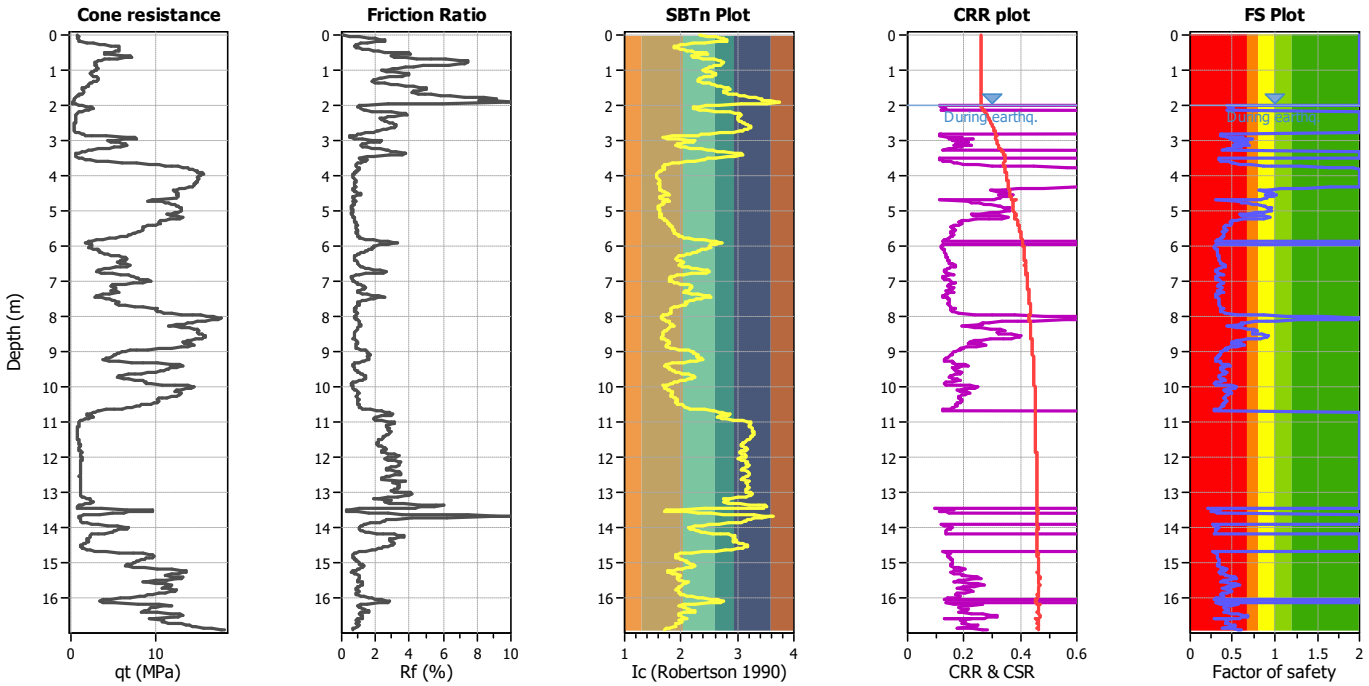
LIQUEFACTION ANALYSIS REPORT

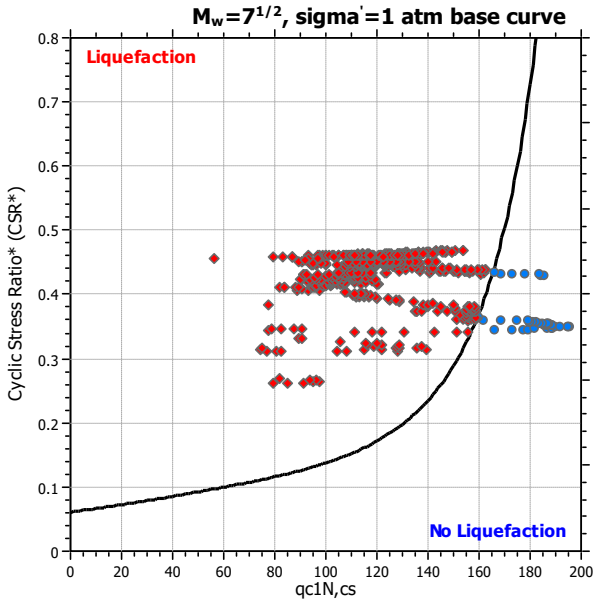
Project title : 181090602 Lyndhurst Arbuckle Subdivision **Location : Hastings**

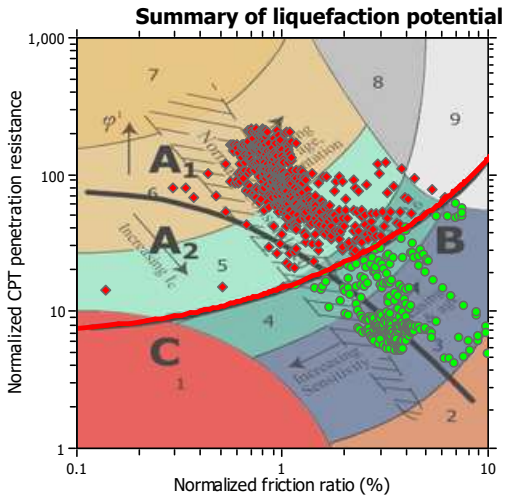
CPT file : CPT03_ULS

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

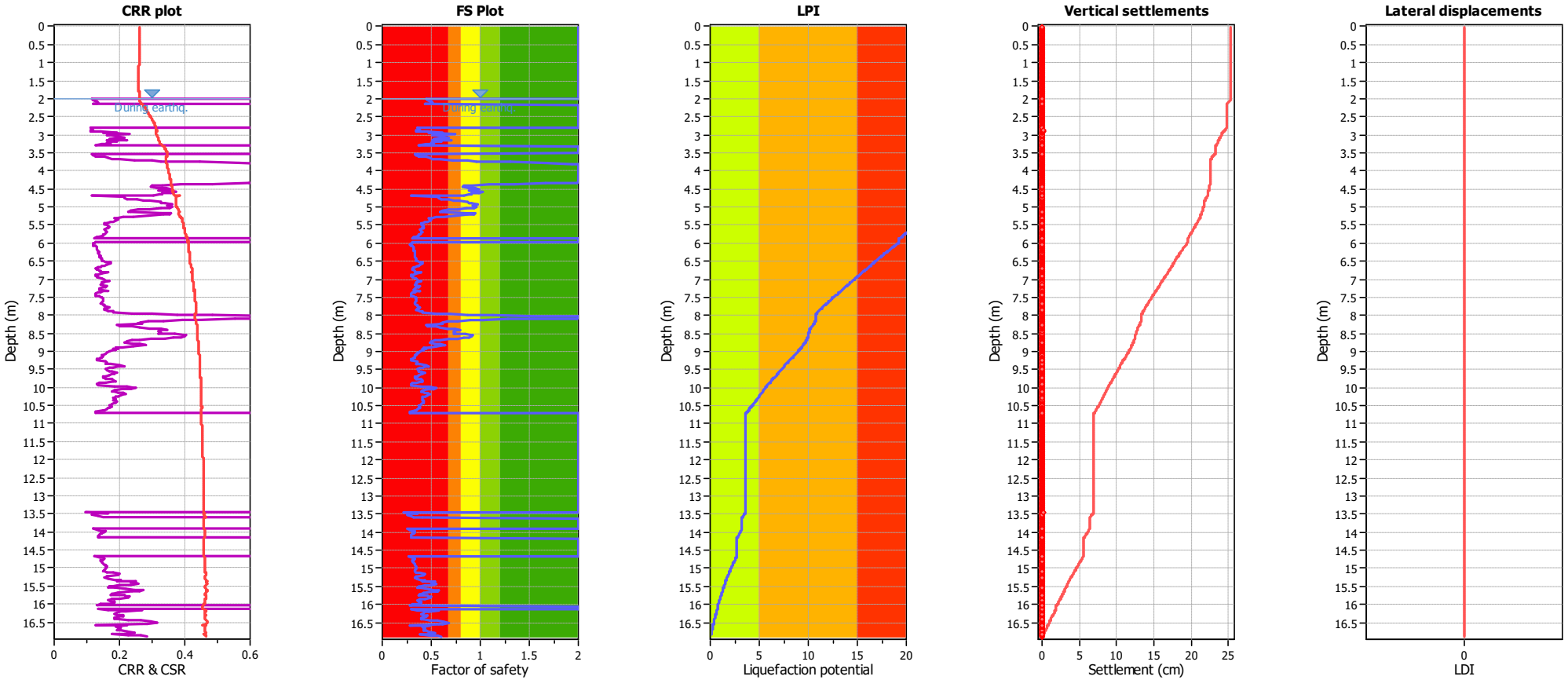






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

APPENDIX D – OPUS LABORATORY TEST RESULTS

WET SIEVE ANALYSIS
TEST REPORT

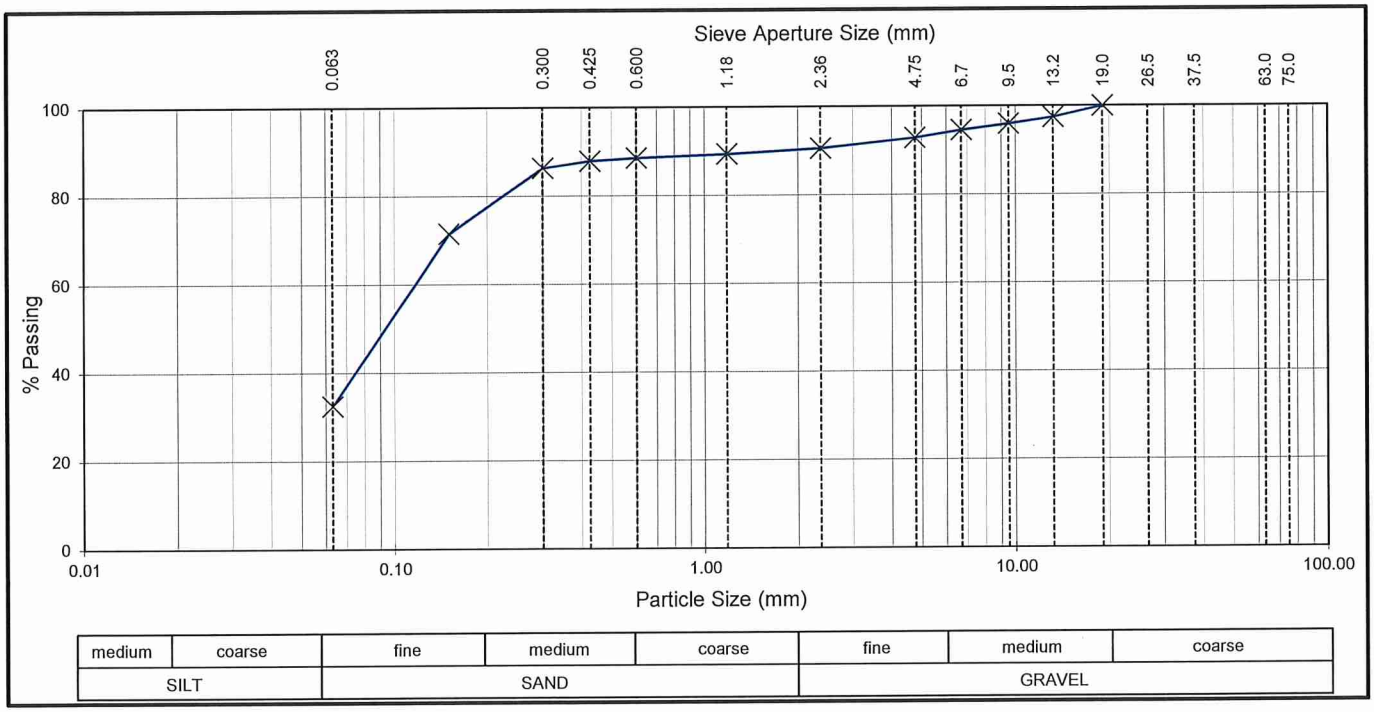
WSP OPUS

Project :	**Lyndhurst - Arbuckle / Stage 6 Subdivision**
Location :	**Hastings**
Client :	**T. Bunny, PO Box 28057, Hastings**
Contractor :	**Resource Development Consultants Ltd**
Sampled by :	**Tim Wilkins**
Date sampled :	**2/05/2018**
Sampling method :	**Unknown**
Sample description :	**Silty Sand with minor gravel**
Sample condition	**Tested as received**

Project No :	**2-S4686.00**
Lab Ref No :	**NA 1581**
Client Ref No :	**O/N 4453**

Sieve Analysis

Size (mm)	% Passing	Size (mm)	% Passing	Size (mm)	% Passing	Size (mm)	% Passing
75.00	-	19.00	**100**	4.75	**93**	0.425	**88**
63.00	-	13.20	**97**	2.36	**91**	0.300	**86**
37.50	-	9.50	**96**	1.18	**89**	0.150	**71**
26.50	-	6.70	**95**	0.600	**89**	0.063	**32**



Test Method	**Notes**
NZS 4407 : 2015 Test 3.8.1	History: Tested as received Fraction tested: Whole Dispersant Used: Nil *Fraction passing finest sieve is by difference.*

Date tested : 03/05/18
Date reported : 04/05/18

Approved

J Crichton

Designation : *Assistant Laboratory Manager*
Date : 04/05/18

WSP Opus
Napier Laboratory
Quality Management Systems Certified to ISO 9001

90 Prebensen Drive
Private Bag 6019, Hawkes Bay Mail
Centre, Napier 4142, New Zealand

Telephone +64 6 833 5590
Website www.wsp-opus.co.nz

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

WSP | OPUS

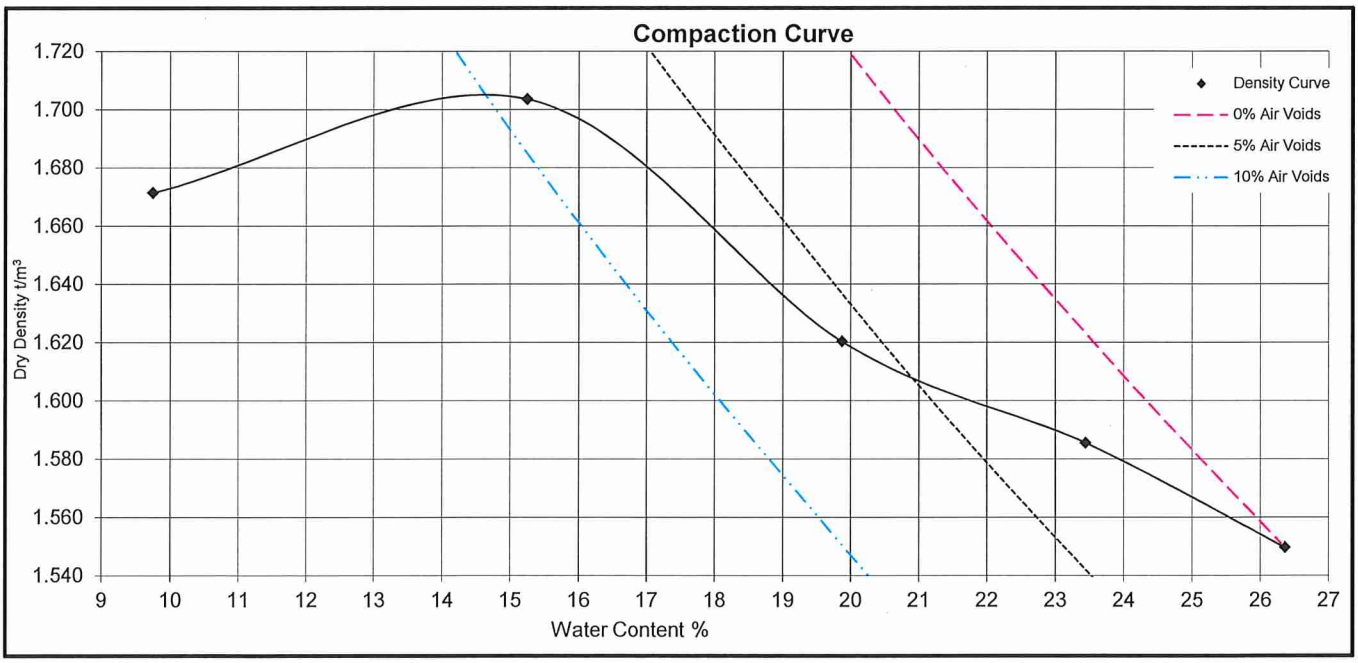
Project :	**Lyndhurst Arbuckle / Stage 6 Subdivision**
Location :	**Hastings**
Client :	**T. Bunny, PO Box 28057, Hastings**
Contractor :	**Resource Development Consultants Ltd**
Sampled by :	**Tim Wilkins**
Date sampled :	**02/05/18**
Sampling method :	**Contractor sampled**
Sample description :	**Silty Sand with minor gravel**
Sample condition :	**Damp**
Solid density :	**2.62 t/m³ (Assumed)**
Source :	**Fulton Hogan**

Project No :	**2-S4686.00**
Lab Ref No :	**NA1581**
Client Ref No :	**PO 4453**

Test Results

Maximum dry density	**1.70**	t/m³		Natural water content	19.9	%	
Optimum water content	**15**	%		Fraction tested	Whole soil		

Sample ID		1	2	Nat	3	4		
Bulk density	t/m³	1.834	1.963	1.942	1.957	1.958		
Water content	%	9.7	15.2	19.9	23.4	26.4		
Dry density	t/m³	1.671	1.704	1.620	1.586	1.550		
Sample condition		Dry Stiff	Moist Stiff	Moist Firm	Wet Soft	Wet Soft		



Test Methods		Notes
Compaction	NZS 4402 : 1986 Test 4.1.1 (Standard)	

Date tested : 03/05/18
Date reported : 04/05/18

Approved J Crichton

Designation : *Assistant Laboratory Manager*
Date : 04/05/18

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Website www.wsp-opus.co.nz

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

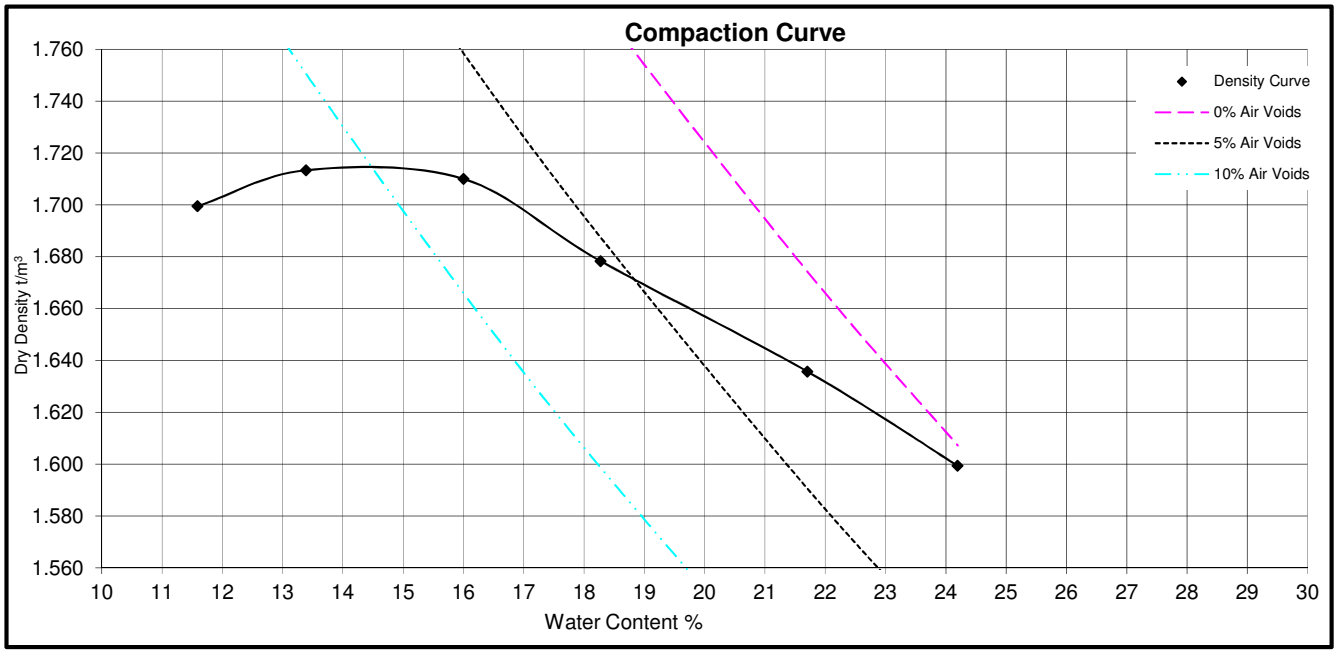
Project :	**Site Development - Lyndhurst Rd / Stage 6**
Location :	**Hastings**
Client :	**Resource Development Consultants Ltd**
Contractor :	**Santo Drainage & Contracting Ltd**
Sampled by :	**Santo Drainage & Contracting Ltd**
Date sampled :	**14/03/18**
Sampling method :	**Contractor sampled**
Sample description :	**Silt with Minor Gravel**
Sample condition :	**Damp**
Solid density :	**2.63 t/m³ (Assumed)**
Source :	**Fulton Hogan Site**

Project No :	**2-S4686.00**
Lab Ref No :	**NA1406 / A**
Client Ref No :	**PO 4310**

Test Results

Maximum dry density	**1.71**	t/m³		Natural water content	-	%	
Optimum water content	**15**	%		Fraction tested	Whole soil		

Sample ID		-4	-2	0	NAT	3	6	
Bulk density	t/m³	1.897	1.943	1.983	1.985	1.991	1.986	
Water content	%	11.6	13.4	16.0	18.3	21.7	24.2	
Dry density	t/m³	1.700	1.713	1.710	1.678	1.636	1.599	
Sample condition								



Test Methods		Notes
Compaction	NZS 4402 : 1986 Test 4.1.1 (Standard)	

Date tested : 22/03/18
Date reported : 28/03/18

Approved A.Ching

Designation : *Laboratory Manager*
Date : 28/03/18

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DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

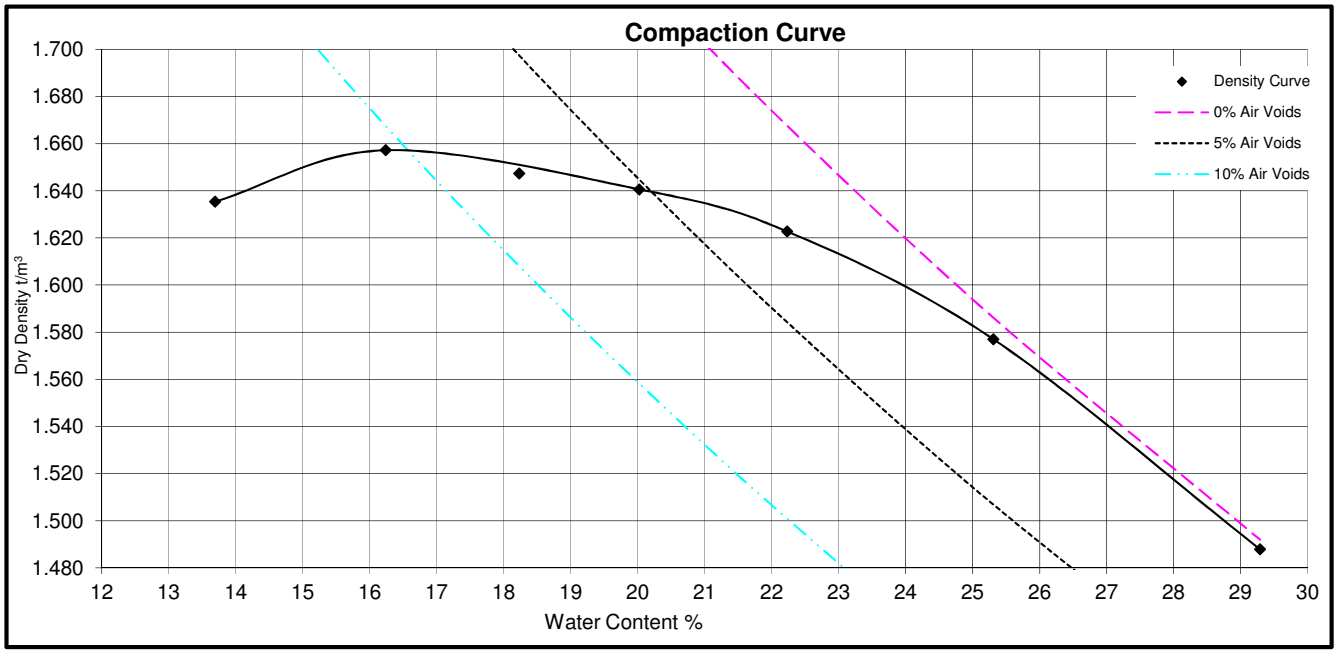
Project :	**Site Development - Lyndhurst Rd / Stage 6**
Location :	**Hastings**
Client :	**Resource Development Consultants Ltd**
Contractor :	**Santo Drainage & Contracting Ltd**
Sampled by :	**Santo Drainage & Contracting Ltd**
Date sampled :	**14/03/18**
Sampling method :	**Contractor sampled**
Sample description :	**Silt**
Sample condition :	**Damp**
Solid density :	**2.65 t/m³ (Assumed)**
Source :	**Santo Site**

Project No :	**2-S4686.00**
Lab Ref No :	**NA1406**
Client Ref No :	**PO 4310**

Test Results

Maximum dry density	**1.66**	t/m³	Natural water content	22.2	%	
Optimum water content	**18**	%	Fraction tested	Whole soil		

Sample ID		0	0	-4	-2	Nat	2	4
Bulk density	t/m³	1.859	1.926	1.948	1.969	1.984	1.976	1.924
Water content	%	13.7	16.2	18.2	20.0	22.2	25.3	29.3
Dry density	t/m³	1.635	1.657	1.647	1.641	1.623	1.577	1.488
Sample condition								



Test Methods		Notes
Compaction	NZS 4402 : 1986 Test 4.1.1 (Standard)	

Date tested : 22/03/18
Date reported : 28/03/18

Approved A.Ching

Designation : *Laboratory Manager*
Date : 28/03/18

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PLASTICITY INDEX FOR SOILS
TEST REPORT

OPUS

Project :	**Resource Development Consultants Ltd**
Location :	**Lyndhurst Road Stage 6**
Client :	**Resource Development Consultants Ltd**
Contractor :	**NA**
Sampled by :	**C Goss, Santo**
Date sampled :	**13/03/18**
Sampling method :	**Unknown**
Sample description :	**See below**
Sample condition :	**As received, sealed, moist.**

Project No :	**2-S4686.00**
Lab Ref No :	**NA1406 (Report WA1)**
Client Ref No :	

Test Results

Sample :	Fulton Hogan Site	Santo Site
Description :	SILT, minor gravel; greyish brown	SILT; brown
Liquid Limit :	34	37
Plastic Limit :	24	25
Plasticity Index :	**10**	**12**
As Received Water Content (%)	20.3	23.0

Test Methods		Notes
Liquid Limit	NZS 4402 : 1986, Test 2.2	Materials used: Minus 0.425 mm, rubbed.
Plastic Limit	NZS 4402 : 1986, Test 2.3	
Plasticity Index	NZS 4402 : 1986, Test 2.4	
Water Content	NZS 4402 : 1986, Test 2.1	

Date tested : 19/03/18 - 21/03/18
Date reported : 22/03/18

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full.

IANZ Approved Signatory
R Jones
Designation : *Laboratory Manager*
Date : 23/03/18

IANZ ACCREDITED LABORATORY

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

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ONE POINT - DYNAMIC COMPACTION TEST REPORT

Project :	**Lyndhurst Stage 6**
Location :	**Hastings**
Client :	**T. Santo, PO Box 123, Waipukurau**
Contractor :	**Santo Drainage and Contracting Ltd**
Sampled by :	**J Crichton**
Date sampled :	**26/04/18**
Formation:	**Silt, Some Gravel**

Project No :	**2-L042.09**
Lab Ref No :	**Terry**
Client Ref No :	

Test Results

NDM sample location:	**Lot 56 Back**	**Lot 60 Back**	**Lot 62 Front**
Material Type:		**Silt, Some Gravel**	
Sample condition:	**Moist**	**Moist**	**Moist**
Fraction tested:		**That passing 19.00mm test sieve**	
Water Content %:	**12.4**	**20.3**	**14.3**
Compacted Dry Density : t/m³	**1.69**	**1.65**	**1.70**

Test Method:	Dry Density/Water Content	NZS4402:1986 - Test 4.1.1
	Water Content	NZS4402:1986 - Test 2.1

Date tested : 26/04/18
Date reported : 01/05/18

Approved

J Crichton J. Crich.

Designation : *Assistant Laboratory Manager*
Date : 01/05/18

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

WSP | OPUS

Project :	**Lyndhurst Stage 6**	
Location :	**Hastings**	
Client :	**T. Santo, PO Box 123, Waipukurau**	
Contractor :	**Santo Drainage and Contracting Ltd**	
Tested by :	**J Crichton**	
Date tested :	**26/04/18**	
Sample description :	**Silt, some gravel**	
Sample condition :	**Moist, Compact**	
Nuclear densometer no :	**27668**	
Solid Density (assumed) :	**2.65**	**t/m³**
Dry Density :	**1.70**	**t/m³**
Water Content :	**14.3**	**%**

Project No :	**2-L042.09**
Lab Ref No :	**Terry**
Client Ref No :	

Nuclear Densometer Test Results

Lot Number	62	62	63	63	61	61	
Test Position	Front	Back	Front	Back	Front	Back	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.89	1.92	1.89	1.92	1.97	1.98	
Dry Density (t/m³)	1.67	1.69	1.67	1.70	1.66	1.73	
Water Content (%)	13.5	13.5	12.9	13.2	18.7	14.5	
Air Voids (%)	14.7	13.3	15.2	13.6	6.3	9.7	
% of DD	98	100	98	100	98	102	

Oven Corrected Test Results

Dry Density (t/m³)							
Water Content (%)	Results have not been oven dry corrected						
Air Voids (%)							
% of DD							

Test Method	**Notes**
Insitu Density : NZS 4407 : 2015, Test 4.2 for Direct Transmission Mode	Approximately 400mm compacted fill placed

Date reported : 01/05/18

Approved

J Crichton

Designation : *Assistant Laboratory Manager*

Date : 01/05/18

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

WSP | OPUS

Project :	**Lyndhurst Stage 6**	
Location :	**Hastings**	
Client :	**T. Santo, PO Box 123, Waipukurau**	
Contractor :	**Santo Drainage and Contracting Ltd**	
Tested by :	**J Crichton**	
Date tested :	**26/04/18**	
Sample description :	**Silt, some gravel**	
Sample condition :	**Moist, Compact**	
Nuclear densometer no :	**27668**	
Solid Density (assumed) :	**2.65**	**t/m³**
Max Dry Density :	**1.66**	**t/m³**
Optimum Water Content :	**18**	**%**

Project No :	**2-L042.09**
Lab Ref No :	**Terry**
Client Ref No :	

Nuclear Densometer Test Results

Lot Number	60	60					
Test Position	Front	Back					
Test Probe Depth (mm)	300	300					
Wet Density (t/m³)	1.92	1.94					
Dry Density (t/m³)	1.69	1.61					
Water Content (%)	13.5	20.4					
Air Voids (%)	13.3	6.3					
% of MDD	102	97					

Oven Corrected Test Results

Dry Density (t/m³)							
Water Content (%)		Results have not been oven dry corrected					
Air Voids (%)							
% of MDD							

Test Method	**Notes**
Insitu Density : NZS 4407 : 2015, Test 4.2 for Direct Transmission Mode	Approximately 400mm compacted fill placed

Date reported : 01/05/18

Approved

J Crichton

Designation : *Assistant Laboratory Manager*

Date : 01/05/18

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

WSP | OPUS

Project :	**Lyndhurst Stage 6**	
Location :	**Hastings**	
Client :	**T. Santo, PO Box 123, Waipukurau**	
Contractor :	**Santo Drainage and Contracting Ltd**	
Tested by :	**J Crichton**	
Date tested :	**26/04/18**	
Sample description :	**Silt, some gravel**	
Sample condition :	**Moist, Compact**	
Nuclear densometer no :	**27668**	
Solid Density (assumed) :	**2.65**	**t/m³**
Dry Density :	**1.69**	**t/m³**
Water Content :	**12.4**	**%**

Project No :	**2-L042.09**
Lab Ref No :	**Terry**
Client Ref No :	

Nuclear Densometer Test Results

Lot Number	59	59	58	58	57	57	
Test Position	Front	Back	Front	Back	Front	Back	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.96	2.02	2.02	2.02	1.98	1.95	
Dry Density (t/m³)	1.71	1.73	1.71	1.73	1.71	1.68	
Water Content (%)	14.5	17.0	18.0	16.5	16.0	16.0	
Air Voids (%)	10.6	5.5	4.6	6.0	8.3	9.7	
% of DD	101	102	101	103	101	99	

Oven Corrected Test Results

Dry Density (t/m³)							
Water Content (%)		Results have not been oven dry corrected					
Air Voids (%)							
% of DD							

Test Method	**Notes**
Insitu Density : NZS 4407 : 2015, Test 4.2 for Direct Transmission Mode	Finish level of structual fill

Date reported : 01/05/18

Approved

J Crichton J. Crichton

Designation : *Assistant Laboratory Manager*

Date : 01/05/18

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

WSP | OPUS

Project :	**Lyndhurst Stage 6**	
Location :	**Hastings**	
Client :	**T. Santo, PO Box 123, Waipukurau**	
Contractor :	**Santo Drainage and Contracting Ltd**	
Tested by :	**J Crichton**	
Date tested :	**26/04/18**	
Sample description :	**Silt, some gravel**	
Sample condition :	**Moist, Compact**	
Nuclear densometer no :	**27668**	
Solid Density (assumed) :	**2.65**	**t/m³**
Dry Density :	**1.69**	**t/m³**
Water Content :	**12.4**	**%**

Project No :	**2-L042.09**
Lab Ref No :	**Terry**
Client Ref No :	

Nuclear Densometer Test Results

Lot Number	56	56	55	55			
Test Position	Front	Back	Front	Back			
Test Probe Depth (mm)	300	300	300	300			
Wet Density (t/m³)	1.98	1.95	1.96	1.91			
Dry Density (t/m³)	1.66	1.71	1.71	1.65			
Water Content (%)	19.0	14.0	14.5	16.0			
Air Voids (%)	5.6	11.5	10.6	11.5			
% of DD	98	101	101	97			

Oven Corrected Test Results

Dry Density (t/m³)							
Water Content (%)		Results have not been oven dry corrected					
Air Voids (%)							
% of DD							

Test Method	**Notes**
Insitu Density : NZS 4407 : 2015, Test 4.2 for Direct Transmission Mode	Finish level of structual fill

Date reported : 01/05/18

Approved

J Crichton

Designation : *Assistant Laboratory Manager*

Date : 01/05/18

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DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

WSP | OPUS

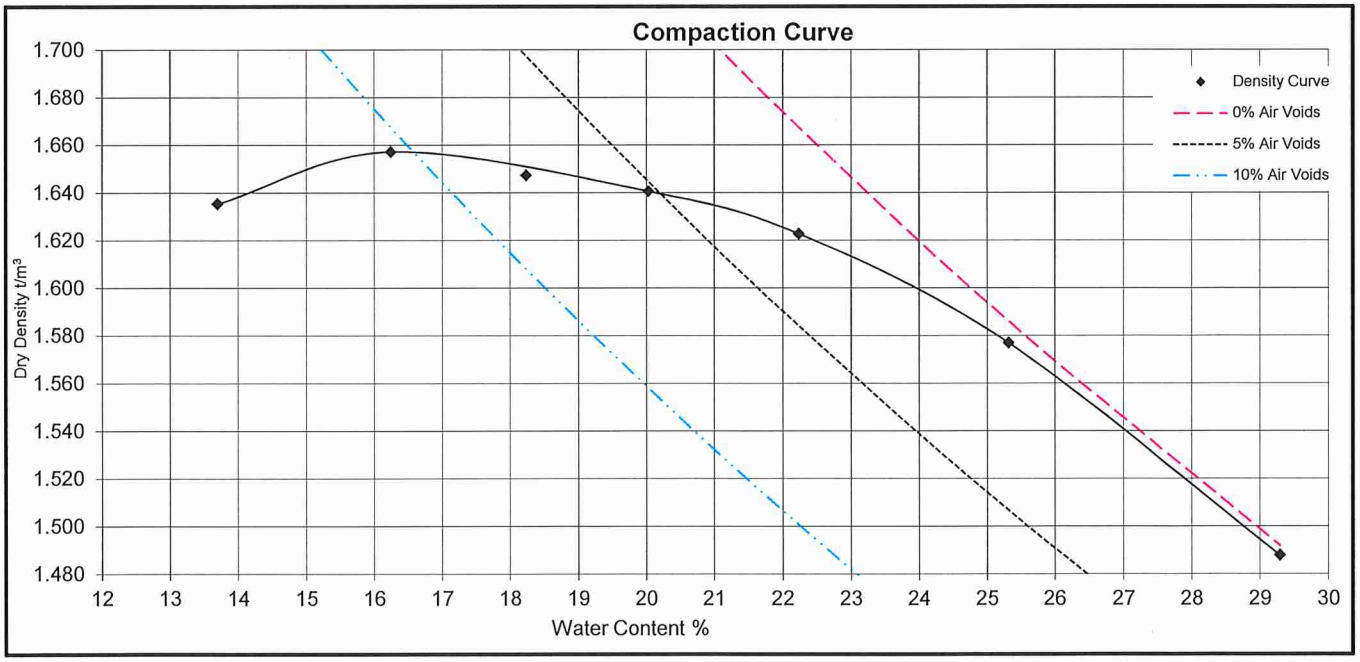
Project :	**Site Development - Lyndhurst Rd / Stage 6**
Location :	**Hastings**
Client :	**Resource Development Consultants Ltd**
Contractor :	**Santo Drainage & Contracting Ltd**
Sampled by :	**Santo Drainage & Contracting Ltd**
Date sampled :	**14/03/18**
Sampling method :	**Contractor sampled**
Sample description :	**Silt**
Sample condition :	**Damp**
Solid density :	**2.65 t/m³ (Assumed)**
Source :	**Santo Site**

Project No :	**2-S4686.00**
Lab Ref No :	**NA1406**
Client Ref No :	**PO 4310**

Test Results

Maximum dry density	**1.66**	t/m³	Natural water content	22.2	%	
Optimum water content	**18**	%	Fraction tested	Whole soil		

Sample ID		0	0	-4	-2	Nat	2	4
Bulk density	t/m³	1.859	1.926	1.948	1.969	1.984	1.976	1.924
Water content	%	13.7	16.2	18.2	20.0	22.2	25.3	29.3
Dry density	t/m³	1.635	1.657	1.647	1.641	1.623	1.577	1.488
Sample condition								



Test Methods		Notes
Compaction	NZS 4402 : 1986 Test 4.1.1 (Standard)	

Date tested : 22/03/18
Date reported : 28/03/18

Approved A.Ching

Designation : *Laboratory Manager*
Date : 28/03/18

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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