

LEGEND

SITE BOUNDARY

CATCHMENTS

CULVERT CROSSING

EXISTING OVERLAND FLOW PATH

DIRTY WATER DIVERSION SWALE

CLEAN WATER DIVERSION SWALE

EXISTING DRAIN TO BE PROTECTED

PROPOSED SILT/SUPER SILT FENCE

STABILISED CONSTRUCTION ENTRANCEWAY WITH SHAKER RAMP

SRP

SEDIMENT RETENTION POND

SLOPE DIRECTION OF EXISTING GROUND

OUTLET STRUCTURE

DECANTING EARTH BUND

LINING TO CHANNELS OR CHECK DAMS

FLOW DIRECTION OF PROPOSED SURFACE

EXISTING CONTOUR

DISTURBED AREA

STABILIZED AREA

STARTING STAGE EARTHWORKS		STAGE 2 EARTHWORKS		FINAL STAGE EARTHWORKS	
SEASON 2021/2		SEASON 2022/3		SEASON 2023/4	
SRP	CATCHMENT	AREA (ha)	CATCHMENT	AREA (ha)	CATCHMENT
SRP 1	A11	4.75	A9	4.70	A9
SRP 2	-	-	-	-	-
SRP 3	-	-	A3	-	A3
SRP 4	-	-	A10	2.87	A10
SRP 5	A4 & A5	4.80	A4	2.20	A4 & A6
SRP 6	A8	4.20	A8	4.10	A7
STAGE AREA TOTAL		13.8	STAGE AREA TOTAL	13.9	STAGE AREA TOTAL

TABLE				
POND	POND SIZING: MAX CATCHMENT SIZE (Ha)	AREA (A²)	LENGTH (m)	WIDTH (m)
SRP1	4.8	1200	60	20
SRP5	4.8	1200	60	20
SRP6	4.2	1200	60	20
DEB1 & 2	0.29	75	15	5

SIZING IN COMPLIANCE WITH GD05 F1.0 STRUCTURAL APPROACHES WITH 5:1 RATIO FOR SRP.

- PROPOSED PLAN IS INDICATIVE ONLY. CONTRACTOR TO SUBMIT EROSION AND SEDIMENT PLAN INCORPORATING PROPOSED CONSTRUCTION METHODOLOGY AND STAGING FOR REVIEW PRIOR TO COMMENCING CONSTRUCTION.
- ALL EROSION AND SEDIMENT CONTROL DEVICES HAVE BEEN SELECTED BASED ON THE ARC GD05 GUIDANCE DOCUMENT.
- CADASTRAL BOUNDARIES SHOWN HAVE BEEN SOURCED FROM LANDONLINE XML DATA AND ARE SUBJECT TO SURVEY DATUM: AUCKLAND VERTICAL DATUM (MSL) 1946
- SITE TO BE STABILISED ON COMPLETION.
- NUMBER OF STABILISED ENTRANCES IS INDICATIVE. ACTUAL NUMBER TO BE DETERMINE ON SITE AND AGREED WITH ENGINEER AND AUCKLAND COUNCIL.
- ALL SEDIMENT RETENTION DEVICES TO BE CHEMICALLY TREATED AS PER THE RECOMMENDATIONS CONTAINED IN GD05.
- SEDIMENT BASINS INDICATIVE SIZE ONLY.
- CONTRACTOR TO CONFIRM LOCATION OF SITE OFFICE AND PROPOSED STOCKPILE LOCATIONS.
- REFER TO DRAWINGS 510611-0100-DRG-CC-1100,1101 & 1102 FOR EROSION AND SEDIMENT CONTROL DETAILS.
- SEQUENCING IS DEPENDENT ON CONTRACTOR APPROACH, THEREFORE INDICATIVE ONLY

REV	DATE	REVISION DETAILS	APPROVED
A	06.12.21	ISSUED FOR INFORMATION	W.NEL
B	15.12.21	COMMENTS ADDRESSED	W.NEL

SCALE	SIZE
1:1500	A1
DRAWN	M.KAUR
DESIGNED	J.TUCKER
REVIEWED	J.A.VORSTER

FOR INFORMATION NOT FOR CONSTRUCTION	
APPROVED	
DATE	06.12.21
W.NEL	

PROJECT	KIWI PROPERTY - DRURY				
TITLE	EROSION AND SEDIMENT CONTROL PLAN STARTING SEQUENCE SHEET 1 OF 3				
DRAWING No.	510611	WBS	0100	TYPE	SKT
PROJECT No.	510611	DISC	CC	NUMBER	0005
REV	B				

Auckland Council | Approved Resource Consent Plan | BUN60390224 | 13/04/2022 | Page 5 of 12

LEGEND

- SITE BOUNDARY
- CATCHMENTS
- CULVERT CROSSING
- EXISTING OVERLAND FLOW PATH
- DIRTY WATER DIVERSION SWALE
- CLEAN WATER DIVERSION SWALE
- EXISTING DRAIN TO BE PROTECTED
- PROPOSED SILT/SUPER SILT FENCE
- STABILISED CONSTRUCTION ENTRANCEWAY WITH SHAKER RAMP
- SEDIMENT RETENTION POND
- SLOPE DIRECTION OF EXISTING GROUND
- OUTLET STRUCTURE
- DECANTING EARTH BUND
- LINING TO CHANNELS OR CHECK DAMS
- FLOW DIRECTION OF SURFACE
- EXISTING CONTOUR

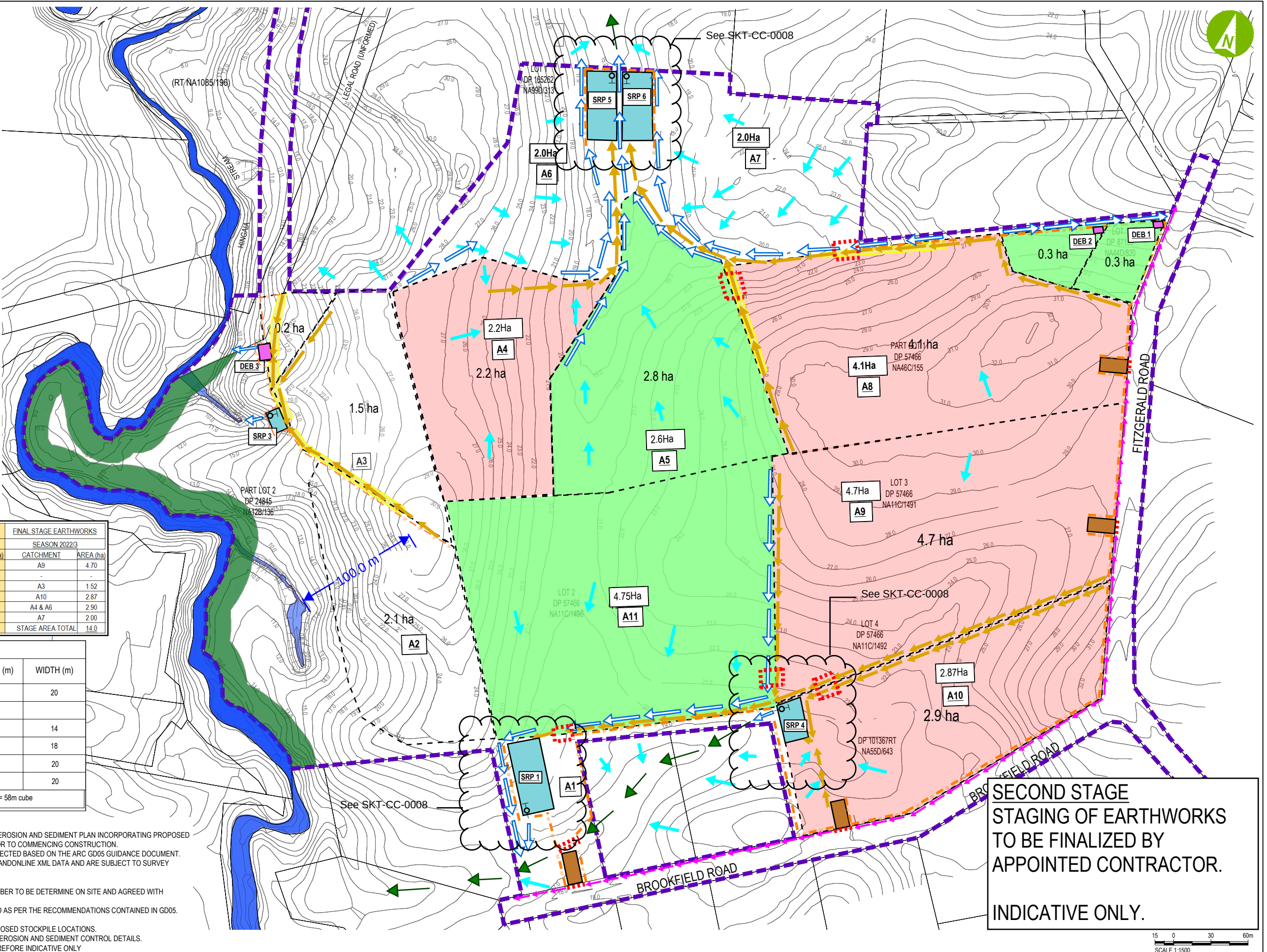
DISTURBED AREA

STABILIZED AREA

STARTING STAGE EARTHWORKS			STAGE 2 EARTHWORKS		FINAL STAGE EARTHWORKS	
SEASON 2021/2			SEASON 2022/3		SEASON 2023/4	
SRP	CATCHMENT	AREA (ha)	CATCHMENT	AREA (ha)	CATCHMENT	AREA (ha)
SRP 1	A11	4.75	A9	4.70	A9	4.70
SRP 2	-	-	-	-	-	-
SRP 3	-	-	A3	-	A3	1.52
SRP 4	-	-	A10	2.87	A10	2.87
SRP 5	A4 & A5	4.80	A4	2.20	A4 & A6	2.90
SRP 6	A8	4.20	A8	4.10	A7	2.00
STAGE AREA TOTAL		13.8	STAGE AREA TOTAL		STAGE AREA TOTAL	
					14.0	

TABLE				
POND	POND SIZING: MAX CATCHMENT SIZE (Ha)	AREA (A²)	LENGTH (m)	WIDTH (m)
SRP1	4.8	1200	60	20
SRP2	0.0	0.0		
SRP3	1.6	588	42	14
SRP4	2.9	972	54	18
SRP5	4.8	1200	60	20
SRP6	4.2	1200	60	20
DEB 1, 2 & 3	0.29	Volume required = 58m cube		

- PROPOSED PLAN IS INDICATIVE ONLY. CONTRACTOR TO SUBMIT EROSION AND SEDIMENT PLAN INCORPORATING PROPOSED CONSTRUCTION METHODOLOGY AND STAGING FOR REVIEW PRIOR TO COMMENCING CONSTRUCTION.
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- ALL SEDIMENT RETENTION DEVICES TO BE CHEMICALLY TREATED AS PER THE RECOMMENDATIONS CONTAINED IN GD05.
- SEDIMENT BASINS INDICATIVE SIZE ONLY.
- CONTRACTOR TO CONFIRM LOCATION OF SITE OFFICE AND PROPOSED STOCKPILE LOCATIONS.
- REFER TO DRAWINGS 510611-0100-DRG-CC-1100, 1101 & 1102 FOR EROSION AND SEDIMENT CONTROL DETAILS.
- SEQUENCING IS DEPENDENT ON CONTRACTOR APPROACH, THEREFORE INDICATIVE ONLY



SECOND STAGE STAGING OF EARTHWORKS TO BE FINALIZED BY APPOINTED CONTRACTOR.

INDICATIVE ONLY.

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REV	DATE	REVISION DETAILS	APPROVED
A	06.12.21	ISSUED FOR INFORMATION	W.NEL
B	15.12.21	COMMENTS ADDRESSED	W.NEL

SCALE	1:1500	SIZE	A1
DRAWN	M.KAUR	DESIGNED	J.TUCKER
REVIEWED	J.A.VORSTER		

FOR INFORMATION NOT FOR CONSTRUCTION	APPROVED	DATE	06.12.21
	W.NEL		

PROJECT	KIWI PROPERTY - DRURY				
TITLE	EROSION AND SEDIMENT CONTROL PLAN SEQUENCING SECOND STAGE SHEET 2 OFF 3				
DRAWING No.	510611	WBS	0100	TYPE	SKT
		DISC	CC	NUMBER	0006
				REV	A

LEGEND

- SITE BOUNDARY
- CATCHMENTS
- CULVERT CROSSING
- EXISTING OVERLAND FLOW PATH
- DIRTY WATER DIVERSION SWALE
- CLEAN WATER DIVERSION SWALE
- EXISTING DRAIN TO BE PROTECTED
- PROPOSED SILT/SUPER SILT FENCE
- STABILISED CONSTRUCTION ENTRANCEWAY WITH SHAKER RAMP
- SRP
- SEDIMENT RETENTION POND
- SLOPE DIRECTION OF EXISTING GROUND
- OUTLET STRUCTURE
- DECANTING EARTH BUND
- LINING TO CHANNELS OR CHECK DAMS
- FLOW DIRECTION OF SURFACE
- EXISTING CONTOUR
- DISTURBED AREA
- STABILIZED AREA

STARTING STAGE EARTHWORKS		STAGE 2 EARTHWORKS		FINAL STAGE EARTHWORKS	
SRP	CATCHMENT	AREA (ha)	CATCHMENT	AREA (ha)	AREA (ha)
SRP 1	A11	4.75	A9	4.70	4.70
SRP 2	-	-	-	-	-
SRP 3	-	-	A3	-	1.52
SRP 4	-	-	A10	2.87	2.87
SRP 5	A4 & A5	4.80	A4	2.20	2.90
SRP 6	A8	4.20	A8	4.10	2.00
STAGE AREA TOTAL		13.8	STAGE AREA TOTAL	13.9	14.0

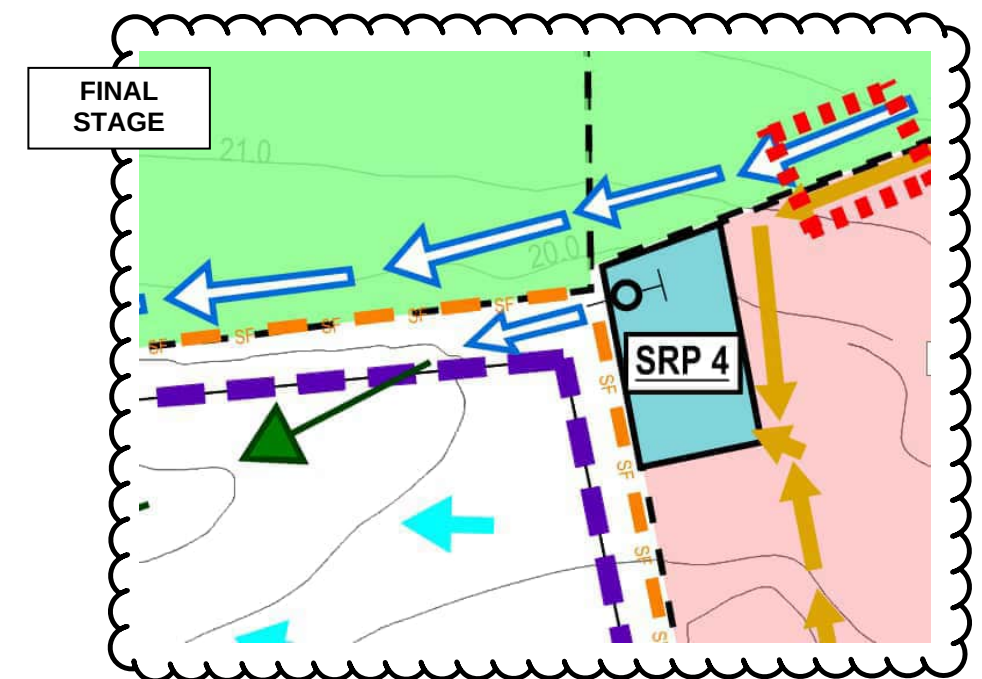
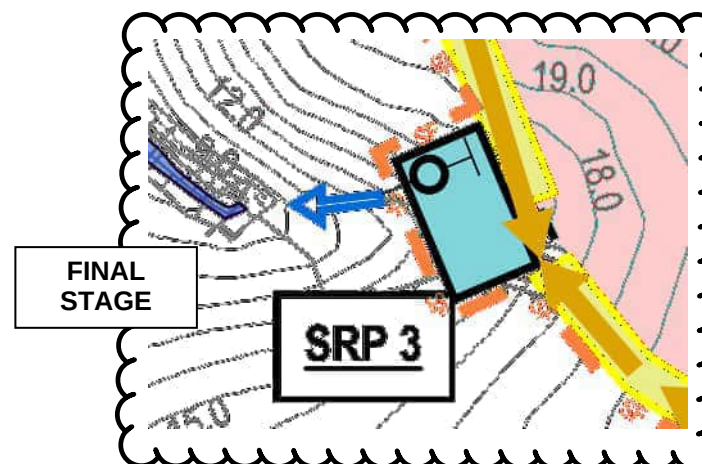
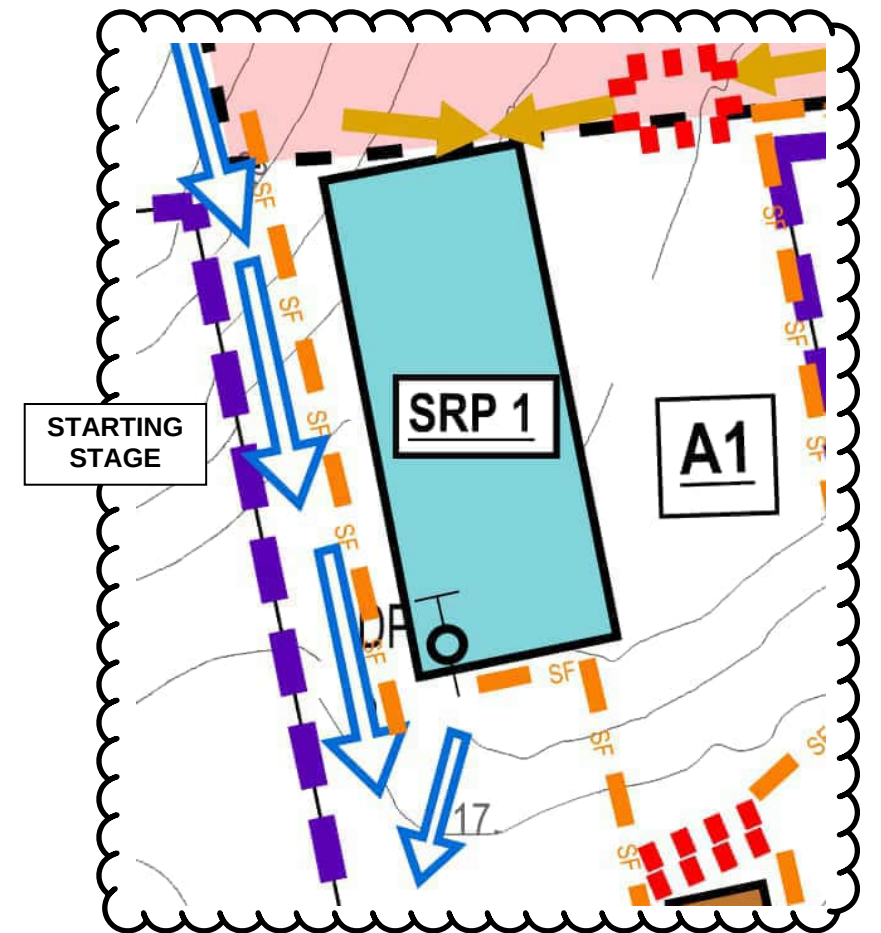
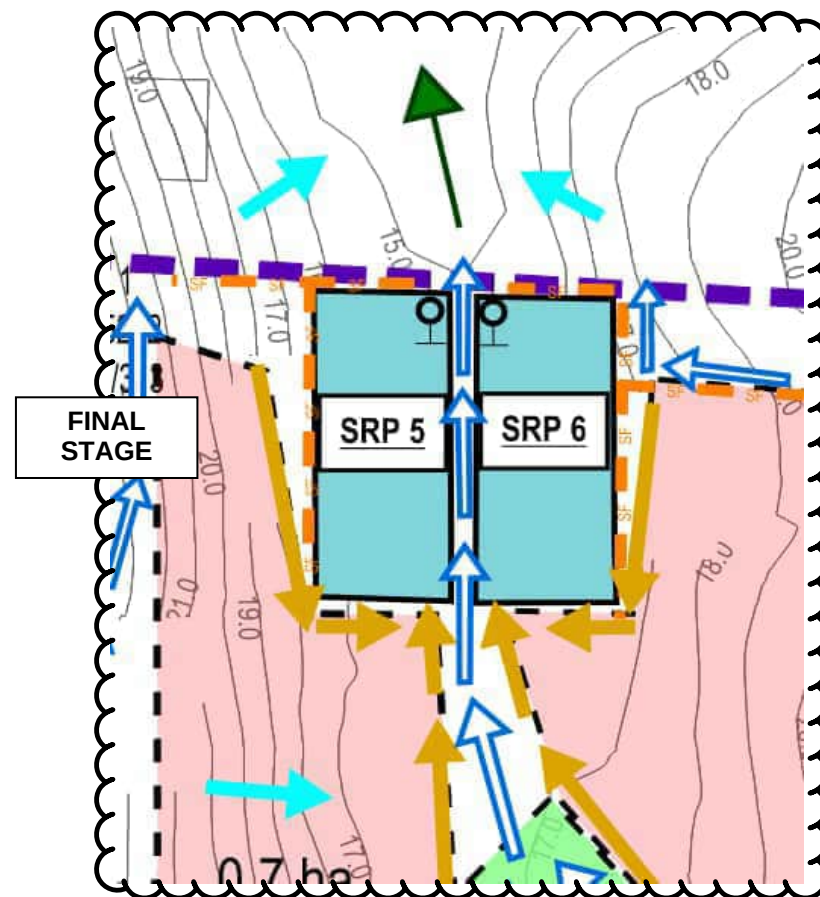
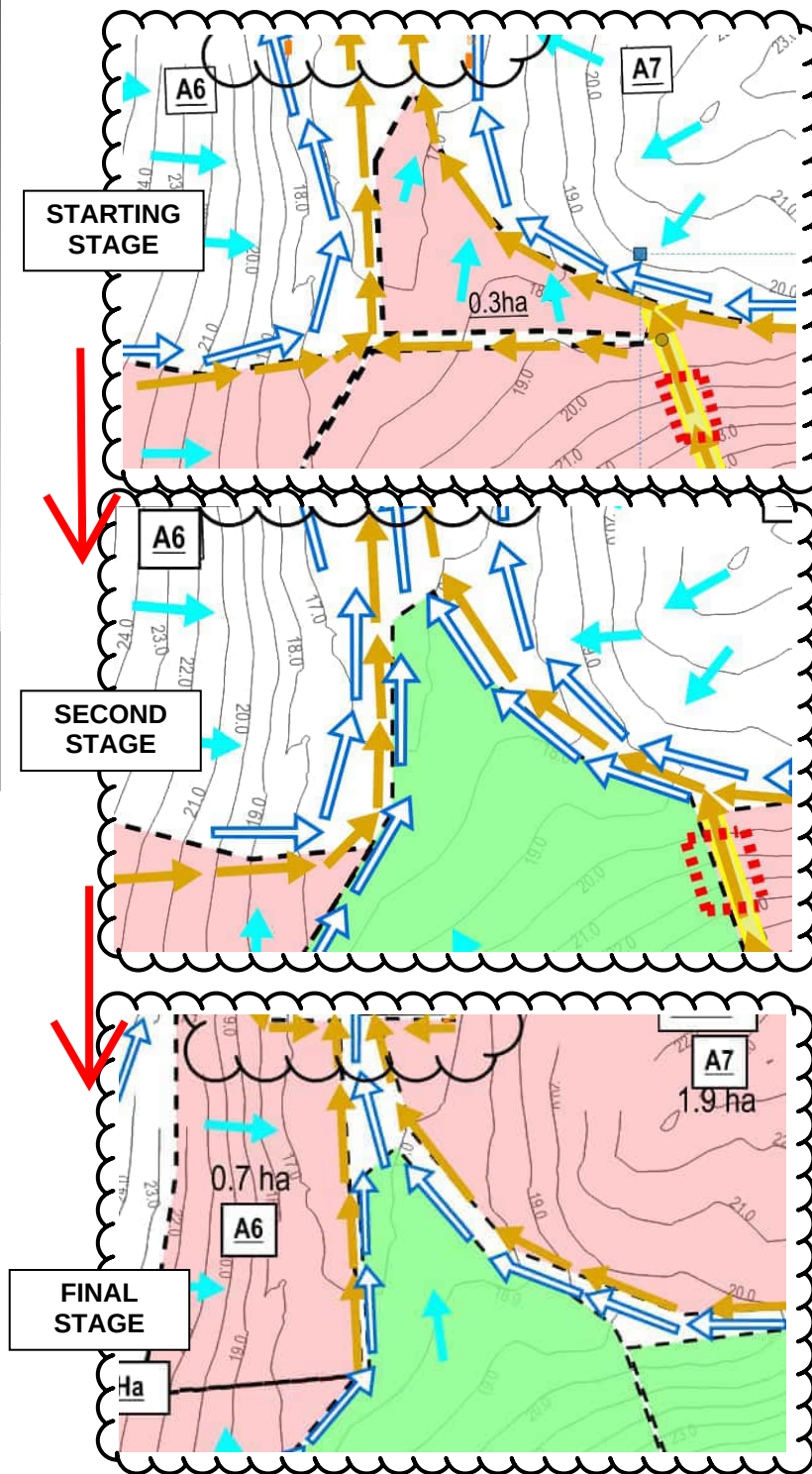
TABLE				
POND	POND SIZING: MAX CATCHMENT SIZE (Ha)	AREA (A²)	LENGTH (m)	WIDTH (m)
SRP1	4.8	1200	60	20
SRP2	0.0	0.0		
SRP3	1.6	588	42	14
SRP4	2.9	972	54	18
SRP5	4.8	1200	60	20
SRP6	4.2	1200	60	20
DEB 1, 2 & 3	0.29	Volume required = 58m cube		

SIZING IN COMPLIANCE WITH GD05 F1.0 STRUCTURAL APPROACHES WITH 5:1 RATIO FOR SRP.

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- SEQUENCING IS DEPENDENT ON CONTRACTOR APPROACH, THEREFORE INDICATIVE ONLY



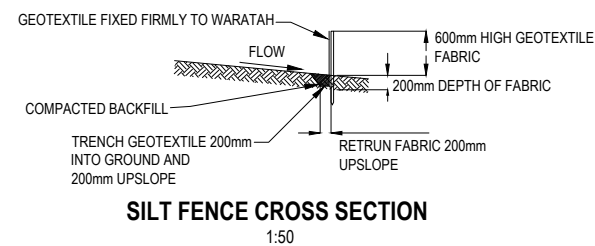
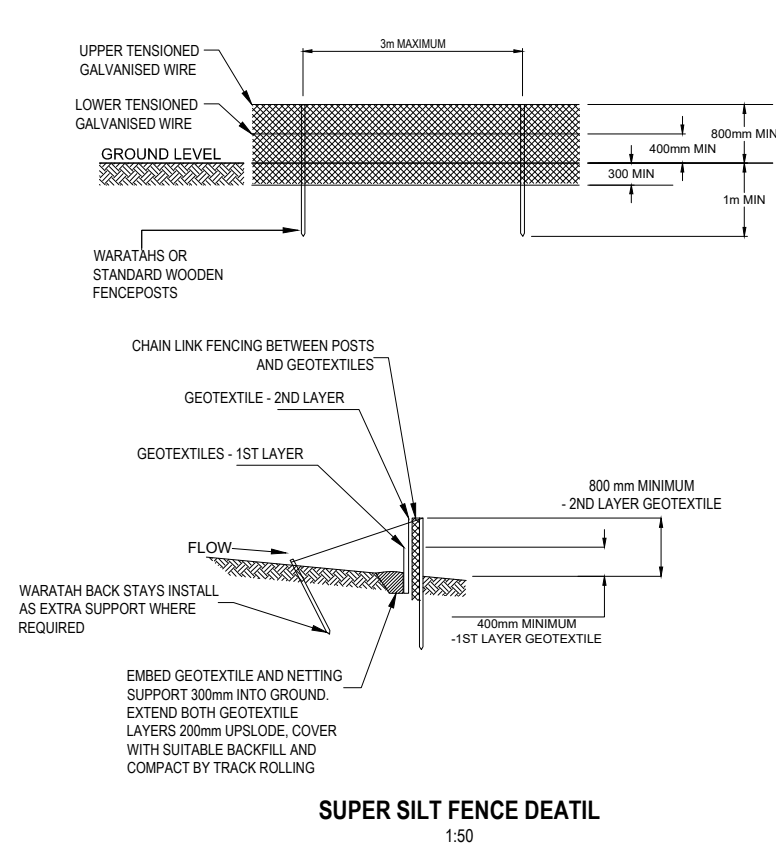
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A	06.12.21	ISSUED FOR INFORMATION	W.NEL	1:1500	A1		KIWI PROPERTY - DRURY
B	15.12.21	COMMENTS ADDRESSED	W.NEL				
				DRAWN		APPROVED	TITLE
				M.KAUR		DATE	EROSION AND SEDIMENT CONTROL PLAN
				J.TUCKER		06.12.21	SEQUENCING FINAL STAGE
				J.A.VORSTER			SHEET 3 OFF 3
						W.NEL	DRAWING No.
							510611
							PROJECT No.
							510611
							WBS
							0100
							TYPE
							SKT
							DISC
							CC
							NUMBER
							0007
							REV
							A



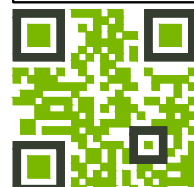
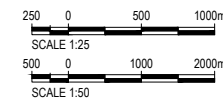
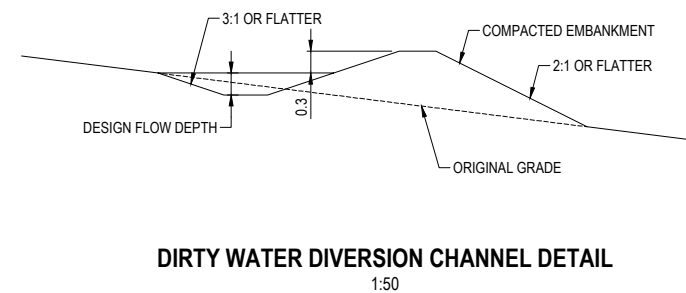
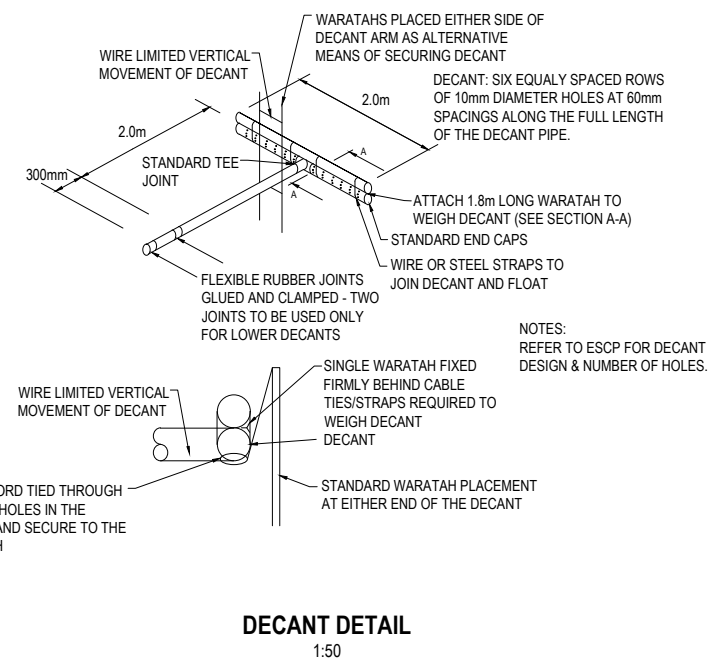
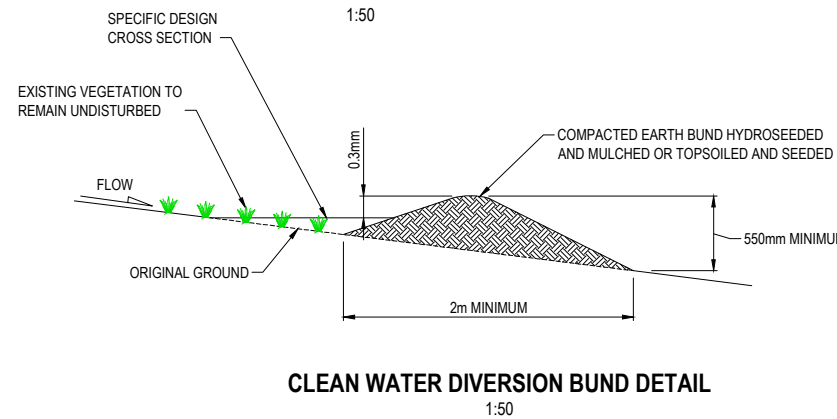
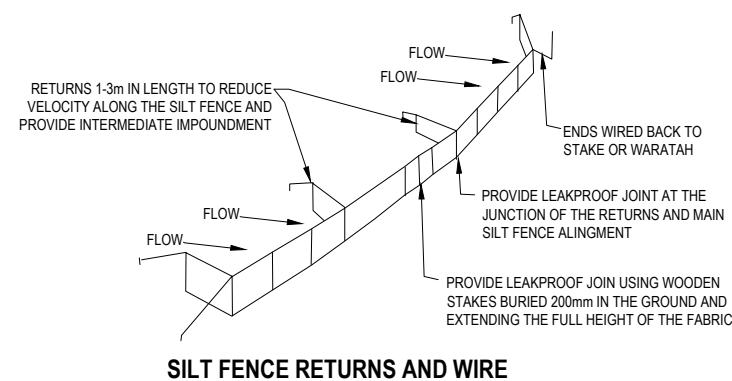
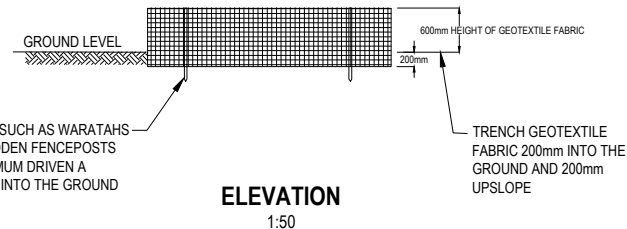
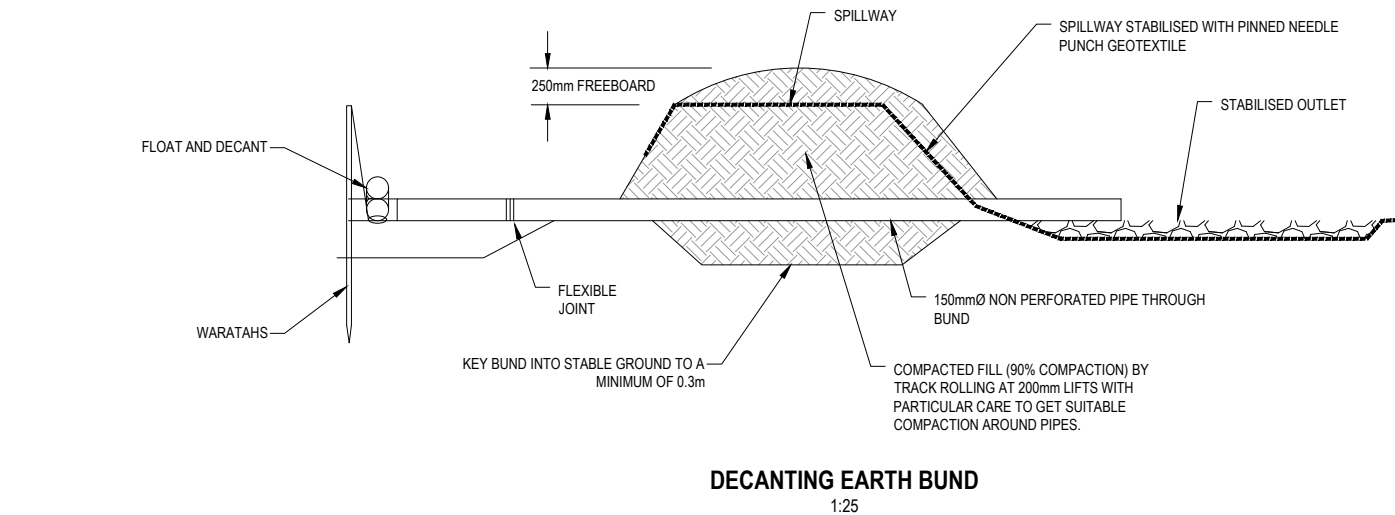
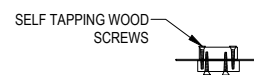
- aurecon**
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	CLIENT		REV		DATE	REVISION DETAILS		APPROVED	SCALE		SIZE	FOR INFORMATION NOT FOR CONSTRUCTION		PROJECT	KIWI PROPERTY - DRURY										
			A	15.12.21		ISSUED FOR INFORMATION		W.NEL	1:1500		A1														
									DRAWN			APPROVED		TITLE	EROSION AND SEDIMENT CONTROL PLAN "CLOSE-UP" OF AREAS										
									M.KAUR																
									DESIGNED																
								J.TUCKER				DATE													
								REVIEWED					15.12.21												
								J.A.VORSTER				W.NEL		DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUMBER	REV					
															510611	-	0100	-	SKT	-	CC	-	0008	-	A



STANDARD DETAIL FOR FABRIC JOIN
1:50



REV	DATE	REVISION DETAILS	APPROVED
B	2021-10-29	ISSUED FOR CONSENT	W.NEL
A	2021-05-20	ISSUED FOR CONSENT	W.NEL

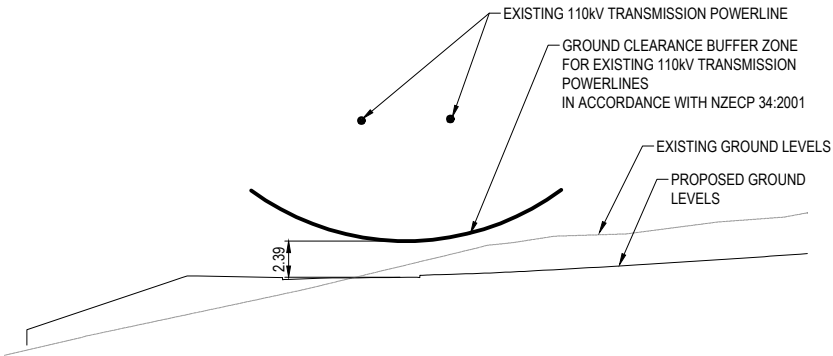
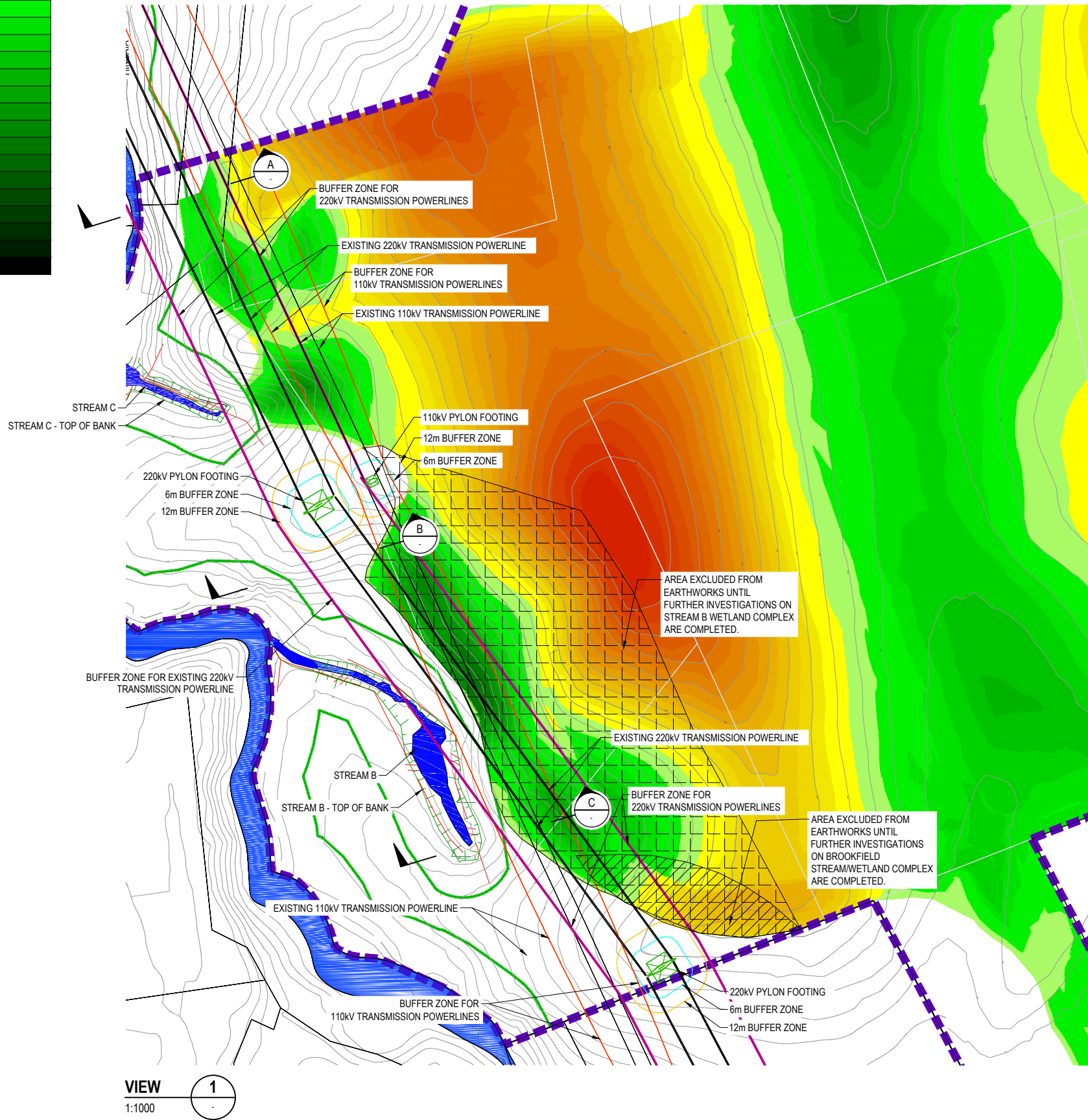
SCALE	SIZE
AS SHOWN	A1
DRAWN	M.KAUR
DESIGNED	J.TUCKER
REVIEWED	J.A.VORSTER

FOR CONSENT	NOT FOR CONSTRUCTION
APPROVED	DATE
W.NEL	29.10.2021

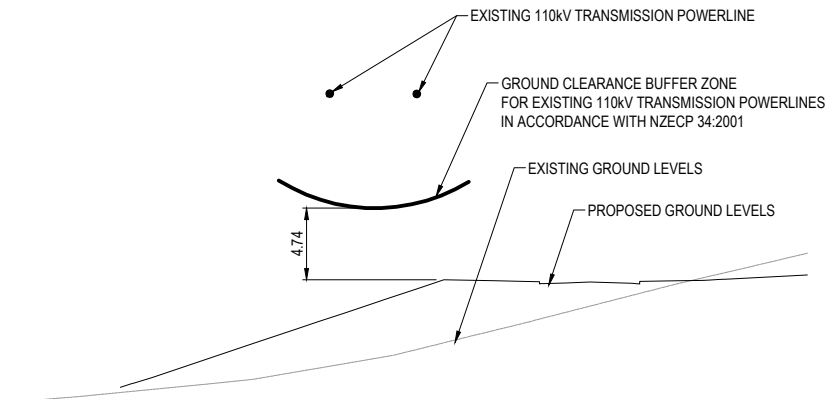
PROJECT	KIWI PROPERTY - DRURY
TITLE	EROSION AND SEDIMENT CONTROL DETAILS
SHEET 2	
DRAWING No.	510611
PROJECT No.	0100
AREA	DRG
TYPE	CC
DISC	0012
NUMBER	B

CUT AND FILL RANGES		
FROM	TO	COLOUR
≤-9.5	-9.0	
-9.0	-8.5	
-8.5	-8.0	
-8.0	-7.5	
-7.5	-7.0	
-7.0	-6.5	
-6.5	-6.0	
-6.0	-5.5	
-5.5	-5.0	
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-4.0	-3.5	
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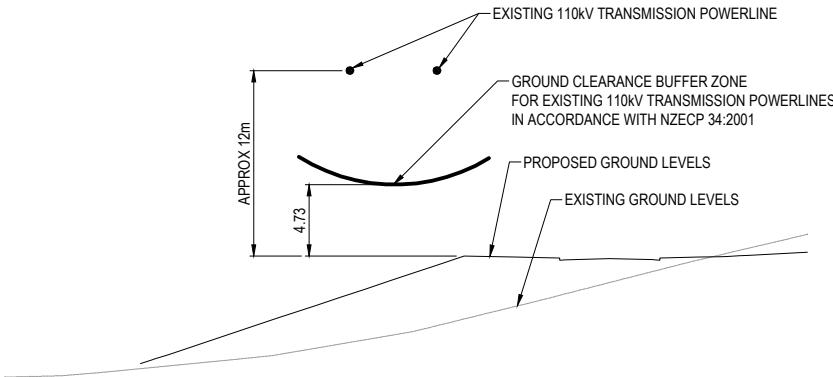
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2.5	3.0	
3.0	3.5	
3.5	4.0	
4.0	4.5	
4.5	5.0	
5.0	5.5	
5.5	6.0	
6.0	6.5	
6.5	7.0	
7.0	7.5	
7.5	8.0	
8.0	8.5	
8.5	≥9.0	



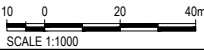
SECTION A
1:250



SECTION B
1:250



SECTION C
1:250



REV	DATE	REVISION DETAILS
C	2021-12-13	STREAM B WETLAND AFFECTED AREA INCLUDED
B	2021-10-29	ISSUED FOR CONSENT
A	2021-05-21	ISSUED FOR CONSENT

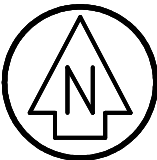
APPROVED	SCALE	SIZE
W.NEL	1:1000	A1
	DRAWN	
	D.SANTOS	
	DESIGNED	
	J.WARLICH-KOOLE	
	REVIEWED	
	J.A.VORSTER	

FOR CONSENT NOT FOR CONSTRUCTION	
APPROVED	DATE
W.NEL	2020-12-13

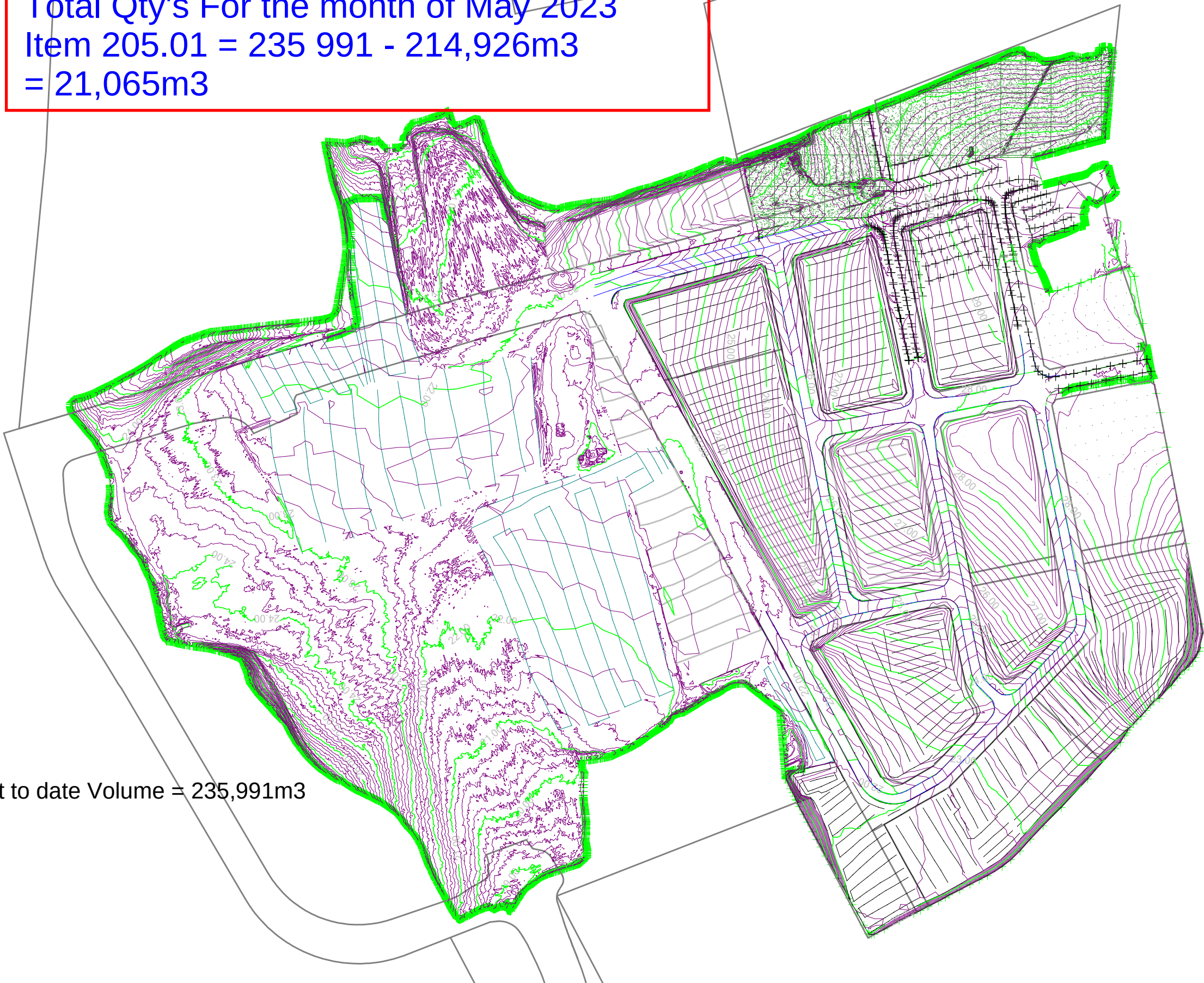
PROJECT	KIWI PROPERTY - DRURY				
TITLE	TRANSMISSION POWERLINE PLAN AND SECTIONS				
DRAWING No.	510611	AREA	0100	TYPE	DRG
		DISC	CC	NUMBER	0021
REV					C

Appendix B

Ross Reid Survey - May 2023



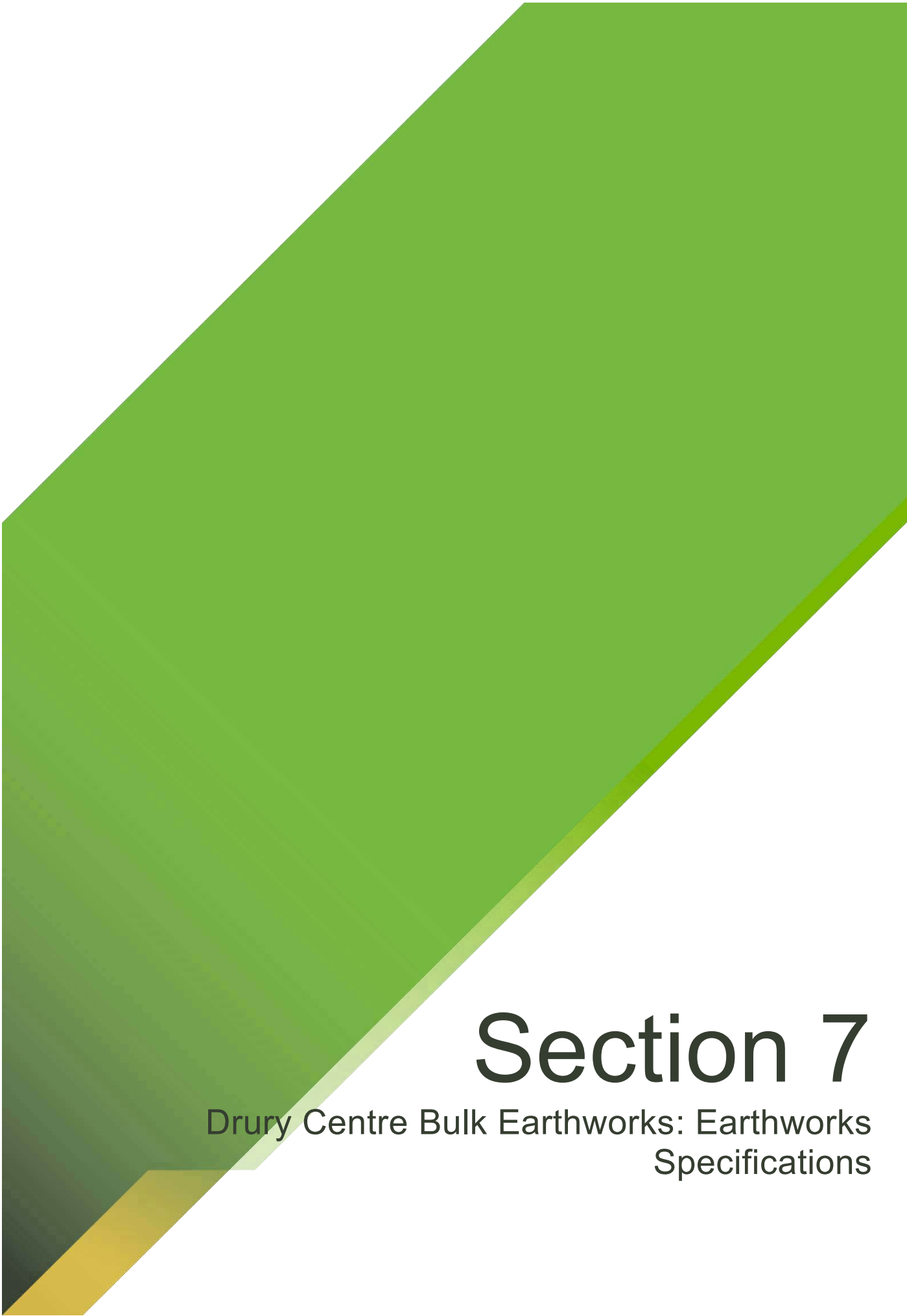
Total Qty's For the month of May 2023
Item 205.01 = 235 991 - 214,926m3
= 21,065m3



Total Cut to date Volume = 235,991m3

Appendix C

Earthworks Specification and Practical Completion Certificate



Section 7

Drury Centre Bulk Earthworks: Earthworks Specifications

Document control record

Document prepared by:

Aurecon New Zealand Limited

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Newmarket Auckland 1023

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New Zealand

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F +64 9 524 7815
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- Using the documents or data for any purpose not agreed to in writing by Aurecon.

Document control							aurecon
Report title		Standard Earthworks Specifications					
Document ID			Project number		510611		
File path		https://aurecongroup.sharepoint.com/sites/510611/5 Deliver Design/505 Field Investigations/Geotechnical/Earthworks Specification/510611 Drury Centre Earthworks Specification DRAFT.docx					
Client		Kiwi Property No.2 Ltd		Client contact			
Re v	Date	Revision details/status		Prepared by	Author	Verifier	Approver
0	12 November 2021	Issue		J Muirson	J Muirson		W Nel
1	3 December 2021	Issue		J Muirson	J Muirson		W Nel
Current revision		1					

Approval			
Author signature		Approver signature	
Name		Name	
Title		Title	
James Muirson		Wilhelm Nel	
Lead Engineering Geologist		Technical Director	



Contents

1	Extent of Contract	5
2	Particular requirements	6
2.1	Resource Consent	6
2.2	Construction Consents	6
2.3	Utility Service Operators	6
2.4	Summary of Testing Requirements	6
3	Preliminary and General	8
3.1	Site Location	8
3.2	Site Office, Power, Water and Conveniences	8
3.3	Health and Safety (H & S)	8
3.4	Public Safety	11
3.5	Requirements of Authorities	11
3.6	Compliance	12
3.7	Discrepancies	12
3.8	Noticeboard	12
3.9	Publicity and Signs	13
3.10	NZTA Specifications	13
3.11	Underground Services	13
3.12	Protection of Property	14
3.13	Road, Pavement and Kerb Protection	14
3.14	Site Maintenance, Clean Up and Restoration	15
3.15	Work Standards in Private Property	15
3.16	Quality Management	16
3.17	Compliance Testing by Contractor	17
3.18	Engineer's Verification and Inspections	17
3.19	Engineer's charges	17
3.20	Setting out	18
3.21	Noise	18
3.22	Vibration	19
3.23	Dust and Sediment	20
3.24	Construction Programmes	21
3.25	Hours of Work	21
3.26	Site Reports and Meetings	21
3.27	Traffic Control	21
3.28	Permanent Signs and Marker Posts	22
3.29	Notification of Works	22
3.30	Land entry	22

3.31	Facilities to be Provided and Maintained by the Contractor	22
3.32	Cleanliness of Site	24
3.33	Removal of Materials	24
3.34	Clean Up and Maintenance	24
3.35	Statements to the Media	25
3.36	Cultural Monitoring	25
3.37	Payment	25
4	Clearing and Stripping	26
4.1	Scope	26
4.2	Clearing	26
4.3	Disposal	26
4.4	Stripping	26
4.5	Measurement and Payment	26
5	Sediment Control and Environmental Management During Construction	27
5.1	Scope	27
5.2	Design Methodology	27
5.3	Techniques for Managing Adverse Effects	27
5.4	Management of Protection Systems	28
5.5	Modification to Protection Systems	28
5.6	Environmental or Property Damaged	28
5.7	Measurement and Payment	28
6	Excavation	30
6.1	Scope	30
6.2	Preliminary	30
6.3	Environmental Management	30
6.4	Operation of Plant	30
6.5	Mixing of Materials	30
6.6	Disposal	30
6.7	Undercutting	31
6.8	Slips	31
6.9	Maintain Excavation	31
6.10	Inspection	31
6.11	Finished Surfaces	31
6.12	Classification of Material	32
6.13	Stockpiling	32
6.14	Dewatering	32
6.15	Safety and Ground Support	32
6.16	Measurement and Payment	32
7	Excavation and Filling for Building Platform and Site Works	33
7.1	Scope	33

7.2	Preliminary	33
7.3	Extent of Work	33
7.4	Operation of Plant	33
7.5	Mixing of Materials	33
7.6	Disposal	33
7.7	Undercutting	34
7.8	Maintain Excavation	34
7.9	Inspection	34
7.10	Hardfilling	34
7.11	Basecourse Material	34
7.12	Placing and Compaction of Basecourse	34
7.13	Backfilling Against Foundations	35
7.14	Finished Surfaces	35
7.15	Stockpiling	35
7.16	Dewatering	35
7.17	Safety and Ground Support	36
7.18	Obstructions	36
7.19	Measurement and Payment	36
8	Earth fill	37
8.1	Scope	37
8.2	Operation of Plant	37
8.3	Surface Preparation	37
8.4	Fill Material	37
8.5	Testing	38
8.6	Placing, Spreading and Water Conditioning	39
8.7	Compaction	39
8.8	Finished Surfaces	40
8.9	Backfilling	40
8.10	Environmental Management	40
8.11	Compliance Testing	41
8.12	Engineer's Verification	41
8.13	Measurement and Payment	42
9	Settlement Monitoring	43
9.1	General	43
9.2	Instrumentation Installation	43
9.3	Protection	43
9.4	Baseline Reading Requirements	44
9.5	Monitoring Requirements	44
9.6	Surcharge	45
10	Hold Points and Engineer's Approvals	46

10.1 Hold points for Contractor's advice to Engineer

46

Tables

Table 1: Summary of testing requirements	6
Table 2: Summary of Vibration Velocity Limits During Construction	20
Table 3: Source Suitability Testing	38
Table 4: Instrumentation and monitoring frequency	44



1 Extent of Contract

The following provides a general description of the work required which is more specifically defined elsewhere in the Contract Documents.

The Contract includes the following work associated with the construction of earthworks for the Drury Centre Precinct development:

- a)** Clearing and removal of growth, debris etc from all areas to be earthworks and its removal from site.
- b)** Stripping of topsoil and unsuitable near surface soils over all areas to be earthworks, stockpiling and later respreading on fill batters or areas requiring landscaping.
- c)** Excavation and placement of parts of the excavated material as compacted fill. Disposal of surplus excavation material and excavated contaminated material to an appropriate site licensed to receive the material.
- d)** Importation, placement and compaction of bulk fill.
- e)** Installation and monitoring of settlement plates and pins.
- f)** Mulching and/or grass seeding earthworked areas not stabilised by other means
- g)** Tidying of all areas disturbed by the works so the site is left in a tidy condition compatible with the surrounding natural environment.
- h)** All compliance testing and inspection as required in the specification

The Contractor shall supply all labour, materials, plant and supervision necessary to complete the work in accordance with the Contract Documents.

2 Particular requirements

2.1 Resource Consent

The Resource Consents shall be obtained by the Engineer and shall form part of the Contract Documents. The Contractor shall familiarise itself with the Consents and meet all conditions set down for the works.

2.2 Construction Consents

The Contractor shall uplift all construction consents required from Auckland Council, Auckland Transport and Watercare

Confirmation that all construction consents are in hand shall be provided to the Engineer on request but in no case later than 20 days after acceptance of tender.

2.3 Utility Service Operators

Underground and overhead cables exist around the site. The Principle will arrange for the power and telecommunication disconnections from the public network. On-site water, sewer and stormwater are not connected to any public network and the removal of this needs to be allowed for in the tender schedule.

2.4 Summary of Testing Requirements

The testing requirements of this Specification in relation to earthworks and pavements are summarised below for convenience. Preferred testing methods are suggested, however all test methods meeting the requirements of NZS 4402 will be accepted.

Table 1: Summary of testing requirements

Material	Criteria	Method
Earth fill	<u>Top 1m</u>	Preferred
	98% of Maximum Dry Density (MDD)	<u>Beneath Roads</u>
	<u>Greater than 1m Depth</u>	Nuclear Density Meter (NDM) test at a rate of 1 test per 20m in each traffic lane
	95% of Maximum Dry Density (MDD)	<u>All other earthworks areas</u>
	<u>All</u>	Nuclear Density Meter (NDM) test at a rate of 1 test per 500m ³ , or, a minimum of 1 test per 0.5m thickness of fill is being placed. Whichever is greater.
	Moisture content +/- 2% of Optimum Moisture Content (OMC).	Each NDM test shall comprise 2 measurements using the same probe hole but orientated at 90 degrees to each other.
	<or=10% average air voids over 10 tests with a maximum of 12% for any individual test. Air voids to be calculated based on laboratory solid density test.	
	Vane shear strength. Minimum average of 150kPa for 10 tests. Minimum of 110kPa for any one test.	Shear vane test at a rate of 2 tests per 500m ³ , or, a minimum of 1 test per 0.5m thickness of fill is being placed. Whichever is greater.

		Undrained shear strength of the compacted soil at any test location shall be taken as the mean of a set of tests, comprising 3 tests undertaken within an area of 0.5m² of each other. Alternative New Zealand standard compaction test (NZS4402, Test 4.1.1).
Subgrade	CBR	Dynamic Cone Penetrometer test (NZS 4402, Test 6.5.2)
Subgrade	On-site inspection with Engineer	Proof roll on site - Two axle truck with twin tyres on rear axle, loaded to eight tonnes on the rear axle
Sub-base	Mean > 98% of Max. Dry Density (MDD) Min > 95% of MDD	Preferred <u>Roads</u> Nuclear Density Meter test at a rate of 1 test per 20m in each traffic lane <u>Building platforms or other hardstand areas</u> Nuclear Density Meter test at a rate of 1 test per 10m² Alternative MDD to be the greater of: New Zealand vibrating hammer compaction test (NZS4402, Test 4.1.3). Plateau Density Test on a test strip of approx. 50m and at an appropriate water content
Sub-base	CBR > 40%	Dynamic Cone Penetrometer test (NZS 4402, Test 6.5.2)
Base course	Mean > 98% of MDD Min > 95% of MDD	Preferred <u>Roads</u> Nuclear Density Meter test at a rate of 1 test per 20m in each traffic lane <u>Building platforms or other hardstand areas</u> Nuclear Density Meter test at a rate of 1 test per 100m² Alternative MDD to be the greater of: New Zealand vibrating hammer compaction test (NZS4402, Test 4.1.3). Plateau Density Test on a test strip of approx. 50m and at an appropriate water content
Base course	95% of the deflections measured shall not exceed: 0.8mm for Principal and Collector Streets	Benkelman Beam test

	• 1.0mm local streets • 1.3mm for short local streets and cul-de-sacs With no measurement exceeding 25% of the above for the particular category.	
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3 Preliminary and General

3.1 Site Location

The location of the Site and means of access are described on the Drawings. Tenderers shall, before submitting tenders, inspect the site and shall satisfy themselves as to the nature and extent of the work and its feasibility.

The Contractor shall be responsible for the provision of suitable access to and through the Site, and shall make all arrangements necessary with adjacent property owners and with Local and Statutory Authorities.

The Contractor shall limit the areas occupied whether with huts, plant, storage, earthworks or by entering upon land with staff to the areas defined by the Drawings as areas upon which work is to be carried out.

3.2 Site Office, Power, Water and Conveniences

The Contractor shall erect, maintain and, at the completion of the works remove any necessary site offices and other accommodation for Contractor's staff and workmen, and shall make these facilities available for use by the Engineer's Representative during site meetings and inspections.

The Contractor shall make his own arrangements for the supply of power and water for construction purposes. Conveniences for work people shall be provided by the Contractor in accordance with any appropriate by-laws and awards.

3.3 Health and Safety (H & S)

For the duration of the contract, the Contractor shall fulfil its obligations under the Health & Safety at Work Act 2015 and associated Regulations.

3.3.1 Health and Safety Plan

Prior to commencement of work the Contractor shall supplement the H & S information provided in the tender with the provision of a full Site-specific H & S Plan. The plan shall cover the safety of both Contractor's staff and any other people or vehicles that may be on the site or pass through or adjacent to the site during the period of the Contract works. The Contractor shall implement, actively manage and adhere to the plan at all times.

Without limiting the Contractor's obligation to identify and manage all safety issues the Safety Plan should cover as a minimum, the following:

- Specific hazards and methods of dealing with them
- A process of identification and management of new and existing hazards

- Safety equipment that will be provided and used
- A copy of the accident reporting process
- Arrangements for consideration of issues arising between Contractors and Subcontractors on site
- A schedule of health and safety meetings
- Nominated site staff who will be responsible for managing site health and safety and their relevant training.
- Management staff with overall responsibility for health and safety
- Procedures for dealing with visitors to the place of work
- Procedures for employee participation in health and safety on site
- Audit procedures
- Procedures for dealing with public movements on or around the project site.
- Procedures for managing emergencies including site evacuation procedures and telephone numbers of relevant company officers and emergency services.

The Contractor shall update and/or modify the H & S plan and its management on an on-going basis as project experience, project staging, or requirements of the Engineer or regulatory bodies may necessitate. Any such changes shall be reported directly to both the Principal and Engineer with reasons.

3.3.2 Site Hazards

The following hazards are identified but the list is not exhaustive and the Contractor shall satisfy itself of all hazards on the site and include these within its Health and Safety Plan.

Site hazards include:

- Contaminated soil
- Trench excavations
- Construction plant
- Fences
- Motor vehicles on adjacent public road
- Public moving adjacent to or through the site
- Above ground cables
- Below ground services
- Open storm drains or streams
- Open silt ponds
- Movement of plant and equipment on site

3.3.3 Suitability of H and S plan

The Engineer reserves the right to withhold approval to commence work if in his/her opinion the H & S plan is not provided or not appropriate to the specific site works. Any approval to commence work given or implied by the Engineer shall not be taken as an approval of the contents of the H & S plan, the preparation and management of which shall be the responsibility of the Contractor.

3.3.4 Health and Safety Compliance

The Contractor shall take all practicable steps to ensure the safety of its employees while at work, and to ensure that no action or inaction of its employees while at work harms any other person.

In particular, the Contractor shall take all practicable steps to:

- Identify hazards.
- Provide and maintain a safe working environment at all times
- Provide and maintain facilities and protective equipment for the safety and health of its employees while they are at work
- Ensure that plant used by an employee at work is designed, made and maintained so that it is safe for use and stored in an appropriate secure environment when not in use
- Ensure that all work carried out for or by the Contractor and all practises and procedures comply with all applicable Acts of Parliament, Regulations, Codes of Practice and industry good practice and guidelines.
- Ensure that while at work its employees are not exposed to hazards arising out of the arrangement, disposal, manipulation, organisation, processing, storage, transport, working or use of things in their workplace or under the Contractor's control
- Ensure that all employees are adequately trained and supervised in safety procedure relevant to the work being undertaken
- Ensure that emergency response procedures are in place at all times and there is suitable first aid equipment and suitably trained first aid personnel on site at all times.

The Contractor's Health and Safety systems shall also ensure that all practicable steps are taken to ensure the safety of others including:

- Its Subcontractors and the Subcontractor's employees
- Other Contractors working at the place of work
- Members of the public or any other persons or vehicles who may be within or in the vicinity of the site.

3.3.5 Multi Contractor sites

Where there are multiple Contractors who have no sub contractual relationship to the Contractor, on a working site then the Contractor shall work with the Principal and other contractors to agree on overriding health and safety procedures for the site to ensure consistent site wide health and safety systems. Implementation of such site wide systems shall not in any way limit the Contractors health and safety obligations under the Health & Safety at Work Act 2015 and as set out in the Contract documents.

3.3.6 H & S Reporting

The Contractor shall provide regular reports to both the Principal and Engineer as follows:

- i. Immediate reporting (telephone and email with time record) of:
 - Any fatalities and lost time injuries to staff or others working on the site.
 - Any public accidents or injuries.
 - Any serious harm.

- Any plant breakdowns or accidents, or any spills that create a potential health, safety or environmental risk.

The above matters shall also be reported to OSH, Police, Council, NUO, etc as applicable.

- ii. Written reporting within 24 hours (including follow up reporting in the above cases) of the occurrence of any accident, incident or event, with information on the outcomes and consequential Contractor actions, including the desirability of modifications to H & S systems
- iii. Fortnightly (unless otherwise approved by the Engineer) written reporting of issues during the previous period and expectations for the next period. The report contents shall be agreed between the Engineer and Contractor, but as a minimum shall cover:
 - Confirmation that all H & S systems are in place and being actively managed.
 - H & S accidents /incidents during the period and outcomes.
 - Notifiable works being undertaken and confirmation that notifications have been given to the appropriate regulatory bodies.
 - Subcontractors or “other” contractors on site and any associated H & S issues.
 - Confirmation that all equipment on site meets H & S requirements and is currently certified where applicable.
 - Tool box or other safety meetings or courses provided to the site team or individuals.
 - Any other relevant H & S issues and any needs to modify the safety plan or systems with reasons.

The report shall include H & S expectations for the next period based on the expected work programme and the above contents as applicable.

3.3.7 Notifiable Works

The Contractor shall notify the appropriate Worksafe office of work that is notifiable under the relevant regulations 24 hours prior to starting the work. The Contractor shall maintain notification records and make them available upon request.

3.4 Public Safety

Without limiting the Contractors Health & Safety obligations the Contractor shall take all practicable measures to ensure the safety of the public, vehicles, and livestock in and around any work site, including as a minimum the following:

- provide fences, barriers, signs, lights and other devices as necessary to manage the safe movement of traffic, persons and livestock
- fill, cover, enclose and light all holes, ponds or excavations that could cause a safety risk
- enclose the contract works by suitably secure fencing whenever necessary to ensure public safety
- if agreed with the Engineer as being necessary for public safety, close off the site and/or adjacent areas to the public. Where any closure requires public notification, work with the Engineer to arrange such notification and meet any legal timing requirements.

3.5 Requirements of Authorities

The work is to be carried out in accordance with the Contract Documents and the requirements of Territorial Authorities having jurisdiction over the area in which the work is located and utility operators



having jurisdiction over utilities in or around the site. The Contractor shall ascertain and become familiar with any such requirements prior to commencing work.

The Contractor shall obtain and uplift such permits/consents as may be required by Local or other Authorities and allow for the payment of all such fees or levies in the tender rates.

Authorities or utility operators may require inspections of the work at various stages of construction to ensure their requirements are being satisfied. The Contractor shall establish which inspections are required, and shall arrange for the inspections to take place. Failure to arrange inspections may result in work being rejected.

Should the Authorities or utility operators request modifications to the Work specified in the Contract Documents, the Contractor shall notify the Engineer before proceeding. Where the Contractor considers such modifications may constitute an extra payment under the terms of the Contract, any claim will be considered only when the modifications have been approved by the Engineer, prior to their being undertaken.

The approval of the work by the Authorities and utility operators will be required before the issue of the Certificate of Practical Completion.

3.6 Compliance

The Contractor shall be deemed to have allowed for all work associated with the safe and orderly carrying out of the demolition work, including complying with all Territorial Authority requirements, demolition consent, Building Act, WorkSafe NZ requirements, and all other acts, laws, by-laws and regulations that may affect the execution of the contract. No variations will be allowed on the grounds of ignorance of the site or the buildings on it or adjoining, or the conditions under which the work will be executed.

3.7 Discrepancies

The Contractor is deemed to be competent and experienced enough to interpret the Contract Documentation to ensure successful system completion and operation.

Any ambiguities in the Design Drawings and Specifications and the balance of the Contract Documents should be noted. The Contractor shall provide the details of its initial review to the Engineer within one month from the Date of Acceptance of the Tender or issue of the Design Drawing set (whichever is the later). The Contractor shall not be entitled to Claim for additional Costs and/or time for ambiguities in the Design Drawings and Specification and the balance of the Contract Documents discovered after submission of the initial review.

After this initial review period has taken place any discrepancies, ambiguities or conflict noted will be the responsibility of the Contractor and no variation and or extension of time will be claimable.

3.8 Noticeboard

The Contractor shall erect and maintain in a prominent position at the entrance to the site a signboard displaying the name of the project, the name of the Principal, Engineer and Contractor, and telephone numbers indicating where the Contractor's Representative may be contacted after working hours.

3.9 Publicity and Signs

The Contractor shall not make statements to the media regarding policy, road conditions or contractual matters. All enquiries are to be directed to the Engineer or Principal.

3.10 NZTA Specifications

The following NZTA Specifications, including all current amendments shall be read with and form part of the Contract Documents. Whilst the listed NZTA Specifications are not provided within the Contract Documents they are available on line from the NZTA web site. Copies of these NZTA Specifications are available for inspection at the office of the Engineer during business hours.

NZTA B/2	Construction of Unbound Granular Pavement Layers
NZTA E/2	Performance of Bitumen Distributors
NZTA E/3	Performance of Road Marking Paint Applicators
NZTA F/1	Earthworks Construction
NZTA F/5	Corrugated Plastic Pipe Subsoil Drain Construction
NZTA F/6	Fabric Wrapped Aggregate Subsoil Drain Construction
NZTA M/1	Asphaltic Bitumens
NZTA M/4	Basecourse Aggregate
NZTA M/6	Sealing Chips
NZTA M/7	Roadmarking Paints
NZTA M/10	Dense graded, stone mastic and fine graded asphalt paving materials.
NZTA M/12	Raised Pavement Markers
NZTA M/13	Adhesion Agents
NZTA M/14	Edge Marker Posts
NZTA P/3	First Coat Sealing
NZTA P/4	Resealing
NZTA P/9	Construction of Asphaltic Concrete Paving
NZTA P/12	Pavement Marking
NZTA P/14	Installation of Raised Pavement Markers
NZTA Q/1	Quality Assurance for Chip Sealing
NZTA Q/3	Normal Quality Assurance Level Contracts

3.11 Underground Services

The locations and extent of underground and above ground services where shown on the Drawings are provided for the information of Tenderers, but no guarantee is given as to the correctness or completeness of this information. The Contractor shall notify all applicable Network Utility Operators (NUO's), search all records and have field markouts of all services undertaken by the relevant NUO, to best available accuracy standards, at least one week in advance of the work, and shall be responsible for their protection, and for the cost of repair or replacement of any services damaged by neglect of this requirement.



Any work required on an existing live utility service shall be undertaken by the relevant Network Utility Operator (NUO) or its approved contractors. The Contractor shall be responsible for coordinating and attending upon any such NUO works.

The Contractor shall ensure that any existing utility surface openings are kept clean and undamaged for the project duration.

Should interruptions to services be required, or if there is a possibility that they may be interrupted as a result of work, a thorough investigation must be made to ensure no other areas/users will be affected.

3.12 Protection of Property

The Contractor shall minimise any inconvenience to any persons affected by the work and shall prevent nuisance by dust, mud, stockpiled materials or noise. Unless otherwise specified the Contractor shall not unduly delay the legal passage of persons or vehicles through or within the site of the works. Where it is necessary to restrict access to public or private property prior notice shall be given to persons affected. Access shall not be completely restricted for longer than 24 hours without prior approval of the Engineer.

The Contractor shall protect all Contract Works from damage on the site and adjoining areas. This requirement includes supporting of structures, walls, fences and protecting all services and property which may, unless so protected, be damaged as a result of the execution of the Contract Works.

Whereby reason of activities of the Contractor damage results to any public or private property including roads, footpaths, structures, trees or gardens, such damage shall be made good by the Contractor without extra payment to the satisfaction of the property owner.

If, at any stage during the work, the Engineer determines by inspection that further work in accordance with the Contract is likely to damage any work or adjoining public or private property, the Engineer may require the Contractor to carry out adequate measures to prevent such damage occurring. Where such measures are, in the opinion of the Engineer, beyond the requirements of the original Contract, additional payment will be made for such work.

3.13 Road, Pavement and Kerb Protection

The Contractor shall provide and maintain all temporary roads, temporary pavement crossovers, hard standings washing down facilities and associated drainage, etc. as necessary to ensure that mud is not carried on to adjacent roads or paved areas by vehicles leaving the site. Vehicles removing spoil, rubbish, etc., from the site shall not be loaded beyond their normal capacity and shall be fitted with proper tail-boards and side - boards to eliminate the dropping of spoil or rubbish. Roads and paths, if fouled by spoil, concrete or other material, shall be cleaned immediately to the extent of washing if necessary or as directed by the Engineer.

The Contractor shall protect permanent roads, pavements, footpaths, kerbs and crossovers as required for access and carrying out of the Contract Works. Any rectification or upgrade costs of damage by vehicles and / or weather to bring the road to a design level as specified in this Contract shall be the responsibility of the Contractor.

The Contractor shall remove temporary roads, paths and crossovers prior to Practical Completion, or when no longer required, and make good and / or reinstate all permanent roads, pavements, footpaths, kerbs, crossovers, street channels, street and other surfaces to the satisfaction of the Engineer and the relevant Authorities, at the Contractor's cost.



3.14 Site Maintenance, Clean Up and Restoration

The Contractor shall keep the site clean and tidy at all times. Contractor to pay continuous attention to the removal of litter, waste materials, garbage and refuse including food scraps, vermin control and the like.

The Contractor is responsible for the supply and removal of skips and bins. Skips and bins shall not restrict traffic in carriageways and must be illuminated at night. The location of Contractor's skips and bins shall be accepted by the Engineer as part of the EMP, and shown on their site Control Plan.

Debris must not be stored within stairways, passages or exits. All debris, including food scraps, shall be removed from site and placed in bins. The Contractor is required to ensure that the work area is kept clean and tidy and that bins are emptied on a regular basis. Bins and debris shall be removed before holiday periods at Easter, Christmas and prior to public holidays.

For dropping refuse, the Contractor must use hoppers and shutters, chutes or refuse buckets which are covered or of such a design as to confine the material completely and prevent dust emission.

All spoil from earthworks shall be removed by the Contractor from the site.

Prior to the issue of the Practical Completion Certificate, the Contractor shall remove from the site and all areas used by it for the purpose of the Contract, all temporary Works, plant, buildings, rubbish, unused Materials, construction facilities and other Material and equipment belonging to it and its Subcontractors or used under its direction, and leave the Site and such other areas clean and tidy to the satisfaction of the Engineer.

The Contractor must properly dispose of all solid, liquid and gaseous contaminants in accordance with all statutory requirements and remove from site.

3.15 Work Standards in Private Property

The process through which the Contractor is to undertake work in private properties is outlines below:

- The Contractor shall notify private property owners at least one week prior to starting construction on their property
- No trench shall be open for longer than 2 weeks on an individual property
- The Contractor is to inform all residents in the event of a variation to the original programme of works, in writing within 24 hours of the variation
- All requests for information by the Resident shall be attended to by the Contractor within 24 hours
- The Contractor is to complete all works in private property by the deadlines supplied on the submitted programme of works
- There shall be no instances where unreasonable actions on the part of the Contractor may prejudicially affect the goodwill and reputation of the Council
- Reinstatement's shall be completed in accordance with the agreements included in the tender documents
- All reinstatement's shall be completed within 1 week of the trench being backfilled

3.16 Quality Management

3.16.1 Introduction

This Contract shall be completed in accordance with the requirements of NZTA Specification Q/3 for Normal Quality Assurance Level Contracts - TQS2.

The Contractor is responsible for quality control measures which incorporate all techniques including checking and testing required to ensure construction meets all the requirements of the Drawings and Specifications.

If the Engineer tests any part of the works and finds that it is not in compliance with the specified requirements, the Contractor shall be liable for the cost of testing, including any costs incurred by the Engineer or Principal.

All necessary producer statements and Contract Quality documentation including Inspection Checklists shall be provided by the Contractor before the Certificate of Practical Completion is issued.

3.16.2 Recommended Check/Inspection/Tests, etc

Check/inspection/tests and their regularity shall be identified by the Contractor in the Quality Plan but as a minimum the following shall be included:

- Programming and performance against programmes
- Health and Safety status and issues
- Traffic and pedestrian control
- Survey and set out
- Landowner liaison
- Daily site weather and activity summary
- Procedures for field checking of utility service location
- Recording of pipe sizes, strengths testing regimes as applicable
- Compaction testing regimes for bulk earthworks and pavements and name of independent testing organisation.
- Material specifications, sources and how ongoing quality is to be controlled, including type and regularity of field laboratory testing and recording – Refer also the section on “Compliance Testing by Contractor” within this Specification
- Construction tolerances, check levels for pavement layers, drains, etc.
- Seal materials and binder application rates, including design basis and weather conditions during sealing

Sampling and testing materials and measurements checks on completed layers shall be carried out by a registered laboratory engaged by the Contractor at its cost.

Where NZS test or other recognised test method is not applicable the Contractor shall detail the equipment to be employed and prescribe the method to be used to show compliance with the contract documents.

The Engineer shall not be bound to accept any work where QA results indicate non-conforming materials, work outside of tolerance or unacceptable work methods. The Engineer shall also not be bound to accept any QA results if independent verification checks, tests or measurements show a variation those submitted by the Contractor.



No payment will be certified for scheduled items claimed by the Contractor until the Contractor has submitted completed compliance documentation to the Engineer for such completed work.

3.17 Compliance Testing by Contractor

The Contractor shall be responsible for compliance testing on materials and work standards used in the Contract.

a) Bulk fill

The Contractor shall engage a suitably qualified independent testing laboratory or Consulting Engineer to test and monitor the fill preparation and placement and provide a certificate confirming that the compaction works have met the Specification standards at the end of the project. The certificate shall include suitable drawings to show the position (location and level) and results of all testing undertaken.

3.18 Engineer's Verification and Inspections

From time to time the Engineer may without advance notification, arrange for his/her own testing or inspection of any part of the works or plant or materials being used in the works. When requested, the Contractor shall facilitate access for the Engineer or the Engineer's advisers and attend on them as required, all at no extra cost to the Contract.

Should the Engineer find evidence of non-conforming materials or workmanship or results at variance with any certified Quality Control Checklist, the Quality Representative/Manager, on request from the Engineer, shall supply within one working day a Non-Conformance Report (NCR) including a written explanation for the variance detailing what remedial action has been taken.

Where the Contract Documents provide for inspections by the Engineer, or the Engineer has given notice of a wish to inspect items of work, the Contractor shall give the Engineer at least 24 hours' notice of the need for the inspection.

The Engineer accepts no responsibility for being unable to attend the site if inadequate notice is given. In such cases no work on the particular aspect of the project will be allowed until the inspection has been made and no time extensions will be allowed for the delay.

Where the Engineer carries out inspections or testing and finds the work inspected or tested has not been completed in accordance with the Specification, thereby requiring further involvement of the Engineer or specialist testers or advisers then the Engineer reserves the right to charge all such extra work to the cost of the Contractor.

Where the Engineer identifies non-compliance even where the contractors Quality Assurance shows complying work, the Engineer may stop the work until it is confirmed that work standards or materials comply. In such cases all costs associated with the stop work and all remedial measures required to achieve compliance shall be borne by the Contractor.

3.19 Engineer's charges

Where the Engineer incurs costs associated with addressing issues relating to non-conforming work or additional inspections as provided for within this Specification and Contract Conditions, costs will be deducted from money due or becoming due to the Contractor.

Costs will be based on time and expense based on the following rates:

- | | |
|-----------------------------|------------|
| - Engineer to the Contract | \$270/hour |
| - Engineer's Representative | \$150/hour |

- Other Professional Personnel	\$130/hour
- Vehicle	\$1.00/km
- Expenses	\$ as incurred

(All costs exclusive of GST). Expenses will include costs such as specialist laboratory or field testing services and use of specialist advisers where deemed necessary by the Engineer.

3.20 Setting out

The Contractor shall locate and verify survey marks and datum points required to set out the works. The Contractor shall record and maintain their position.

The Contractor shall set out all the work in accordance with the pegs and levels shown on the Drawings or Instructions supplied by the Engineer, and to do so shall employ suitable qualified personnel equipped with all necessary instruments.

If any survey marks or pegs are in the way of the Contractor's operations, the Engineer shall be informed who will advise on action to be taken.

The Contractor is to take all practical steps to protect survey pegs, survey marks and datum points during construction. Should the reinstatement of any pegs be required as a result of poor construction practice, the reinstatement will be at the Contractors cost.

3.21 Noise

The Contractor shall minimise noise generated during this project and arrange the works so as to minimise the effects of any noise on the public. Construction noise shall comply with noise limits as stated in any Resource Consent conditions, the requirements of NZS 6803, the requirements of the Resource Management Act sections 326, 327 and 328 and the Health and Safety in Employment Regulations Clause 11.

The Contractor shall minimise the effects of noise generation by including in the planning of the work such factors as placing of plant, programming the sequence of operations and other management functions.

The Contractor shall comply with the requirements set out below including the requirement that noise should not exceed the workplace exposure limited set by WorkSafe NZ.

The Contractor shall comply with:

- All regulations under health and safety legislation with regard to acceptable noise exposure for employees. Noise assessment and management shall be in accordance with the guidelines in NZS 1269:2014 Occupational Noise Management Parts 0-4 in particular hearing protector selection as outlined in Part 3.
- NZS 6803:1999. This standard covers noise emitted by construction and maintenance works and outlines acceptable upper noise limits at neighbouring areas. Table 2 shall apply to the Contract Works, that is the site shall be treated as a residential area. The limits apply outside neighbouring buildings; one metre from the façades and 1.2 to 1.5 metres above the relevant floor level.
- Conditions of the relevant Consents.

The method of measurement and assessment of noise from construction, maintenance and demolition work shall be in accordance with NZS 6801:2008 Acoustics - Measurement of Sound, except for as expressly provided in NZS6803:1999. The various sound measurement and assessment terms and



parameters discussed above are described fully in NZS 6801:2008 Acoustics - Measurement of Sound.

The Contractor is to notify the neighbours and parties affected of the proposed programme of works via a letter drop.

The Contractors shall ensure that all items of noise producing plant on site are equipped with silencers and noise insulation to reduce noise at source to the lowest levels achievable in terms of the best of current low noise equipment design. The Engineer has the right to order the removal and replacement of plant at no cost to the Principal, if the Contractor has not complied with this clause and better low-noise plant is available.

3.22 Vibration

Vibration is always to be minimized on the site and within the vicinity of the site.

Construction vibration monitoring shall be undertaken to demonstrate that all vibrations to third party buildings or structures generated from construction activities are less than the maximum limits recommended in the German Standard DIN 4150-3:1999 "Structural Vibration – Effects of Vibration on Structures". In the first instance the Contractor shall undertake vibration monitoring at the property boundary. Additional monitoring inside the neighbouring property shall be undertaken where the vibration limits at the boundary exceed the above standard, or where complaints are received. Where access is granted such additional monitoring shall be undertaken either outside the building but connected to the building foundation, or inside the building. The peak particle velocity (ppv) limits which are to be applied are summarised in Table 1 and Figure 1 or as otherwise required by the Resource Consent.

The Contractor shall undertake vibration monitoring at the beginning of each phase of the Works, or when construction plant or methodology changes that is likely to result in an increase in the vibrations emitted, to demonstrate compliance with the above vibration limits. All vibration monitoring shall be undertaken by appropriately qualified and experienced personnel approved by the Engineer.

All vibration monitoring shall be undertaken at a time approved by the Engineer, when construction operations are most likely to result in maximum vibrations at the site boundaries. Vibration measurement instruments shall be placed by the Contractor at varying distances from the site to ensure that vibration is within the limits set out in the DIN standard 4150-3:1999, and to ensure that effects from vibration on occupants of adjacent structures are no more than minor.

The Contractor shall note that building occupants may notice or be disturbed by vibrations at levels lower than those cited in DIN 4150-3:1999 (i.e. vibration is perceptible at levels above 0.3 mm/s), which might give rise to complaints. This vibration is often due to occupants concern over building damage, and can generally be mitigated through effective consultation regarding the project objectives and timeframes, vibration monitoring and demonstration to the occupant that vibration levels are within acceptable levels. The Contractor shall take responsibility for liaison and discussions with neighbouring occupants to relay this information to them, and to keep them informed of construction activities and programme. On request of the Engineer, the Contractor shall provide vibration records to the occupants. The Contractor shall also take all practicable steps to minimise disruption to the occupants as much as possible.

Where required by the Resource Consent, the Contractor shall prepare a Construction Vibration Plan in accordance with this section. This is to form part of the Construction Management Plan.

Table 2: Summary of Vibration Velocity Limits During Construction

Type of Structure	Maximum Permitted Vibration Velocity (mm/s)			
	Foundation Frequency (Intermittent)			Foundation Frequency (Continuous)
	Less than 10 Hz	10 to 50 Hz	50 to 100 Hz ^(a)	
Residential Structures Residential dwellings and buildings of similar design and/or use	5	5 to 15	15 to 5	5
Sensitive Structures Structures that, because of their sensitivity to vibration, do not correspond to those listed above and of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	3

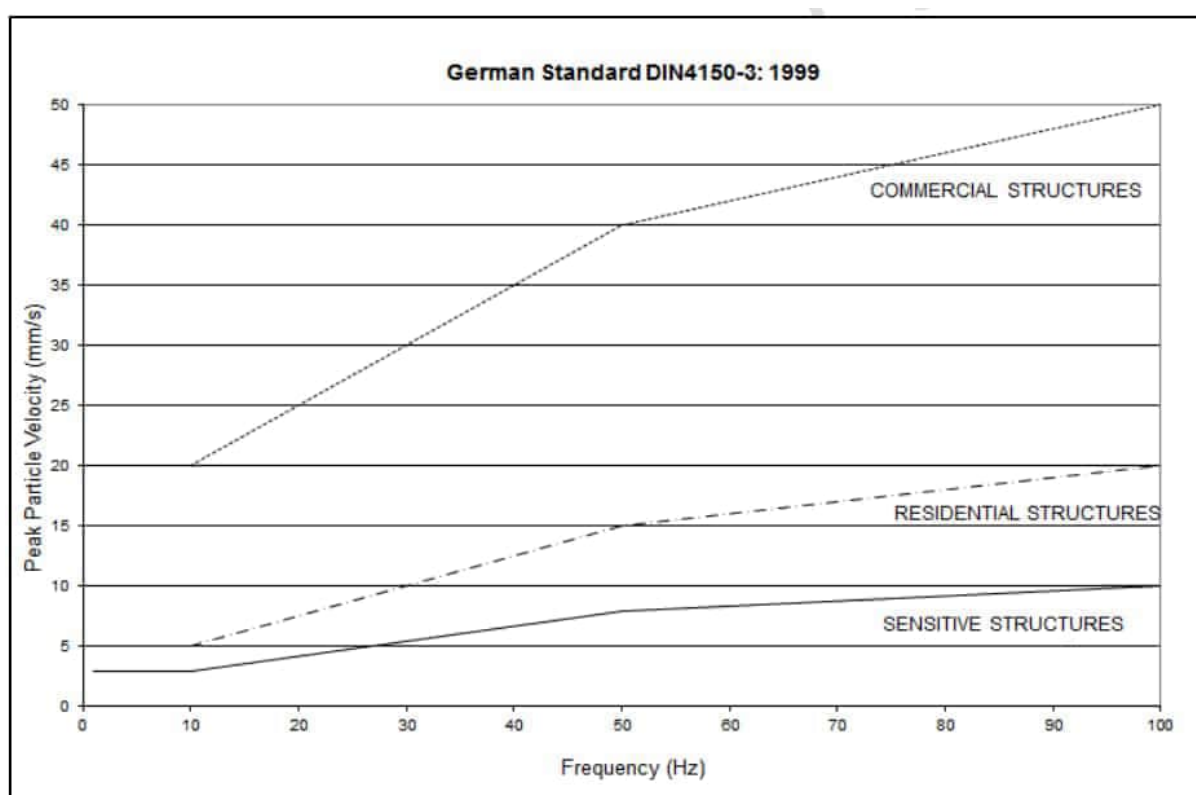


Figure 1: Summary of vibration velocity limits during construction

3.23 Dust and Sediment

The Contractor shall be responsible to ensure that adjacent residents, business proprietors or other members of the public suffer no inconvenience or hardship from dust or sediment arising by any means whatsoever from the works during the course of the Contract. The Contractor shall allow for the prevention of such a dust nuisance or sediment runoff in its scheduled rates.

Remove dirt and droppings deposited on public or private thoroughfares from vehicles servicing the site to the satisfaction of the appropriate authorities and the Engineer.

3.24 Construction Programmes

The Contractor shall, at the time of preparing their tenders, prepare an outline construction programme and satisfy themselves of the feasibility of constructing the Work with the plant, labour and materials available within the specified time.

Unless otherwise described in the Conditions of Contract, within fourteen days following the date of the Letter of Acceptance of Tender the Contractor shall submit for the Engineer's review a detailed Construction Programme showing the proposed sequence for carrying out the work and the construction methods, plant and labour to be employed, all in accordance with the Contract Documents and with the critical path indicated. The Engineer will have the right to reject or modify any such programme which is not in the interests of the Principal, and the first progress payment will not become due until a satisfactory modified programme has been received.

3.25 Hours of Work

No construction work under the Contract, other than emergency or maintenance work, shall be undertaken between the hours of 9:00 p.m. and 7:00 a.m., nor at any time on a Sunday or Easter Friday, Easter Sunday, Anzac Day and Christmas Day without the prior permission of the Engineer and of any Public Authority whose consent may be required.

3.26 Site Reports and Meetings

Unless otherwise directed, at all times when no work is being undertaken at the site, the Contractor shall arrange for the telephoning or emailing of a message to this effect to the Engineer. These reports shall be made before 9:00 a.m., in order to assist the Engineer in avoiding wasted site visits. Where the Contractor fails to provide these reports resulting in the Engineer undertaking unnecessary site visits such costs will be deducted from Contract sums owing.

The Contractor shall arrange for the attendance of its Representative and key Sub-contractors at regular site meetings with the Engineer for the purpose of reviewing the progress and quality of the work. Unless otherwise directed, site meetings shall be held each week at a venue and time approved by the Engineer.

3.27 Traffic Control

3.27.1 General

To ensure the safety of Contractors staff and road users, a high standard of traffic control complying as a minimum with the NZTA "Code of Practice for Temporary Traffic Management" (COPTTM: Fourth Edition, August 2015) will be required. In areas where work is likely to have the potential to disrupt traffic the Contractor shall submit in writing a Traffic Management Plan (TMP) detailing the methodology for traffic control including a plan of the proposed sign placements and the name of the Traffic Control Supervisor who will be responsible for Traffic Control on a day to day basis.

No work shall commence on the site prior to the Engineer's written agreement that the Contractor's Traffic Management Plan has been accepted. The Contractor is to advise all staff and subcontractors working on the site of their responsibilities to the Traffic Control Supervisor.

The TMP shall be considered a living document through the project. Where problems on the site, or ongoing experience with a TMP indicates changes or improvements should be made the TMP shall be modified and resubmitted to the Engineer with reasons for the proposed changes. Costs associated with any changes shall be borne by the Contractor.

3.27.2 Traffic Control Inspections

Traffic control inspections shall be undertaken at least once daily by the Contractor seven days per week and more frequently should faults occur. Any identified non-compliance to the Traffic Management Plan shall be rectified immediately. The Contractor is to pay particular attention to the condition of all temporary and permanent traffic signs, edge marker posts and raised pavement markers within the Site. These should be checked as part of the daily traffic control inspection and any identified as missing or damaged shall be replaced within two hours (applies 24 hours a day, 7 days per week). All signs and delineation devices shall be regularly cleaned to be free of grime and dust.

3.27.3 Edge Delineation

Edge delineation shall be maintained by the use of either temporary or permanent reflectorised marker posts. Where the use of marker posts is not practicable, other means of delineation in accordance with COPTTM shall be provided. Permanent marker posts shall be reinstated before the removal of the temporary guidance. Edge marker posts shall comply with NZTA M/14 Specification.

3.27.4 Non-Conforming Traffic Control

If during the course of the Contract the Engineer is required to investigate complaints of inadequate traffic control by the Contractor, then, if it is found to be non-conforming, the Engineer shall be reimbursed by the Contractor for the costs and disbursements for such investigation. Reimbursements shall be set out in the section of this Specification entitled "Engineers' Charges".

3.28 Permanent Signs and Marker Posts

The Contractor shall locate accurately and record on a plan the positions and number of existing traffic facilities, road edge marker posts, route position markers, etc.

The Contractor shall be responsible for the maintenance of all existing marker posts, route position pegs, advisory, warning and information signs and shall replace to the Engineer's satisfaction any that are lost, stolen or damaged.

3.29 Notification of Works

At least 1 week prior to commencement of work the Contractor shall notify land owners affected by the works of the likely start of the physical works.

The Contractor shall either send a copy of letters sent out to the Engineer, or shall write to the Engineer certifying that such notification has been made.

3.30 Land entry

Right of entry onto private property will be obtained by the Principal.

3.31 Facilities to be Provided and Maintained by the Contractor

3.31.1 Site Accommodation and Facilities ('Site Sheds')

The Contractor shall provide and erect a neat group of site sheds constructed from uniform materials in an area indicated on the Site Plan.

The site accommodation and facilities provided by the Contractor shall include a secure site office and an area that could function as a first aid / sick-bay. The Contractor must provide, in addition to the site office and other amenities, the following facilities for use by the Engineer, Consultants and Principal when visiting site:

- Access to Contractor's drawings;
- Safety hats, vests and boots for up to six (6) people; and
- Meeting space of sufficient size to accommodate the typical attendee numbers for a regular Site Meeting.

No temporary or permanent desk space for the Engineer, Consultants or Principal is required. All temporary buildings and structures should be maintained in good order during currency of the Contract and shall be removed at Practical Completion of the Contract Works, unless otherwise agreed by the Engineer.

3.31.2 Site Office

The Contractor shall establish an office on the site to deal with the matters relating to this Contract. The offices shall be under the personal control of the Contractor's Representative who shall have full authority to deal with and carry out the following:

- a) All communications with the Engineer;
- b) Ordering of material and goods; and
- c) Financial matters except those of a major nature as may be agreed by the Engineer.

3.31.3 Site Hoarding

The Contractor shall install and maintain all necessary hoardings and fences, screens, gates, footways, gangways, gantries, platforms, temporary walls and enclosures, etc., to protect the Contract Works, persons and property.

The location of the hoarding shall be agreed with the Engineer and Principal.

Gates shall be provided as required for construction access, egress and emergency use from the site. A key to the lockable gate(s) shall be provided to the Principal via the Engineer at the commencement of the Contract Works to enable emergency access.

3.31.4 Project and Temporary Signage

The Principal will supply and install project and general promotional information signage to the 'public' side of the site hoarding.

The Contractor is responsible for the cost and provision (including production, erection, maintenance and removal) of all necessary temporary construction signage including all required statutory and information signage to identify the site, advise safety control measures, hazardous materials and dangerous goods stored within the site, and re-direct non-construction vehicular and pedestrian traffic around the perimeter of the site in accordance with the TMP.

Any proposed signage, excluding directional and safety compliance / statutory signage, must be approved by the Principal prior to installation via the Engineer to Contract. This approval includes any signage to cranes and the like.

3.31.5 Water and Sewer

The Contractor shall connect to water and sewer points nominated by the Principal. The Contractor shall meet all costs for connection and disconnection. The Principal will pay for reasonable consumption costs.

3.31.6 Sanitary Provisions

The Contractor shall provide toilet facilities for its own and its Subcontractors use. The Contractor shall provide water tight refuse bins for use by its workforce. The Contractor is responsible for connection



and disconnection to the Principal's sewer. The Contractor is to have satisfied themselves that the available sewer system is sufficient for the site needs. Any additional permanent or temporary facilities are fully at the Contractors cost.

3.31.7 Security

The Contractor shall be wholly responsible for the proper and adequate safeguards for the Contract Works and for all fixed and unfixed Materials on the site during both working and non -working hours, throughout the Contract.

The Contractor shall receive, check, record and secure all equipment, Materials and supplies being delivered to the site and stored within the boundaries of the site.

The Contractor shall ensure all tools, equipment, Materials and supplies are stored and used in accordance with the manufacturer's directions and any statutory requirements governing their storage or use.

When the site is left unattended, the Contractor must ensure that all points of entry to the site are locked and any other means or points of access are prevented.

3.31.8 First Aid and Medical Facilities

The Contractor shall in all respects be fully responsible for the provision of first aid services to its employees and employees of its Subcontractors and suppliers, including coordinating the transport of injured personnel to hospital or other appropriate facilities as and when required.

3.32 Cleanliness of Site

The Contractor shall take precautions to keep the site and adjacent public areas, roads etc free of debris and mud. Adequate vehicle washing facilities shall be provided at all times on the construction site and all vehicles shall be cleaned free of mud and debris prior to passage on to public streets.

The Contractor shall programme such work accordingly and allow in the Contract rates for all such costs which may be necessary to meet these requirements. If the measures taken by the Contractor are not adequate the associated work shall cease and remedial measures may be taken by the Engineer at the Contractor's expense.

3.33 Removal of Materials

Unless approved otherwise by the Engineer all surplus material shall be moved from the site immediately as it becomes surplus.

On completion of the Contract the Contractor shall remove any surplus material used in connection with the works, leaving the area of his operations tidy and free from debris.

3.34 Clean Up and Maintenance

On completion of the work, the Contractor shall remove all construction plant, buildings, surplus materials and garbage, and leave the site clean and tidy to the satisfaction of the Engineer.

The work shall be maintained for the length of the Defects Liability period and this shall include the repair of damaged road surfacing whether the result of faulty material, workmanship, vandalism or wear and tear.



3.35 Statements to the Media

The Contractor shall not make statements to the media regarding policy, road conditions or contractual matters. All inquiries are to be directed to the Engineer or the Principal.

3.36 Cultural Monitoring

There is a requirement for the contractor to engage with local iwi organizations throughout the lifecycle of the project. In more detail, participate in consultation with representatives of Ngai Tai ki Tamaki, Ngati Tamaoho, Ngaati Whanaunga, Te Akitai Waiohua, Ngati Paoa and Ngati Te Ata in respect of their request to undertake cultural monitoring, Karakia and other such religious or cultural ceremonies where appropriate, associated with the following milestones:

- a) Pre-start meeting
- b) Following the completion of pre-commencement works
- c) Implementation of sediment control measures
- d) Prior to completion of bulk earthworks across the site

3.37 Payment

The costs associated with complying with these Preliminary and General requirements of the Specification shall be included in the rates and amounts tendered in the Schedule in accordance with this Specification.

4 Clearing and Stripping

4.1 Scope

The work specified in this section covers the clearing and disposal of vegetation and other unwanted material and the stripping and stockpiling of topsoil from within the area of the work as defined in the Drawings.

The Contractor shall supply all plant, materials, labour and supervision for the clearing and stripping of all such materials as is required for the proper execution of the work.

4.2 Clearing

The area of the work shall be cleared of all obstructions except those specifically required to remain. Clearing shall include complete removal from the site of buildings, foundations, trees, logs, scrub, grass, roots and other vegetation, paving materials, fences and garbage.

All trees within the limits of the earthworks shall be felled unless otherwise specified. Trees and other vegetation beyond the limits of the earthworks shall be disturbed only when directed or approved by the Engineer. Any trees specifically designated by the Engineer shall be protected from damage by the Contractor's operations.

4.3 Disposal

Unless otherwise specified, all material cleared shall become the property of the Contractor, and shall be removed from the Site and disposed of in a safe and legal manner and so as not to inconvenience the owners of adjoining property. The Contractors shall pay any tip fees required.

Burning of material will not be permissible.

4.4 Stripping

All topsoil, turfs, humus and organic material remaining after the clearing of vegetation shall be stripped from the surface of the ground within the limits of the earthworks, to such depth as is directed by the Engineer.

Topsoil is defined as the top layer of soil characterised by the presence of organic matter. The more suitable topsoil shall be stockpiled separately and neatly for later resspreading. The location and size of stockpiles shall be subject to the approval of the Engineer. Surfaces of topsoil stockpiles shall be rolled smooth to minimise erosion and unless otherwise specified shall be sown with clover seed at a coverage of 10 grams per square metre.

4.5 Measurement and Payment

Where provided for in the Schedule, measurement for payment of clearing shall be by plan area of ground surface cleared in accordance with the Contract. Additional payment will be made for individual trees felled or structures demolished and disposed of if such items are shown in the Schedule. Measurement for payment of stripping of topsoil will be by volume measured in stockpiles.

Payment at the scheduled rates or amounts for clearing and stripping shall include for all costs associated with this work. Where separate items for clearing and stripping are not shown in the Schedule, payment shall be included in the rates or amounts scheduled for earthworks.

5 Sediment Control and Environmental Management During Construction

5.1 Scope

This Specification covers the precautions to be taken by the Contractor to control erosion and sediment effects and minimise related damage or environmental deterioration to the Works, surrounding property, or receiving environment during the period of the Contract including the Defects Liability period and any longer period when required by the Contract Documents.

The Contractor shall supply all system design, plant, labour, materials and supervision necessary to ensure the satisfactory construction, operation and maintenance of the environmental protection systems throughout the contract period and beyond as necessary until the construction works and any drainage changes are stabilised to a standard where risk of adverse effects from the works are minimal.

5.2 Design Methodology

An Environmental and Earthworks Management Plan (EMP) supported by associated design calculations and drawings as necessary shall be prepared by the Contractor and provided to the Engineer before commencement of any earthworks or construction having potential to have adverse effects on the works, the neighbourhood or the broader receiving environment.

The EMP shall be a comprehensive plan incorporating earthworks methodology, sediment and dust control, treatment of dewatering flows, and any other environmental measures necessary to manage potential adverse effects from the works and meet Resource Consent conditions.

Design and construction management techniques for avoiding adverse effects from the works shall be in accordance with the design codes adopted by the controlling environmental authority and current good practice. Detailed design of mitigation measures such as isolating features, fences, cut off ditches, detention ponds etc shall be undertaken by a suitably qualified person employed by the Contractor.

5.3 Techniques for Managing Adverse Effects

Although the Contractor shall retain responsibility for the design and implementation of environmental protection during the works a number of basic management principles shall be followed. In particular:

- a) Areas being earthworked or otherwise disturbed at any one time shall be kept to a minimum.
- b) As soon as any reasonable sized earthworked area has been completed to final grade or a stage where it will be left for two months or more it shall be surface stabilised by topsoiling and grassing or similar approved method to minimise runoff, erosion, dust nuisance and improve appearance.
- c) Light soil or sand areas may require coating with mulch or similar to avoid wind-blown nuisance.
- d) Surfaces of fills in progress shall be shaped to prevent materials yet to be compacted from becoming saturated, to prevent erosion and to prevent ponding on the fills (except where the areas are designed as ponding or settlement areas).
- e) Diversion ditches and catch drains shall be used to divert upslope catchments around areas of earthworks.

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- f) Catch drains or similar interception methods shall be used where feasible to intercept stormwater from disturbed areas and divert it to designed settlement areas and ponds before providing for managed discharge to natural gullies, waterways or other receiving area.
 - g) Where works are immediately adjacent to live waterways measures shall be taken to separate the live waterway from the works if at all possible and to cut off any silt or debris from being suspended into the waterway.
 - h) Temporary riprap or other anti-erosion methods shall be used where discharges could erode natural slopes.
 - i) Brush or filter mesh fences, hay bales, detention ponds and other techniques shall be used as necessary to limit erosion and collect water borne soil in a way that manages adverse downstream effects on streams and natural water bodies.
 - j) Topsoil, excavated soil or other material shall be located in positions where the risk of erosion into the receiving environment is minimised and shall be encircled with cut off drains and filter fences as appropriate to ensure such risk is further avoided.
 - k) Washing and cleaning facilities shall be provided to ensure trucks and other plant does not carry silt or dust onto public roads or private roads owned or partially owned by other parties.

In all cases the requirements of any applicable Resource Consents shall be met.

5.4 Management of Protection Systems

Prior to, during, and following rain the Contractor shall arrange for attendance by plant, labour and supervision to ensure safe operation of protection systems, including isolation bunds, settlement ponds, catch drains, detritus fences and outlets and the like.

Detention and interception facilities shall be cleared and maintained regularly to insure they perform in accordance with their design throughout the contract period and beyond as necessary. Silt, debris, etc, removed from interception and settlement works shall be spread to dry in areas approved by the Engineer and disposed of as directed, either as material for use in the construction of earth fill or by removal to dumps away from the site.

5.5 Modification to Protection Systems

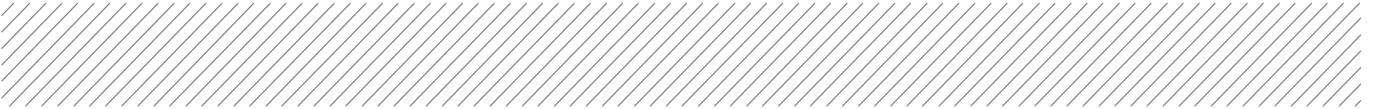
If at any time during the contract the performance of the environmental protection systems, or ongoing review of them, indicates that they need to be extended or modified the design modification and construction shall be undertaken by the Contractor at no extra cost to the Principal.

5.6 Environmental or Property Damaged

Where environmental or property damage occurs to any party as a result of works being undertaken or not undertaken by the Contractor such damage shall be repaired by the Contractor to the satisfaction of the property owner or authority involved, without additional payment.

5.7 Measurement and Payment

The cost of complying with these requirements of the Specification shall be included in the amounts tendered for this item in the Schedule of Prices or, if no separate item is shown, in the rates and amounts for the various items of earthworks construction.



Where the Engineer directs that material won from settlement ponds be removed from the site, such cartage and disposal will be measured and paid for as an additional item.



6 Excavation

6.1 Scope

The work specified in this section covers the excavation of earth and rock to form the land as detailed on the Drawings. The Contractor shall excavate out all material above the finished levels or contours of the site or above road formation levels where applicable, making due allowance for restoration of topsoil and the construction of pavements, foundations and underground utilities.

The Contractor shall supply all plant, materials, labour and supervision necessary to carry out the work in accordance with this Specification.

6.2 Preliminary

The Contractor shall satisfy itself as to the nature of the ground to be excavated prior to submitting a tender. Where subsurface information obtained by the Engineer is made available, it is done so without guarantee as to its accuracy or completeness. Tenderers shall make their own deductions as to the nature and conditions of the materials to be excavated and to the accuracy or completeness of the information provided.

6.3 Environmental Management

During construction, the Contractor shall take all necessary measures to manage the earthworks methodology and the minimisation of adverse environmental effects on the site and receiving environment by compliance with the requirements of the Specification entitled “Sediment Control and Environmental Management during Construction”, and environmental good practice.

Unless otherwise provided in the Schedule, no separate payment will be made for this work. Its costs will be considered to be included in the various rates or amounts scheduled for earthworks items.

6.4 Operation of Plant

The Contractor shall be responsible for the determination of suitable types of plant to carry out the excavation operations in accordance with the Contract.

6.5 Mixing of Materials

Where materials being excavated include mixtures of topsoil, unsuitable material and material suitable for use as earth fill, the excavation shall be carried out as far as is practicable so as to avoid mixing the materials.

6.6 Disposal

All material removed from the excavation, and which is approved as suitable by the Engineer, shall be used as far as practicable in the construction of fills or for backfilling within the Work.

Excavated material shall not be removed from the Site without the consent of the Engineer. Surplus or unsuitable material which is approved for removal shall become the property of the Contractor and shall be disposed of away from the site in a safe and legal manner.

6.7 Undercutting

Any excavation taken to greater depths than shown on the Drawings, without authority of the Engineer and any unauthorised excavations shall be backfilled with suitable material compacted in layers in accordance with the requirements of the Specification for "Earth Fill", without further payment.

6.8 Slips

Slips of material from cut batters or natural ground shall be removed and disposed of as specified. Slips with an in-place volume exceeding 10 cubic metres will be paid for at the appropriate scheduled rate or amount for excavation, provided such slips did not result from any foreseeable action or inaction by the Contractor.

6.9 Maintain Excavation

Secure and maintain excavations free from slips, erosion, water and other fluids or fallen materials. Provide and maintain all pile liners, shoring, strutting, sheet piling, planking, pumps and other materials or plan necessary for carrying out and maintaining excavations and remove them where no longer necessary.

The cut face of any slopes created during excavation shall be monitored daily by the Contractor before any work is undertaken under the excavated slope. Should the condition of the slope be deemed unsafe in the opinion of the Contractor, the Engineer shall be notified immediately, and allowance shall be made to inspect the slope.

6.10 Inspection

No backfilling shall be placed until the relevant area has been inspected by the Engineer.

6.11 Finished Surfaces

The finished surfaces of excavation shall conform to the levels, lines, grades and contours shown on the Drawings, within the tolerances specified. Where not otherwise specified any point on the finished surfaces shall conform to the following tolerances in respect of the levels shown or inferred on the Drawings: -

Subgrade Surfaces	-	+10mm/-50mm
Slopes flatter than 1 on 6	-	+/-50mm
Slopes of between 1 on 6 and 1 on 2	-	+/-100mm
Slopes steeper than 1 on 2	-	+/-200mm

Vertical or near vertical excavations shall be of adequate dimension to enable safe access and placing of formwork etc.

Finished surfaces may vary from the designated slope or level by the tolerances shown above measured at right angles to the slopes, but any variations shall be gradual so as not to impair the appearance of the surface or hold ponded water. Finished surfaces excavated for the construction of structures, concrete work, etc., shall be completed to a level such that the detailed dimension of such structures, etc., is achieved.

Where excavations abut against undisturbed ground they shall be trimmed to conform with the shape of the adjacent ground so that the profile is continuous and compatible.



6.12 Classification of Material

Unless otherwise stated in the Schedule of Prices, materials excavated will not be classified for payment and no additional payment will be made for the excavation of any material, which is hard, cemented, wet, dry or otherwise.

6.13 Stockpiling

Any material intended for reuse shall be stockpiled in locations that have been pre-approved in advance by the Engineer. Stockpiles where practical shall be located neatly outside the excavated areas but not so as to jeopardise the ground stability or affect access ways of the wider site.

6.14 Dewatering

The Contractor shall keep excavations free from water, and shall provide all pumps, drainage pipes and other equipment required for this purpose. Where prior approval is obtained from the Local Authority, discharge into existing stormwater drains will be permitted but adequate settling chambers shall be constructed to trap silt. Should deposition occur in existing drains as a result of the operations of the Contractor such deposits shall be cleared immediately by the Contractor at its own expense.

6.15 Safety and Ground Support

Safety procedures in excavation shall comply with the requirements of the WorkSafe NZ for notifiable work and the published Code of Practice for Excavations.

6.16 Measurement and Payment

Where provided for in the Schedule of Prices, materials excavated will be measured for payment by volume *in situ* after clearing and prior to excavation, to the levels, lines, grades and contours shown on the Drawings.

Materials excavated will be paid for at the appropriate scheduled rate or amount tendered for earthworks. Where classification of excavated material is provided for in the Schedule of prices, payment will be at the appropriate rate or amount for the type of material excavated, as classified by the Engineer.

Except where otherwise provided, the scheduled rates or amounts for excavation or earthworks shall include all work associated with excavation in accordance with this Specification, together with all work associated with the transport and disposal or with the spreading and compaction as fill of the excavated material as specified here and elsewhere.



7 Excavation and Filling for Building Platform and Site Works

7.1 Scope

The work specified in this section covers the excavation of existing surfaces including earth and rock to provide for building floors and foundations or non-trafficked slab areas. The Contractor shall excavate out all materials above the finished levels or contours of the site where applicable, making due allowance for restoration of topsoil and the construction of pavements, foundations and underground utilities.

The Contractor shall provide all plant, materials, labour and supervision necessary to carry out the work in accordance with the Specification.

7.2 Preliminary

The Contractor shall satisfy himself as to the nature of the ground to be excavated prior to submitting a tender. Where subsurface information obtained by the Engineer is made available, it is done so without guarantee as to its accuracy or completeness. Tenderers shall make their own deductions as to the nature and conditions of the materials to be excavated and to the accuracy or completeness of the information provided.

7.3 Extent of Work

The Contractor is to provide a finished platform level to the earthworks level shown on the Drawings. A protective layer of metal is to be placed and compacted on the building platform as shown or topsoil placed and respread.

7.4 Operation of Plant

The Contractor shall be responsible for the determination of suitable types of plant to carry out the excavation operations in accordance with the Contract.

7.5 Mixing of Materials

Where materials being excavated includes mixture of topsoil, unsuitable material and material suitable for use as earth fill, the excavation shall be carried out as far as is practical so as to avoid mixing the materials.

7.6 Disposal

All material removed from the excavation, and which is approved as suitable by the engineer, shall be used as far as practicable in the construction of fills or for backfilling within the Work. Excavated spoil required for backfilling of trenches and around foundations and pits, where practical shall be deposited neatly alongside the excavation, but not so as to jeopardise the stability of the excavation.

Excavated material shall not be removed from the Site without the consent of the Engineer. Surplus or unsuitable material which is approved for removal shall become the property of the Contractor and shall be disposed of away from the site in a safe and legal manner.

7.7 Undercutting

Any excavation taken to greater depths than shown on the Drawings or the Engineer's written instructions, shall be backfilled with engineered fill to the proper level in accordance with the Engineer's instructions.

7.8 Maintain Excavation

Secure and maintain excavations free from slips, erosion, water and other fluids or fallen materials. Provide and maintain all pile liners, shoring, strutting, sheet piling, planking, pumps and other materials or plan necessary for carrying out and maintaining excavations and remove them where no longer necessary.

The cut face of any slopes created during excavation shall be monitored daily by the Contractor before any work is undertaken under the excavated slope. Should the condition of the slope be deemed unsafe in the opinion of the Contractor, the Engineer shall be notified immediately, and allowance shall be made to inspect the slope.

7.9 Inspection

No backfilling shall be placed until the relevant area has been inspected by the Engineer.

7.10 Hardfilling

Hardfill material shall be good quality metal of approved origin, well graded and able to be compacted to a dense layer, maximum size 80mm. It shall be free from silts or clays which will cause it to weave when wet. The filling shall be spread in layers of loose thickness not greater than 200mm and compacted to achieve not less than 95% of the maximum dry density obtained for the hardfill material in accordance with NZS 4402: 1986: Test 4.1.1. The Contractor shall ensure suitable weather, metal type and moisture content to enable proper compaction without developing soft spots or weaving. Any areas where excessive deflections occur shall be removed and replaced at the Contractor's expense.

7.11 Basecourse Material

Aggregate for construction of basecourse layers immediately below slabs, foundations etc, shall be crushed rock, free from silt or clay lumps, weathered or disintegrated rock, organic and other non-mineral matter.

Basecourse material shall comply with the NZTA Specification M/4:2006 "Specification for Basecourse aggregate", Grading AP40. In regions where NZTA provides for a Regional basecourse, this material may be approved for use subject to the Contractor notifying this intent in the tender and gaining approval for its use prior to entering into a contract. In all cases the percentage of broken faces shall be at least 70%.

Tests to check compliance with NZTA Specifications shall be carried out on representative samples of the aggregate selected from bin, stockpile or truck.

7.12 Placing and Compaction of Basecourse

Basecourse material shall be placed and compacted in layers with an uncompacted thickness not exceeding 150mm and not less than 50mm. Each layer shall be compacted by multiple passes of a smooth steel wheeled roller or other plant approved by the Engineer, to not less than 98% of the maximum dry density obtained for the basecourse material by the New Zealand Standard Compaction

Test (NZS 4402, Test 4.1.1), and so as to satisfy deflection requirements as specified by the Local Authority.

Compaction of basecourse shall take place at a water content appropriate to the plant being used. If water is required to be added, a fine mist spray shall be used and excess water shall be prevented from damaging the subgrade or sub-base. The uppermost layer shall be compacted and the finished surface proof rolled using a smooth steel wheeled roller, with rear rolls at least 500 mm wide and loaded to not less than six tonnes per metre width.

7.13 Backfilling Against Foundations

Backfill around foundations shall be thoroughly consolidated in layers using suitable mechanical equipment. All timber, rubbish and other loose material shall be removed before backfilling.

Backfilling material and compaction of the backfill shall be as for hardfill.

7.14 Finished Surfaces

The finished surfaces of excavation for building site works shall conform to the levels, lines, grades and contours shown on the Drawings, within the tolerances specified. Where not otherwise specified any point on the finished surfaces shall conform to the following tolerances in respect of the levels shown or inferred on the Drawings: -

Slab and foundation subgrades	-	+10mm/-50mm
Slopes flatter than 1 on 6	-	+/-50mm
Slopes of between 1 on 6 and 1 on 2	-	+/-100mm
Slopes steeper than 1 on 2	-	+/-200mm

Vertical or near vertical excavations shall be of adequate dimension to enable safe access and placing of formwork etc.

Finished surfaces may vary from the designated slope or level by the tolerances shown above measured at right angles to the slopes, but any variations shall be gradual so as not to impair the appearance of the surface or hold ponded water. Finished surfaces excavated for the construction of structures, concrete work, etc., shall be completed to a level such that the detailed dimension of such structures, etc., is achieved.

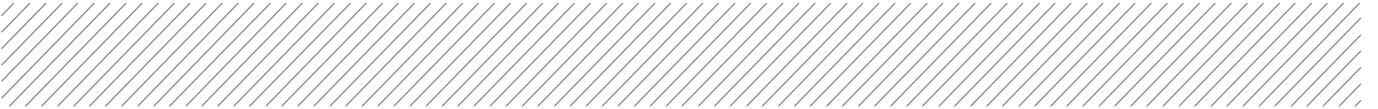
Where excavations abut against undisturbed ground they shall be trimmed to conform with the shape of the adjacent ground so that the profile is continuous and compatible.

7.15 Stockpiling

Any material intended for reuse shall be stockpiled in locations that have been pre-approved in advance by the Engineer. If suitable locations are not available on site, the Contractor shall arrange an alternate storage site at his own expense. Stockpiles where practical shall be located neatly outside the excavated areas but not so as to jeopardise the ground stability, or affect access ways of the wider site.

7.16 Dewatering

The Contractor shall keep excavations free from water, and shall provide all pumps, drainage pipes and other equipment required for this purpose. Where prior approval is obtained from the Local Authority, discharge into existing stormwater drains will be permitted but adequate settling chambers shall be



constructed to trap silt. Should deposition occur in existing drains as a result of the operations of the Contractor such deposits shall be cleared immediately by the Contractor at its own expense.

7.17 Safety and Ground Support

Safety procedures in excavation shall comply with the requirements of the WorkSafe NZ for notifiable work and the published Code of Practice for Excavations.

The Contractor shall form his own estimate of the amount of any temporary ground support which may be required, and shall allow for all such costs in his tender. Timbering placed below top of pipe level shall be withdrawn as bedding and backfilling material is placed, unless the Engineer requires otherwise.

Any slips or subsidence which occur during the course of the work shall be cleared away and made good by the Contractor without extra payment.

7.18 Obstructions

Prior to excavation, the Contractor shall prove the location of all existing underground utilities crossing the site by hand excavation, taking care to avoid damage. Any sewers, stormwater or subsoil drains, underground cables, gas or water mains, other services or structural foundations encountered must be left intact. Should any underground utility be disturbed during excavation, the responsible authority shall be notified immediately.

7.19 Measurement and Payment

Where provided for in the Schedule of Prices, materials excavated will be measured for payment by volume in-situ or square measure after clearing and prior to excavation, to the levels, lines and grades shown on the Drawings.

Materials excavated will be paid for at the appropriate scheduled rate or amount tendered for earthworks.

Except where otherwise provided, the scheduled rates or amounts for excavation or earthworks shall include all work associated with excavation in accordance with this Specification, together with all work associated with the transport and disposal or with the spreading and compaction as fill, of the excavated material, all as specified here and elsewhere.

8 Earth fill

8.1 Scope

The work specified in this section covers the construction of earth fill and all other subsidiary work necessary so that the areas of fill are brought to conform with the lines, grades, elevations and slopes shown or inferred on the Drawings or as directed by the Engineer.

The Contractor shall prepare the areas on which fill is to be placed and shall transport, spread, stockpile, condition, compact and grade the fill material and finish the areas making due allowance for the restoration of topsoil and the construction of pavements and underground utilities.

8.2 Operation of Plant

The Contractor shall be responsible for the determination of suitable types of plant to carry out the sheet piling and filling operations in accordance with the Contract.

8.3 Surface Preparation

The Contractor shall clear and strip the areas on which fill material is to be placed and along haul roads in accordance with the part of the Specification entitled "Clearing and Stripping". Low density, saturated, weak or organic soils exposed by clearing and stripping shall be excavated as directed by the Engineer. If considered by the Engineer to be unsuitable for use as filling, some or all of these soils shall be disposed of beyond the site, neatly stockpiled or wasted in approved areas as directed. If considered suitable by the Engineer, some or all of these soils shall be reused as fillings in layers as directed.

The exposed surfaces of natural ground upon which fill is to be placed shall be compacted so as to achieve relative compaction at least equal to that specified for the fill to a depth of 150mm. If necessary to meet this requirement, the ground shall be bladed until it is uniform, free of large clods and brought to suitable water content prior to compaction.

Before filling commences in any area of the Site, the cleared and stripped surface shall be inspected and approved by the Engineer's Representative and if required shall be subjected to proof rolling using a fully laden rubber tyred motor scraper or similar approved plant. Where directed by the Engineer, any soft or compressible areas shall be excavated and refilled with suitable compacted material.

Where fill material is to be placed against a hillside or previous fill where the slope is steeper than 1 vertical on 4 horizontal, the slope shall be prepared by benching. Near horizontal benches, suitably graded for drainage, shall be cut at vertical intervals of not less than 1 metre up the slope as the fill surface is raised, so that no less than 75% of the plan area on which fill is to be placed shall consist of such benches. Apart from the rates or amounts shown the Schedule for earthworks, no additional payment will be made for such benching.

Where shown on the Drawings or where seepage is encountered, the ground shall be trenched, graded or benched and subsoil drains installed to collect the seepage and discharge it to an approved point clear of the fill in accordance with details shown on the Drawings or as directed by the Engineer. Where shown on the Drawings, culverts shall be constructed as detailed.

8.4 Fill Material

Except for materials removed during clearing and stripping of topsoil or material designated as unsuitable by the Engineer, the on-site soils obtained from excavation may be used for general filling.

Wherever possible, the Contractor shall use suitable material won from cut areas or approved borrow areas within the site. When material imported from off the site is used, the Contractor shall obtain the required permissions and permits, and pay all royalties and charges required in connection with its use.

Imported material shall be of consistent well graded type and be subject to the approval of the Engineer prior to use. Material which is organic or highly plastic for example will not be considered as being suitable. A representative 10kg sample of proposed imported material shall be delivered to the Engineer at least three days before approval is required. Laboratory testing of imported fill material shall be provided with the representative sample. The laboratory testing provided shall be the same as per the site won material, with the test type and frequency provided in the “Testing” section below.

Prior to placing imported fill, the Contractor shall deliver to the site (and later dispose of) a 4m³ control sample of fill material for site comparisons and checking. The control sample must meet the requirements of this Specification, and be confirmed by the Engineer as being representative and approved before any material is used in the work.

8.5 Testing

The Contractor shall be responsible for testing and determination of the acceptability of earth fill materials. Prior to commencement of bulk fill construction, representative samples of the proposed fill material shall be sent to an approved laboratory to be tested for compliance, with the results provided to the Engineer. The Contractor shall seek acceptance from the Engineer for the testing laboratory that is proposed to be use, which shall hold appropriate accreditation for the tests to be performed. The Engineer may request an alternative testing laboratory is used.

The requirements for testing and minimum testing frequencies are stated below. The amount of testing is based on the fill material encountered onsite and number of source locations. Fill material types are likely to comprise residual clays/silts soils, weathered basalt and alluvial clays/silts.

Table 3: Source Suitability Testing

Test Type/Requirement	Test Method	Test Frequency
Standard Compaction with Air Voids	NZS 4402:1986, Test 4.1.1	3 tests per site-won fill material for each source location.
Water Content (In-situ)	NZS 4402:1986, Test 2.1	3 tests per site-won fill material for each source location.
Shear Strength	NZGS Guideline for Hand Held Shear Vane Test 2001	3 tests per site-won fill material for each source location, undertaken on a compacted mould sample, which shall be measured and reported for every point on each compaction curve.
Particle Size Distribution	NZS 4402:1986, Test 2.8.1	3 tests per site-won fill material for each source location.
Plasticity Index	NZS 4402:1986, Test 2.2, 2.3 & 2.4	3 tests per site-won fill material for each source location.

These results will be used to determine OMC range, and MDD for NDM testing.

In addition, the Contractor shall obtain representative samples of each fill material type and arrange laboratory testing in accordance with the Solid Density Test (NZS 4402:1986, Test 2.7.2) prior to placement of engineered fill. Laboratory determined solid density is required on cohesive soils to enable accurate calculation of % air voids.

No fill layers shall be placed prior to such laboratory testing being forwarded to the Engineer.



At the discretion of the Engineer, an alternative approach to the laboratory testing may be taken to assess the fill.

8.6 Placing, Spreading and Water Conditioning

No fill material shall be placed until the Engineer has inspected and approved the surface preparation of that part of the Site.

Fill material shall be placed and spread in a systematic manner and in uniform near horizontal layers which, prior to compaction, do not exceed 200mm in thickness.

Any lumps or rocks exceeding 100mm in greatest dimension shall be either broken down to less than 100mm or removed or used as may be directed by the Engineer.

When the water content of the fill material is below that which is necessary to achieve the specified degree of compaction, water shall be added and thoroughly mixed into the fill material until it is uniformly dispersed throughout the soil. Similarly, when the water content of the fill material is too high, the soil shall be air dried by scarifying, harrowing, discing or other aeration processes. The water content shall also be kept low enough to provide a stable working surface for the hauling and compacting plant, free from heaving, weaving and excessive rutting.

No fill material shall be placed, spread or compacted during or immediately following wet weather or when ground is frozen. Except for essential work to maintain safety, drainage or prevent damage to work, no equipment shall be moved on or over the site except along access roads during or immediately following wet weather.

Where any compacted subgrade or fill has deteriorated due to wet weather or an interruption in the work, the material affected shall be scarified and recompacted to the required standard before any further fill material is placed or spread over it.

8.7 Compaction

After each layer of fill has been placed, spread evenly and brought to a suitable water content (+/- 2% of Optimum Moisture Content, OMC). It shall be compacted to at least the compaction standard specified herein.

- a) The compaction shall be taken as 98% Maximum Dry Density (MDD) in terms of the New Zealand Standard Compaction Test (NZS 4402, Test 4.1.1) for the top 1m of filled areas and 95% Maximum Dry Density for those parts of fills at greater than 1m depth of the finished surface. Compaction shall be at +/- 2% of OMC for all earth fill.
- b) All material shall be compacted so as to achieve an average air void ratio of no more than 10% over 10 tests and a maximum of 12% on any one test, and an average undrained shear strength (S_u) of no less than 150kPa, and minimum of 110kPa for any one test. Note: air voids/penetration criteria have no validity if not taken on the same day as fill placement and no rain or other wetting occurs between the time of compaction and the time of testing. Otherwise percentage of NZ Standard Compaction must then be applied.

Each NDM test shall comprise shall comprise 2 measurements using the same probe hole but orientated at 90 degrees to each other.

Undrained shear strength of the compacted soil at any test location shall be taken as the mean of a set of tests, comprising 3 tests undertaken within an area of 0.5m² of each other.

Compaction and testing shall be in general accordance with NZS 4431:1989.



Compaction shall be accomplished with approved, special-purpose compaction equipment. The equipment shall make sufficient passes to ensure that the required compaction has been uniformly obtained everywhere.

Fill batter faces shall be compacted as a separate operation, either by overfilling and cutting back, or by rolling with compacting plant working up and down the slope.

8.8 Finished Surfaces

The finished surfaces of earth fill shall conform to the levels, lines, grades and contours shown on the Drawings or directed by the Engineer, within the tolerances specified.

Where not otherwise specified any point on the finished fill surfaces shall conform to the following tolerances in respect of the levels shown or inferred on the Drawings: -

Subgrade subgrades	-	+10mm/-50mm
Slopes flatter than 1 on 6	-	+/-50mm
Slopes of between 1 on 6 and 1 on 2	-	+/-100mm
Slopes steeper than 1 on 2	-	+/-200mm
Floor level on permanent storage ponds	-	+20mm/-50mm
Batter slopes on permanent ponds	-	+50 mm/-100mm

Finished surfaces may vary from the designated slope or level by the tolerances shown above measured at right angles to the slopes, but any variations shall be gradual so as not to impair the appearance of the surface or hold ponded water. Finished surfaces for the construction of structures, concrete work, etc., shall be completed to a level such that the detailed dimension of such structures, etc., is achieved.

Where fillings abut against undisturbed ground they shall be trimmed to conform with the shape of the adjacent ground so that the profile is continuous and compatible.

In any area so specified on the Drawings, the Contractor shall adjust the quantities of cut and fill as directed by the Engineer, varying finished levels as necessary to achieve a balance of earthworks quantities.

8.9 Backfilling

Backfilling around structures and as required to bring undercut areas to formation or finished levels shall, unless otherwise specified, consist of selected fill material, spread and compacted in layers using suitable plant such that the relative compaction requirements of the Specification are satisfied.

8.10 Environmental Management

During construction, the Contractor shall take all necessary measures to manage the earthworks methodology and the minimisation of adverse environmental effects on the site and receiving environment by compliance with the requirements of the Specification entitled “Sediment Control and Environmental Management during Construction” and environmental good practice.

Unless otherwise provided in the Schedule, no separate payment will be made for this work. Its costs will be considered to be included in the various rates or amounts scheduled for earthworks items.

8.11 Compliance Testing

The Contractor shall be responsible for engaging a suitably qualified soil testing organisation independent of the Contractor to undertake inspection and testing of the earth fill works. The inspection shall include viewing of the cleared and benched natural ground prior to filling and ongoing inspections and compaction testing of fill throughout the project.

The testing shall be done at vertical and horizontal intervals selected to give a representative and reliable spread of tests through the fill works. The testing regime proposed by the Contractor's nominated testing organisation shall be described in the QA information provided by the Contractor before commencement of the contract works. The Engineer reserves the right to require reasonable changes to the testing regime and such changes shall be implemented at no extra cost to the contract.

Compaction non-compliances shall be immediately brought to the notice of the Contractor and Engineer, faulty areas shall be removed, treated as appropriate (drying, moisturising etc), re-compacted and retested until complying fill standards are met.

All testing reports must be emailed in both pdf and excel formats to the Engineer, within one week following the date of testing.

Each test locations and elevations shall be recorded on a cut/fill plan and labelled appropriately and clearly. All tests locations shall have a plan accuracy of 1m of their location, and the co-ordinates and elevations of each test reported on the test sheets. Elevation accuracy is to be within 100 mm.

There is to be no duplication of test numbering at any site, regardless of the material being tested or the stage of development.

The independent inspections shall also be responsible for identifying any areas where batters are not being laid at appropriate slopes.

On completion of the earthworks, the Contractor and testing organisation shall prepare accurate and tidy as-built plans of the earthworks showing all test locations (position and reduced level) along with a testing report including records of the tests and explanations of actions taken on non-compliances. The report shall be signed by the testing organisation confirming that the specified compaction standards have been met. The report and attachments shall be provided in electronic format and triplicate hard copy, to the Engineer for distribution as follows.

- One copy held by the Engineer.
- One copy to be passed to the controlling local authority.
- One copy to be passed to the Principal.

8.12 Engineer's Verification

The Contractor shall facilitate inspection by the Engineer at all times during construction. The Engineer may from time to time carry out check tests of the soil properties, water content and the compaction standards being achieved in the fill, but the Contractor will remain responsible for achieving the required standard of work.

The Engineer shall have the right, at any stage of the work and until the end of the Defects Liability period, to have material which has not been compacted to the specified standard or which contains organic material, tree roots or the like, wherever it may be, excavated and recompacted to the specified standard without additional payment to the Contractor.

The Engineer may deduct from the Contract amounts payable to the Contractor the cost of check tests on fill material which show the specified compaction has not been achieved.



Fill construction shall be arranged to permit testing to be carried out as the work proceeds. The Contractor shall, on request and without further payment, provide excavating equipment and remove material from above the test level, and subsequently backfill to Specification requirements. Whenever earthmoving, compaction or like work is in progress at the same time as compaction testing, the Contractor shall at any time required by the Engineer, without extra payment, provide safety protection for personnel carrying out testing to the satisfaction of the Engineer.

On request by the Engineer, the Contractor shall provide a suitably loaded truck with driver, or other equipment, for proof rolling which shall be paid for at the appropriate plant hire rate.

8.13 Measurement and Payment

Where provided for in the Schedule of Prices, earth fill excavated from cut areas or approved borrow areas within the Site will be measured by volume in situ prior to excavation. Fill material imported from outside the Site will be measured by volume in situ in the completed fills.

Earth fills will be paid for at the appropriate scheduled rate or amount for earthworks. Except where otherwise provided, the scheduled rates or amounts shall include all costs associated with the excavation, transport, spreading compaction of fill material, compliance testing, as-built recording and associated work as specified.

9 Settlement Monitoring

9.1 General

Instrumentation is required to monitor ground displacement of placed fills. Displacement will be monitored by survey of settlement plates and pins, as shown on the Drawings. Additional instrumentation may be required during construction should adverse ground displacements be observed on site, this will be at the Engineer's discretion during or following construction.

The purpose of instrumentation and monitoring is to:

- Observe the rate and magnitude of settlement;
- Verify the parameters and assumptions made in the settlement analysis;
- Determine the timing of subsequent construction stages;
- Allow contingency measures to be implemented in a timely fashion, if required.
- Instrumentation details and locations shall be as per the Drawing.

Drawings referenced in this Specification shall be updated by the Engineer as required to include actual instrument locations and any additional instrumentation that may be required during construction.

Further to this, other components of this Specification may be changed during the works to reflect changes in materials utilised, alterations to the works plan, etc.

9.2 Instrumentation Installation

All installations shall be in accordance with the manufacturer's recommendations and instructions (where applicable) and in accordance with this Specification.

Settlement plates and settlement pins installation and monitoring shall be carried out under the supervision of a registered surveyor.

Instrumentation shall be installed as early as practical (e.g. following site earthworks activities). When deciding on program for instrumentation installation, consideration shall be given to construction activities likely to damage instrumentation as well as safety of plant and personnel during the installation process.

The Contractor shall obtain the Engineer's approval of the proposed instrumentation (e.g. make and model) prior to installation.

The Contractor shall ensure all instrumentation, are located in plan and elevation by engineering survey immediately upon installation.

Once the Contractor finalises the construction programme it shall be discussed with the Engineer and the stages at which each instrument will be installed, and the order of priority shall be discussed and jointly decided upon.

As-built plans shall be provided to the Engineer within two days of installation, which include the instrumentation X, Y and Z coordinates.

9.3 Protection

Instrumentation forms an integral part of the construction monitoring and must be protected at all times against any damage. Construction activities adjacent to instruments must be carried out with care. In

particular, fill placement around the instruments shall be undertaken by manual methods within a distance of 1m.

Instrumentation and monitoring equipment locations shall be clearly identified on site by means of fencing with pegs and glow mesh fencing as detailed on the Drawings or as otherwise proposed by the Contractor and approved by the Engineer.

If an instrument is damaged, the Contractor shall repair or replace the damaged instrument as soon as is practically possible to the satisfaction of the Engineer, who may impose stop-work orders in the vicinity of the instrument if it is critical. Baseline Readings should be taken within 24 hours after the repair once the instrument is stabilised.

Settlement points on structures shall be appropriately positioned and protected in order to allow monitoring at all stages throughout the adjacent construction activities, without risk of damage or displacement as a result of the activities.

9.4 Baseline Reading Requirements

Baseline readings of all monitoring equipment shall be taken to demonstrate that the instruments are working correctly, and to establish baseline behaviour of the ground or structures. The number of base readings and duration between successive base readings are to be undertaken as per this Specification and the Drawings, and as a minimum will not be less than two separate readings 3 days apart.

Baseline readings shall be carried out immediately after installation and before adjacent construction commences. The Contractor shall allow sufficient time between installing instruments and commencing construction activities, which the instruments are intended to monitor the effects of, particularly for instruments requiring several readings to obtain a reliable baseline.

A reference levelling point should also be installed and located in a safe location outside of the filling area, and comprise a pin sleeved to 2.5m to 3m depth so that any seasonal volume changes effecting surface levels are accounted for.

9.5 Monitoring Requirements

Following baseline, monitoring shall be undertaken as shown on the Drawings unless an alternative frequency is specified or agreed to by the Engineer.

Settlement plates and pins must be monitored to $\pm 2\text{mm}$ vertical accuracy.

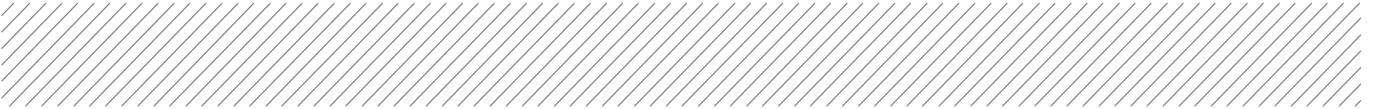
Construction of buildings, utilities, pavements, or other infrastructure are not to commence within 50m of monitoring equipment until the Engineer has confirmed deformations have slowed to acceptable rates.

The following instrumentation and monitoring frequency are required:

Table 4: Instrumentation and monitoring frequency

Instrumentation	Installation	Monitoring Frequency*
Settlement plates	Installed on stripped subgrade prior to placement of engineered fill.	<u>During fill placement</u> – Twice weekly <u>During preloading</u> – Weekly
Settlement pins	Installed in engineered fill surface once at final design level.	<u>During preloading</u> – Weekly

*Baseline reading required in addition to the monitoring frequency provided in the table.



The results shall be reported to the Engineer. The frequency of the survey may be relaxed by the engineer depending on the results.

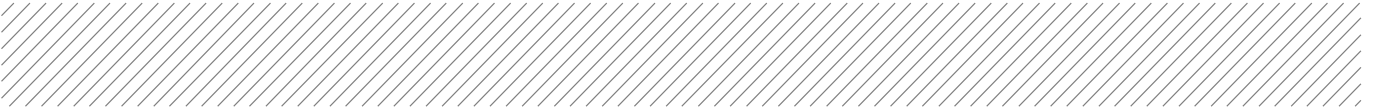
9.6 Surcharge

Surcharge is defined as the placement of soil or fill in addition to the final earthworks design level to accelerate settlement. If the building platforms are to be surcharged then the contractor is to submit a plan showing the location and height of the surcharge, as well as noting the material type of the surcharge soil and any existing monitoring points that would be affected. The surcharge plan will need to be approved by the Engineer prior to any surcharge being placed.

If monitoring points need to be adjusted to accommodate the surcharge the following applies:

- Settlement plates will need to be extended so these sit above the surcharge fill levels and monitoring continues as per the Drawing and this Specification.
- Settlement pins, if installed, will need to be removed, re-established on the same X - Y coordinates and new baseline readings taken. If settlement pins are not installed yet, then pin installation is as per the Drawing and this Specification.

Adjustments or changes to the monitoring points can only be undertaken with the approval from the Engineer.



10 Hold Points and Engineer's Approvals

10.1 Hold points for Contractor's advice to Engineer

As a guide to the contractor, the points at which the works shall be paused, and the engineer's approval to proceed obtained, include but are not necessarily limited to the following:

- Approval of documents to be prepared by Contractor as captured in this document
- Clearance certificate post contaminated soil removal to prove all contamination has been removed.
- Following strip of topsoil prior to cut to fill commencing.
- Installation of settlement monitoring instrumentation.
- During placement of initial fill layers and at half depth of the engineered fill.
- At finished level of the engineered fill.
- Approval of finished levels prior to respread of topsoil or stabilising of surface.

The Contractor shall also hold any other works for inspection by the Engineer as instructed from time to time.



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2023-05-15

David Schwartzfeger
Kiwi Property Group Ltd
PO Box 2071
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Dear David

Drury Bulk Earthworks Stage 1 Separable Portion 1: Completion Certificate 2023– Geotechnical Review

1 Introduction

We understand that as part of the earthworks for the Drury Centre Development, a completion certificate is required for the earthworks undertaken to date. The earthworks have been undertaken by Ross Reid Contractor Ltd, with Aurecon New Zealand Ltd (Aurecon) undertaking inspections and reviews of quality assurance (QA) documentation. At this stage a Geotechnical Completion Report (GCR) is not required but confirmation is required on the suitability of the work undertaken by the Contractor to date.

2 QA Testing Review

The areas of Separable Portion 1 inspected is presented in Appendix A.

The following table provides a summary of the QA checks that Aurecon has undertaken to date for the areas included as Separable Portion 1 in Practical Completion Certificate nr.1 :

			DRURY BULK EARTHWORKS PROJECT						
QA PROGRESS TRACKING SHEET									
Lot Details			Inspection / Test Completed (Y / N)						
Lot Number	Full / Partial	Description	Topsoil Strip	Subgrade	Subgrade Survey	Fill Compaction	Placing Topsoil	Topsoil Survey	Mulching / Grassing
LOT 001	Partial	LFR	Y	Y	Y	Y	Y	Y	Y
LOT 012	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 013	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 016	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 017	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 018	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 019	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 020	Full	Residential	Y	Y	Y	Y	Y	Y	Y

			DRURY BULK EARTHWORKS PROJECT						
QA PROGRESS TRACKING SHEET									
Lot Details			Inspection / Test Completed (Y / N)						
Lot Number	Full / Partial	Description	Topsoil Strip	Subgrade	Subgrade Survey	Fill Compaction	Placing Topsoil	Topsoil Survey	Mulching / Grassing
LOT 021	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 022	Full	Residential	Y	Y	Y	Y	Y	Y	Y
LOT 101	Full	Reserve	Y	Y	Y	Y	Y	N	Y
LOT 110	Full	Access Way	Y	Y	Y	Y	Y	Y	Y
LOT 111	Full	Access Way	Y	Y	Y	Y	Y	Y	Y
LOT 112	Full	Access Way	Y	Y	Y	Y	Y	Y	Y
LOT 301	Partial	Road	Y	Y	Y	Y	N/A	N/A	Y
LOT 302	Partial	Road	Y	Y	Y	Y	N/A	N/A	Y
LOT 304	Partial	Road	Y	Y	Y	Y	N/A	N/A	Y
LOT 305	Full	Road	Y	Y	Y	Y	N/A	N/A	Y

Note: This checksheet should be read in conjunction with the Defect List for Separable Portion 1 which will cover minor remedial work identified

Table 1: QA progress tracking summary

During the course of the site works the Contractor has also submitted QA testing of the engineered fill (NDM and shear vane testing), which were reviewed by Aurecon.

Based on our inspections and QA testing provided to us by the Contractor the engineered earthfill has achieved the required compaction.

3 Settlement Monitoring

As part of the site work, the Contractor installed and monitored settlement plates and pins. The locations of these are shown in Appendix B.

The settlement data received from the Contractor has been presented in Appendix C.

We note the following about the settlement data.

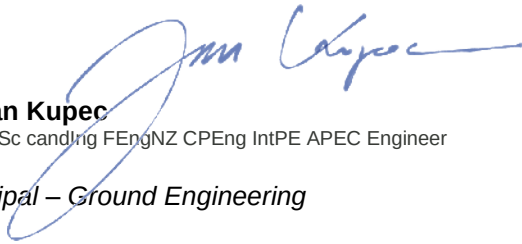
- Observed settlement match calculated settlements.
- The settlement data over the past three months indicates a general plateauing of results.
- There is some variability in the readings due to the following reasons:
 - Survey accuracy.
 - Nature of the plastic soils (shrinkage and swelling depending on moisture levels)
 - Heaving of the material due to machinery working close by the pins and plates to achieve compaction
 - Damage to the monitoring pins, for example the sudden drop in the reading for Plate 3 was due to the plate being bumped by a machine so the readings were reset following the incident.

Although works have stopped over the winter season, monitoring will continue every second week, which will provide further information on the settlement trend and confirm the plateauing of results, with the absence of site works affecting results.

4 Conclusion

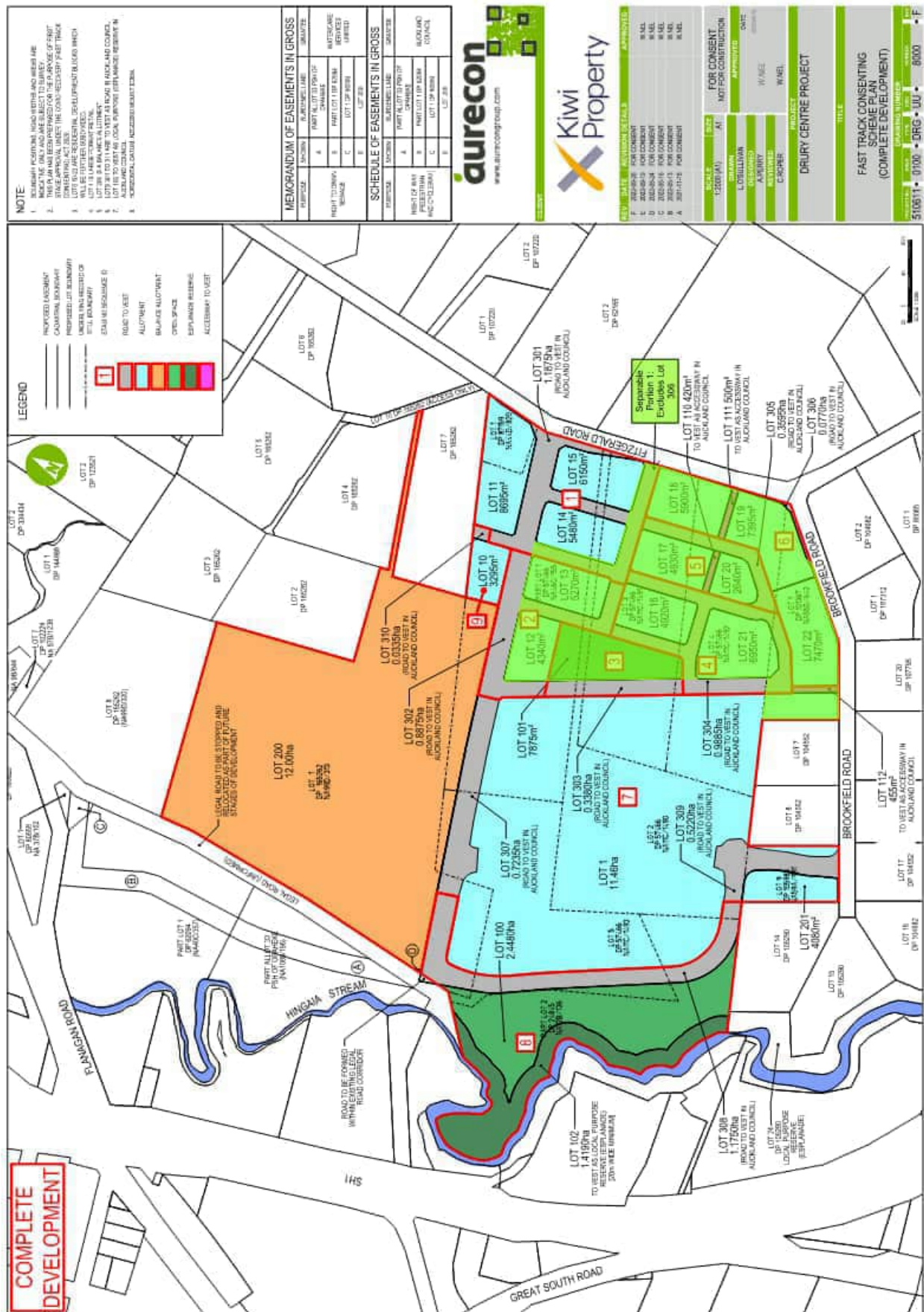
In summary, based on site inspections by Aurecon and our review of the QA testing provided to us, we can confirm that the earthworks in the area covered by Practical Completion Certificate nr. 1 to date meet the requirements of the specification and the engineered fill placed across the site has achieved the required compaction.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Jan Kupec', written over the printed name and title.

Dr Jan Kupec
PhD MSc candEng FEngNZ CPEng IntPE APEC Engineer
Principal – Ground Engineering

Appendix A - Separable Portion 1



Appendix D

Laboratory Testing

Material Test Report

Report No: ETAM17S-00118-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)



Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00118
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH01
0.5 - 0.6 m

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	118	
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	
Plasticity Index	NZS 4402:1986 Test 2.4	Not Tested	
Linear Shrinkage	NZS 4402:1986 Test 2.6	25	
Curling		No	
Cracking		Yes	
Sample History		Natural state	
Fraction Tested		Passing 425µm sieve	
Date Tested		16/01/2017	
Moisture Content (%)	NZS 4402:1986 Test 2.1	63.8	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP



A TETRA TECH COMPANY

East Tamaki Laboratory

Coffey Services (NZ) Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Report No: ETAM17S-00117-1

Issue No: 1

Material Test Report

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)



Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00117
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH01
0.5 - 0.6 m

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	>7%	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP



A TETRA TECH COMPANY

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Coffey Services (NZ) Limited

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Fax: +64 9 272 3378

Material Test Report

Report No: ETAM17S-00119-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)

IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00119
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH02
0.5 m

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	5 - 7 %	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052

Tested By: CP



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Coffey Services (NZ) Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Material Test Report

Report No: ETAM17S-00121-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00121
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH03

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	127	
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	
Plasticity Index	NZS 4402:1986 Test 2.4	Not Tested	
Linear Shrinkage	NZS 4402:1986 Test 2.6	24	
Curling		No	
Cracking		Yes	
Sample History		Natural state	
Fraction Tested		Passing 425µm sieve	
Date Tested		16/01/2017	
Moisture Content (%)	NZS 4402:1986 Test 2.1	50.2	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP



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East Tamaki Laboratory

Coffey Services (NZ) Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Material Test Report

Report No: ETAM17S-00120-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)

IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00120
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH03

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	5 - 7 %	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP



A TETRA TECH COMPANY

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Coffey Services (NZ) Limited

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Material Test Report

Report No: ETAM17S-00122-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00122
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: HA11
0.4 m

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	5 - 7 %	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP NEW ZEALAND STANDARD COMPACTION TEST METHOD NZS 4402 : 1986 TEST 4.1.1

Project Name : **Drury Town Centre**

Location: A5 - Cut Area

Project No : 22 0101 00

Page : 1 of 4

Client : Ross Reid Contractors Ltd

Date of Order : 02.05.22

Address : PO Box 58545

Botany

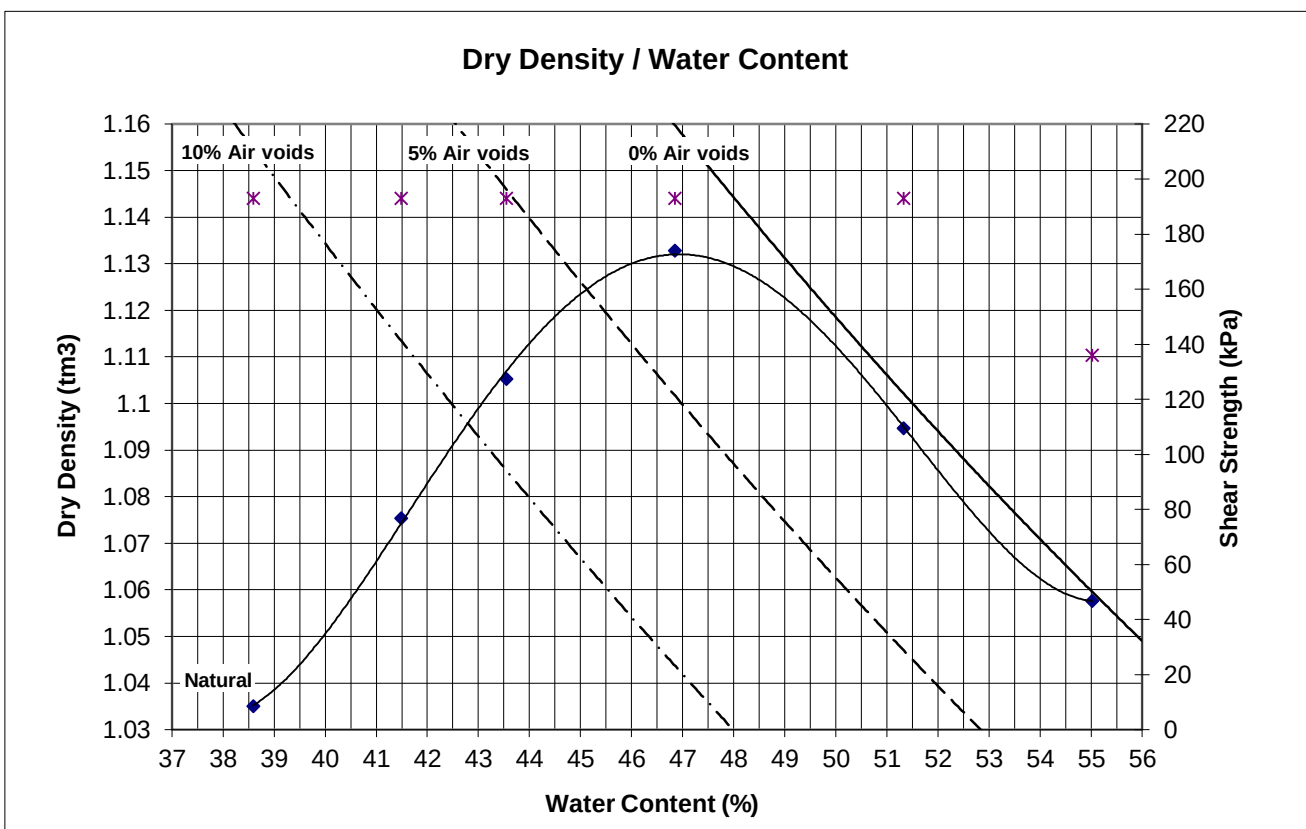
Sample No.: 070N

Sample Method : Hand

Attention : Deon DeRidder

Sample Date : 03.05.22

Sampled By : AS



Maximum Dry Density :	1.13	t/m ³	Optimum Water Content :	47.0	%
Natural Water Content :	38.0	%			
Solid Density of Soil :	2.54	t/m ³	Measured		
Description of Soil :	Orange brown SILT				
Fraction of soil tested :	Passing 19mm				
History of sample :	Natural				
Comments :	-				

Tested By:	AS	Date :	03 to 09.05.22
Calculated By :	ZH	Date :	12.05.22
Checked By :	ZH	Date :	13.05.22

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP NEW ZEALAND STANDARD COMPACTION TEST METHOD NZS 4402 : 1986 TEST 4.1.1

Project Name : **Drury Town Centre**

Location: A8 - Cut Area

Project No : 22 0101 00

Page : 2 of 4

Client : Ross Reid Contractors Ltd

Date of Order : 02.05.22

Address : PO Box 58545

Botany

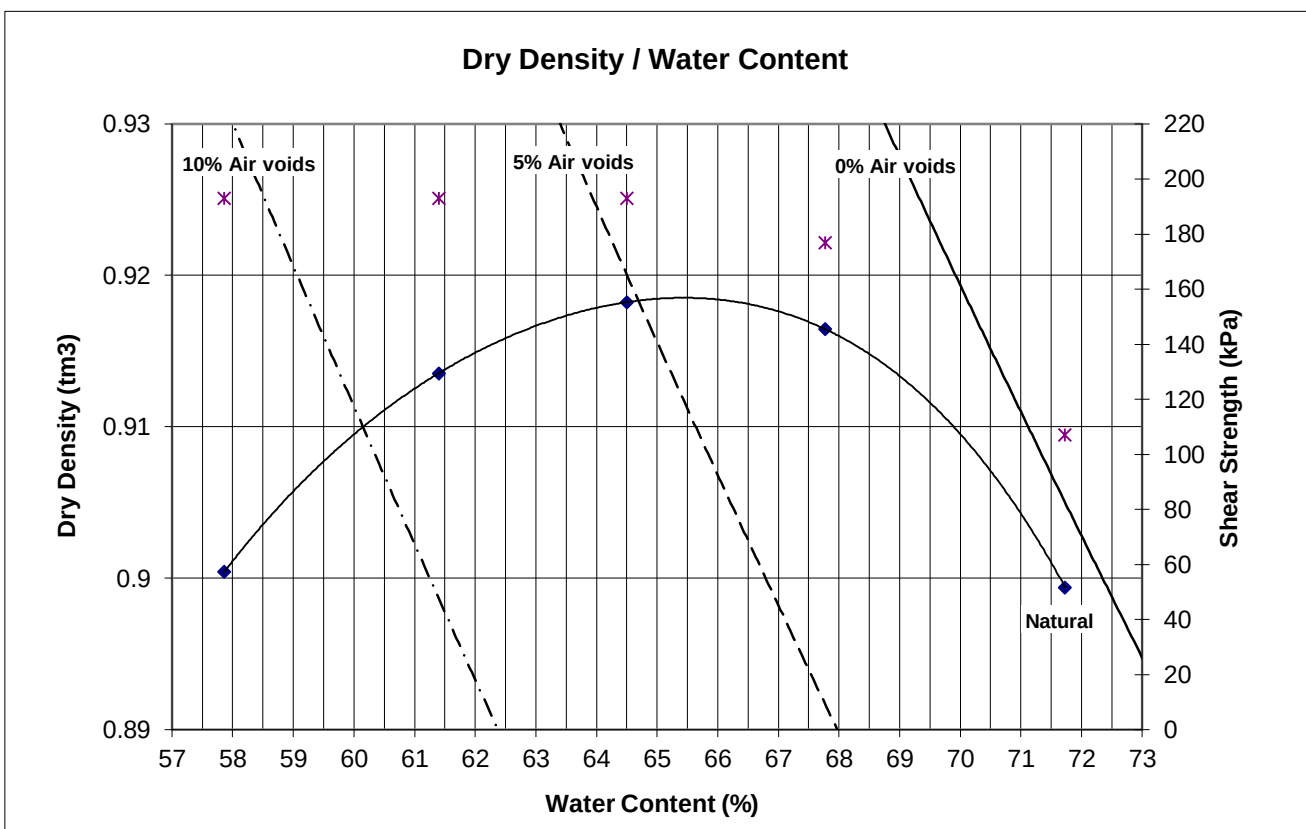
Sample No.: 071N

Sample Method : Hand

Attention : Deon DeRidder

Sample Date : 03.05.22

Sampled By : AS



Maximum Dry Density :	0.92	t/m ³	Optimum Water Content :	65.0	%
Natural Water Content :	71.7	%	Measured		
Solid Density of Soil :	2.58	t/m ³	History of sample :	Natural	
Description of Soil :	Orange brown SILT				
Fraction of soil tested :	Passing 19mm sieve				
Comments :	-				

Tested By:	AS	Date :	03 to 12.05.22
Calculated By :	ZH	Date :	13.05.22
Checked By :	ZH	Date :	16.05.22

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP NEW ZEALAND STANDARD COMPACTION TEST METHOD NZS 4402 : 1986 TEST 4.1.1

Project Name : **Drury Town Centre**

Location: A11 - Cut area

Project No : 22 0101 00

Page : 3 of 4

Client : Ross Reid Contractors Ltd

Date of Order : 02.05.22

Address : PO Box 58545

Botany

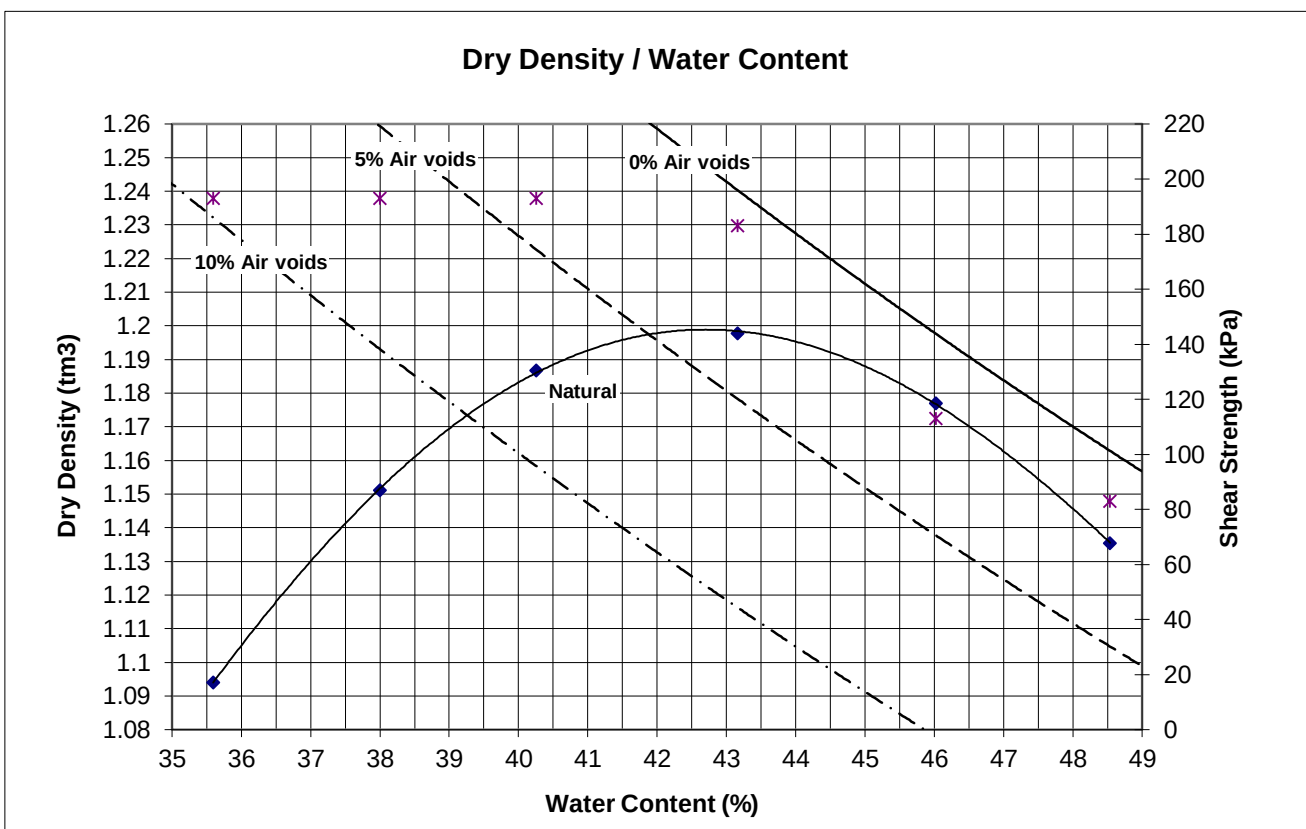
Sample No.: 072N

Sample Method : Hand

Attention : Deon DeRidder

Sample Date : 03.05.22

Sampled By : AS



Maximum Dry Density :	1.20	t/m ³	Optimum Water Content :	43.0	%
Natural Water Content :	40.3	%	Measured		
Solid Density of Soil :	2.67	t/m ³	History of sample :	Natural	
Description of Soil :	Orange brown SILT				
Fraction of soil tested :	Passing 19mm sieve				
Comments :	-				

Tested By:	AS	Date :	03 to 12.05.22
Calculated By :	ZH	Date :	13.05.22
Checked By :	ZH	Date :	16.05.22

**DETERMINATION OF THE
WATER CONTENT, CONE PENETRATION LIMIT, PLASTIC LIMIT, PLASTICITY INDEX
& LINEAR SHRINKAGE
TEST METHOD NZS 4402 : 1986 TEST 2.1, 2.3, 2.4, 2.5 & 2.6**

Project Name : **Drury Town Centre**

Client : Ross Reid Contractors Ltd
Address : PO Box 58545
Botany

Attention : Deon DeRidder

Project No : 22 0101 00

Page : 4 of 4

Date of Order : 02.05.22

Sample Method : Hand

Sample Date : 03.05.22

Sampled By : AS

Test Details :

Test performed on : Whole Sample
History : Natural

Sample No.	Location	Depth (m)	Cone Penetration (CPL)	Plastic Limit (PL)	Plasticity Index (PI)	Linear Shrinkage (LS)	Natural Water Content (%)
070N	A5 - Cut area	SGL	97	52	45	23	37.9
071N	A8 - Cut area	2.5m below	124	61	63	24	72.6
072N	A11 - Cut area	1.5m below	106	45	61	25	42.1

Comments :

Tested By: AS Date : 03 to 17.05.22
Calculated By : AS Date : 19.05.22
Checked By : ZH Date : 20.05.22

Test Number: 211975

Report Number: 39280T

Date of Issue: 9th June 2021

Page 1 of 5 Pages

FINAL REPORT FOR STEVENSON AGGREGATES LTD – CLEVEDON QUARRYClients Address: Private Bag 94000
MANUKAU CITY 2241

Attention: Ross Twidle

Reference: Production Quality Control

Subject: **AGGREGATE TESTING**

Clients Instructions: Conduct the tests as detailed below on the aggregate sample retrieved.

Test Methods:

1. NZS4407: 2015: Tests
 - 3.7.1: Determination of the Solid Density of Aggregate Particles
- Pycnometer Method
 - 3.8.2 Particle Size Distribution – Dry Sieve Method
 - 3.15 : Determination of the California Bearing Ratio
2. NZS4402: 1986: Tests
 - 4.1.1: Dry Density/Water Content Relationship
– NZ Standard Compaction
 - 4.1.2: Dry Density/Water Content Relationship
– NZ Heavy Compaction

Date Sampled: 28th May 2021Date Received: 28th May 2021

Date of Tests: March – April 2021

Description of Sample: **Soft Pit Run (SPR)**

Source: Clevedon Quarry

Notes:

- i. Field sample received in its natural state.
- ii. Sampling of aggregate is not covered by this report.

for STEVENSON AGGREGATES LTDB T BUCKLAND
IANZ APPROVED SIGNATORY

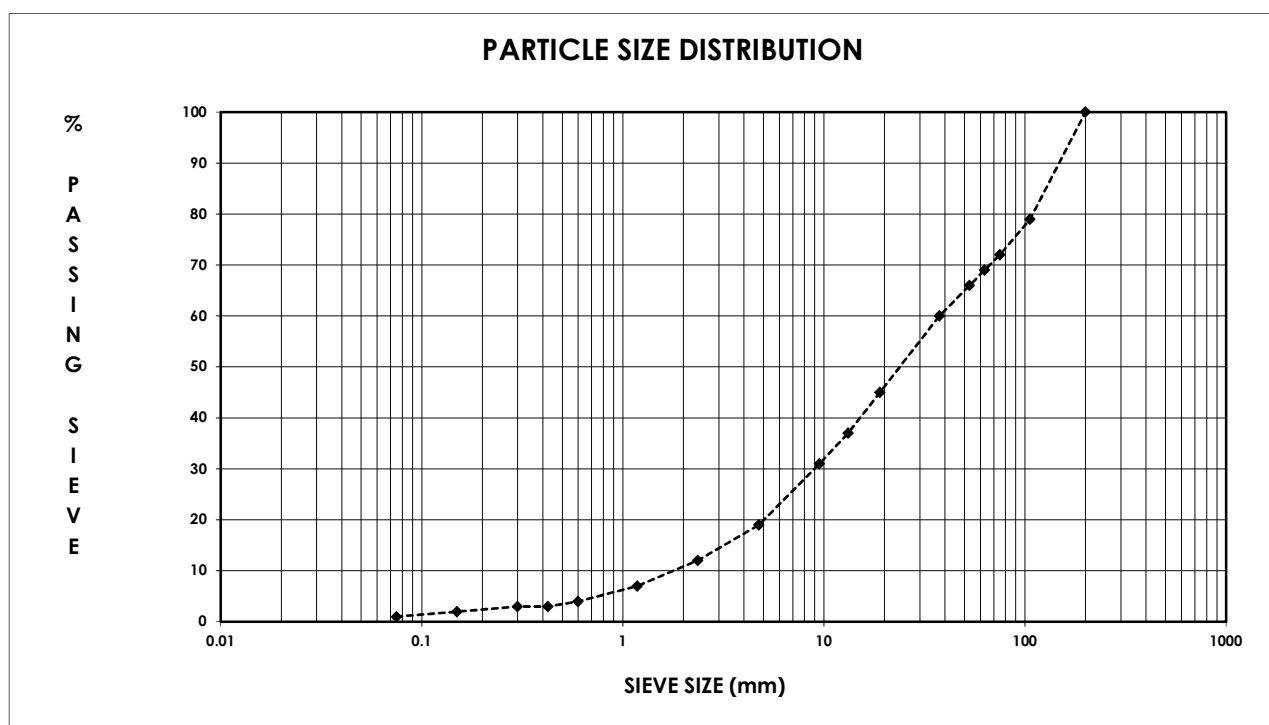
THIS REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL

TEST RESULTS

Material:	Soft Pit Run	Test No.:	211975
Source:	Clevedon Quarry	Date Sampled:	28 th May 2021
Job:	Production Quality Control	Reference No.:	-
Quantity in Stockpile:	Unknown	Location:	Quarry Stockpile

TEST METHOD	RESULT	SPECIFICATION
Particle Size Distribution (Wet Sieve Method)	See below	-

SIEVE SIZE (mm)	200	106	75	63	37.5	19	13.2	9.5	4.75	2.36	1.18	0.600	0.425	0.300	0.150	0.075
% PASSING SIEVE (Dry)	100	79	72	69	60	45	37	31	19	12	7	4	3	3	2	1
MAXIMUM SPECIFIED LIMIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MINIMUM SPECIFIED LIMIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(Dry) = Oven Dried Sample (Wet) = % passing finest sieve obtained by difference																Fineness Modulus:
																-



TEST RESULTS

Material:	Soft Pit Run	Test No.:	211975
Source:	Clevedon Quarry	Date Sampled:	28 th May 2021
Job:	Production Quality Control	Reference No.:	-
Quantity in Stockpile:	Unknown	Location:	Quarry Stockpile

CALIFORNIAN BEARING RATIO

	Result
Compaction effort	NZ Heavy Compaction
Sample condition	Soaked
Surcharge mass (kg)	4.0
Period of Soaking (Days)	4
Compacted dry density (t/m ³)	2.06
Compacted water content (%)	11.2
Soaked water content (%)	11.5
Swell (%)	-0.4
Rate of penetration (mm/min)	1
Depth CBR recorded (mm)	5.0
California Bearing Ratio	CBR
	50%

- Notes:
- i. Negative Swell implies shrinkage
 - ii. Test performed on material passing the 19.0mm test Sieve (45%).

CALIFORNIAN BEARING RATIO

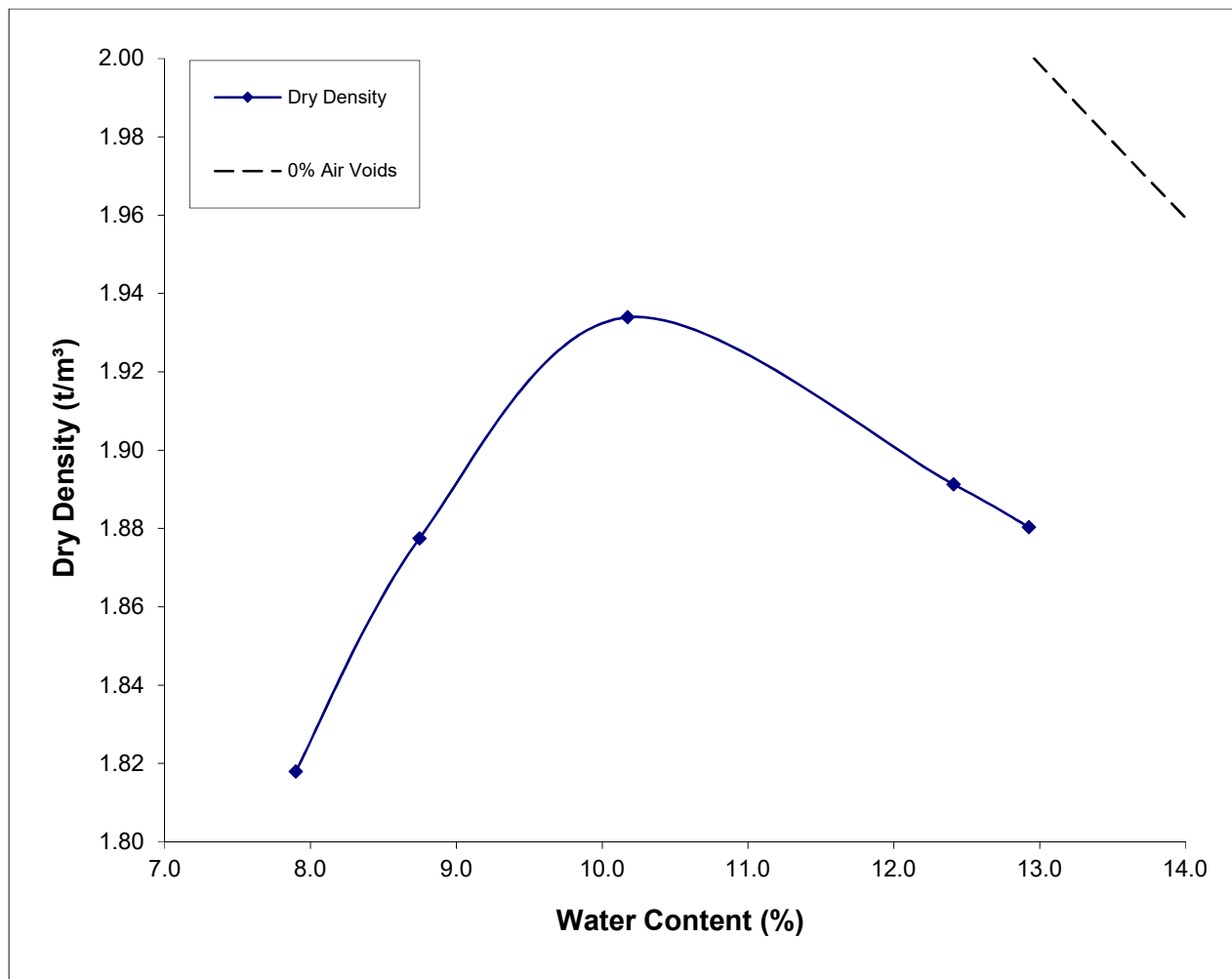
	Result
Compaction effort	NZ Standard Compaction
Sample condition	Soaked
Surcharge mass (kg)	4.0
Period of Soaking (Days)	4
Compacted dry density (t/m ³)	1.96
Compacted water content (%)	13.4
Soaked water content (%)	12.2
Swell (%)	0.0
Rate of penetration (mm/min)	1
Depth CBR recorded (mm)	5.0
California Bearing Ratio	CBR
	35%

- Notes:
- i. Negative Swell implies shrinkage
 - ii. Test performed on material passing the 19.0mm test Sieve (45%).

TEST RESULTS

Material:	Soft Pit Run	Test No.:	211975
Source:	Clevedon Quarry	Date Sampled:	28 th May 2021
Job:	Production Quality Control	Reference No.:	-
Quantity in Stockpile:	Unknown	Location:	Quarry Stockpile

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured (t/m³)	Natural Water Content <19mm %
1.93	10.0	2.70	6.9

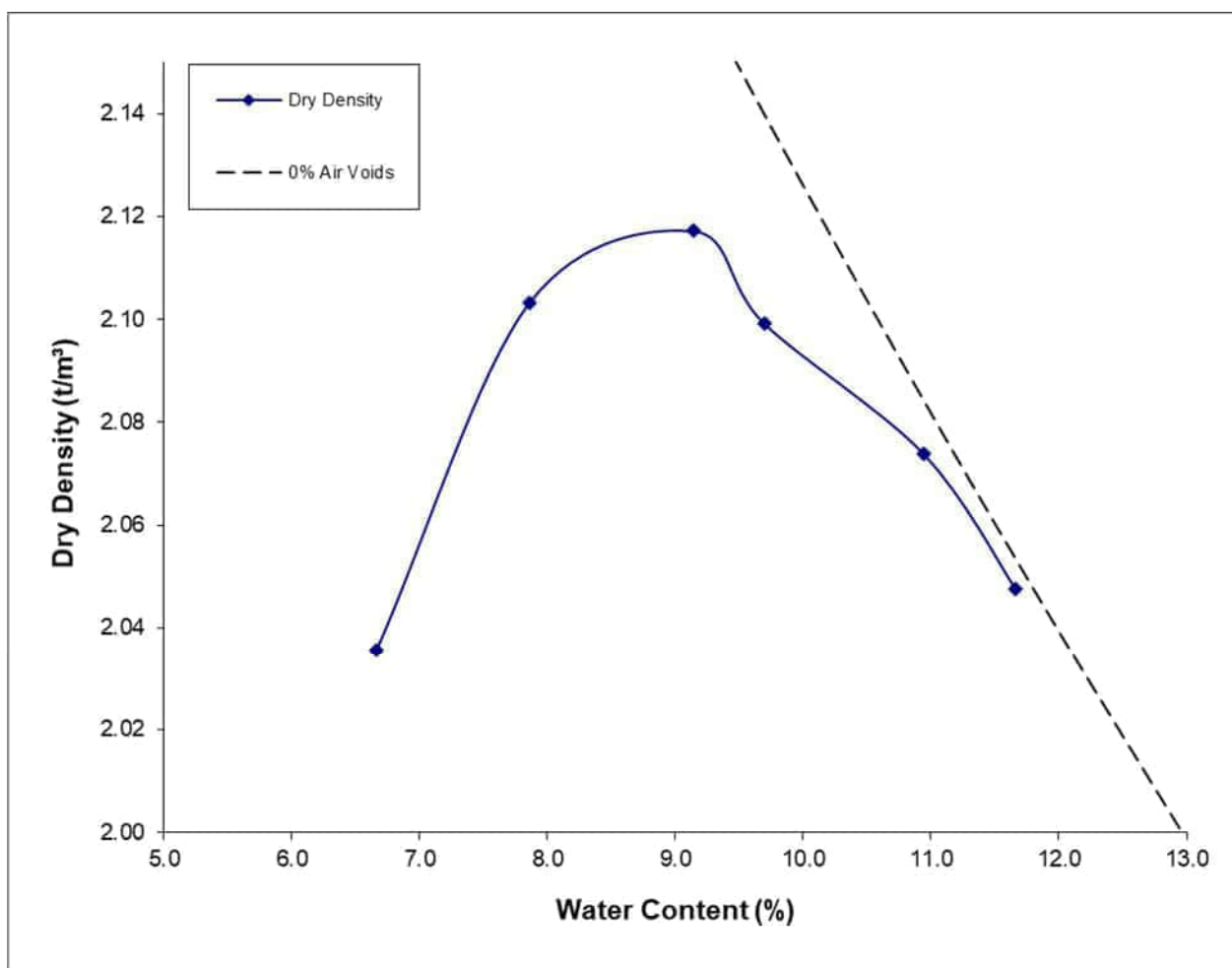
Water Content (%)	7.9	8.7	10.2	12.4	12.9
Dry Density (t/m³)	1.82	1.88	1.93	1.89	1.88

Note: i. Test performed on material <19.0mm (45%).

TEST RESULTS

Material:	Soft Pit Run	Test No.:	211975
Source:	Clevedon Quarry	Date Sampled:	28 th May 2021
Job:	Production Quality Control	Reference No.:	-
Quantity in Stockpile:	Unknown	Location:	Quarry Stockpile

NZ HEAVY COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured (t/m³)	Natural Water Content <19mm %
2.12	9.0	2.70	6.9

Water Content (%)	6.7	7.9	9.1	9.7	10.9	11.7
Dry Density (t/m³)	2.04	2.10	2.12	2.10	2.07	2.05

Note: i. Test performed on material <19.0mm (45%).

Test Number: 221807

Report Number: 42470T

Date of Issue: 9th June 2022

Page 1 of 5 Pages

FINAL REPORT FOR STEVENSON AGGREGATES LTD - CLEVEDON QUARRYClients Address: PO Box 94000
MANUKAU CITY 2241

Attention: Mr R. Twidle

Reference: Production Quality Control

Subject: **AGGREGATE TESTING**

Clients Instructions: Conduct the tests as detailed below on the aggregate sample retrieved.

Test Methods:

1. NZS4407: 2015: Tests
 - 3.6 Determination of the Sand Equivalent
 - 3.7.1: Determination of the Solid Density of Aggregate Particles
- Pycnometer Method
 - 3.8.1: Particle Size Distribution – Wet Sieve Method
 - 3.10 Determination of Crushing Resistance of Coarse Aggregates under
a specified load
 - 3.15: Determination of the California Bearing Ratio (CBR)
2. NZS4402: 1986: Test
 - 4.1.1: Dry Density/Water Content Relationship
- NZ Standard Compaction
 - 4.1.3: Dry Density/Water Content Relationship
- NZ Vibration Hammer Compaction

Date Sampled: 27th April 2022Date Received: 27th April 2022

Date of Test: April - June 2022

Description of Sample: **Soft Pit Run**

Source: Clevedon Quarry

Note:

- i. Field sample received in its natural state.
- ii. Sampling of aggregate and product information is not covered by this report.
- iii. Test results apply to sample received.

for STEVENSON AGGREGATES LTDT A WHITMORE
IANZ APPROVED SIGNATORY

TEST RESULTS

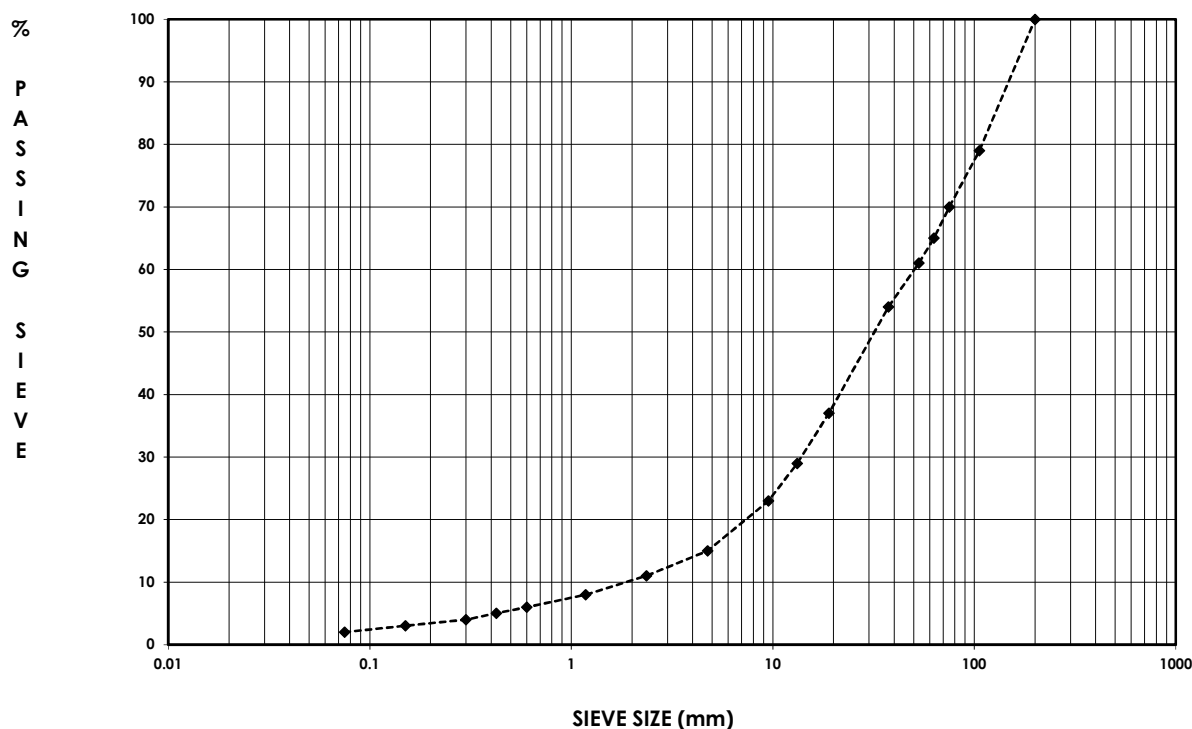
Material:	Soft Pit Run	Test No.:	221807
Source:	Clevedon Quarry	Date Sampled:	27 th April 2022
Job:	Production Quality Control	Reference No.:	-
Quantity in Stockpile:	Unknown	Location:	Quarry Stockpile

TEST METHOD	RESULT	SPECIFICATION
Particle Size Distribution (Wet Sieve method)	See below	-
Crushing Resistance	12% @ 130kN	10% @ 130kN
Sand Equivalent (Air Dried, Washed, Brushed, Mechanical Shaking)	26	-

- Notes:
- i. Crushing Resistance test performed on material passing 13.2mm sieve and retained on 9.5mm sieve.
 - ii. Crushing resistance needed to produce 10% fines is LESS than specified load

SIEVE SIZE (mm)	200	106	75	63	37.5	19	13.2	9.5	4.75	2.36	1.18	0.600	0.425	0.300	0.150	0.075
% PASSING SIEVE (Wet)	100	79	70	65	54	37	29	23	15	11	8	6	5	4	3	2
MAXIMUM SPECIFIED LIMIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MINIMUM SPECIFIED LIMIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(Dry) = Oven Dried Sample (Wet) = % passing finest sieve obtained by difference Fineness Modulus: -																

PARTICLE SIZE DISTRIBUTION



TEST RESULTS

Material:	Soft Pit Run	Test No.:	221807
Source:	<i>Clevedon Quarry</i>	Date Sampled:	<i>27th April 2022</i>
Job:	<i>Production Quality Control</i>	Reference No.:	-
Quantity in Stockpile:	<i>Unknown</i>	Location:	<i>Quarry Stockpile</i>

CALIFORNIAN BEARING RATIO

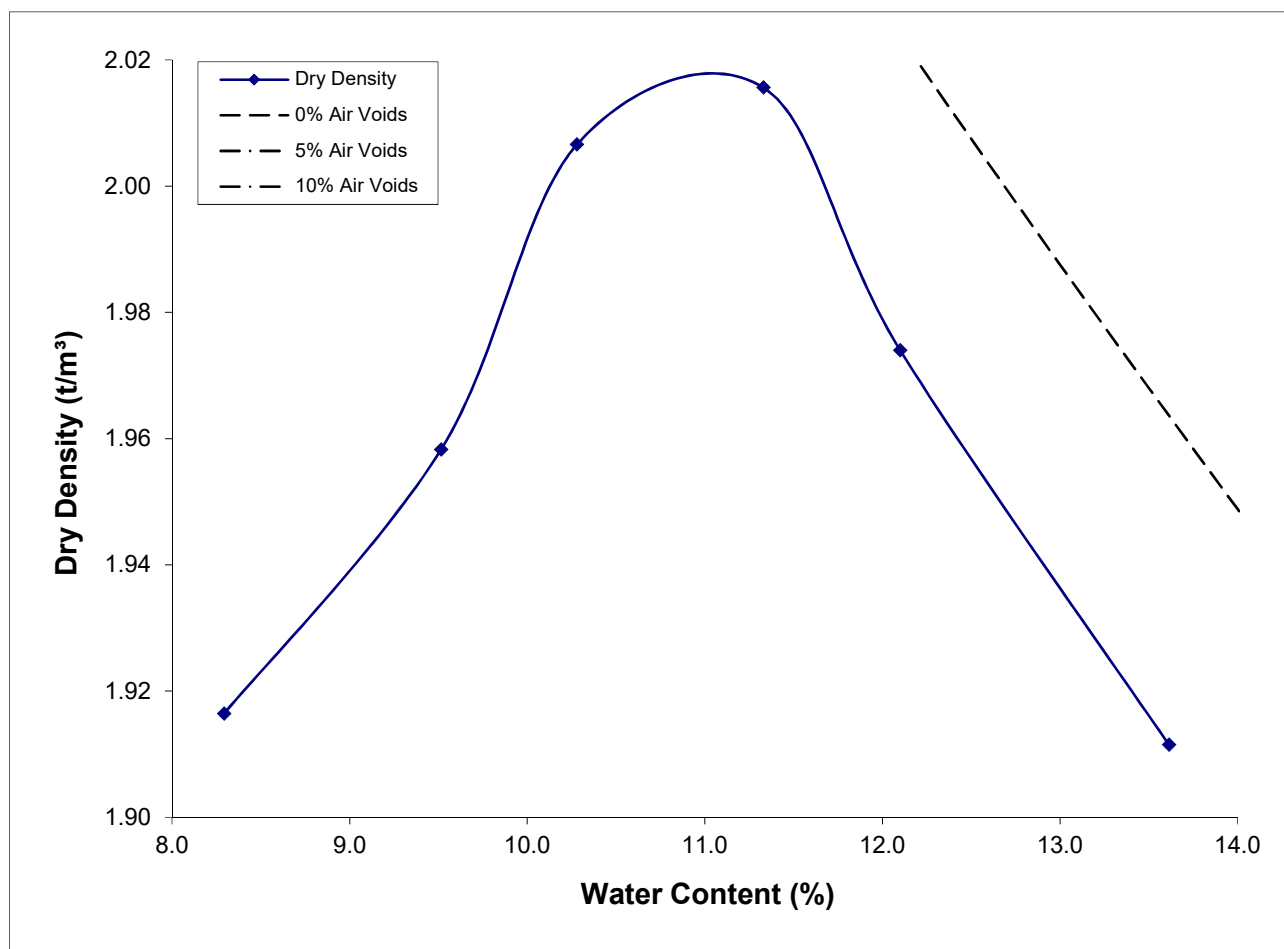
	Results
Compaction Effort	NZ Vibration Hammer
Sample Condition	Soaked
Surcharge Mass (kg)	4.0
Period of Soaking (Days)	4
Compacted Dry Density (t/m ³)	2.04
Compacted Water Content (%)	11.0
Soaked Water Content (%)	11.4
Swell (%)	0
Rate of Penetration (mm/min)	1
Depth CBR Recorded (mm)	5.0
California Bearing Ratio	60%

- Notes:
- i. Negative Swell implies shrinkage.
 - ii. Test performed on material passing the 19.0mm Test Sieve (37%).

TEST RESULTS

Material:	Soft Pit Run	Test No.:	221807
Source:	Clevedon Quarry	Date Sampled:	27 th April 2022
Job:	Production Quality Control	Reference No.:	-
Quantity in Stockpile:	Unknown	Location:	Quarry Stockpile

NZ STANDARD COMPACTION



Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured (t/m³)	Natural Water Content (%)
2.02	11.0	2.68	6.9

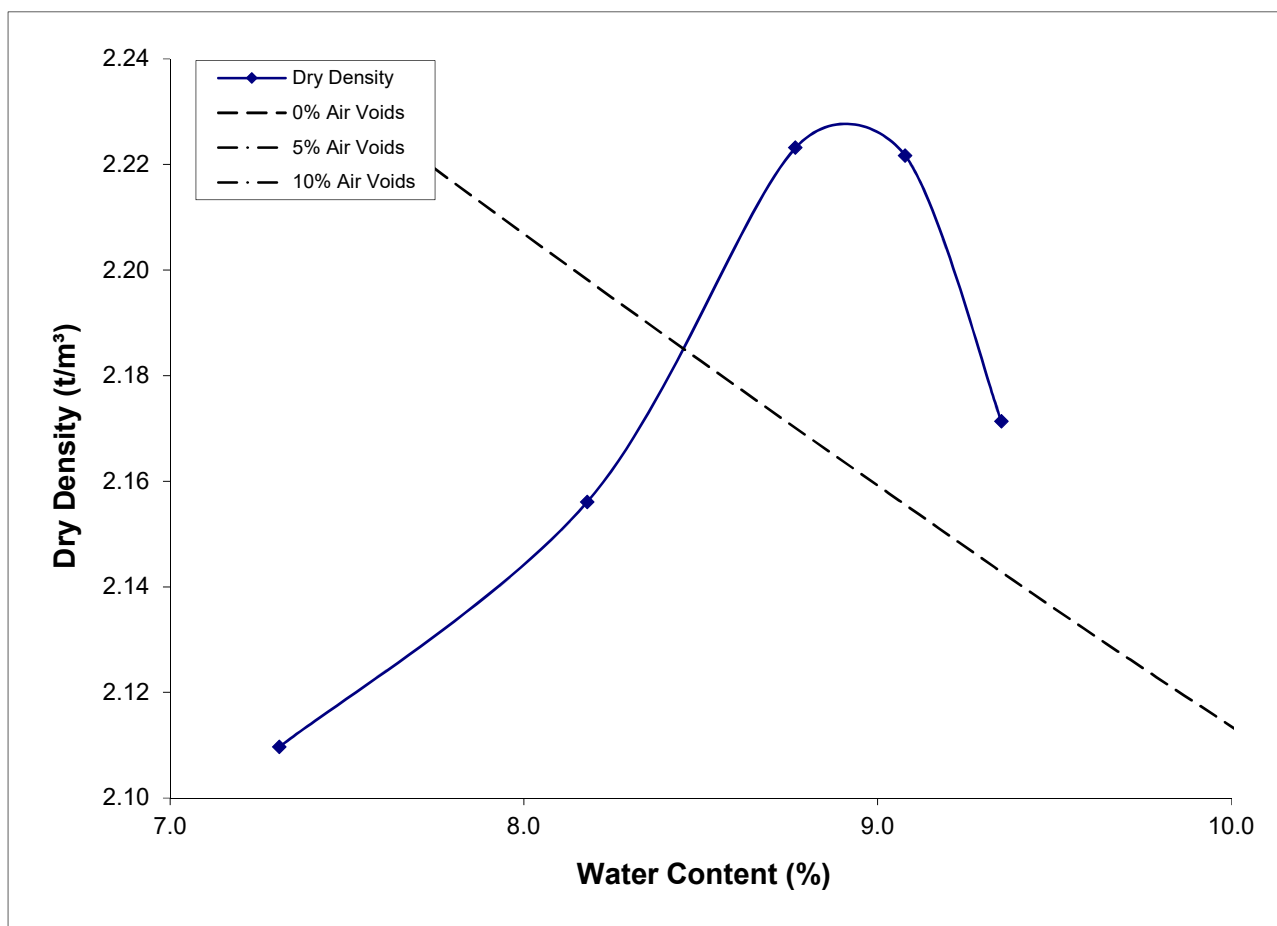
Water Content (%)	8.3	9.5	10.3	11.3	12.1	13.6
Dry Density (t/m³)	1.92	1.96	2.01	2.02	1.97	1.91

Note: i. Test performed on material passing the 19.0mm sieve (37%)

TEST RESULTS

Material:	Soft Pit Run	Test No.:	221807
Source:	Clevedon Quarry	Date Sampled:	27 th April 2022
Job:	Production Quality Control	Reference No.:	-
Quantity in Stockpile:	Unknown	Location:	Quarry Stockpile

NZ VIBRATION HAMMER COMPACTION

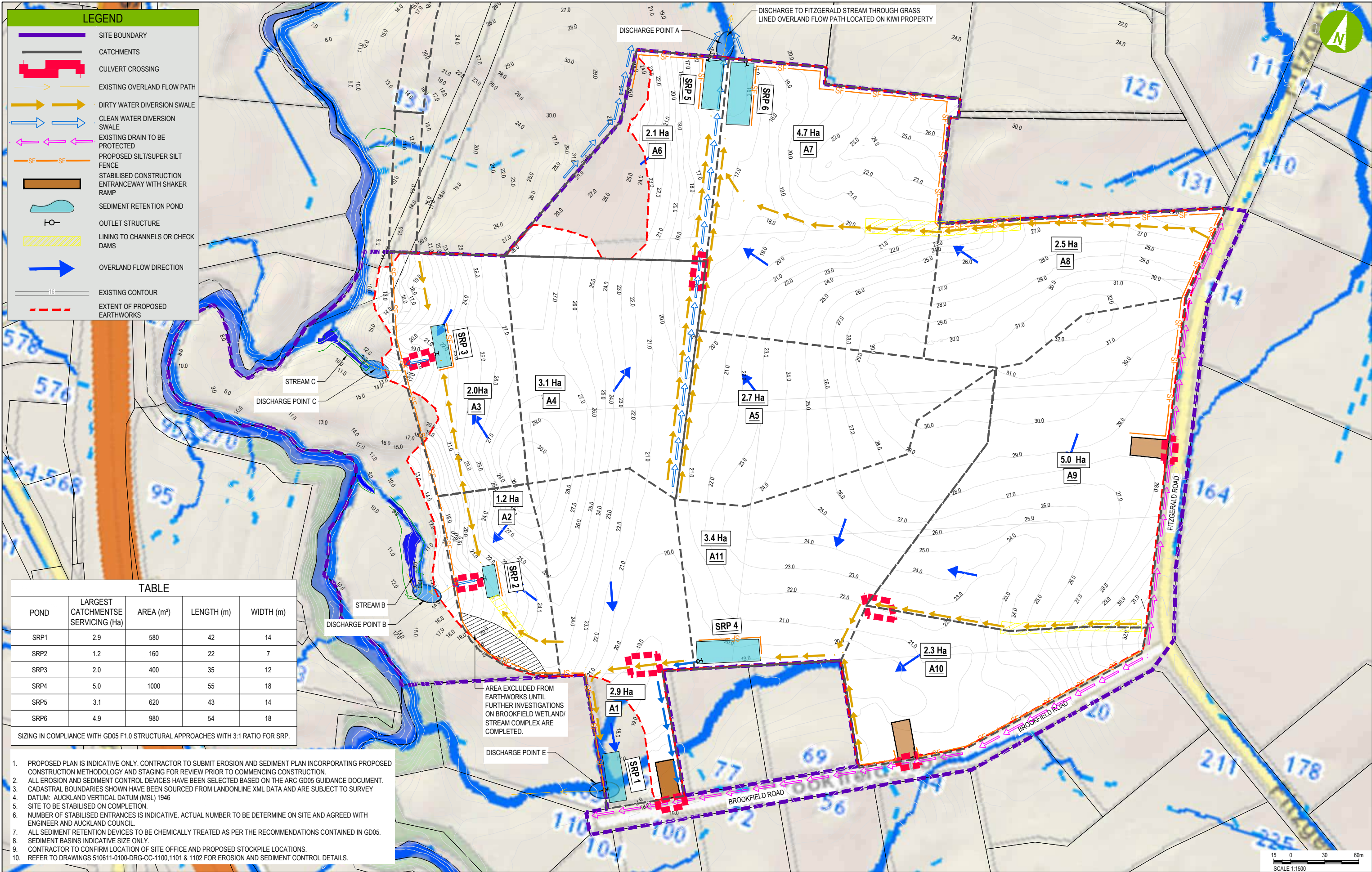


Maximum Dry Density (t/m³)	Optimum Water Content (%)	Solid Density Measured (t/m³)	Natural Water Content (<37.5mm) %
2.22	9.0	2.68	6.7

Water Content (%)	7.3	8.2	8.8	9.1	9.3
Dry Density (t/m³)	2.11	2.16	2.22	2.22	2.17

Note: i. Test performed on material passing the 37.5mm sieve (54%)

Allophane Soil Assessment
Drury Centre Precinct
510611



DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP NEW ZEALAND STANDARD COMPACTION TEST METHOD NZS 4402 : 1986 TEST 4.1.1

Project Name : **Drury Town Centre**

Location: A5 - Cut Area

Project No : 22 0101 00

Page : 1 of 4

Client : Ross Reid Contractors Ltd

Date of Order : 02.05.22

Address : PO Box 58545

Botany

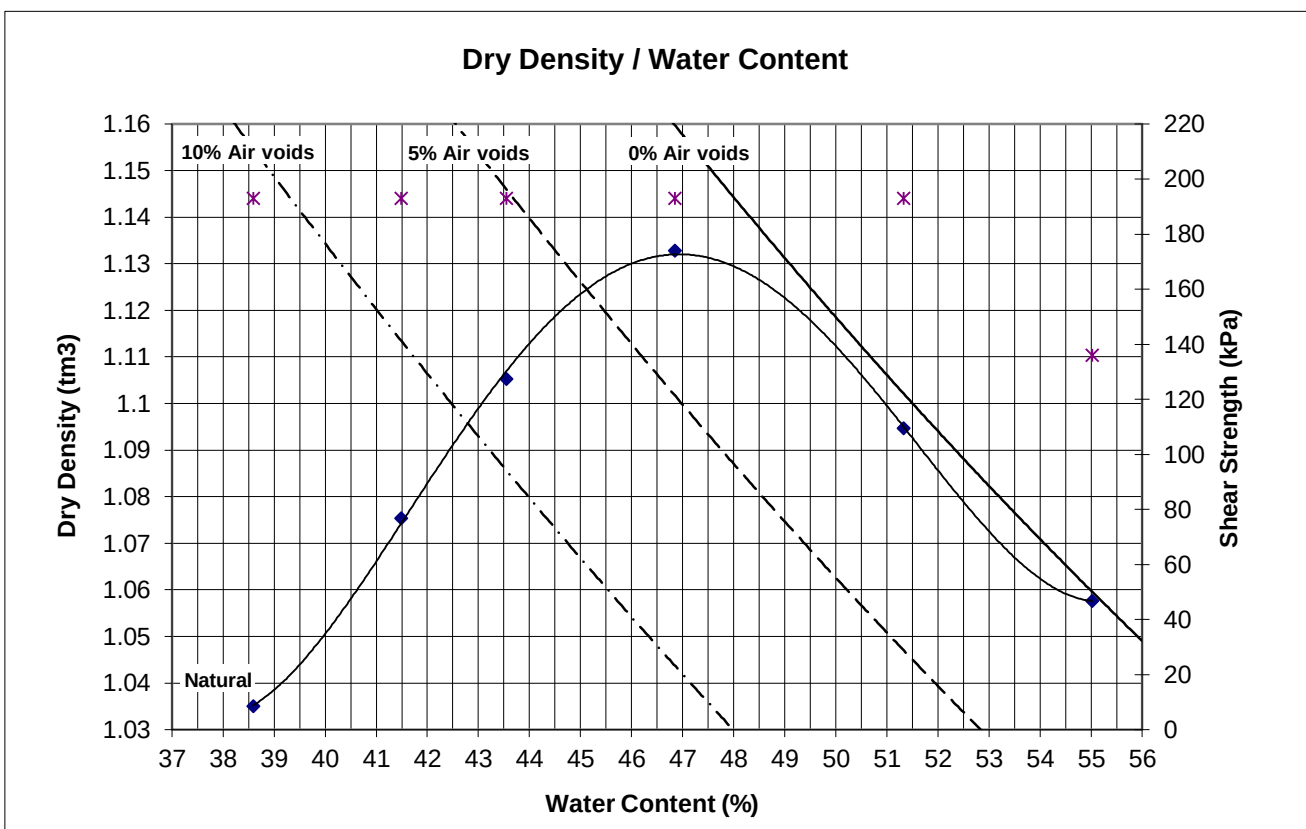
Sample No.: 070N

Sample Method : Hand

Attention : Deon DeRidder

Sample Date : 03.05.22

Sampled By : AS



Maximum Dry Density :	1.13	t/m ³	Optimum Water Content :	47.0	%
Natural Water Content :	38.0	%	Measured		
Solid Density of Soil :	2.54	t/m ³	History of sample :	Natural	
Description of Soil :	Orange brown SILT				
Fraction of soil tested :	Passing 19mm				
Comments :	-				

Tested By:	AS	Date :	03 to 09.05.22
Calculated By :	ZH	Date :	12.05.22
Checked By :	ZH	Date :	13.05.22

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP NEW ZEALAND STANDARD COMPACTION TEST METHOD NZS 4402 : 1986 TEST 4.1.1

Project Name : **Drury Town Centre**

Location: A8 - Cut Area

Project No : 22 0101 00

Page : 2 of 4

Client : Ross Reid Contractors Ltd

Date of Order : 02.05.22

Address : PO Box 58545

Botany

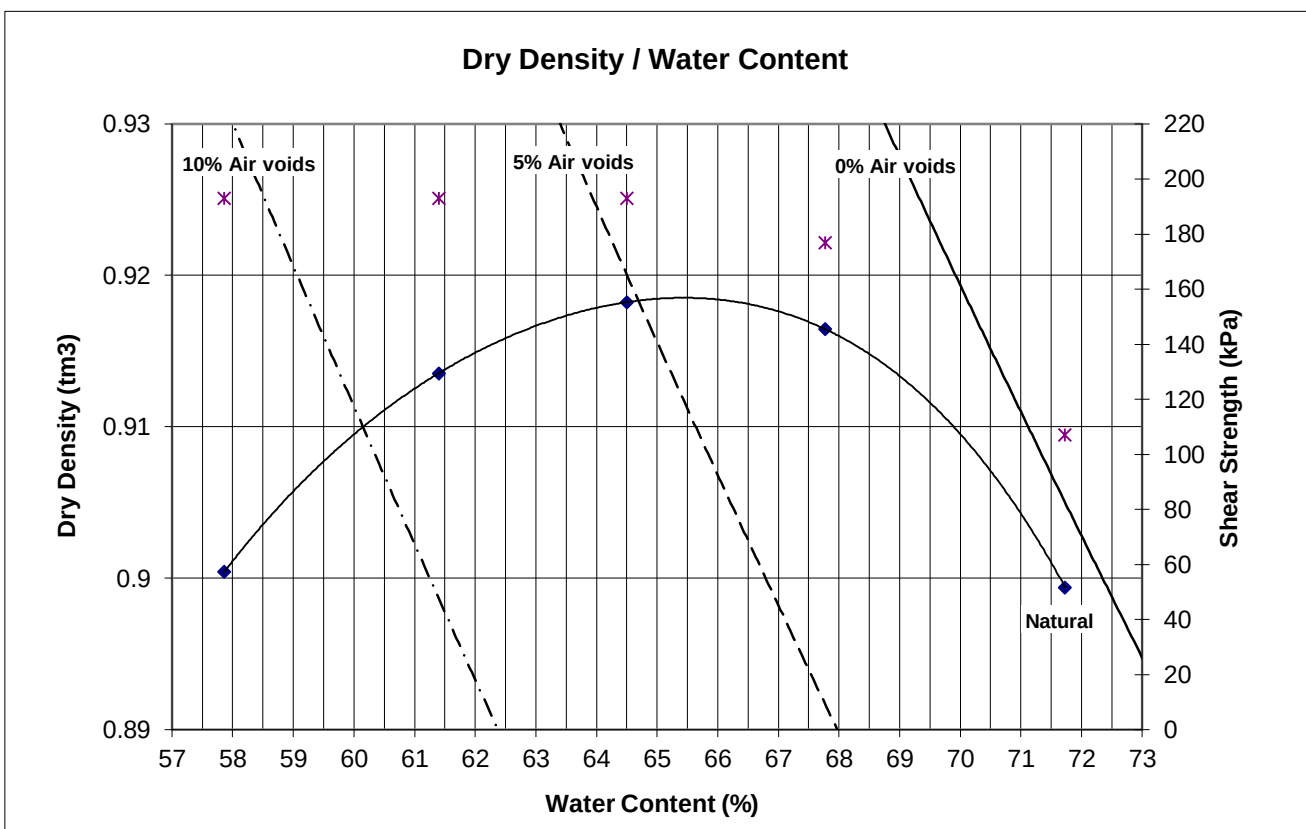
Sample No.: 071N

Sample Method : Hand

Attention : Deon DeRidder

Sample Date : 03.05.22

Sampled By : AS



Maximum Dry Density :	0.92	t/m ³	Optimum Water Content :	65.0	%
Natural Water Content :	71.7	%	Measured		
Solid Density of Soil :	2.58	t/m ³	History of sample :	Natural	
Description of Soil :	Orange brown SILT				
Fraction of soil tested :	Passing 19mm sieve				
Comments :	-				

Tested By:	AS	Date :	03 to 12.05.22
Calculated By :	ZH	Date :	13.05.22
Checked By :	ZH	Date :	16.05.22

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP NEW ZEALAND STANDARD COMPACTION TEST METHOD NZS 4402 : 1986 TEST 4.1.1

Project Name : **Drury Town Centre**

Location: A11 - Cut area

Project No : 22 0101 00

Page : 3 of 4

Client : Ross Reid Contractors Ltd

Date of Order : 02.05.22

Address : PO Box 58545

Botany

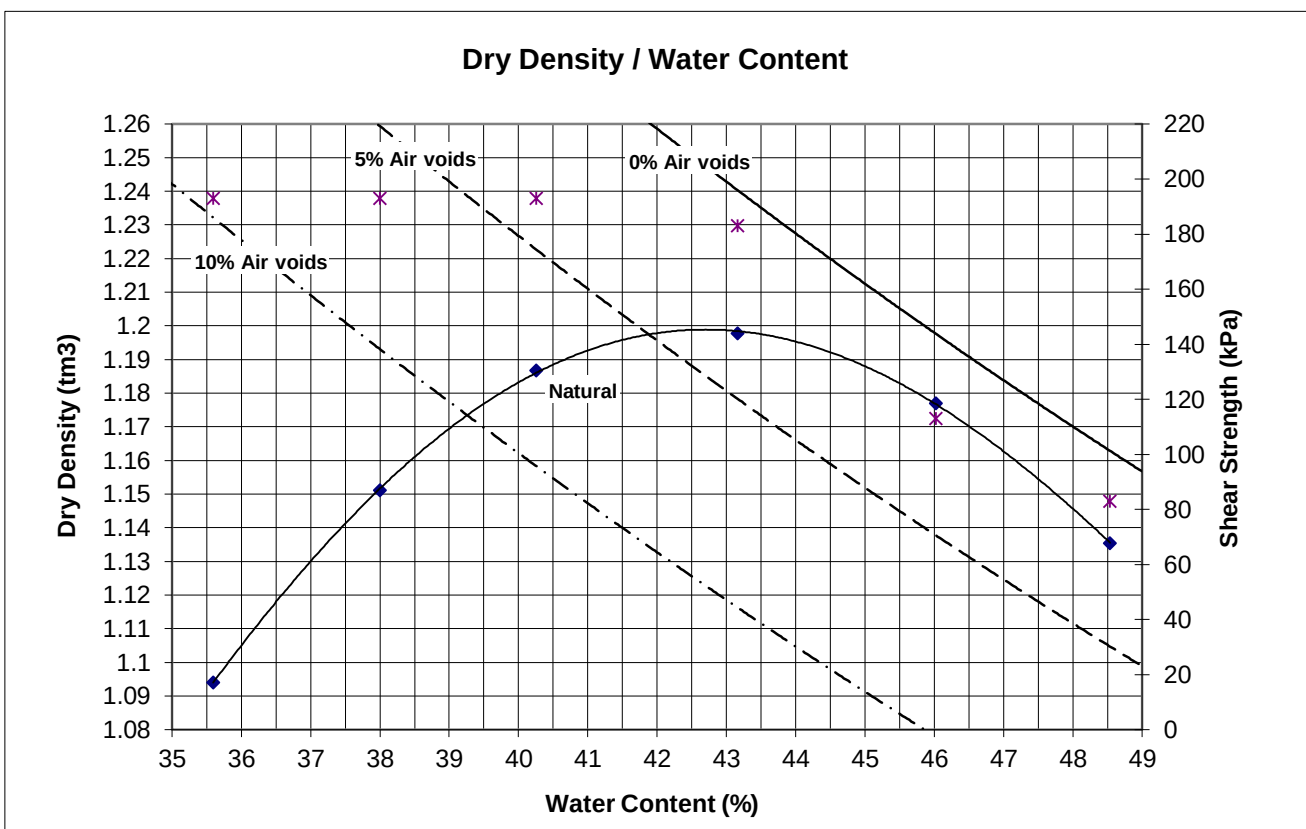
Sample No.: 072N

Sample Method : Hand

Attention : Deon DeRidder

Sample Date : 03.05.22

Sampled By : AS



Maximum Dry Density :	1.20	t/m ³	Optimum Water Content :	43.0	%
Natural Water Content :	40.3	%			
Solid Density of Soil :	2.67	t/m ³	Measured		
Description of Soil :	Orange brown SILT				
Fraction of soil tested :	Passing 19mm sieve				
History of sample :	Natural				
Comments :	-				

Tested By:	AS	Date :	03 to 12.05.22
Calculated By :	ZH	Date :	13.05.22
Checked By :	ZH	Date :	16.05.22



0 15 30 60 90 120 150 Metres

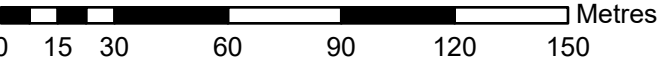


REV	DATE	REVISION DETAILS	APPROVED
A	31-03-21	GEOTECHNICAL INVESTIGATION LOCATIONS	J KUPEC

SCALE	SIZE
1:2,000	A3
DRAWN	M DOONEY
DESIGNED	J MUIRSON
REVIEWED	

FOR INFORMATION
NOT FOR CONSTRUCTION
APPROVED

PROJECT	KIWI PROPERTY GROUP LIMITED					
TITLE	DRURY CENTRE PROJECT GEOTECHNICAL INVESTIGATION LOCATIONS GIS SHEET 2 OF 5					
DOCUMENT	PROJECT No. 510611	WBS 002	TYPE FIG	DISC GG	NUMBER 0002	REVISION A

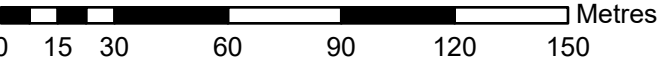
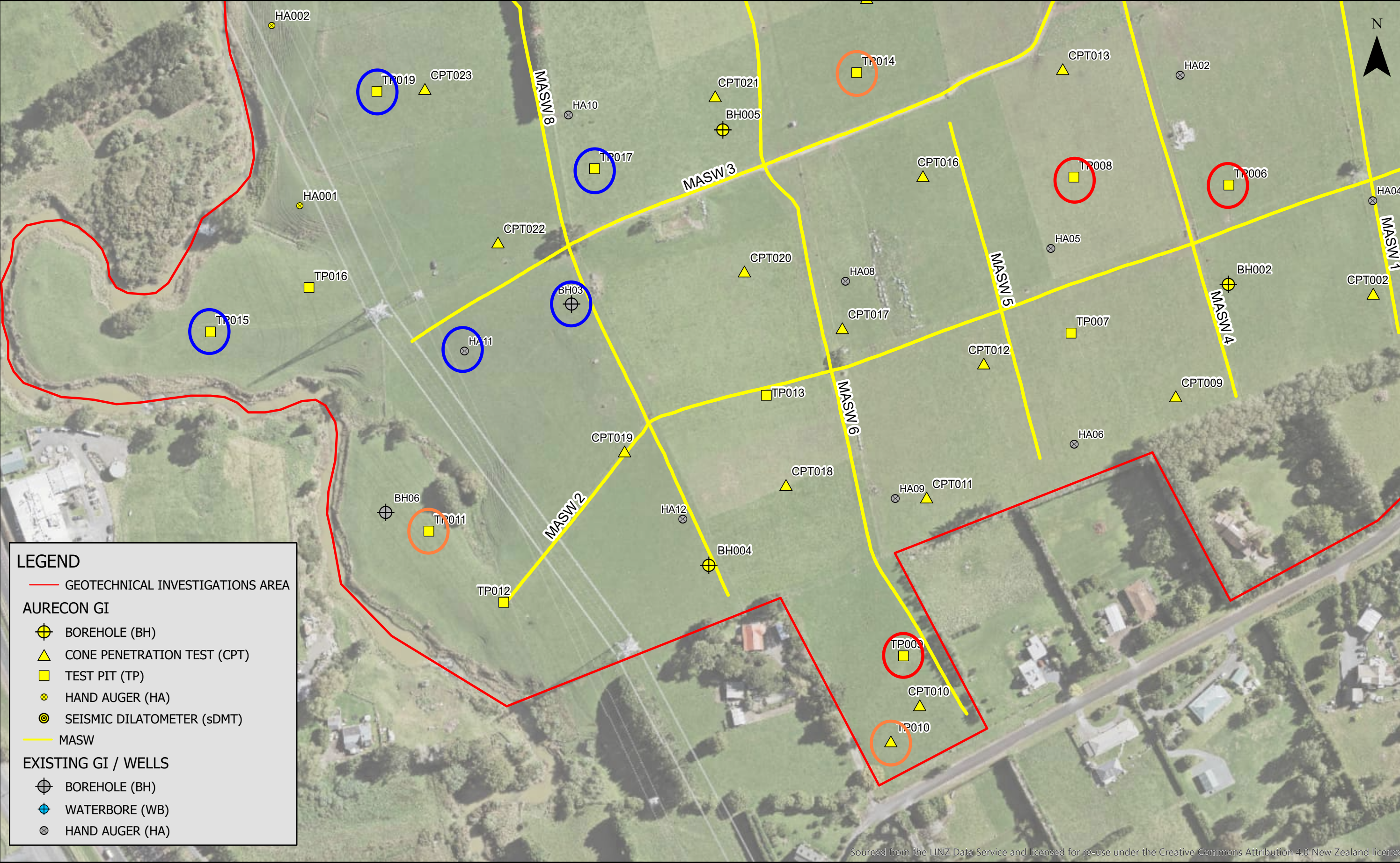


REV	DATE	REVISION DETAILS	APPROVED
A	31-03-21	GEOTECHNICAL INVESTIGATION LOCATIONS	J KUPEC

SCALE	SIZE
1:2,000	A3
DRAWN	M DOONEY
DESIGNED	J MUIRSON
REVIEWED	

FOR INFORMATION
NOT FOR CONSTRUCTION
APPROVED

PROJECT	KIWI PROPERTY GROUP LIMITED					
TITLE	DRURY CENTRE PROJECT GEOTECHNICAL INVESTIGATION LOCATIONS GIS SHEET 3 OF 5					
DOCUMENT	PROJECT No. 510611	WBS 002	TYPE FIG	DISC GG	NUMBER 0003	REVISION A



REV	DATE	REVISION DETAILS	APPROVED
A	31-03-21	GEOTECHNICAL INVESTIGATION LOCATIONS	J KUPEC

SCALE	SIZE
1:2,000	A3
DRAWN	
M DOONEY	
DESIGNED	
J MUIRSON	
REVIEWED	

FOR INFORMATION
NOT FOR CONSTRUCTION
APPROVED

PROJECT	KIWI PROPERTY GROUP LIMITED					
TITLE	DRURY CENTRE PROJECT GEOTECHNICAL INVESTIGATION LOCATIONS GIS SHEET 4 OF 5					
DOCUMENT	PROJECT No.	WBS	TYPE	DISC	NUMBER	REVISION
	510611	002	FIG	GG	0004	A



LEGEND

— GEOTECHNICAL INVESTIGATIONS AREA

AURECON GI

BOREHOLE (BH)

CONE PENETRATION TEST (CPT)

TEST PIT (TP)

HAND AUGER (HA)

SEISMIC DILATOMETER (sDMT)

MASW

EXISTING GI / WELLS

BOREHOLE (BH)

WATERBORE (WB)

HAND AUGER (HA)

aurecon

www.aurecongroup.com

Kiwi Property

REV	DATE	REVISION DETAILS	APPROVED
A	31-03-21	GEOTECHNICAL INVESTIGATION LOCATIONS	J KUPEC

SCALE	SIZE
1:2,000	A3
DRAWN	M DOONEY
DESIGNED	J MUIRSON
REVIEWED	

FOR INFORMATION
NOT FOR CONSTRUCTION
APPROVED

PROJECT	KIWI PROPERTY GROUP LIMITED				
TITLE	DRURY CENTRE PROJECT GEOTECHNICAL INVESTIGATION LOCATIONS GIS SHEET 5 OF 5				
DOCUMENT	PROJECT No. 510611	WBS 002	TYPE FIG	DISC GG	NUMBER 0005
					REVISION A

Please reply to: W.E. Campton

Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

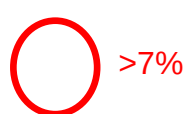
Attention: **SAM MacKAY**

Location of these test results are shown on the site investigation plans above.

DETECTION OF THE PRESENCE OF ALLOPHANE

Dear Sam,

Re: DRURY CENTRE PROJECT
Report Number: 64121#L/Allophane



>7%



<5%



5 to 7%

The following table presents the results of 'Detection of the Presence of Allophane in Soils' testing at BGL of soil samples delivered to this laboratory on the 29th of January 2021.

The samples were tested in accordance with the following standard:

Detection of Presence of Allophane in Soils:

NZS4402:1986:Test 3.4

Borehole Number	Sample Number	Depth (m)	Allophane Content
TP001	BULK	0.80 – 1.20	> 7%
TP002	BULK	0.50 – 0.90	> 7%
TP003	BULK	0.25 – 0.80	> 7%
TP003	BULK	1.60 – 1.90	> 7%
TP004	BULK	0.60 – 1.10	> 7%
TP004	BULK	2.00 – 2.50	> 7%
TP005	BULK	2.10 – 2.40	> 7%
TP006	BULK	1.80 – 2.10	> 7%
TP008	BULK	2.30 – 2.70	> 7%
TP009	BULK	2.40 – 2.80	> 7%

Borehole Number	Sample Number	Depth (m)	Allophane Content
TP010	BULK	1.50 – 1.80	< 5%
TP011	BULK	2.20 – 2.50	< 5%
TP014	BULK	1.70 – 2.80	< 5%
TP015	BULK	1.20 – 1.80	5 – 7%
TP017	BULK	2.20 – 2.50	5 – 7%
TP019	BULK	0.25 – 0.75	5 – 7%
TP023	BULK	0.75 – 3.00	< 5%
TP024	BULK	1.10 – 1.80	> 7%
TP025	BULK	0.70 – 1.50	< 5%
TP029	BULK	0.70 – 1.80	> 7%
TP029	BULK	1.80 – 2.40	< 5%
TP031	BULK	0.60 – 1.80	< 5%
TP032	BULK	0.70 – 2.00	< 5%
BH007	BULK	2.00 – 2.50	< 5%

Please note that the test results relate only to the samples as-received, and relate only to the samples under test. Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Signatory (Assistant Laboratory Manager)
Babbage Geotechnical Laboratory



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A TETRA TECH COMPANY

East Tamaki Laboratory

Coffey Services (NZ) Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Report No: ETAM17S-00117-1

Issue No: 1

Material Test Report

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)



Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00117
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH01
0.5 - 0.6 m

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	>7%	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP



A TETRA TECH COMPANY

East Tamaki Laboratory

Coffey Services (NZ) Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375

Fax: +64 9 272 3378

Material Test Report

Report No: ETAM17S-00119-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)



Approved Signatory: James McKelvey
(Senior Technician)

IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00119
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH02
0.5 m

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	5 - 7 %	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052

Tested By: CP



A TETRA TECH COMPANY

East Tamaki Laboratory

Coffey Services (NZ) Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Material Test Report

Report No: ETAM17S-00120-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)

IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00120
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: BH03

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	5 - 7 %	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP



A TETRA TECH COMPANY

East Tamaki Laboratory

Coffey Services (NZ) Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Material Test Report

Report No: ETAM17S-00122-1

Issue No: 1

Client: ENGEO Limited
PO Box 305136, Triton Plaza
Auckland 0757

Principal:

Project No.: 773-ETAM00143AA

Project Name: 13451 - ENGEO Testing

Lot No.: -

TRN: -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 18/01/2017

Sample Details

Sample ID: ETAM17S-00122
Client Sample: -
Date Sampled: 21/12/2016
Source: Unknown (Sampled by Client)
Material: Disturbed Soil
Specification: No Specification
Sampling Method: Unknown (Not IANZ Endorsed)
Project Location: 13451
Sample Location: HA11
0.4 m

Test Results

Description	Method	Result	Limits
Allophane Content	NZS 4402:1986 Test 3.4	5 - 7 %	
Date Tested		12/01/2017	

Comments

Work Order: ETAM17W00052
Tested By: CP

Please reply to: W.E. Campton

Page 1 of 4

Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Job Number: 64121#L
BGL Registration Number: 2884
Checked by: WEC

Attention: **SAM MacKAY**

23rd February 2021

ATTERBERG LIMITS & LINEAR SHRINKAGE TESTING

Dear Sam,

Re: DRURY CENTRE PROJECT
Report Number: 64121#L/AL

The following report presents the results of Atterberg Limits & Linear Shrinkage testing at BGL of soil samples delivered to this laboratory on the 29th of January 2021. Test results are summarised below, with pages 3 & 4 showing where the samples plot on the Unified Soil Classification System (Casagrande) Chart. Test standards used were:

Water Content:	NZS4402:1986:Test 2.1
Liquid Limit:	NZS4402:1986:Test 2.2
Plastic Limit:	NZS4402:1986:Test 2.3
Plasticity Index:	NZS4402:1986:Test 2.4
Linear Shrinkage:	NZS4402:1986:Test 2.6

Test Pit / Borehole Number	Sample Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage (%)
TP003	BULK	0.25 – 0.80	53.3	104	42	62	22
TP004	BULK	2.00 – 2.50	47.3	83 ♦	51 ♦	32 ♦	21 ♦
TP005	BULK	2.10 – 2.40	46.9	75	50	25	18
TP006	BULK	1.80 – 2.10	39.3	68 ♦	44 ♦	24 ♦	16 ♦
TP008	BULK	2.30 – 2.70	43.5	74	36	38	18
TP010	BULK	1.50 – 1.80	43.0	74	33	41	19
TP014	BULK	1.70 – 2.80	51.6	97	46	51	21

♦ = The soil fraction passing a 425µm sieve was used for the liquid limit, plastic limit and linear shrinkage tests.

Test Pit / Borehole Number	Sample Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage (%)
TP017	BULK	2.20 – 2.50	45.1	77	48	29	16
TP019	BULK	0.25 – 0.75	33.3	79	34	45	20
TP025	BULK	0.70 – 1.50	40.2	83	37	46	20
TP029	BULK	1.80 – 2.40	32.6	82	27	55	23
TP031	BULK	0.60 – 1.80	49.3	66	33	33	14
TP032	BULK	0.70 – 2.00	53.6	109	33	76	26
BH007	BAG	2.00 – 2.50	74.3	100	42	58	not tested
BH008	BAG	8.00 – 8.50	92.6	131	42	89	not tested
BH015	BAG	8.50 – 9.00	58.9	85	25	60	not tested
BH016	BAG	11.00 – 11.50	83.8	108	33	75	not tested

The whole soil was used for all water content tests (the soils were in a natural state), and for the liquid limit, plastic limit and linear shrinkage tests without a diamond beside them. The soil fraction passing a 425µm sieve was used for the liquid limit, plastic limit and linear shrinkage tests with a diamond (◆) beside them. The soil was wet up and dried where required for the liquid limit, plastic limit and linear shrinkage tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit, test 2.3: plastic limit, and test 2.6: linear shrinkage are reported to the nearest whole number.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test. Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Signatory (Assistant Laboratory Manager)
Babbage Geotechnical Laboratory



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Tested By: JW/TH/CB/WC February 2021

Compiled By: JF 23/02/2021

Checked By: JF 23/02/2021

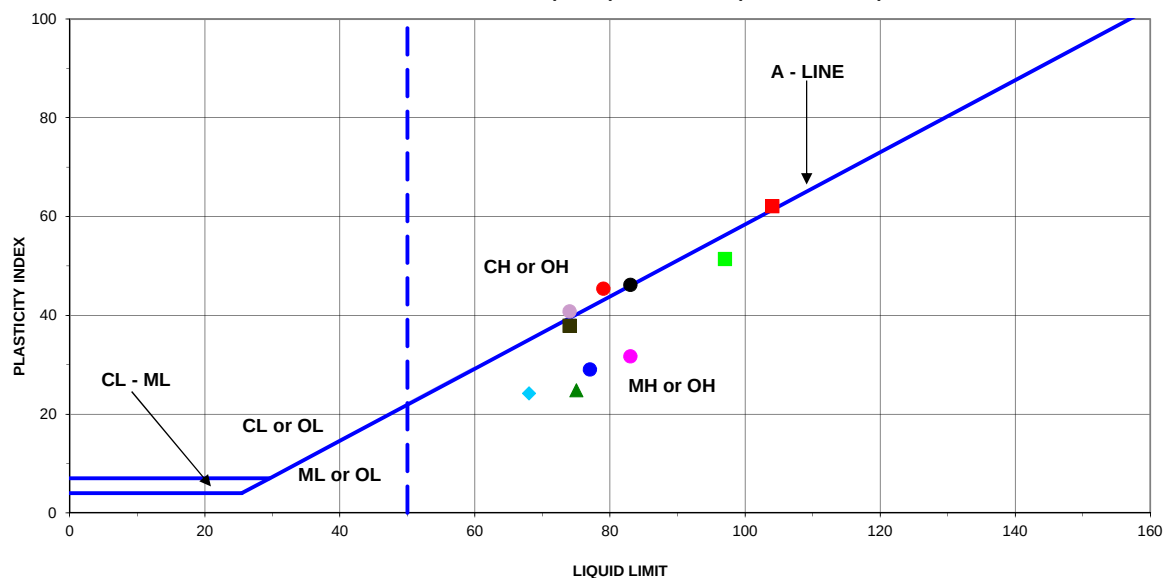
Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

SUMMARY OF TESTING

Borehole Number	Sample Number	Depth (m)	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification Based on USCS Chart Below
TP003	BULK	0.25 - 0.80	104	42	62	CH
TP004	BULK	2.00 - 2.50	83	51	32	MH
TP005	BULK	2.10 - 2.40	75	50	25	MH
TP006	BULK	1.80 - 2.10	68	44	24	MH
TP008	BULK	2.30 - 2.70	74	36	38	MH
TP010	BULK	1.50 - 1.80	74	33	41	CH
TP014	BULK	1.70 - 2.80	97	46	51	MH
TP017	BULK	2.20 - 2.50	77	48	29	MH
TP019	BULK	0.25 - 0.75	79	34	45	CH
TP025	BULK	0.70 - 1.50	83	37	46	CH / MH

The chart below & soil classification terminology is taken from ASTM D2487-17 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", January 2018, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) PLASTICITY (CASAGRANDE) CHART



■ TP003 / 0.25 - 0.80m ● TP004 / 2.00 - 2.50m ▲ TP005 / 2.10 - 2.40m ◆ TP006 / 1.80 - 2.10m ■ TP008 / 2.30 - 2.70m
● TP010 / 1.50 - 1.80m ■ TP014 / 1.70 - 2.80m ● TP017 / 2.20 - 2.50m ● TP019 / 0.25 - 0.75m ● TP025 / 0.70 - 1.50m

CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)

OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit

ML = SILT, low liquid limit

CL - ML = SILTY CLAY

CH = CLAY, high plasticity ('fat' clay)

OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit

MH = SILT, high liquid limit ('elastic silt')

DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Tested By: JW/TH/CB/WC February 2021

Compiled By: JF 23/02/2021

Checked By: JF 23/02/2021

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

SUMMARY OF TESTING

Borehole Number	Sample Number	Depth (m)	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification Based on USCS Chart Below
TP029	BULK	1.80 - 2.40	82	27	55	CH
TP031	BULK	0.60 - 1.80	66	33	33	CH / MH
TP032	BULK	0.70 - 2.00	109	33	76	CH
BH007	BAG	2.00 - 2.50	100	42	58	CH / MH
BH008	BAG	8.00 - 8.50	131	42	89	CH
BH015	BAG	8.50 - 9.00	85	25	60	CH
BH016	BAG	11.00 - 11.50	108	33	75	CH

The chart below & soil classification terminology is taken from ASTM D2487-17 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", January 2018, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.

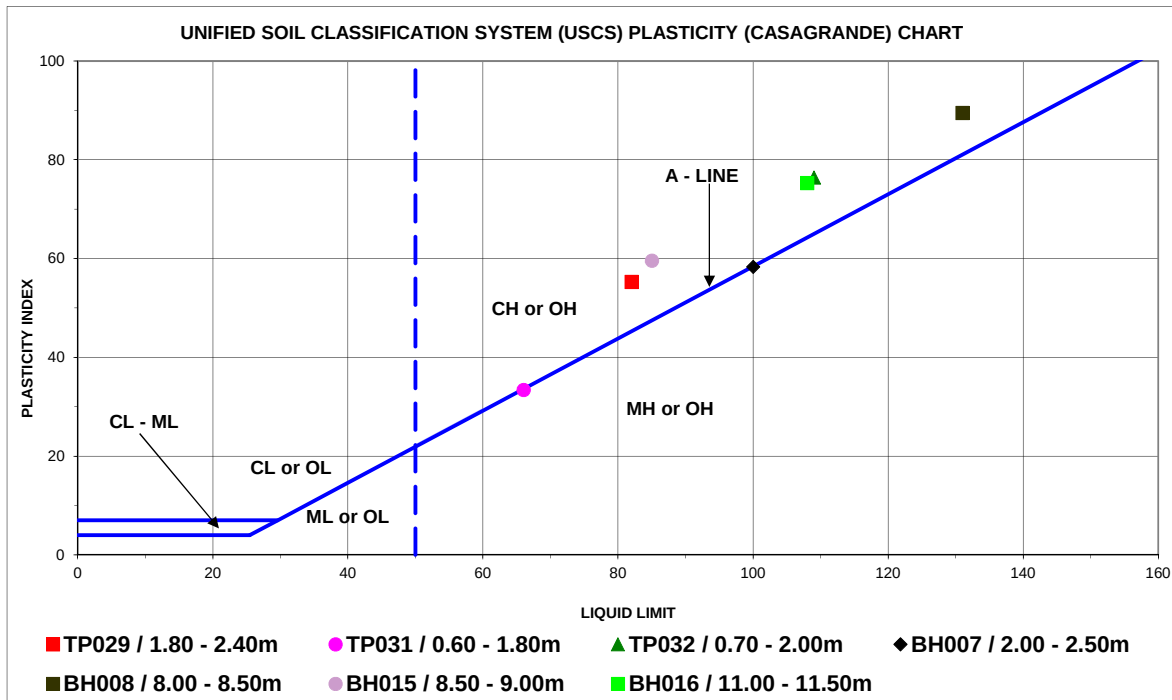


CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)

OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit

ML = SILT, low liquid limit

CL - ML = SILTY CLAY

CH = CLAY, high plasticity ('fat' clay)

OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit

MH = SILT, high liquid limit ('elastic silt')

Please reply to: W.E. Campton

Page 1 of 3

Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Job Number: 64121#L
BGL Registration Number: 2884
Checked by: WEC

Attention: **SAM MacKAY**

1st March 2021

ATTERBERG LIMITS & WATER CONTENT TESTING

Dear Sam,

Re: DRURY CENTRE PROJECT
Report Number: 64121#L/AL2

The following report presents the results of Atterberg Limits & water content testing at BGL of soil samples delivered to this laboratory on the 23rd February 2021. Test results are summarised below, with page 3 showing where the samples plot on the Unified Soil Classification System (Casagrande) Chart. Test standards used were:

Water Content:	NZS4402:1986:Test 2.1
Liquid Limit:	NZS4402:1986:Test 2.2
Plastic Limit:	NZS4402:1986:Test 2.3
Plasticity Index:	NZS4402:1986:Test 2.4

Borehole Number	Sample Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
BH014	BAG	18.00 – 18.50	96.3	130	38	92
BH014	BAG	33.00	52.0	limits not carried out		
BH016*	BAG	24.00 – 24.50	113	173 ♦	60 ♦	113 ♦
BH014	BAG	34.50	136	limits not carried out		

♦ = The soil fraction passing a 425µm sieve was used for the liquid limit, plastic limit and linear shrinkage tests.

***Organic soil**

The whole soil was used for all water content tests (the soils were in a natural state), and for the liquid limit and plastic limit tests for BH014 18.00 – 18.50m. The soil fraction passing a 0.425mm sieve was used for the liquid limit and plastic limit tests for sample BH016 24.00 – 24.50m. The soil was wet up and dried where required for the liquid limit and plastic limit tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit and test 2.3: plastic limit are reported to the nearest whole number.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Signatory (Assistant Laboratory Manager)
Babbage Geotechnical Laboratory



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

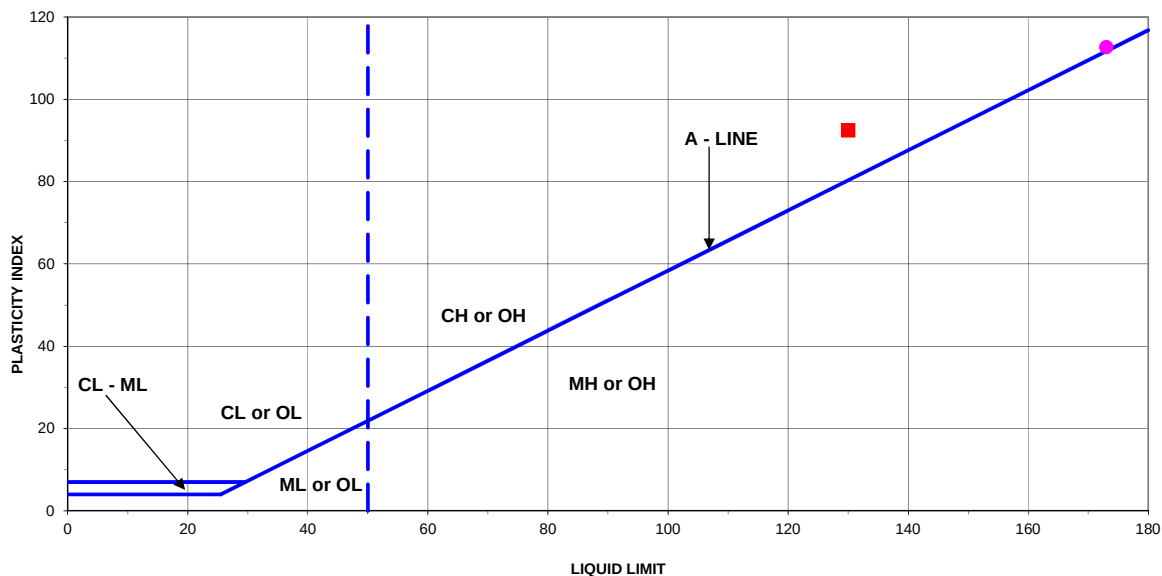
Tested By:	JW / CBH	February 2021
Compiled By:	JF	1/03/2021
Checked By:	JF	1/03/2021

SUMMARY OF TESTING

Borehole Number	Sample Number	Depth (m)	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification Based on USCS Chart Below
BH014	BAG	18.00 - 18.50	130	38	92	CH
BH016	BAG	24.00 - 24.50	173	60	113	OH - ORGANIC CLAY

The chart below & soil classification terminology is taken from ASTM D2487-17 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", January 2018, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) PLASTICITY (CASAGRANDE) CHART



■ BH014 / BAG / 18.00 - 18.50m ● BH016 / 24.00 - 24.50m

CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)

OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit

ML = SILT, low liquid limit

CL - ML = SILTY CLAY

CH = CLAY, high plasticity ('fat' clay)

OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit

MH = SILT, high liquid limit ('elastic silt')

Please reply to: W.E. Campton

Page 1 of 2

Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Job Number: 64121#L
BGL Registration Number: 2884
Checked by: WEC

Attention: **SAM MacKAY**

16th February 2021

SOIL WATER CONTENT TESTING

Dear Sam,

Re: DRURY CENTRE PROJECT
Report Number: 64121#LWC

The following page presents the results of water content testing at BGL of soil samples delivered to this laboratory on the 29th of January 2021. These samples were tested in accordance with the following standard:

Water Content: NZS4402:1986:Test 2.1

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Signatory (Assistant Laboratory Manager)
Babbage Geotechnical Laboratory



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

Please reply to: W.E. Campton

Page 1 of 3

Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: WEC

Attention: **CHRIS GOODIN**

27th September 2022

ATTERBERG LIMITS TESTING

Dear Sir,

Re: DRURY PRECINCT
Report Number: 64746#L/AL Drury Precinct

The following report presents the results of Atterberg Limits testing at BGL of soil samples delivered to this laboratory on the 9th of September 2022. Test results are summarised below, with page 3 showing where the samples plot on the Unified Soil Classification System (Casagrande) Chart.

Test standards used were:

Water Content:	NZS4402:1986:Test 2.1
Liquid Limit:	NZS4402:1986:Test 2.2
Plastic Limit:	NZS4402:1986:Test 2.3
Plasticity Index:	NZS4402:1986:Test 2.4

Borehole Number	Sample Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
Saddle Centre	1	0.50	58.6	90	46	44
Saddle Centre	2	1.00	42.8	89	42	47
Saddle with Slope	3	0.50	48.6	84	38	46
Saddle with Slope	4	1.00	64.3	105	60	45
SE Low	5	1.00	47.5	77 ♦	34 ♦	43 ♦
SE High	6	1.00	63.2	104	44	60

♦ = The soil fraction passing a 425 μ m sieve was used for the liquid limit and plastic limit tests.

The whole soils were used for the water content tests (the soils were in a natural state), and for the liquid limit and plastic limit tests without a diamond beside them. The soil fraction passing a 0.425mm sieve was used for the liquid limit and plastic limit tests with a diamond (◆) beside them. The soils were wet up and dried where required for the liquid limit and plastic limit tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit and test 2.3: plastic limit are reported to the nearest whole number.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Key Technical Person
Assistant Laboratory Manager
Babbage Geotechnical Laboratory



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

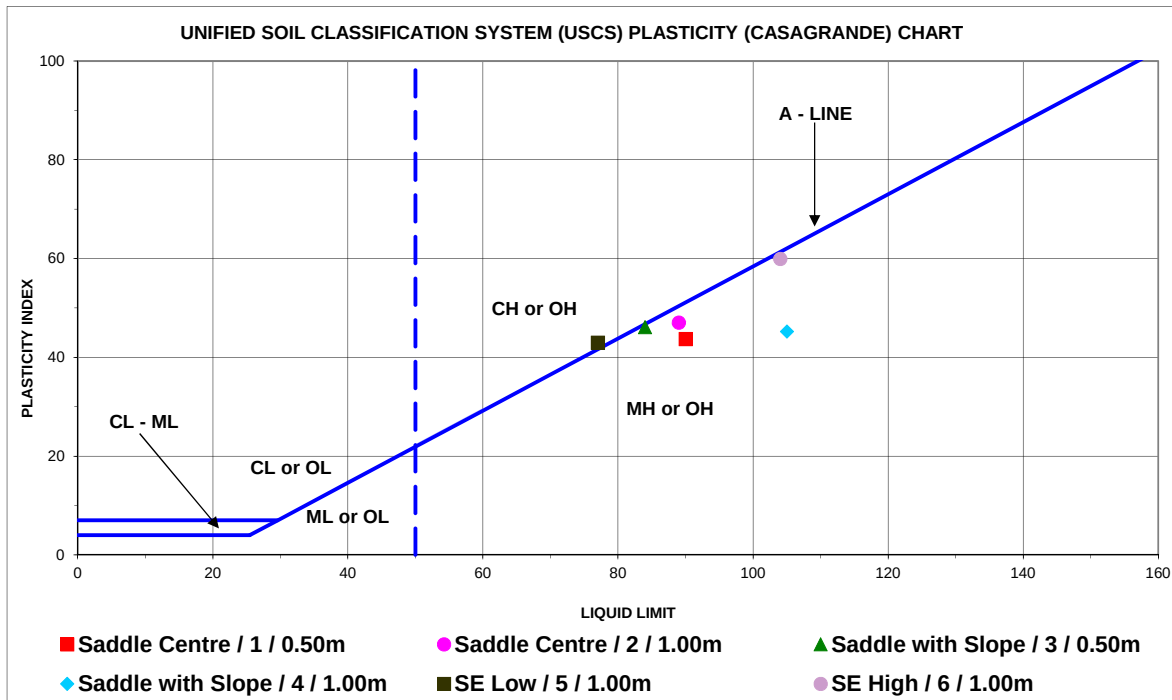
Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

Tested By:	JW	September 2022
Compiled By:	JF	27/09/2022
Checked By:	JF	27/09/2022

SUMMARY OF TESTING

Borehole Number	Sample Number	Depth (m)	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification Based on USCS Chart Below
Saddle Centre	1	0.50	90	46	44	MH
Saddle Centre	2	1.00	89	42	47	MH
Saddle with Slope	3	0.50	84	38	46	MH
Saddle with Slope	4	1.00	105	60	45	MH
SE Low	5	1.00	77	34	43	CH
SE High	6	1.00	104	44	60	MH

The chart below & soil classification terminology is taken from ASTM D2487-17^{e1} "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", April 2020, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.



CL = CLAY, low plasticity ('lean' clay)
 OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
 ML = SILT, low liquid limit
 CL - ML = SILTY CLAY
 CH = CLAY, high plasticity ('fat' clay)
 OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
 MH = SILT, high liquid limit ('elastic silt')

Please reply to: W.E. Campton

Page 1 of 7

Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Job Number: 64121#L
BGL Registration Number: 2884
Checked by: WEC

Attention: **SAM MacKAY**

23rd February 2021

DRY DENSITY / WATER CONTENT RELATIONSHIP (COMPACTION CURVE) TESTING

Dear Sam,

Re: DRURY CENTRE PROJECT
Report Number: 64121#L/CC

The following report presents the results of compaction curve testing at BGL of bulk soil samples delivered to this laboratory on the 29th of January 2021. Test results are summarised below, with the following pages showing graphs and detailed results.

A single shear vane test was carried out on each compacted sample while it was still in the proctor mould, and these results are included on the results tables and water content / density graphs. The shear vane results are included for your information only, and are not included in the IANZ endorsement for this report.

Test standards used were:

Water Content:	NZS4402:1986:Test 2.1
NZ Standard Compaction:	NZS4402:1986:Test 4.1.1
Vane Shear Strength:	NZ Geotechnical Society Guideline 2001

Sample Details	Maximum Dry Density (t/m ³)	Optimum Water Content (%)	Natural Water Content (%)
TP005 / BULK / 2.10 – 2.40m	1.17	44	46.9
SILT, minor fine gravel, moderately plastic, mottled grey & reddish brown.			

Note that sample descriptions above are not part of BGL IANZ Accreditation.

Sample Details	Maximum Dry Density (t/m ³)	Optimum Water Content (%)	Natural Water Content (%)
TP008 / BULK / 2.30 – 2.70m	1.24	40	43.5
SILT, clayey, minor fine gravel, moderately plastic, brown with orangish red mottles, slightly moist.			
TP017 / BULK / 2.20 – 2.50m	1.21	44	45.1
SILT, moderately plastic, orange, slightly moist, very friable			
TP023 / BULK / 0.75 – 3.00m	1.14	43	59.0
SILT to COARSE GRAVEL (completely to highly weathered basalt scoria), slightly plastic, red, grey & brown.			
TP025 / BULK / 1.50 – 3.00m	1.17	44	55.3
SILT, clayey, gravelly, slightly plastic, reddish brown, moist.			

Note that sample descriptions above are not part of BGL IANZ Accreditation.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 4.1.1: New Zealand Standard Compaction Test, maximum dry density is reported to the nearest 0.01t/m³, optimum water content is reported to the nearest 0.2% for values below 5%, to the nearest 0.5% for values from 5 to 10%, and to the nearest whole number for values greater than 10%.

For calculating the air voids percentages a solid density of 2.65t/m³ was assumed for TP005, a solid density of 2.61t/m³ was assumed for TP008, a solid density of 2.72t/m³ was assumed for TP017, a solid density of 2.76t/m³ was assumed for TP023, and a solid density of 2.71t/m³ was assumed for TP025. Please note that these assumed values are not part of the IANZ endorsement for this report.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test. Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Signatory (Assistant Laboratory Manager)
Babbage Geotechnical Laboratory



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

Determination of the Dry Density / Water Content Relationship by Standard Compaction

Test Method: NZS4402: 1986: Test 4.1.1

Tested By:	WEC / JW	Feb 2021
Compiled By:	WEC	23/02/2021
Checked By:	JF	23/02/2021

Sample No: TP005 / BULK

Sample Depth: 2.10 - 2.40m

Sample History: Air-dried and wetted from natural water content
Compaction Used: New Zealand Standard Compaction
Test Performed On: Whole Soil / Fraction Passing the 19mm Sieve
Solid Density of Soil Particles: 2.65 t/m³ (measured / assumed)

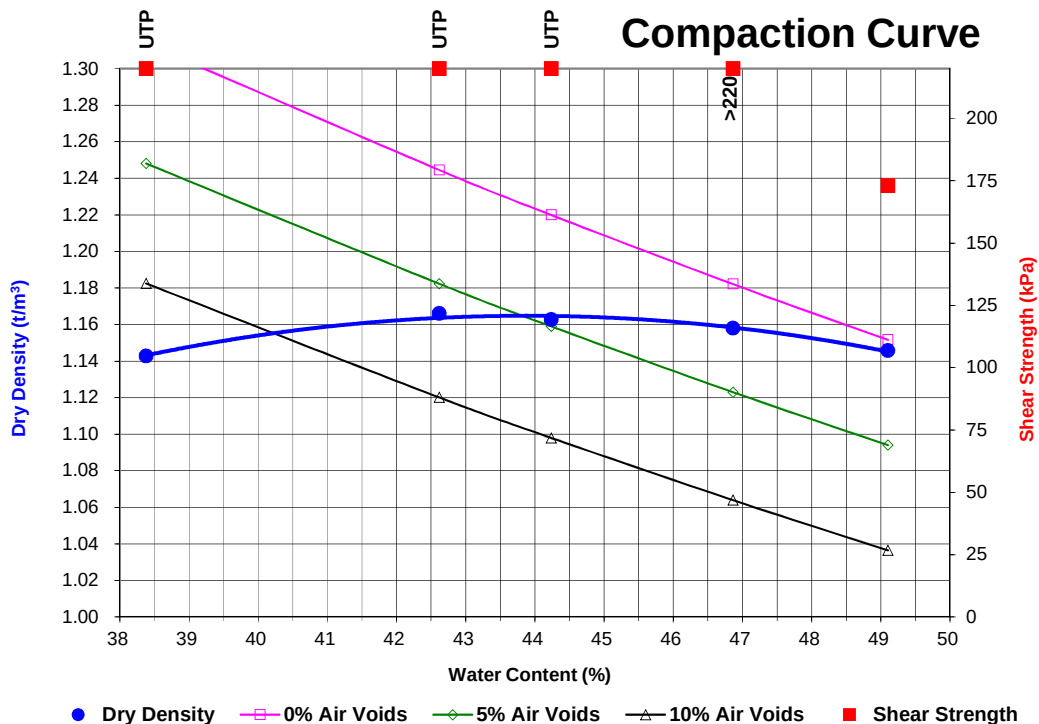
Natural Water Content (%): 46.9

TEST RESULTS

Water Content (%)	38.4	42.6	44.2	46.9	49.1
Bulk Density (t/m ³)	1.58	1.66	1.68	1.70	1.71
Dry Density (t/m ³)	1.14	1.17	1.16	1.16	1.15
Air Voids (%)	13.0	6.3	4.7	2.0	0.5
Shear Strength (kPa)	UTP*	UTP*	UTP*	>220	110

*UTP = unable to penetrate sample with the shear vane.

Maximum Dry Density: 1.17 t/m³ **Optimum Water Content:** 44 %



Determination of the Dry Density / Water Content Relationship by Standard Compaction

Test Method: NZS4402: 1986: Test 4.1.1

Tested By:	WEC / JW	Feb 2021
Compiled By:	WEC	23/02/2021
Checked By:	JF	23/02/2021

Sample No: TP008 / BULK

Sample Depth: 2.30 - 2.70m

Sample History: Air-dried and wetted from natural water content
Compaction Used: New Zealand Standard Compaction
Test Performed On: Whole Soil / Fraction Passing the 19mm Sieve
Solid Density of Soil Particles: 2.61 t/m³ (measured / assumed)

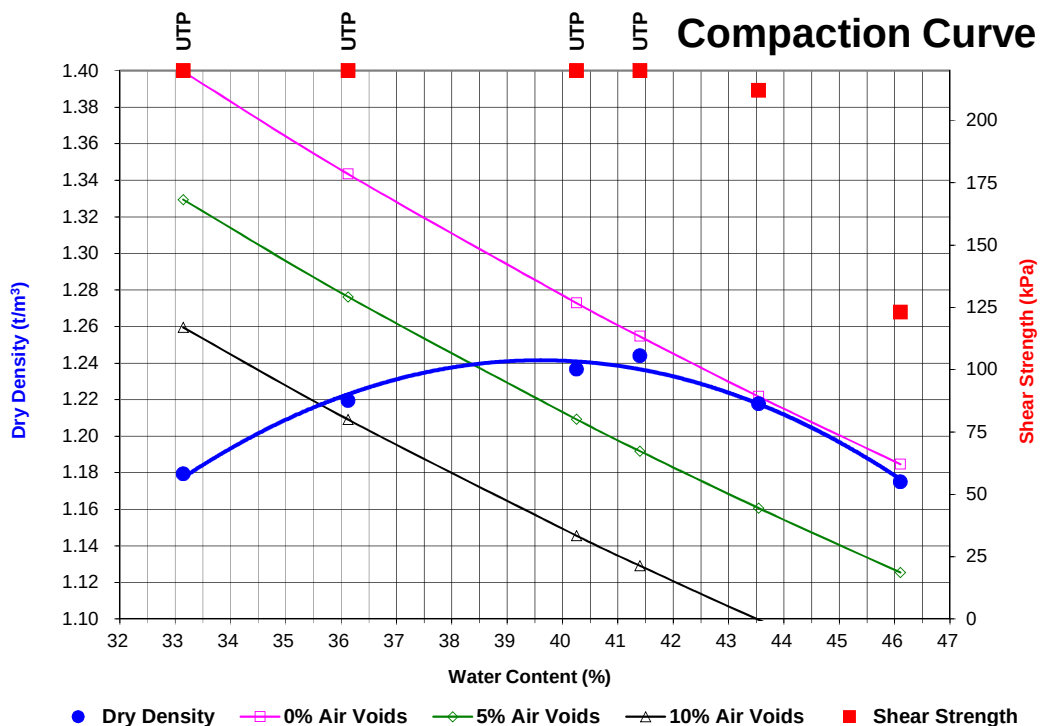
Natural Water Content (%): 43.5

TEST RESULTS

Water Content (%)	33.1	36.1	40.2	41.4	43.5	46.1
Bulk Density (t/m ³)	1.57	1.66	1.73	1.76	1.75	1.72
Dry Density (t/m ³)	1.18	1.22	1.24	1.24	1.22	1.17
Air Voids (%)	15.7	9.2	2.9	0.8	0.3	0.8
Shear Strength (kPa)	UTP*	UTP*	UTP*	UTP*	212	123

*UTP = unable to penetrate sample with the shear vane.

Maximum Dry Density: 1.24 t/m³ **Optimum Water Content:** 40 %



Determination of the Dry Density / Water Content Relationship by Standard Compaction

Test Method: NZS4402: 1986: Test 4.1.1

Tested By:	WEC / CBH	Feb 2021
Compiled By:	WEC	23/02/2021
Checked By:	JF	23/02/2021

Sample No: TP017 / BULK

Sample Depth: 2.20 - 2.50m

Sample History: Air-dried and wetted from natural water content
Compaction Used: New Zealand Standard Compaction
Test Performed On: Whole Soil / Fraction Passing the 19mm Sieve
Solid Density of Soil Particles: 2.72 t/m³ (measured / assumed)

Natural Water Content (%): 45.1

TEST RESULTS

Water Content (%)	40.8	43.3	45.1	47.9	50.4
Bulk Density (t/m ³)	1.66	1.73	1.75	1.73	1.71
Dry Density (t/m ³)	1.18	1.21	1.21	1.17	1.13
Air Voids (%)	8.4	3.4	1.0	1.1	1.1
Shear Strength (kPa)	UTP*	>220	>220	164	116

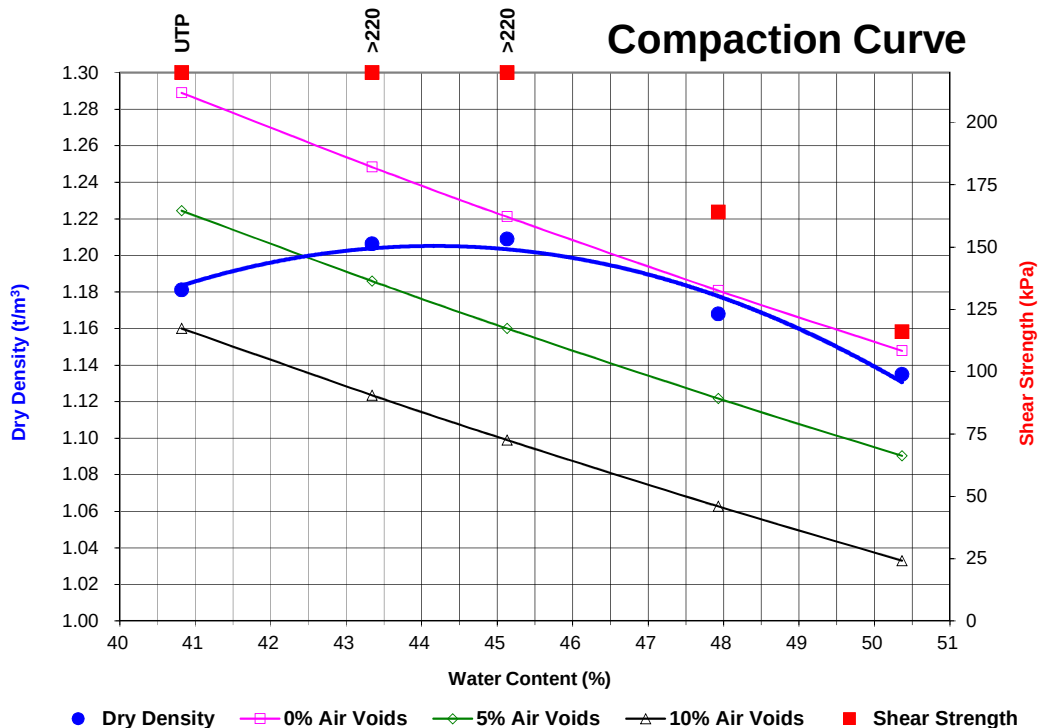
*UTP = unable to penetrate sample with the shear vane.

Maximum Dry Density:

1.21 t/m³

Optimum Water Content:

44 %



Determination of the Dry Density / Water Content Relationship by Standard Compaction

Test Method: NZS4402: 1986: Test 4.1.1

Tested By:	WEC / CBH	Feb 2021
Compiled By:	WEC	23/02/2021
Checked By:	JF	23/02/2021

Sample No: TP023 / BULK

Sample Depth: 0.75 - 3.00m

Sample History: Air-dried from natural water content
Compaction Used: New Zealand Standard Compaction
Test Performed On: Whole Soil / Fraction Passing the 19mm Sieve
Solid Density of Soil Particles: 2.76 t/m³ (measured / assumed)

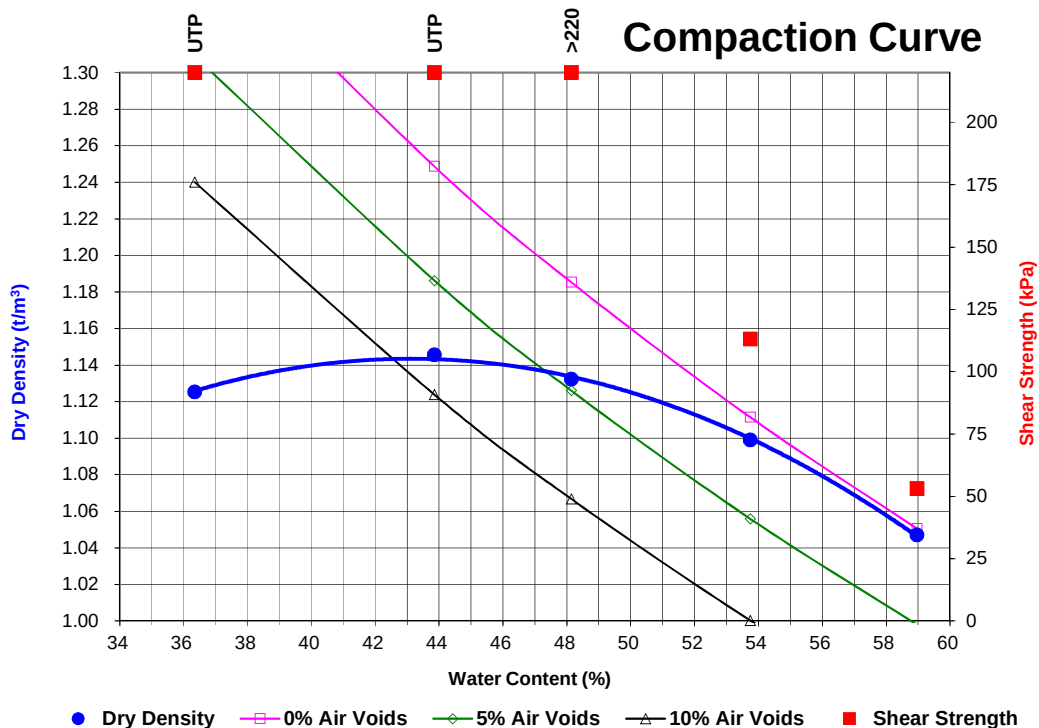
Natural Water Content (%): 59.0

TEST RESULTS

Water Content (%)	36.3	43.9	48.1	53.7	59.0
Bulk Density (t/m ³)	1.53	1.65	1.68	1.69	1.66
Dry Density (t/m ³)	1.13	1.15	1.13	1.10	1.05
Air Voids (%)	18.3	8.3	4.5	1.1	0.3
Shear Strength (kPa)	UTP*	UTP*	>220	113	53

*UTP = unable to penetrate sample with the shear vane.

Maximum Dry Density: 1.14 t/m³ **Optimum Water Content:** 43 %



Determination of the Dry Density / Water Content Relationship by Standard Compaction

Test Method: NZS4402: 1986: Test 4.1.1

Tested By:	WEC / JW	Feb 2021
Compiled By:	WEC	23/02/2021
Checked By:	JF	23/02/2021

Sample No: TP025 / BULK

Sample Depth: 1.50 - 3.00m

Sample History: Air-dried from natural water content
Compaction Used: New Zealand Standard Compaction
Test Performed On: Whole Soil / Fraction Passing the 19mm Sieve
Solid Density of Soil Particles: 2.71 t/m³ (measured / assumed)

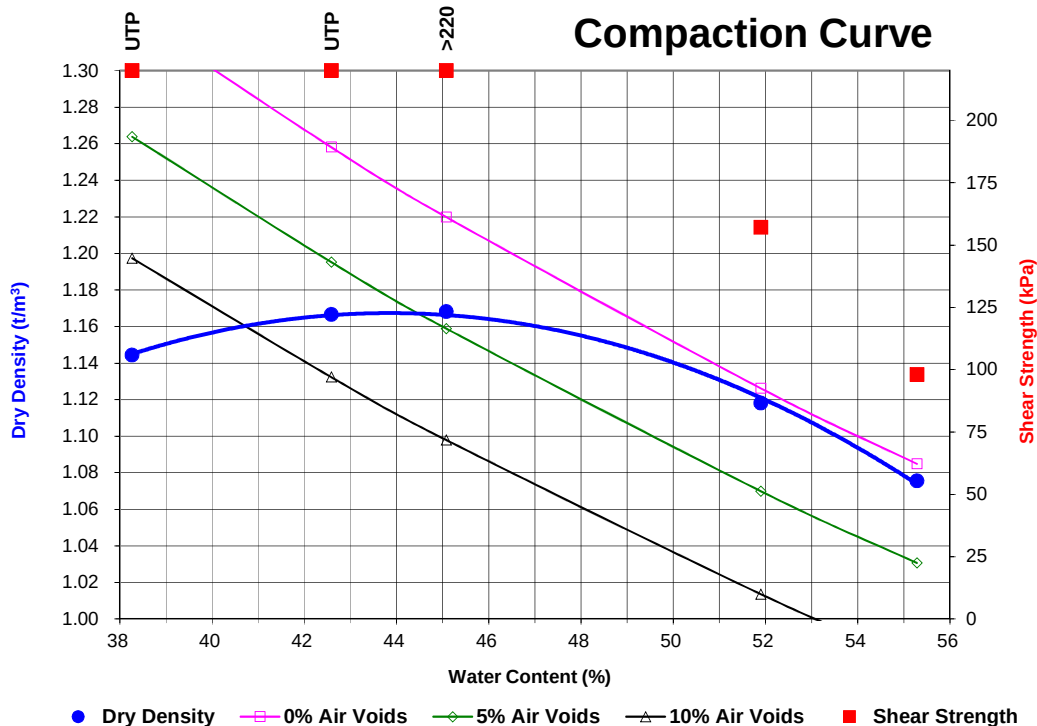
Natural Water Content (%): 55.3

TEST RESULTS

Water Content (%)	38.3	42.6	45.1	51.9	55.3
Bulk Density (t/m ³)	1.58	1.66	1.69	1.70	1.67
Dry Density (t/m ³)	1.14	1.17	1.17	1.12	1.08
Air Voids (%)	14.0	7.3	4.2	0.7	0.9
Shear Strength (kPa)	UTP*	UTP*	>220	157	98

*UTP = unable to penetrate sample with the shear vane.

Maximum Dry Density: 1.17 t/m³ **Optimum Water Content:** 44 %



APPENDIX E: FIELD TEST DATA

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417233m Northing: 774233m Reduced level: N/A	Date started: 23/08/2023 Date completed: 23/08/2023 Inclination: -90° Azimuth: N/A	Logged by: DB Input by: GMR Checked by: BGW Reviewed by: PK
--	---	---	--

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
	x x x	T	0m: Organic SILT; dark brown. Firm, moist, low plasticity. [TOPSOIL]		0m: PLACED TOPSOIL	
	x x x		0.15m: SILT with minor clay and gravel; reddish orange. Very stiff, moist, low plasticity. [FILL]	0.3m: ISHSV UTP	0.15m: FILL SOURCED FROM LOCAL WEATHERED BASALTIC VOLCANIC DEPOSITS	
			0.5m: ...dark orange, flecked pink and white.	0.6m: ISHSV 108/38 kPa		
1		FEc	0.9m: Silty CLAY with trace gravel; brown, mottled orange. Very stiff, moist, high plasticity. Gravel, fine, subrounded.	0.9m: ISHSV UTP		1
			1.1m: Clayey SILT with trace gravel; light reddish brown. Very stiff, moist, low plasticity. Gravel, fine, subrounded.	1.2m: ISHSV UTP		
			1.5m: SILT with minor clay; orange brown. Very stiff, moist, low plasticity.	1.5m: ISHSV 151/86 kPa		
			1.7m: Silty CLAY; brownish orange. Very stiff, moist, high plasticity.			
2	x x x	VRb	1.8m: SILT with minor clay, trace gravel and organics; greyish orange, speckled brown. Very stiff, moist, low plasticity. Gravel, fine, rounded. Organics, disseminated, fibrous. [COMPLETELY WEATHERED BASALT LAVA]	1.8m: ISHSV 173/84 kPa	1.8m: SOUTH AUCKLAND VOLCANIC FIELD	2
			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 189+ kPa		
3						3
4						4

REMARKS: 1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.	Water Level Readings: Date Time Hole Depth Water Level (1) 23/08/23 10:30 m Hole Dry
HSV Serial No: 3178 Correction Factor: 1.351	

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417256m Northing: 774182m Reduced level: N/A	Date started: 23/08/2023 Date completed: 23/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
--	---	---	---

Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
	x x	T	0m: SILT with minor clay; dark greyish brown. Firm, moist, low plasticity. [TOPSOIL]		0m: TOPSOIL	
	x x		0.15m: SILT with minor clay and trace gravel; brownish orange. Very stiff, moist, low plasticity. Gravel, fine, rounded. [FILL]	0.3m: ISHSV 189+ kPa	0.15m: FILL SOURCED FROM LOCAL WEATHERED BASALTIC VOLCANIC DEPOSITS	
			0.4m:...mottled pink and white.	0.6m: ISHSV 189+ kPa		
			0.7m: Silty CLAY; brownish orange, mottled pink and white. Very stiff, moist, high plasticity.	0.9m: ISHSV 170/89 kPa		
1			0.9m: SILT with some clay; reddish orange, speckled white. Very stiff, moist, high plasticity.	1.2m: ISHSV 168/130 kPa		1
			1m:...mottled reddish pink.			
			1.1m: Silty CLAY; brownish orange. Very stiff, moist, high plasticity.	1.5m: ISHSV 189+ kPa		
			1.3m: SILT with some clay; reddish orange. Very stiff, moist, low plasticity.	1.8m: ISHSV 189+ kPa		
			1.5m: CLAY with some silt; light brown. Very stiff, moist, high plasticity.			
			1.6m to 1.7m:...pink, mottled white.			
2			1.9m to 2m:...reddish pink, speckled white.			2
			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 181/81 kPa		
3						3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 23/08/23 13:00 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417251m Northing: 774115m Reduced level: N/A	Date started: 23/08/2023 Date completed: 23/08/2023 Inclination: -90° Azimuth: N/A	Logged by: CSR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
0	x x x	T	0m: SILT with some clay and minor gravel; brown. Firm, moist, low plasticity. Gravel, fine, subrounded. [TOPSOIL]		0m: PLACED TOPSOIL	0
0.2	x x x		0.2m: Clayey SILT with trace sand; yellowish brown, mottled grey, pink and green. Hard, moist, low plasticity. Sand, fine. [COMPLETELY WEATHERED ASH]	0.3m: ISHSV UTP	0.2m: SOUTH AUCKLAND VOLCANIC FIELD	0.2
0.35	x x x		0.35m: ...trace gravel, fine, grey, subrounded, highly weathered.			0.35
0.4	x x x		0.4m: ...grey, mottled pink.			0.4
0.58	x x x		0.58m: SILT with some clay; light brownish orange. Hard, moist, low plasticity.	0.6m: ISHSV UTP		0.58
1	x x x			0.9m: ISHSV UTP		1
1	x x x		1m: ...mottled white; trace gravel, fine, grey, subrounded, completely weathered.			1
1.05	x x x		1.05m: Silty CLAY; light yellow. Hard, moist, high plasticity.	1.2m: ISHSV UTP		1.05
1.35	x x x		1.35m: SILT with some clay; orange brown. Hard, moist, high plasticity.			1.35
1.6	x x x		1.6m: Clayey SILT; light orange brown, mottled white. Hard, moist, low plasticity.	1.5m: ISHSV 209+/78 kPa		1.6
1.9	x x x		1.9m: SILT with some clay; orange brown. Hard, moist, low plasticity.			1.9
2	x x x		Hand Auger terminated at 2m (Target Depth)			2
3						3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 23/08/23 14:00 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417214m Northing: 774049m Reduced level: N/A	Date started: 23/08/2023 Date completed: 23/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		T	0m: Organic CLAY; dark brown. Stiff, moist, low plasticity. [TOPSOIL]		0m: PLACED TOPSOIL	
			0.3m: Clayey SILT with trace gravel; reddish orange, speckled white. Hard, moist, high plasticity. Gravel, fine, rounded, completely weathered volcanics. [FILL]	0.3m: ISHSV UTP	0.3m: FILL SOURCED FROM LOCAL WEATHERED BASALTIC VOLCANIC DEPOSITS	
				0.6m: ISHSV UTP		
1			0.8m: CLAY with some silt and trace fibrous organics; brownish orange. Hard, moist, high plasticity. Organics, fibrous rootlets.	0.9m: ISHSV UTP		1
		FEC	1.4m to 1.8m:...trace fine gravel, rounded, potential limonite?	1.2m: ISHSV 176/86 kPa		
			1.5m:...reddish pink, mottled white.	1.5m: ISHSV UTP		
2			1.8m to 2m:...trace fine gravel, subrounded, completely weathered to slightly weathered volcanics.	1.8m: ISHSV UTP		2
			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 189+ kPa		
3						3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 23/08/23 14:00 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417150m Northing: 773986m Reduced level: N/A	Date started: 30/08/2023 Date completed: 30/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		T	0m: Organic SILT; dark brownish black. Stiff, moist, low plasticity. [TOPSOIL]		0m: PLACED TOPSOIL	
			0.2m: Clayey SILT with minor sand; brownish orange, speckled white. Hard, moist, low plasticity. Sand, fine. [FILL]	0.3m: ISHSV UTP	0.2m: FILL SOURCED FROM LOCAL WEATHERED BASALTIC VOLCANIC DEPOSITS	
			0.3m: Clayey SILT with trace sand; brownish orange. Hard, moist, high plasticity. Sand, fine.			
			0.4m:...trace fine to medium gravel, subrounded, pink, completely weathered volcanics.	0.6m: ISHSV UTP		
1			0.65m: Silty CLAY with trace gravel; reddish orange. Hard, moist, high plasticity. Gravel, fine, subrounded to rounded, highly weathered volcanics.	0.9m: ISHSV UTP		1
		FEC	1.1m:...orange brown, mottled pink and white.	1.2m: ISHSV UTP		
			1.2m: SILT with some clay and minor sand; reddish brown. Hard, moist, low plasticity. Sand, fine.			
			1.4m: CLAY with some silt; reddish orange. Hard, moist, high plasticity.	1.5m: ISHSV UTP		
2			1.5m:...trace fine to medium gravel, subrounded to subangular, completely weathered volcanics.	1.8m: ISHSV UTP		2
			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV UTP		
3						3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 30/08/23 11:00 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417108m Northing: 774090m Reduced level: N/A	Date started: 30/08/2023 Date completed: 30/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		T	0m: Organic SILT; dark brownish grey. Firm, moist, low plasticity. Organics, fibrous rootlets. [TOPSOIL]		0m: PLACED TOPSOIL	
1		FEc	0.25m: CLAY with some silt; reddish orange, mottled grey. Very stiff, moist, high plasticity. [FILL] 0.85m to 0.9m: ...trace dark brown, fibrous rootlet organics. 1.05m to 1.8m: ...trace fine gravel, grey, subrounded to subangular, completely weathered volcanics.	0.3m: ISHSV 189+ kPa 0.6m: ISHSV 170/78 kPa 0.9m: ISHSV 119/41 kPa 1.2m: ISHSV 189+ kPa 1.5m: ISHSV 187/59 kPa	0.25m: FILL SOURCED FROM LOCAL WEATHERED BASALTIC VOLCANIC DEPOSITS	1
2		VRb	1.8m: Silty CLAY; brownish orange. Very stiff, moist, high plasticity. [COMPLETELY WEATHERED BASALT LAVA?]	1.8m: ISHSV 149/73 kPa	1.8m: SOUTH AUCKLAND VOLCANIC FIELD	2
3			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 122/76 kPa		3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
 (1) 30/08/23 14:30 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417176m Northing: 774119m Reduced level: N/A	Date started: 30/08/2023 Date completed: 30/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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[illegible]

Water Level Readings:
Date Time | Hole Depth | Water Level
 (1) 30/08/23 15:00 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417157m Northing: 774151m Reduced level: N/A	Date started: 30/08/2023 Date completed: 30/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
0		T	0m: Organic SILT with minor clay; dark brown. Firm, moist, low plasticity. Organics, rootlets, disseminated. [TOPSOIL]		0m: PLACED TOPSOIL	0
0.25			0.25m: Clayey SILT; pinkish orange. Hard, moist, low plasticity. [FILL]	0.3m: ISHSV UTP	0.25m: FILL SOURCED FROM LOCAL WEATHERED BASALTIC VOLCANIC DEPOSITS	0.25
0.75			0.75m: Silty CLAY; yellowish brown, mottled grey. Hard, moist, high plasticity.	0.6m: ISHSV UTP		0.75
0.95			0.95m:....minor fine gravel, grey, rounded, moderately weathered volcanics.	0.9m: ISHSV UTP		0.95
1			1m to 1.3m:....streaked pink, red, and white.	1.2m: ISHSV 97/57 kPa		1
1.2			1.2m:....stiff.	1.5m: ISHSV 178/57 kPa		1.2
1.4			1.4m: Silty CLAY with trace gravel; brownish orange. Very stiff, moist, high plasticity. Gravel, fine, grey, subrounded to rounded, completely weathered volcanics.	1.8m: ISHSV 141/57 kPa		1.4
2			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 149/73 kPa		2
3						3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 30/08/23 15:30 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417157m Northing: 774213m Reduced level: N/A	Date started: 31/08/2023 Date completed: 31/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
		T FEc VAa	0m: SILT with some organics; dark brown. Stiff, moist, low plasticity. [TOPSOIL] 0.15m: Silty CLAY with trace gravel; dark brownish orange, streaked pink and white. Hard, moist, high plasticity. Gravel, fine, grey, subrounded, completely weathered volcanics. [FILL] 1.5m: Silty CLAY with trace gravel; brownish orange. Hard, moist, high plasticity. Gravel, fine, subrounded. [COMPLETELY WEATHERED ASH] 1.8m: ...very stiff.	 0.3m: ISHSV UTP 0.6m: ISHSV UTP 0.9m: ISHSV UTP 1.2m: ISHSV UTP 1.5m: ISHSV UTP 1.8m: ISHSV 189+ kPa	0m: PLACED TOPSOIL 0.15m: FILL SOURCED FROM LOCAL WEATHERED BASALTIC VOLCANIC DEPOSITS 1.5m: SOUTH AUCKLAND VOLCANIC FIELD	
1						1
2						2
3			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 189+ kPa		3
4						4

REMARKS: 1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.	Water Level Readings: Date Time Hole Depth Water Level No water level recorded
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BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417094m Northing: 774161m Reduced level: N/A	Date started: 31/08/2023 Date completed: 31/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
0	x	T	0m: Organic SILT; dark brown. Stiff, moist, high plasticity. Organics, rootlets. [TOPSOIL]		0m: PLACED TOPSOIL	0
0.08	x		0.08m: CLAY with some silt; brownish orange, mottled grey. Very stiff, moist, high plasticity. [COMPLETELY WEATHERED BASALT LAVA?]	0.3m: ISHSV 227+ kPa	0.08m: SOUTH AUCKLAND VOLCANIC FIELD	0.08
0.5	x	VRb	0.5m: Silty CLAY with trace gravel; light brownish grey. Very stiff, moist, high plasticity. Gravel, fine, grey, volcanics.	0.6m: ISHSV 179/88 kPa		0.5
0.6	x		0.6m: CLAY with some silt and trace gravel; brownish orange. Very stiff, moist, high plasticity. Gravel, fine, grey, subrounded, highly weathered to completely weathered volcanics.	0.9m: ISHSV 227+ kPa		0.6
1	x		1m: Clayey SILT; yellowish brown, streaked grey. Very stiff, moist, high plasticity.	1.2m: ISHSV 156/62 kPa		1
1.3	x	VAa	1.3m: CLAY with some silt; brownish orange. Hard, moist, high plasticity. [COMPLETELY WEATHERED ASH OR TUFF]	1.5m: ISHSV 227+ kPa		1.3
1.8	x			1.8m: ISHSV 221/55 kPa		1.8
2			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 227+ kPa		2
3						3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417083m Northing: 774213m Reduced level: N/A	Date started: 31/08/2023 Date completed: 31/08/2023 Inclination: -90° Azimuth: N/A	Logged by: GMR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
0		T	0m: Organic SILT with minor clay; dark brown. Stiff, moist, high plasticity. Organics, rootlets, disseminated. [TOPSOIL]	0.3m: ISHSV 227+ kPa 0.6m: ISHSV UTP 0.9m: ISHSV 130/23 kPa 1.2m: ISHSV 127/42 kPa 1.5m: ISHSV 130/49 kPa 1.8m: ISHSV 208/65 kPa	0m: PLACED TOPSOIL	0
0.15		VRb	0.15m: Clayey SILT; brownish orange, streaked grey. Very stiff, moist, high plasticity. [COMPLETELY WEATHERED BASALT LAVA?]		0.15m: SOUTH AUCKLAND VOLCANIC FIELD	0.15
0.3						0.3
0.6						0.6
0.9						0.9
1.2						1.2
1.5						1.5
1.6			1.6m: Silty CLAY; light orange. Hard, moist, high plasticity.			1.6
1.8						1.8
2						2
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BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417071m Northing: 774277m Reduced level: N/A	Date started: 31/08/2023 Date completed: 31/08/2023 Inclination: -90° Azimuth: N/A	Logged by: CSR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
0	x	T	0m: SILT with some clay and trace organics; brown. Firm, moist, low plasticity. Organics, rootlets. [TOPSOIL]		0m: PLACED TOPSOIL	0
0.1	x		0.1m: Clayey SILT with trace gravel and sand; brownish orange. Very stiff, moist, low plasticity. Gravel, fine, subrounded to subangular. Sand, fine, mica. [COMPLETELY WEATHERED BASALT LAVA]		0.1m: SOUTH AUCKLAND VOLCANIC FIELD	0.1
0.55	x		0.55m:...minor gravel, fine, subrounded to subangular, completely weathered volcanics.	0.3m: ISHSV 189+ kPa		0.55
1	x			0.6m: ISHSV 189+ kPa		1
1.3	x		1.3m:...minor gravel and sand; reddish orange.	0.9m: ISHSV 176/62 kPa		1.3
1.75	x		1.75m:...trace fine to medium, white feldspar gravel, subrounded.	1.2m: ISHSV UTP		1.75
2	x			1.5m: ISHSV 173/68 kPa		2
	x			1.8m: ISHSV 149/122 kPa		
2	x		Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 189+ kPa		2
3						3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 31/08/23 14:00 | m | Hole Dry

BOREHOLE INFORMATION Method: Hand Auger Equipment: 50mm Hand Auger Contractor: Aurecon	CO-ORDINATES: Mount Eden Circuit 2000 Easting: 417065m Northing: 774321m Reduced level: N/A	Date started: 31/08/2023 Date completed: 31/08/2023 Inclination: -90° Azimuth: N/A	Logged by: CSR Input by: GMR Checked by: BGW Reviewed by: PK
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Depth (m)	Graphic Log	Layer Code	Soil Description	Testing	Additional Observations	Depth (m)
1		T VRb VAa	0m: SILT with some clay and trace organics; brown. Firm, moist, high plasticity. Organics, rootlets. [TOPSOIL] 0.1m: Clayey SILT with trace gravel and sand; orange, mottled brownish red. Very stiff, moist, low plasticity. Gravel, grey, subrounded. Sand, fine, mica. [COMPLETELY WEATHERED BASALT LAVA] 0.55m: Silty CLAY with trace gravel and sand; light brownish orange, mottled pink. Very stiff, moist, high plasticity. Gravel, grey, subrounded to subangular. Sand, fine, mica. 0.9m: ...mottled orange and pink. 1.1m: CLAY with some silt, trace gravel and sand; grey, mottled pink and orange. Very stiff, moist, high plasticity. Gravel, fine, subangular, completely weathered volcanics. Sand, fine, mica. [Fine to coarse ash or completely weathered tuff?] 1.3m: ...sand absent; brownish orange.	0.3m: ISHSV 184/49 kPa 0.6m: ISHSV 189+ kPa 0.9m: ISHSV 173/65 kPa 1.2m: ISHSV 82/35 kPa 1.5m: ISHSV 189+ kPa 1.8m: ISHSV 189+ kPa	0m: PLACED TOPSOIL 0.1m: SOUTH AUCKLAND VOLCANIC FIELD	1
2		VRb VAa	1.5m: CLAY with some silt; brownish orange. Firm, moist, high plasticity. [COMPLETELY WEATHERED BASALT LAVA] 1.53m: Clayey SILT with trace gravel; orange, mottled white, pink, and dark grey. Very stiff, moist, low plasticity. Gravel, fine to medium, subrounded, highly weathered, vesicular basalt.	1.5m: ISHSV 189+ kPa 1.8m: ISHSV 189+ kPa		2
3			Hand Auger terminated at 2m (Target Depth)	2m: ISHSV 189+ kPa		3
4						4

REMARKS:
1) Hand auger location co-ordinates taken on personal GPS device and converted from WGS84 to Mt Eden Circuit 2000. Accuracy +/- 5m.

Water Level Readings:
Date Time | Hole Depth | Water Level
(1) 31/08/23 15:00 | m | Hole Dry

Client: Woods Group
Project: 133 Fitzgerald Road
Site Location: Drury
Project No.: AKS2023-0072
Date: 19/04/2024



Sheet 1 of 1

Survey Source: Hand Held GPS

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - HA04

Client: Woods Group
Project: 133 Fitzgerald Road
Site Location: Drury
Project No.: AKS2023-0072
Date: 19/04/2024



Borehole Location: Refer to Site Plan

Logged by: AZ

Checked by: SA

Scale: 1:25

Sheet 1 of 1

Position: 417117.3mE; 774415.9mN

Projection: NZTM

Datum: NZVD2016

Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Dynamic Cone Penetrometer (Blows/100mm)		
	Depth	Type & Results							5	10	15
	0.3	Peak = >193kPa				CL: Silty CLAY with some organic silt: brown mottled black. Low plasticity. (Topsoil) ... at 0.20m, becoming red, contains minor sand.					
	0.6	Peak = >193kPa				CL: Silty CLAY: orange-brown mottled orange. Low plasticity. (Fill)					
	0.9	Peak = UTP				CL: Silty CLAY: light brown streaked orange. (Auckland Volcanics)					
	1.2	Peak = UTP		1		CL: Silty CLAY: orange streaked red. Low plasticity. (Auckland Volcanics) ... at 1.20m, becoming red mottled orange.	M	H			
	1.6	Peak = UTP				... at 1.50m, becoming light brown mottled red.					
	2.0	Peak = UTP		2		... at 2.00m, becoming red mottled light brown.					
	2.4	Peak = >193kPa				Borehole terminated at 2.4 m					
				3							
				4							
				5							

Termination Reason: Target Depth Reached

Shear Vane No: 2323

DCP No:

Remarks: Groundwater not encountered.

Client: Woods Group
Project: 133 Fitzgerald Road
Site Location: Drury
Project No.: AKS2023-0072
Date: 19/04/2024



Sheet 1 of 1

Survey Source: Hand Held GPS

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - HA06

Client: Woods Group
Project: 133 Fitzgerald Road
Site Location: Drury
Project No.: AKS2023-0072
Date: 23/04/2024
Borehole Location: Refer to Site Plan

PRELIMINARY



Scale: 1:25 Sheet 1 of 1

Position: Projection: NZTM
Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Dynamic Cone Penetrometer (Blows/100mm)		
	Depth	Type & Results							5	10	15
	0.3	Peak = 168kPa Residual = 55kPa				CL: Silty CLAY: light brown mottled orange. Low plasticity. (Auckland Volcanics) ... at 0.30m, becoming light brown.					
	0.6	Peak = 193kPa Peak = >192kPa				 ... at 0.80m, becoming streaked red.					
	1.0	Peak = 193kPa Peak = >192kPa		1		Borehole terminated at 1.0 m					
				2							
				3							
				4							
				5							

Termination Reason: Target depth reached.
Shear Vane No: 2323 DCP No:
Remarks: Groundwater not encountered.

Client: Woods Group
Project: 133 Fitzgerald Road
Site Location: Drury
Project No.: AKS2023-0072
Date: 23/04/2024
Borehole Location: Refer to S



PRELIMINARY

Sheet 2 of 2

Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Dynamic Cone Penetrometer (Blows/100mm)		
	Depth	Type & Results							5	10	15
	9.0	Peak = UTP									

Remarks: Groundwater not encountered.

HAND AUGER BOREHOLE LOG - HA14

Client: Woods Group
Project: 133 Fitzgerald Road
Site Location: Drury
Project No.: AKS2023-0072
Date: 23/04/2024
Borehole Location: Refer to Site Plan

PRELIMINARY



Scale: 1:25

Sheet 1 of 1

Position:

Projection: NZTM

Datum: NZVD2016

Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/Relative Density	Dynamic Cone Penetrometer (Blows/100mm)		
	Depth	Type & Results							5	10	15
	0.4	Peak = UTP				OL: Silty Organic CLAY: light brown mottled dark brown. Low plasticity. (Topsoil)					
	0.6	Peak = UTP				CL: Silty CLAY: orange streaked red. Low plasticity. (Auckland Volcanics)					
	0.9	Peak = UTP				... at 0.90m, becoming brown streaked orange.					
				1		Borehole terminated at 1.0 m					
				2							
				3							
				4							
				5							

Termination Reason: Target depth reached.

Shear Vane No: 2323

DCP No:

Remarks: Groundwater not encountered.

APPENDIX F: INSPECTION RECORDS

GROUND TEST LOCATION

Project Nam Drury Town Center
Contractor: Ross Reid Contractors Ltd
Date: 2022

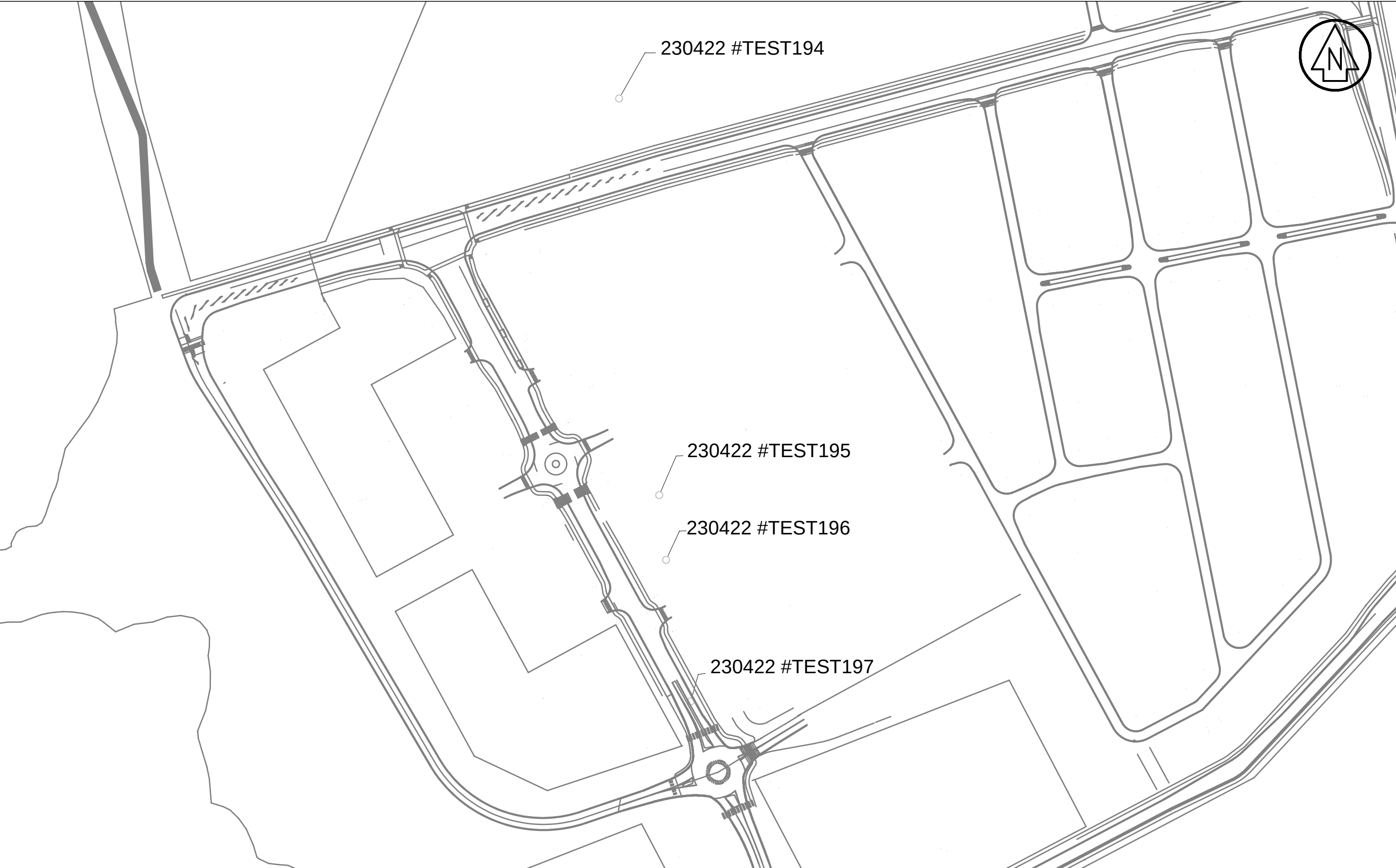
Date Tested	Road Test Ltd Control Number	Point Attribute	Coordinates		Elevation	Code	Remarks	Notes
			Easting	Northing				
221012	15	1	417148.6	774116.1	21.61			Re test-32
	16	2	417139.4	774071.3	21.15		Pass	
	17	3	417078.4	774066.6	21.138			Re-test-33
	18	4	417227.9	774298.3	27.877		Pass	
221013	19	1	417230.6	774294.3	27.847		Pass	
	20	2	417229.9	774237.9	26.894		Pass	
221017	21	1	417179.6	774196.8	25.55	Test		Re-test-35
	22	2	417170.7	774180.5	24.51	Test		Re-test-34
221020	23	1	417191.3	774269	25.99	Test	Pass	Lift 1,Historical Well Backfill
	24	2	417191.9	774268.1	26.41	Test	Pass	Lift 1,Historical Well Backfill
	25	3	417190.4	774268.8	26.99	Test	Pass	Lift 1,Historical Well Backfill
	26	4	417191.1	774268.7	27.47	Test	Pass	Lift 1,Historical Well Backfill
	27	5	417190.8	744269.2	28.03	Test	Pass	Lift 1,Historical Well Backfill
	28	6	417187.1	774268.7	28.41	Test	Pass	Lift 1,Historical Well Backfill
221021	29	1	417203.7	774246.8	27.4	Test	Pass	
	30	2	417206.7	774218.4	26.55	Test	Pass	
	31	3	417181.3	774190.1	25.23	Test	Pass	
221025	32	Previously 15					Pass	Pass in Re-Test
	33	Previously 17					Pass	Pass in Re-Test
	34	Previously 22					Pass	Pass in Re-Test
	35	Previously 21					Pass	Pass in Re-Test
	36	1	417147.5	774079.8	21.72	Test	Pass	
	37	2	417127.4	774080.6	21.66	Test	Pass	
	38	3	417119.8	774089.5	22.57	Test	Pass	
	39	4	417135.7	774123.5	22.98	Test	Pass	
	40	5	417165.2	774129	22.74	Test	Pass	
	41	6	417168.7	774157.1	23.18	Test	Pass	
221026	42	1	417224.5	774296.7	28.14	Test		Re-test-57
	43	2	417230.9	774270.1	27.87	Test	Pass	
	44	3	417242	774248.9	27.78	Test		Re-test-58

	45	4	417222.7	774204.7	26.81	Test	Pass	
221027	46	1	417186.7	774149.2	24.45	Test	Pass	
	47	2	417172.4	774131.8	23.78	Test	Pass	
	48	3	417159.3	771115.6	22.94	Test	Pass	
	49	4	417131	774117.8	23.12	Test	Pass	
	50	5	417118.4	774117.4	23.76	Test	Pass	
	51	6	417133.5	774138.6	24.72	Test	Pass	
221028	52	1	417222.9	774296.9	28.55	Test	Pass	
	53	2	417217.2	774213.7	27.43	Test	Pass	
	54	3	417197.9	774197.8	26.58	Test	Pass	
	55	4	417190.9	774215.3	27.14	Test	Pass	
	56	5	417180	774105.8	24.29	Test	Pass	
221102	57	Previously 42					Pass	Pass in Re-Test
	58	Previously 44					Pass	Pass in Re-Test
221104	59	1						
	60	2	417140.6	774146.9	24	Test	Pass	
	61	3	417110.4	774092.4	23	Test	Pass	
	62	4	416872	774218.6	21	Test	Pass	
	63	5	416853.1	774253.5	20	Test	Pass	
221114	64	1	417197.7	774191.8	27	Test	Pass	
	65	2	417152.7	774139.7	24	Test	Pass	
	66	3	417134.2	774094.9	23	Test	Pass	
221205	67	1	416956.9	774141.4	23.75	Test	Pass	
	68	2	416797	774267.9	18.55	Test	Pass	
	69		416911.1	774348.6	17.18	Test	Pass	
	70	1	416946.9	774368.1	19.28	Test	Pass	
	71	2	416977.2	774203.5	28.99	Test	Pass	
	72	3	417209.9	774133.9	26.24	Test	Pass	
230116	73	1		774428.7	28.48	Test	Pass	
230116	74	2		77423.66	28.5	Test	Pass	
230116	75	3		774197.5	28.77	Test	Pass	
230116	76	4		774192	28.44	Test	Pass	
230116	77	5		774230.6	28.51	Test	Pass	
230116	78	6		774260.2	25.59	Test	Pass	
230118	79	1	417177.7	774158.4	26.8	Test	Pass	
230118	80	2	417176.9	774120.6	25.67	Test	Pass	
230118	81	3	417137.1	774107.6	24.83	Test	Pass	
230118	82	4	417103.1	774084.7	24.1	Test	Pass	
230118	83	5	417211.3	774143.1	27.53	Test	Pass	
230118	84	6	417186.2	774196.3	28.05	Test	Pass	
230119	85	1				Test	Pass	
230119	86	2				Test	Pass	
230119	87	3				Test	Pass	
230119	88	4				Test	Pass	

230120	89	1	416804.4	774210.6	20.07	Test	Pass	
230120	90	2	416794.3	774250.9	19.812	Test	Pass	
230120	91	3	416843.6	774228.8	20.484	Test	Pass	
230120	92	4	416828	774281.5	18.644	Test	Pass	
230120	93	5	416904.6	774348.4	19.563	Test	Pass	
230120	94	6	416957.7	774369.7	21.09	Test	Pass	
230120	95	7	416982.3	774378	22.048	Test	Pass	
230120	96	8	RE TEST					
230123	97	1	417175.4	774116.3	26.411	Test	Pass	
230123	98	2	417202.3	774038	22.02	Test	Pass	
230123	99	3	417165.6	773999.4	20.899	Test	Pass	
230123	100	4	417131.6	773981.9	20.107	Test	Pass	
230123	101	5	417118.6	774043.6	20.933	Test	Pass	
230123	102	6	417119.3	774124.1	25.477	Test	Pass	
230125	103	1	416824.9	774222.3	20.21	Test	Pass	
230125	104	2	416818.2	774261.3	19.48	Test	Pass	
230125	105	3	416862.6	774315	19.63	Test	Pass	
230125	106	4	416905.2	774356.2	19.8	Test	Pass	
230125	107	5	416966.5	774370.8	21.98	Test	Pass	
230125	108	6	417107	774102.3	26.16	Test	Pass	
230126	109	1	417171.7	774046.8	22.8	Test	Pass	
230126	110	2	417145.6	774016.5	21.641	Test	Pass	
230126	111	3	417148.2	774062.2	22.473	Test	Pass	
230209	112	1	417178.4	774040.6	23.57	Test	Pass	
230209	113	2	417131.4	774006.3	21.37	Test	Pass	
230209	114	3	416928.1	774330.8	21.69	Test	Pass	
230209	115	4	416996.3	774374.1	23.58	Test	Pass	
230210	116	1	417009.1	774382.8	24.21	Test	Pass	
230210	117	2	417036.6	774394.3	24.74	Test	Pass	
230210	118	3	417143.9	774069.4	23.78	Test	Pass	
230210	119	4	417103.9	774043.6	21.71	Test	Pass	
230217	120	4	416948	774349.2	23.31	Test	Pass	
230220	121	1	416784.8	774348.1	18.23	Test	Pass	
230220	122	2	416815.1	774364.8	17.18	Test	Pass	
230220	123	3	416810.5	774395	16.95	Test	Pass	
230220	124	4	416849.6	774384.7	17.5	Test	Pass	
230220	125	5	416899.4	774333.9	21.9	Test	Pass	
230220	126	6	417067.5	7740202	19.13	Test	Pass	
230220	127	7	417088.8	773979	18.93	Test	Pass	
230221	129	1	416821	774232.5	20.87	Test	Pass	
230221	130	2	416797.2	774321.8	17.66	Test	Pass	
230221	131	3	416834	774354.9	17.36	Test	Pass	
230221	132	4	Re test previously	Test	18.93	Test	Pass	RE TEST
230221	133	5	417075.1	773975.5	19.36	Test	Pass	

230222	134	1	416845.1	774373.2	17.74	Test	Pass	
230222	135	2	416850.1	774156.6	19.97	Test	Pass	
230222	136	3	416553.3	774132.7	20.04	Test	Pass	
230223	137	1	417083.5	773993.5		Test	Pass	
230223	138	2	417064.4	774010.8		Test	Pass	
230301	139	1	416852.6	774274.8	21.17	Test	Pass	
230301	140	2	416858.4	774226.6	21.7	Test	Pass	
230301	141	3	417094.6	773975.6	20.95	Test	Pass	
230301	142	4	417057.4	774007.6	20.54	Test	Pass	
230303	143	1	416846.1	774229.4	21.9	Test	Pass	
230303	144	2	416798	774198.5	21.86	Test	Pass	
230303	145	3	416817	774259.9	21.85	Test	Pass	
230303	146	4	417054.7	774011.8	20.84	Test	Pass	
230303	147	5	417075.2	773963.3	21.31	Test	Pass	
230303	148	6	417054.7	773977.7	21.45	Test	Pass	
230306	149	1	416855.4	774144.5	20.13	Test	Pass	
230306	150	2	416865.6	774172.9	20.97	Test	Pass	
230306	151	3	417086.5	773953.8	21.58	Test	Pass	
230306	152	4	417059.6	774014.5	21.03	Test	Pass	
230308	153	1	416795.4	774319.2	19.07	Test	Pass	
230308	154	2	417098	773978.4	22.06	Test	Pass	
230308	155	3	417083.3	774015.3	21.94	Test	Pass	
230310	156	1	416671.9	774184.7	22.11	Test	Pass	
230310	157	2	416661.3	774161.3	21.13	Test	Pass	
230310	158	3	416775.8	774393.5	18.31	Test	Pass	
230310	159	4	416784.3	774346.8	20.46	Test	Pass	
230315	160	1	416861.5	774315.8	20.21	Test	Pass	
230315	161	2	416671.9	774184.7	21.53	Test	Pass	PREVIOUSLY #156
230315	162	3	416833.3	774161.7	21.52	Test	Pass	
230321	163	1	416854.4	774313.6	20.34	Test	Pass	
230321	164	2	416842.3	774340.8	19.48	Test	Pass	
230321	165	3	416829.6	774370.6	18.63	Test	Pass	
230328	166	1	416871.3	774099.1	29.4	Test	Pass	
230328	167	2	416852.7	774052.2	19.39	Test	Pass	
230328	168	3	417033.5	774018.7	19.2	Test	Pass	
230328	169	4	417050	773997.7	19.3	Test	Pass	
230328	170	5	417059.8	773973	20.06	Test	Pass	
230328	171	6	417073.7	773952.3	21.25	Test	Pass	
230330	172	1	417079.2	773970.4	22.05	Test	Pass	
230330	173	2	417061.9	774010.7	21.9	Test	Pass	
230330	174	3	416861.8	774122.6	21.43	Test	Pass	
230330	175	4	416885.2	774047.8	20.48	Test	Pass	
230331	176	1	416856.3	774374.2	19.75	Test	Pass	

230331	177	2	416819.4	774349.3	19.87	Test	Pass	
230403	178	1	417079.3	774413.8	26.28	Test	Pass	
230403	179	2	416858.4	774226.6	27.01	Test	Pass	
230405	180	1	416830	774279.3	21.45	Test	Pass	
230405	181	2	416835.7	774298.8	21.24	Test	Pass	
230405	182	3	416875.6	774432.9	22.4	Test	Pass	
230405	183	4	416893.4	774081.3	21.76	Test	Pass	
230418	184	1	416833.9	774081.7	19.96	Test	Pass	
230418	185	2	416854.3	774028.8	19.02	Test	Pass	
230418	186	3	416860.9	773976.7	18.59	Test	Pass	
230419	187	1	416869.5	774310.2	21.78	Test	Pass	
230419	188	2	416842.9	774345.6	21.46	Test	Pass	
230420	189	1	417133.5	774419.5	28.44	Test	Pass	
230420	190	2	417082.8	774405.6	26.61	Test	Pass	
230420	191	3	416858.4	774107.8	20.71	Test	Pass	
230420	192	4	416841.3	774049.7	20.27	Test	Pass	
230420	193	5	416876.5	774024.2	19.32	Test	Pass	
230420	194	1	774339.4	416815	20.44	Test	Pass	
230420	195	2	774112.7	416838	21.31	Test	Pass	
230420	196	3	774075.6	416841.9	29.3	Test	Pass	
230420	197	4	773994.8	416856.1	19.24	Test	Pass	



PROJECT :
133 Fitzgerald Road - Drury

TITLE :
May Test Locations

PROJECT NO.	1274	SURVEY DATE	22/05/23	SCALE : (A3) 1:2000	SHEET NO.: 1 OF 1
SURVEYOR		DRAWN BY	AR	PLOT DATE	31/05/2023
JOB LOCATION /PATH	S:\Surveyor\civilcad 6\Data\133 Fitzgerald Road - Drury - Local site calibration\GROUND TEST\GROUND TEST\2305\Ground Test Location -MAY 2023.mxd - Drawing002				



SURVEYED		
DRAWN		
CHECKED BY		
SURVEY ORIGIN		

NOTES



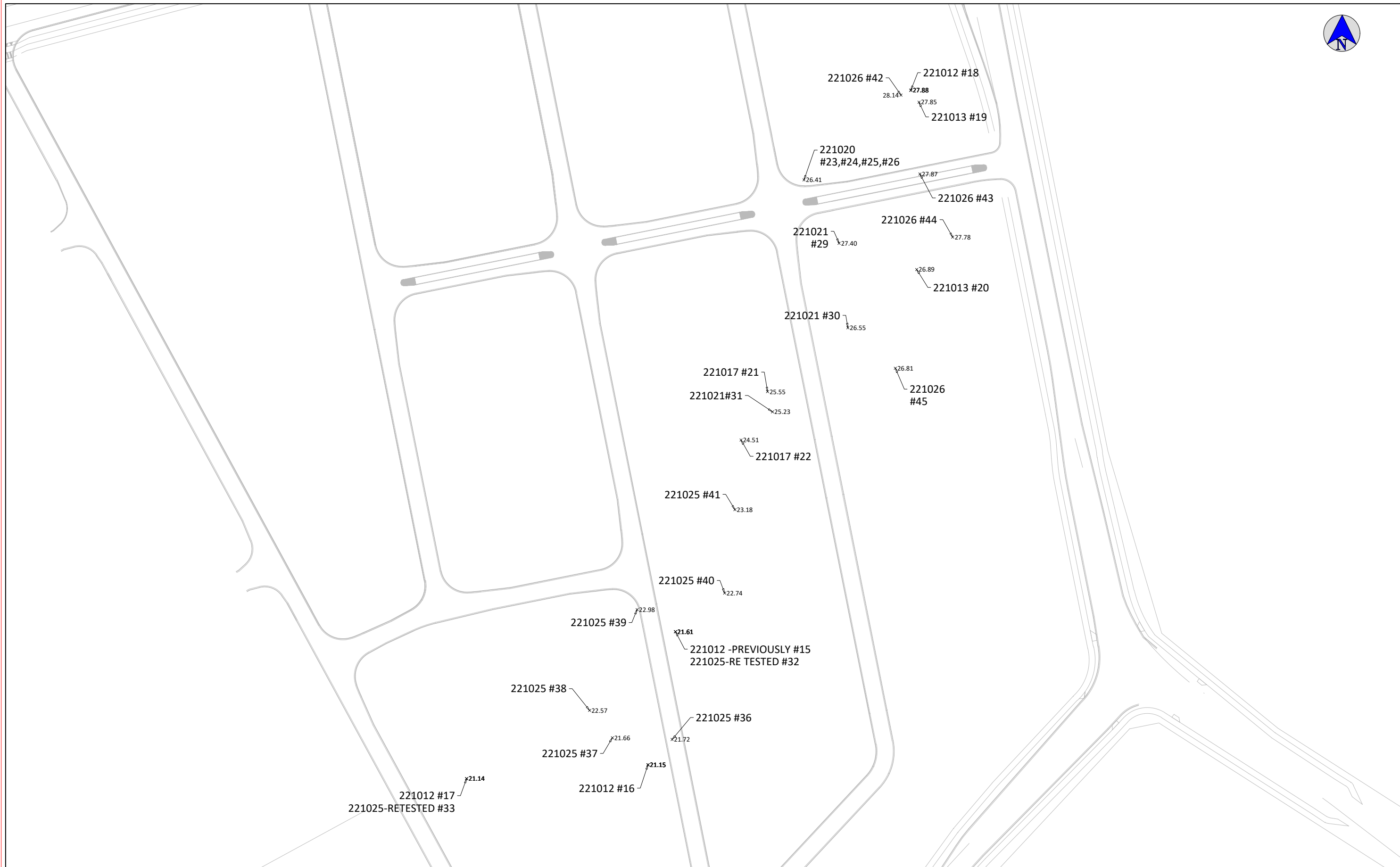
PROJECT

DRURY TOWN CENTER

TITLE

GROUND TEST
LOCATION MONTH OF
NOVEMBER

SCALE		(A1)
(A3)	1:1200	1:600
DRAWING NO.		
SHEET	REVISION	
1 OF 1	0	



SURVEYED			NOTES		PROJECT	DRURY TOWN CENTER	TITLE	GROUND TEST LOCATION MONTH OF OCTOBER	SCALE	
DRAWN									(A3) 1:1200	(A1) 1:600
CHECKED BY									DRAWING NO.	
SURVEY ORIGIN									SHEET 1 OF 1	



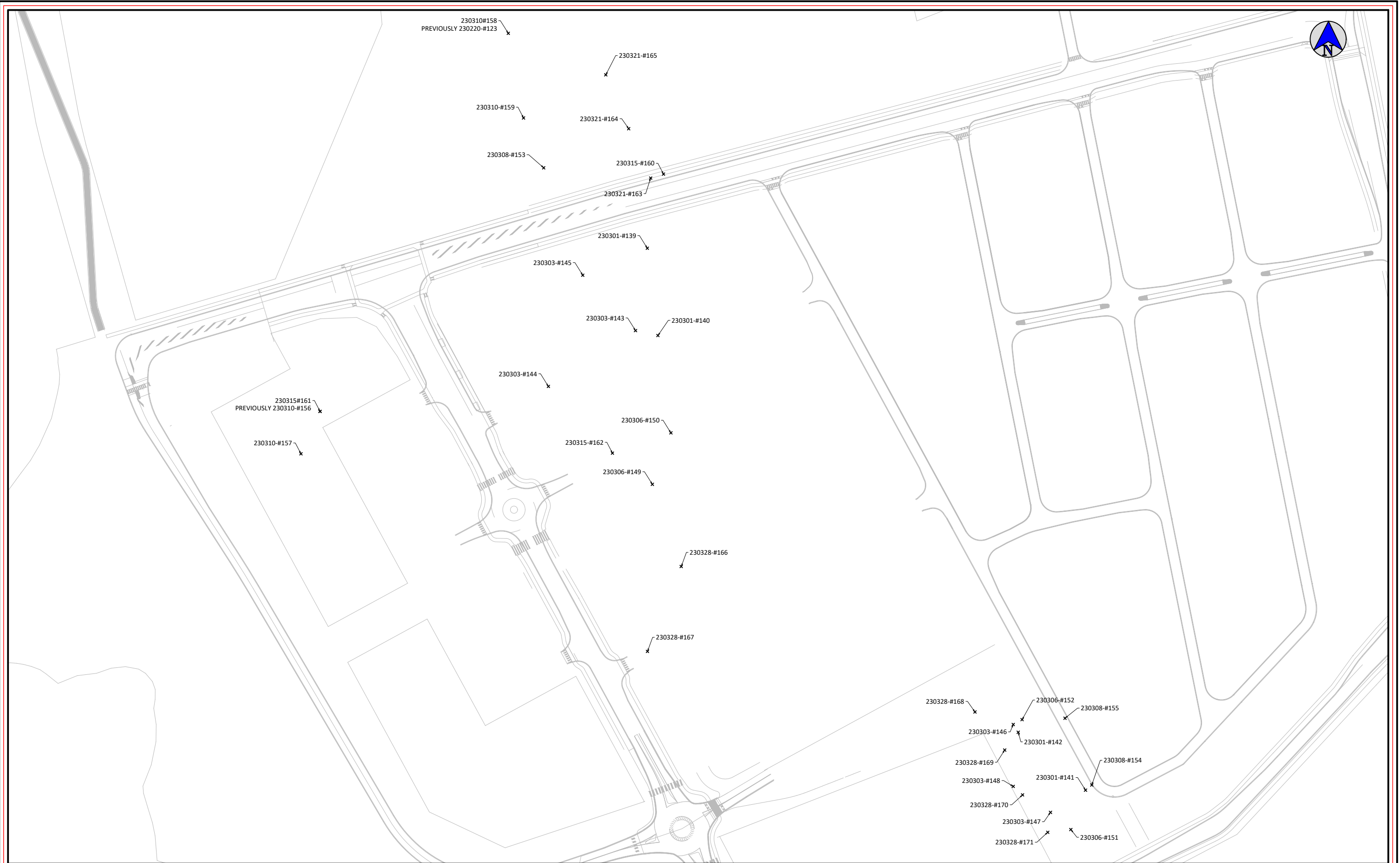
SURVEYED			NOTES		PROJECT	DRURY TOWN CENTER	TITLE	GROUND TEST LOCATION MONTH OF OCTOBER-UPDATED	SCALE	
DRAWN									(A3) 1:1200	(A1) 1:600
CHECKED BY									DRAWING NO.	
SURVEY ORIGIN									SHEET 1 OF 1	
									REVISION 0	



SURVEYED			NOTES		PROJECT	DRURY TOWN CENTER	TITLE	GROUND TEST LOCATION MONTH OF DECEMBER	SCALE	
DRAWN									(A3) 1:1200	(A1) 1:600
CHECKED BY									DRAWING NO.	
SURVEY ORIGIN									SHEET 1 OF 1	



SURVEYED			NOTES		PROJECT	TITLE	SCALE	
DRAWN							(A3) 1:1200	(A1) 1:600
CHECKED BY							DRAWING NO.	
SURVEY ORIGIN							SHEET 1 OF 1	REVISION 0



SURVEYED			NOTES		PROJECT	TITLE	SCALE	
DRAWN							(A3) 1:1200	(A1) 1:600
CHECKED BY							DRAWING NO.	
SURVEY ORIGIN							SHEET 1 OF 1	REVISION 0

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 03
Date of Order : 29.04.22



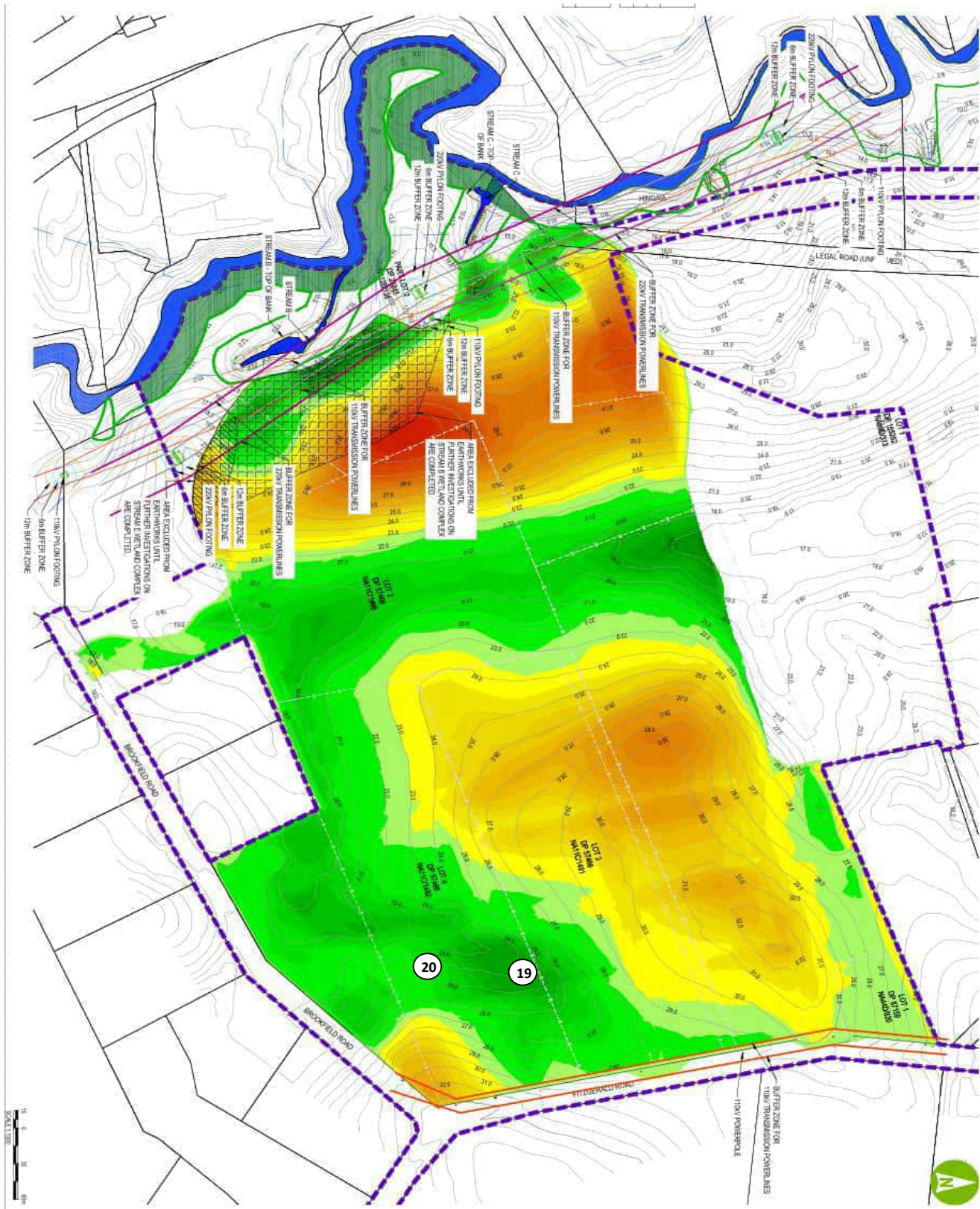
TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
19	DT	13.10.22	See Plan	150	1.71	45.4	1.18	2.54	0.2	0.8	1.13	105	178	160	214+	214+	27.85	East - 417230.637
					1.71	43.4	1.19	2.54	1.4									North - 774294.261
20	DT	13.10.22	See Plan	150	1.65	52.3	1.08	2.54	0.7	2.3	1.13	97	210	157	214+	214+	26.89	East - 417229.857
					1.64	46.5	1.12	2.54	3.9									North - 774237.933

Checked By: ZH
 Date: 19.10.22
 Page: 1 of 2

NT = Not Tested

Location :

Site Plan - Not to scale



152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 04
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
21	DT	17.10.22	See Plan	150	1.61	61.5	1.00	2.54	0.0	0.1	1.13	89	185	140	174	214+	25.55	East - 417179.645 North - 774196.840
					1.61	60.2	1.00	2.54	0.1									
22	DT	17.10.22	See Plan	150	1.62	58.9	1.02	2.54	0.0	0.2	1.13	90	214+	214+	198	149	24.51	East - 417170.739 North - 774180.544
					1.62	57.9	1.02	2.54	0.4									

Checked By: ZH
 Date: 21.10.22
 Page: 1 of 2

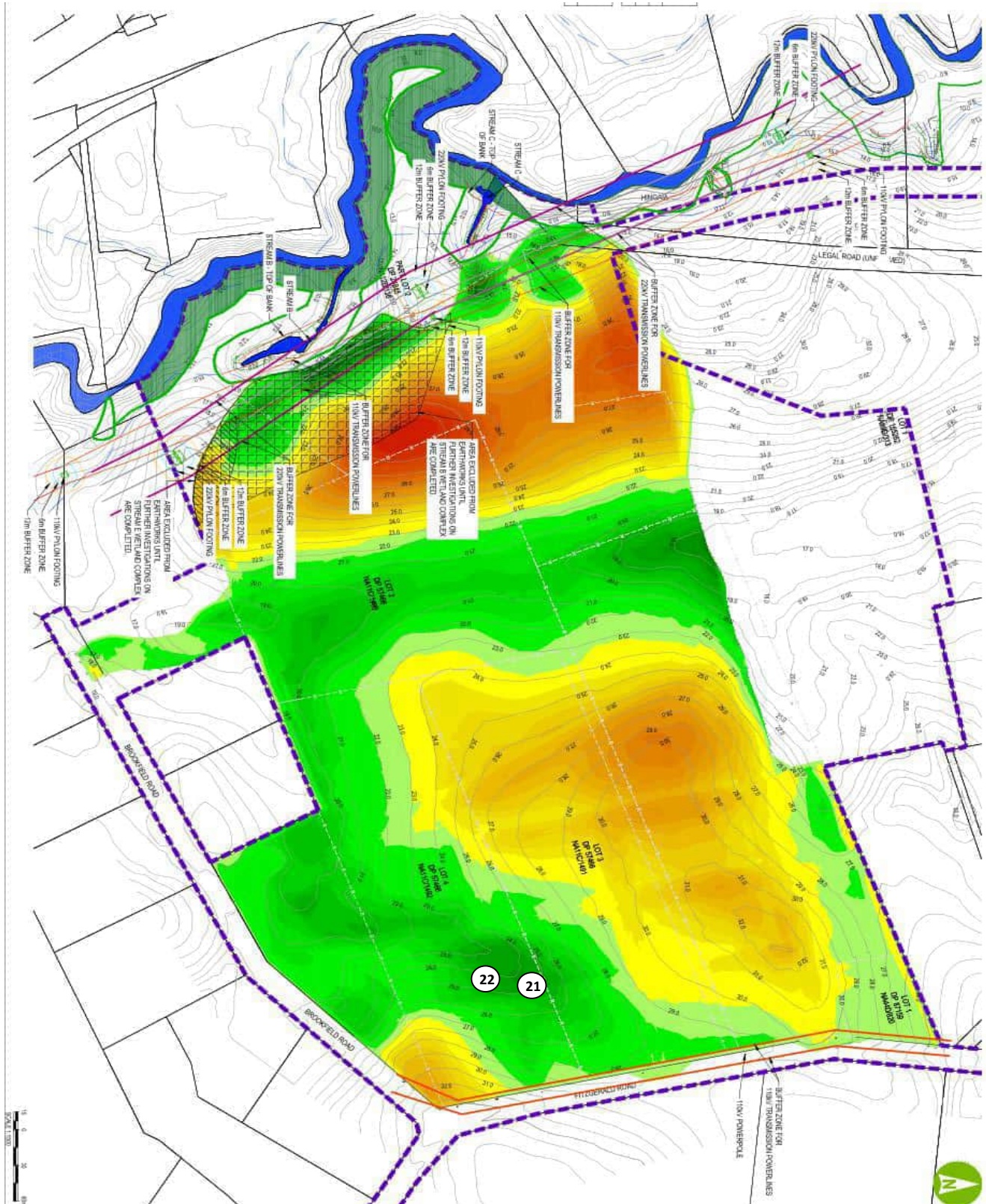
NT = Not Tested

Job Name :

Drury Town Centre

Location :

Site Plan - Not to scale



Tested By :

DT

Date :

17.10.22

Checked By :

ZH

Date :

21.10.22

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 05
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
23	DT	20.10.22	See Plan	150	1.77	44.1	1.23	2.54	0.0	0.0	1.13	108	210	210	185	185	25.99	East - 417191.308 - Lift 1
					1.77	44.8	1.22	2.54	0.0									North - 774268.955 - Historical Well Backfill
24	DT	20.10.22	See Plan	150	1.71	49.0	1.14	2.54	0.0	0.5	1.13	103	198	198	214	178	26.41	East - 417191.913 - Lift 2
					1.71	44.6	1.18	2.54	0.9									North - 774268.114 - Historical Well Backfill
25	DT	20.10.22	See Plan	150	1.72	43.4	1.20	2.54	0.5	0.2	1.13	107	214+	214+	214+	214	26.99	East - 417190.413 - Lift 3
					1.74	43.0	1.21	2.54	0.0									North - 774268.846 - Historical Well Backfill
26	DT	20.10.22	See Plan	150	1.80	38.8	1.30	2.54	0.0	0.4	1.13	113	214+	214+	214+	214+	27.47	East - 417191.093 - Lift 4
					1.76	39.3	1.26	2.54	0.7									North - 774268.713 - Historical Well Backfill
27	DT	20.10.22	See Plan	150	1.77	43.9	1.23	2.54	0.0	0.0	1.13	108	214+	214+	214+	214+	28.03	East - 417190.775 - Lift 5
					1.75	45.0	1.21	2.54	0.0									North - 774269.188 - Historical Well Backfill
28	DT	20.10.22	See Plan	150	1.74	35.9	1.28	2.54	3.4	5.3	1.13	109	214+	214+	214+	214+	28.41	East - 417187.115 - Lift 6
					1.64	39.5	1.18	2.54	7.1									North - 774268.734 - Historical Well Backfill

Checked By: ZH
 Date: 25.10.22
 Page: 1 of 2

NT = Not Tested

[illegible]

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 06
Date of Order : 29.04.22



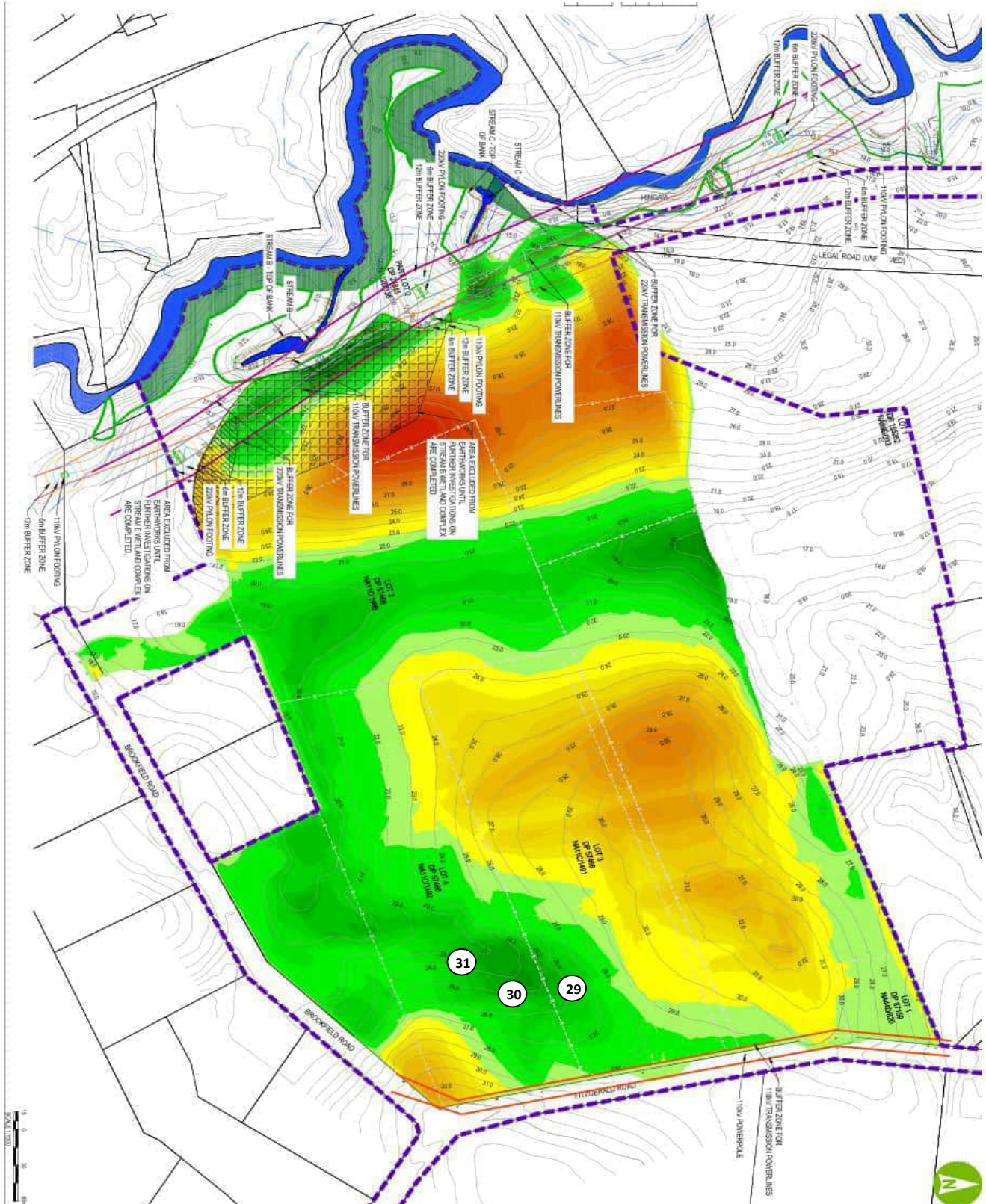
TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
29	DT	21.10.22	See Plan	150	1.73	50.3	1.15	2.54	0.0	0.0	1.13	101	214+	214+	214+	214+	27.40	East - 417203.730 North - 774246.796
					1.70	49.9	1.14	2.54	0.0									
30	DT	21.10.22	See Plan	150	1.65	47.3	1.12	2.54	2.9	2.7	1.13	96	157	160	214+	214+	26.55	East - 77417206.693 North - 774218.355
					1.61	53.6	1.05	2.54	2.5									
31	DT	21.10.22	See Plan	150	1.76	50.3	1.17	2.54	0.0	0.7	1.13	103	178	160	214+	214+	25.23	East - 417181.316 North - 774190.060
					1.69	45.1	1.17	2.54	1.4									

Job Name :

Drury Town Centre

Location :

Site Plan - Not to scale



Tested By :

DT

Date :

21.10.22

Checked By :

ZH

Date :

25.10.22

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 07
Date of Order : 29.04.22



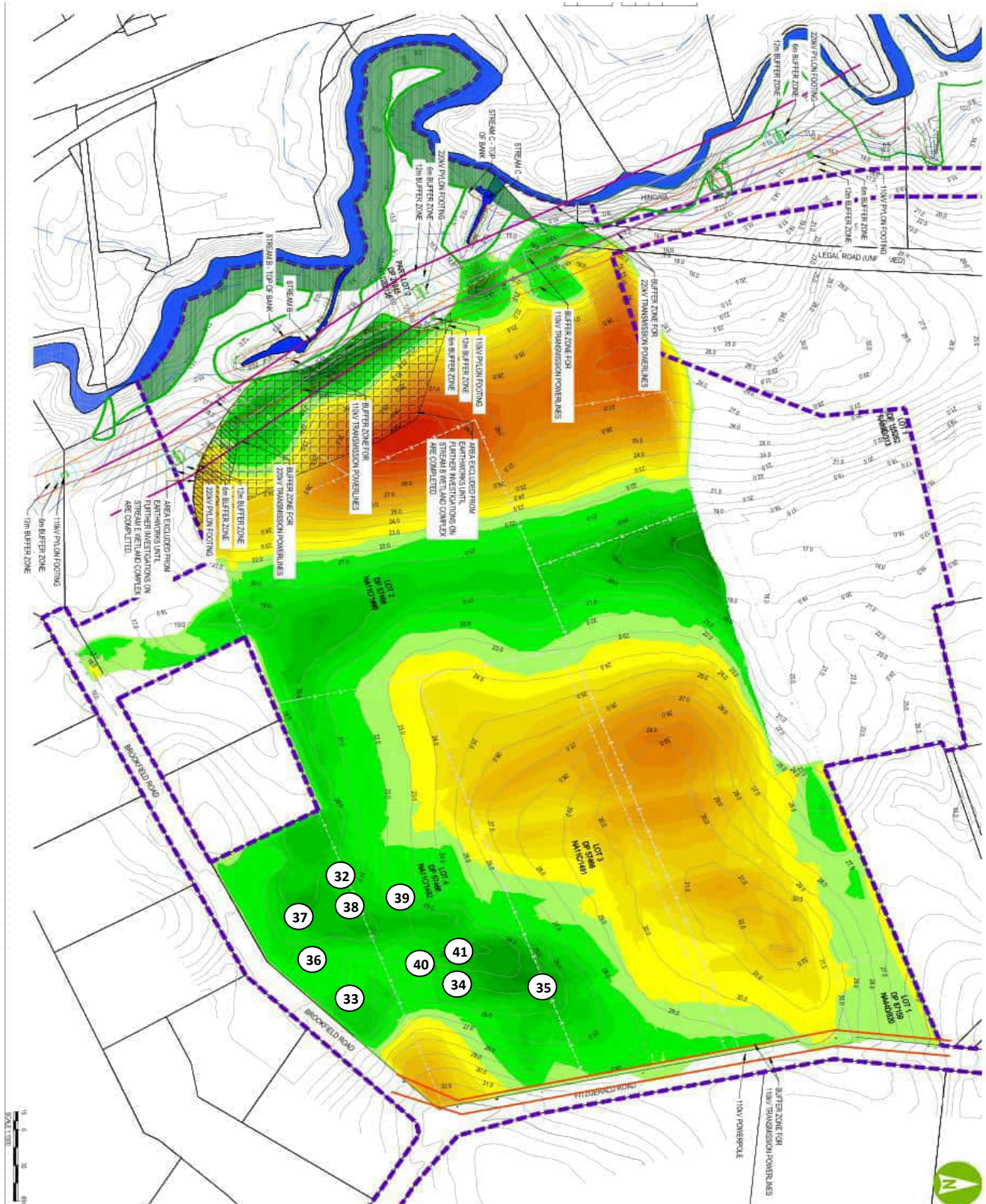
TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
32	DT	25.10.22	See Plan	150	1.67	50.3	1.11	2.54	0.5	2.4	1.13	100	214+	214+	214+	214+	-	Retest of No.15
					1.65	44.1	1.15	2.54	4.4									
33	DT	25.10.22	See Plan	150	1.67	52.9	1.09	2.54	0.0	0.3	1.13	96	214+	214+	160	149	-	Retest of No. 17
					1.64	53.2	1.07	2.54	0.7									
34	DT	25.10.22	See Plan	150	1.75	40.5	1.24	2.54	0.7	0.4	1.13	108	214+	214+	214+	214+	-	Retest of No. 22
					1.73	44.0	1.20	2.54	0.0									
35	DT	25.10.22	See Plan	150	1.69	42.7	1.19	2.54	2.6	3.6	1.13	98	214+	214+	214+	214+	-	Retest of No. 21
					1.58	52.5	1.04	2.54	4.6									
36	DT	25.10.22	See Plan	150	1.68	53.1	1.10	2.54	0.0	0.3	1.13	96	214+	214+	214+	164	21.72	East - 417147.519 North - 774079.776
					1.64	54.2	1.06	2.54	0.6									
37	DT	25.10.22	See Plan	150	1.67	50.3	1.11	2.54	0.4	0.9	1.13	96	214+	214+	153	157	21.66	East - 417127.421 North - 774080.552
					1.63	53.0	1.07	2.54	1.4									
38	DT	25.10.22	See Plan	150	1.68	49.3	1.12	2.54	0.4	0.2	1.13	100	214+	214+	214+	214+	22.57	East - 417119.751 North - 774089.524
					1.71	51.1	1.13	2.54	0.0									
39	DT	25.10.22	See Plan	150	1.73	52.7	1.13	2.54	0.0	0.8	1.13	103	214+	214+	214+	214+	22.98	East - 417135.743 North - 774123.487
					1.71	43.3	1.19	2.54	1.6									
40	DT	25.10.22	See Plan	150	1.71	52.9	1.12	2.54	0.0	1.6	1.13	95	160	167	153	153	22.74	East - 417165.213 North - 774129.042
					1.59	54.6	1.03	2.54	3.2									
41	DT	25.10.22	See Plan	150	1.62	55.1	1.04	2.54	1.3	1.4	1.13	97	181	214+	214+	214+	23.18	East - 417168.665 North - 774157.136
					1.68	46.5	1.15	2.54	1.5									

Job Name :

Drury Town Centre

Location :

Site Plan - Not to scale



Tested By :

DT

Date :

25.10.22

Checked By :

ZH

Date :

27.10.22

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

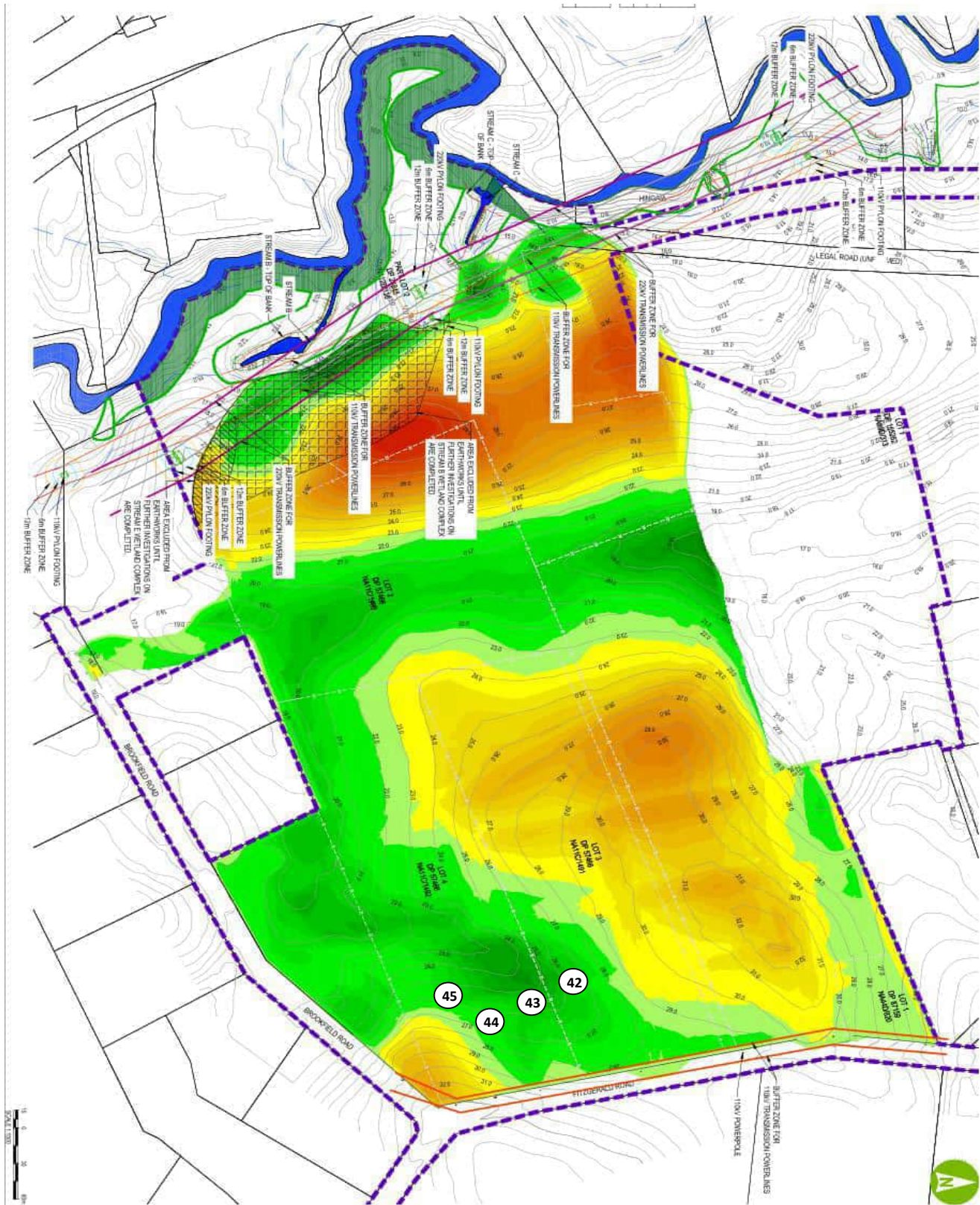
Project No. : 22 0101 08
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
42	DT	26.10.22	See Plan	150	1.66	52.6	1.09	2.54	0.0	0.9	1.13	95	188	214+	214+	214+	28.14	East - 417224.510 North - 774296.652
					1.62	54.2	1.05	2.54	1.7									
43	DT	26.10.22	See Plan	150	1.66	49.0	1.12	2.54	1.4	1.8	1.13	95	214+	214+	214+	214+	27.87	East - 417230.936 North - 774270.103
					1.61	55.1	1.04	2.54	2.1									
44	DT	26.10.22	See Plan	150	1.58	56.2	1.01	2.54	3.1	3.0	1.13	88	214+	214+	214+	195	27.78	East - 417241.988 North - 774248.853
					1.57	59.2	0.99	2.54	2.9									
45	DT	26.10.22	See Plan	150	1.72	46.9	1.17	2.54	0.0	0.1	1.13	104	153	156	214+	181	26.81	East - 417222.681 North - 774204.741
					1.71	45.5	1.18	2.54	0.2									

Location :

Site Plan - Not to scale



152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 09
Date of Order : 29.04.22

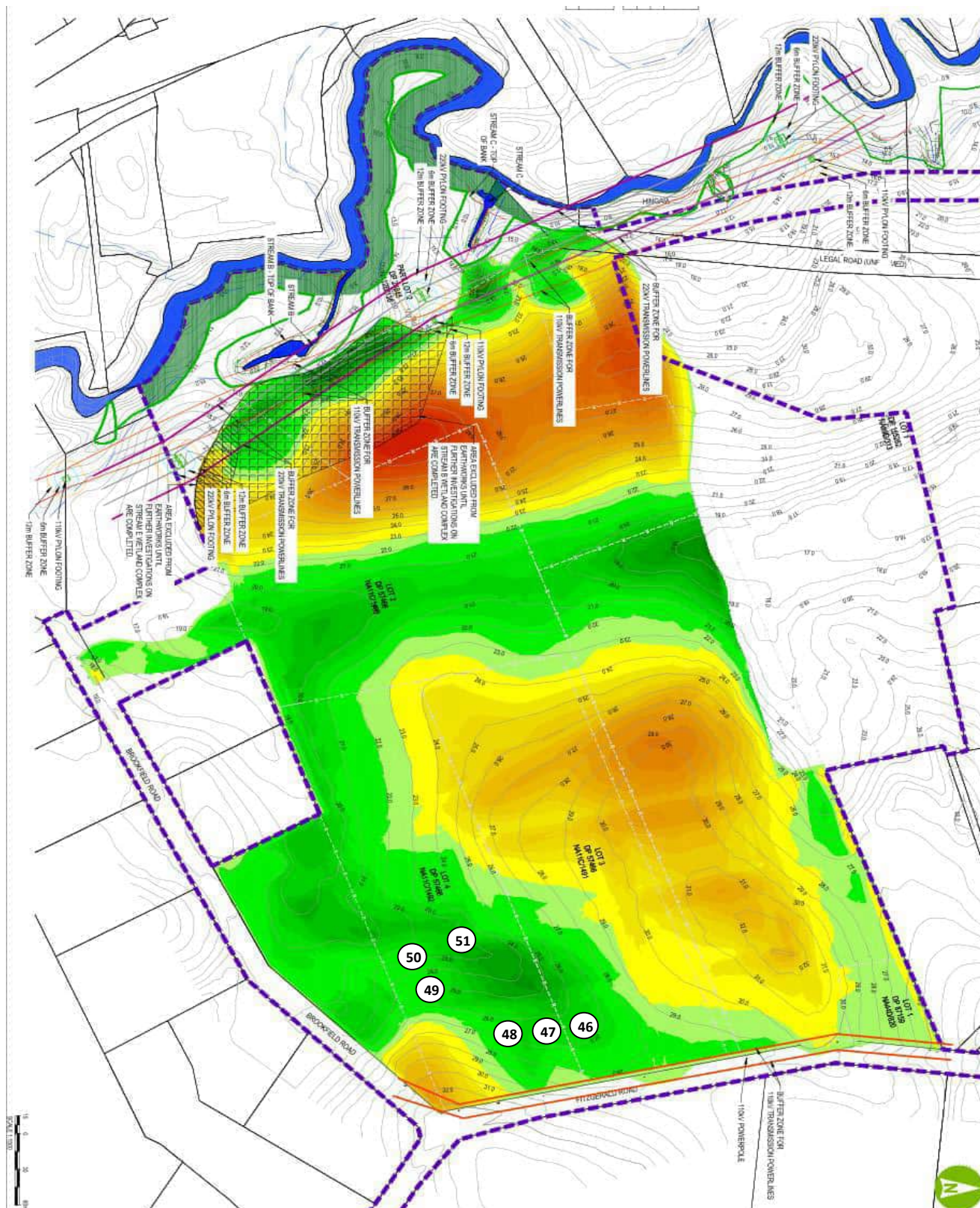


TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
46	DT	27.10.22	See Plan	150	1.74	41.6	1.23	2.54	0.5	1.9	1.13	107	214+	214+	214+	214+	24.45	East - 417186.669 North - 774149.189
					1.69	41.5	1.20	2.54	3.3									
47	DT	27.10.22	See Plan	150	1.77	40.8	1.25	2.54	0.0	0.0	1.13	111	214+	214+	214+	214+	23.78	East - 417172.370 North - 774131.838
					1.78	42.4	1.25	2.54	0.0									
48	DT	27.10.22	See Plan	150	1.70	48.4	1.14	2.54	0.0	0.8	1.13	98	140	153	171	202	22.94	East - 417159.284 North - 774115.637
					1.63	53.2	1.06	2.54	1.7									
49	DT	27.10.22	See Plan	150	1.73	49.6	1.16	2.54	0.0	1.7	1.13	100	214+	214+	214+	145	23.12	East - 417131.016 North - 774117.781
					1.64	47.8	1.11	2.54	3.5									
50	DT	27.10.22	See Plan	150	1.79	46.3	1.22	2.54	0.0	0.0	1.13	108	214+	214+	214+	214+	23.76	East - 417118.405 North - 774117.386
					1.77	45.1	1.22	2.54	0.0									
51	DT	27.10.22	See Plan	150	1.68	42.2	1.18	2.54	3.9	1.9	1.13	97	214+	214+	214+	214+	24.72	East - 417133.532 North - 774138.595
					1.61	60.6	1.00	2.54	0.0									

Report No : 22 0101 09
Page : 2 of 2

Job Name : Drury Town Centre
Location :

Site Plan - Not to scale



Tested By :
Checked By :

DT
ZH

Date :
Date :

27.10.22
28.10.22

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 10
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
52	DT	28.10.22	See Plan	150	1.79	50.2	1.19	2.54	0.0	1.2	1.13	102	214+	214+	214+	214+	28.55	East - 417222.885 North - 774296.850
					1.66	47.8	1.12	2.54	2.3									
53	DT	28.10.22	See Plan	150	1.72	46.2	1.18	2.54	0.0	0.0	1.13	105	214+	214+	214+	214+	27.43	East - 417217.226 North - 774213.652
					1.78	47.6	1.21	2.54	0.0									
54	DT	28.10.22	See Plan	150	1.74	49.1	1.17	2.54	0.0	1.0	1.13	101	214+	214+	214+	214+	26.58	East - 417197.932 North - 774197.788
					1.65	48.9	1.11	2.54	2.0									
55	DT	28.10.22	See Plan	150	1.72	47.2	1.17	2.54	0.0	0.0	1.13	104	214+	214+	149	178	27.14	East - 417190.870 North - 774215.267
					1.74	45.9	1.19	2.54	0.0									
56	DT	28.10.22	See Plan	150	1.76	39.8	1.26	2.54	0.1	0.1	1.13	109	149	153	160	214+	24.29	East - 774105.784 North - 417180.009
					1.73	45.1	1.19	2.54	0.0									

Checked By: ZH
 Date: 01.11.22
 Page: 1 of 2

NT = Not Tested

Report No : 22 0101 10

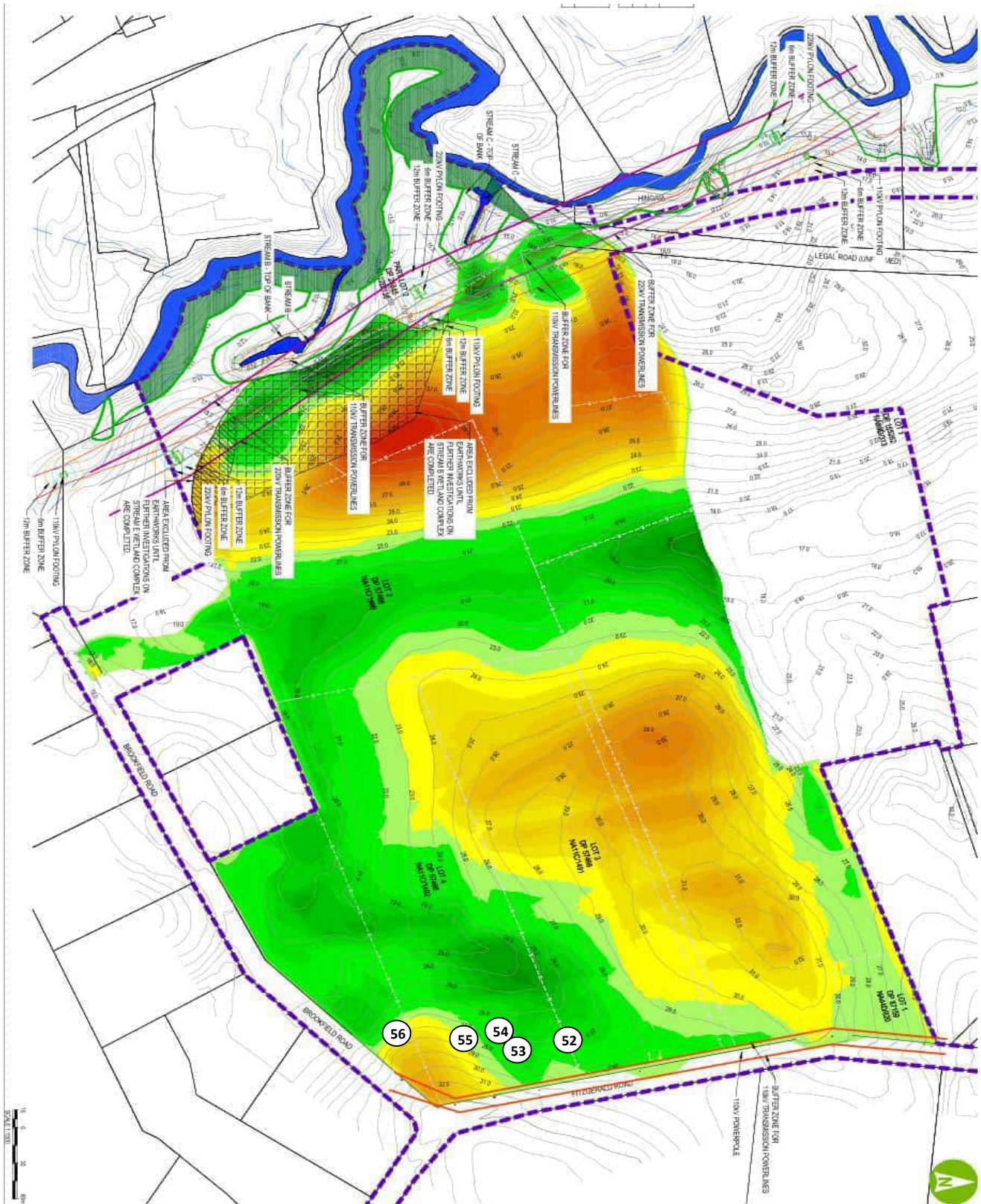
Page : 2 of 2

Job Name :

Drury Town Centre

Location :

Site Plan - Not to scale



Tested By :

DT

Date :

26.10.22

Checked By :

ZH

Date :

01.11.22

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 11
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
57	DT	02.11.22	See Plan	150	1.77	49.7	1.18	2.54	0.0	0.0	1.13	104	214+	214+	214+	214+	-	Retest of No. 42
					1.74	48.6	1.17	2.54	0.0									
58	DT	02.11.22	See Plan	150	1.70	53.7	1.10	2.54	0.0	0.0	1.13	98	214+	214+	214+	214+	-	Retest of No. 44
					1.69	51.5	1.12	2.54	0.0									

[illegible]

DETERMINATION OF THE CLEGG IMPACT VALUE (CIV)
TEST METHOD ASTM D 5874

(Please note equivalent CBR conversions are not IANZ endorsed as part of this report)

Project Name : **Drury Town Centre**

Location : Refer to plan

Project No : 22 0101 12

Client : Ross Reid Contractors Ltd

Address : PO Box 58545

Date of Order : 01.11.22

Botany

Layer Tested : Soft Pit Run

Attention : Deon DeRidder

[illegible]

DETERMINATION OF THE CLEGG IMPACT VALUE (CIV)
TEST METHOD ASTM D 5874

(Please note equivalent CBR conversions are not IANZ endorsed as part of this report)

Project Name : **Drury Town Centre**

Location : Refer to plan

Project No : 22 0101 12

Client : Ross Reid Contractors Ltd

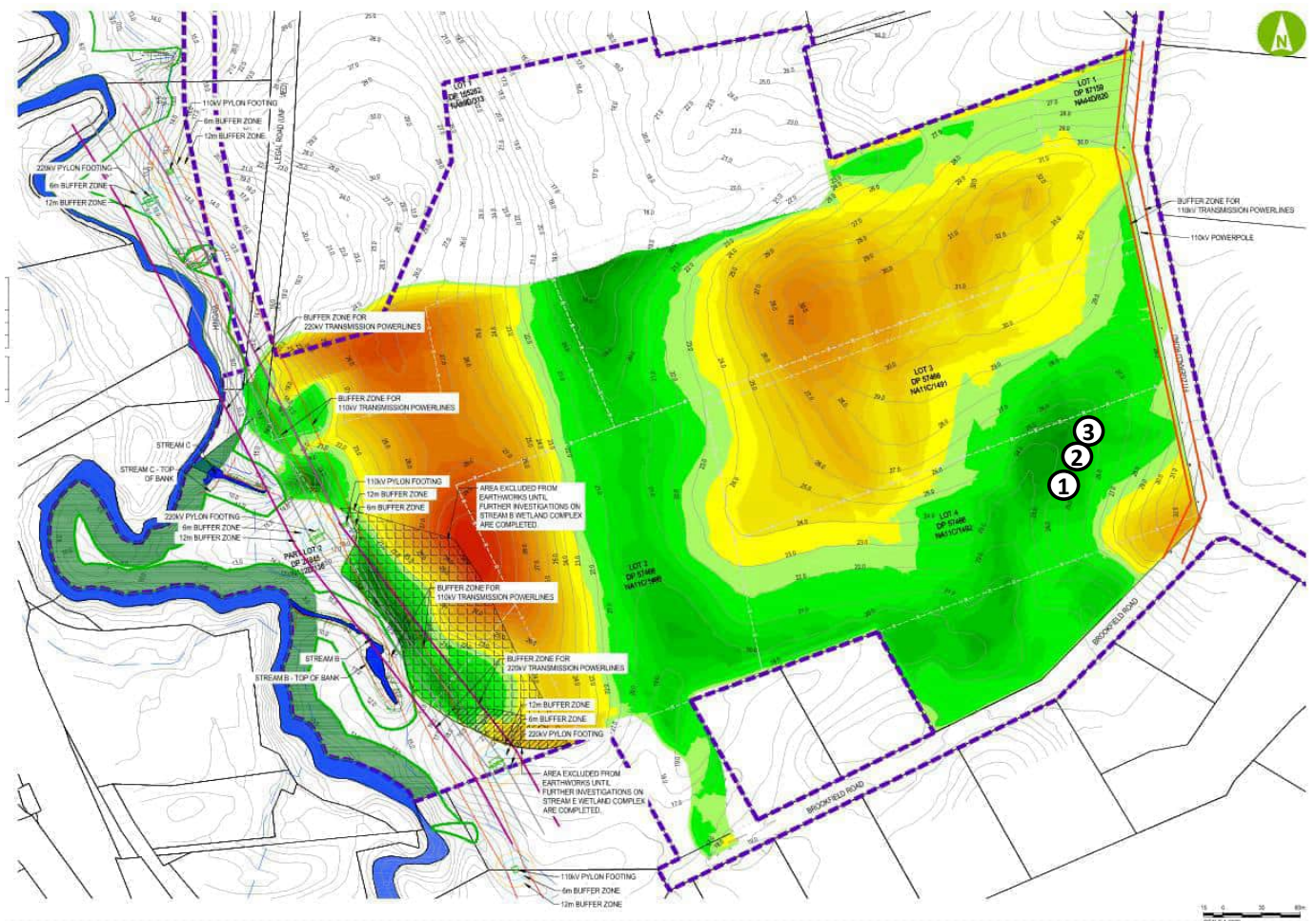
Address : PO Box 58545

Date of Order : 01.11.22

Attention : Botany
Deon DeRidder

Layer Tested : Soft Pit Run

Tested By : DT Checked By : KH				Date : 02.11.22 Date : 04.11.22	
KEY: DAR Distance Across Road CIV Clegg Impact Value LHS / Left Left hand side RHS / Right Right hand side				 Test results indicated as not accredited are outside the scope of the laboratory's accreditation  Signatory - Zach Hooton	
TEST NUMBER	CHAINAGE (m)	DAR (m)	CIV	EQUIVALENT CBR	COMMENTS



**DETERMINATION OF THE CLEGG IMPACT VALUE (CIV)
TEST METHOD ASTM D 5874**

(Please note equivalent CBR conversions are not IANZ endorsed as part of this report)

Project Name : **Drury Town Centre**

Location : Refer to plan

Project No : 22 0101 13

Client : Ross Reid Contractors Ltd

Date of Order : 03.11.22

Address : PO Box 58545

Layer Tested : SPR

Attention : Deon DeRidder

[illegible]

152C Foundry Road, Silverdale 0932

DETERMINATION OF THE CLEGG IMPACT VALUE (CIV) TEST METHOD ASTM D 5874

(Please note equivalent CBR conversions are not IANZ endorsed as part of this report)

Project Name : **Drury Town Centre**

Location : Refer to plan

Project No : 22 0101 13

Client : Ross Reid Contractors Ltd

Date of Order : 03.11.22

Address : PO Box 58545

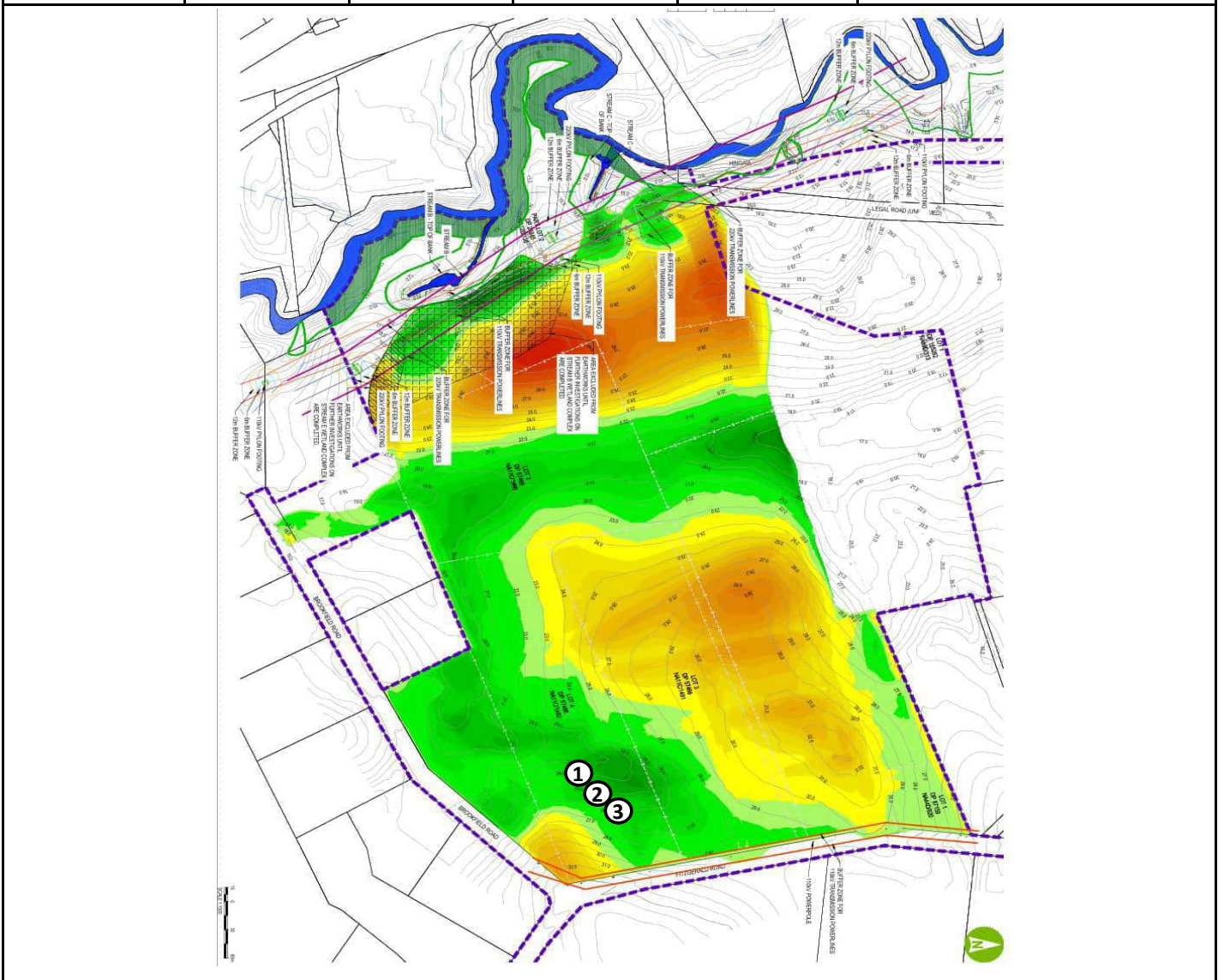
Layer Tested : SPR

Attention : Deon DeRidder

Tested By :	DT	Date :	04.11.22
Checked By :	KH	Date :	08.11.22

KEY: DAR Distance Across Road CIV Clegg Impact Value LHS / Left Left hand side RHS / Right Right hand side		 Test results indicated as not accredited are outside the scope of the laboratory's accreditation  Signatory - Zach Hooton
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TEST NUMBER	CHAINAGE (m)	DAR (m)	CIV	EQUIVALENT CBR	COMMENTS
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152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

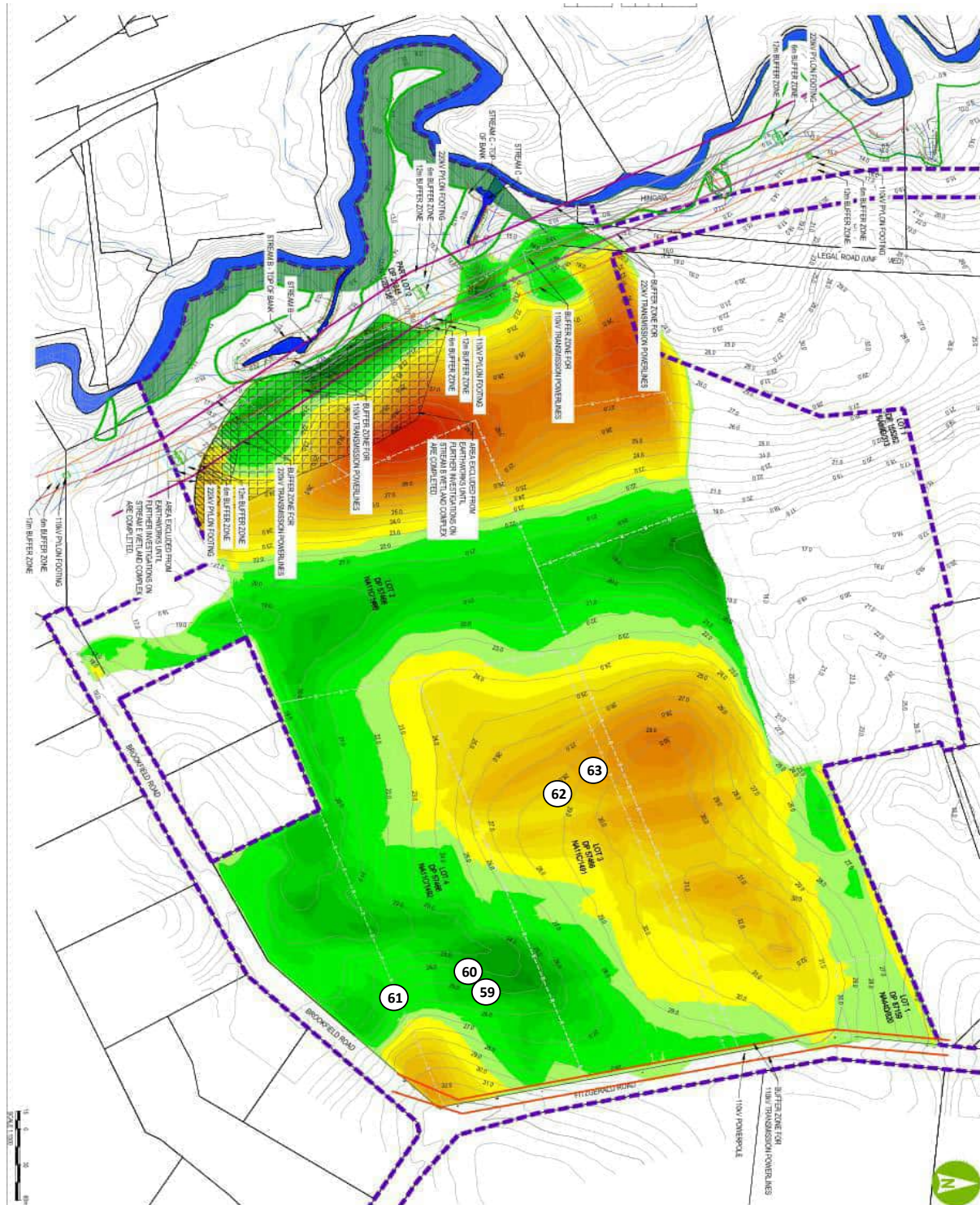
Project No. : 22 0101 14
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
59	DT	04.11.22	See Plan	150	1.71	42.0	1.20	2.54	1.9	5.0	1.13	105	214+	214+	214+	174	-	-
					1.62	39.8	1.16	2.54	8.0									
60	DT	04.11.22	See Plan	150	1.76	40.1	1.26	2.54	0.2	3.1	1.13	108	214+	214+	174	188	24	East - 417140.642 North - 774146.942
					1.65	40.3	1.18	2.54	6.1									
61	DT	04.11.22	See Plan	150	1.69	47.8	1.14	2.54	0.4	5.0	1.13	100	167	171	181	214+	23	East - 417110.368 North - 774092.394
					1.58	42.0	1.11	2.54	9.6									
62	DT	04.11.22	See Plan	150	1.77	37.1	1.29	2.54	1.1	0.9	1.13	114	214+	214+	214+	214+	21	East - 416872.030 North - 774218.562
					1.78	37.4	1.29	2.54	0.6									
63	DT	04.11.22	See Plan	150	1.72	40.4	1.23	2.54	2.2	2.9	1.13	108	214+	214+	214+	214+	20	East - 416853.108 North - 774253.475
					1.70	39.8	1.22	2.54	3.5									

Job Name : Drury Town Centre
Location :

Site Plan - Not to scale



Tested By :
Checked By :

DT
ZH

Date :
Date :

04.11.22
10.11.22

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 16
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
67	DT	05.12.22	See Plan	150	1.72	46.4	1.18	2.54	0.0	1.2	1.13	105	214++	214++	157	160	23.75	East - 416956.878
					1.70	42.4	1.19	2.54	2.4									North - 774141.381
68	DT	05.12.22	See Plan	150	1.67	49.9	1.12	2.54	0.3	0.3	1.13	100	214++	214++	214++	214++	18.55	East - 416797.005
					1.69	48.5	1.14	2.54	0.3									North - 774267.895
69	DT	05.12.22	See Plan	150	1.83	35.1	1.35	2.54	0.0	0.0	1.13	120	214++	214++	214++	214++	17.18	East - 416911.148
					1.83	35.1	1.36	2.54	0.0									North - 774348.558
70	DT	05.12.22	See Plan	150	1.76	42.3	1.24	2.54	0.0	0.0	1.13	110	214++	214++	214++	214++	19.28	East - 416946.912
					1.77	41.8	1.25	2.54	0.0									North - 774368.139
71	DT	05.12.22	See Plan	150	1.73	44.5	1.20	2.54	0.0	0.7	1.13	106	214++	214++	214++	214++	28.99	East - 416977.203
					1.72	42.7	1.20	2.54	1.3									North - 774203.527
72	DT	05.12.22	See Plan	150	1.67	52.8	1.10	2.54	0.0	0.0	1.13	98	214++	214++	214++	214++	26.24	East - 417209.853
					1.69	51.2	1.12	2.54	0.0									North - 774133.871

Report No : 22 0101 16
Page : 2 of 2

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05.12.22
09.12.22

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 30
Date of Order : 23.02.23



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
137	DT	23.02.23	See Plan	150	1.73	46.9	1.17	2.54	0.0	0.0	1.13	102	181	198	214++	214++	-	Easting - 417083.54
					1.71	49.6	1.14	2.54	0.0									Northing - 773993.47
138	DT	23.02.24	See Plan	150	1.82	46.3	1.24	2.54	0.0	0.0	1.13	108	171	191	214++	214++	-	Easting - 417064.40
					1.75	46.1	1.20	2.54	0.0									Northing - 774010.84

Checked By: HC
Date: 27.02.23
Page: 1 of 1

NT = Not Tested

Report No : 22 0101 30
Page : 2 of 2

Tested By :	DT	Date :	23.02.23
Checked By :	KH	Date :	27.02.23

152C Foundry Road, Silverdale 0932

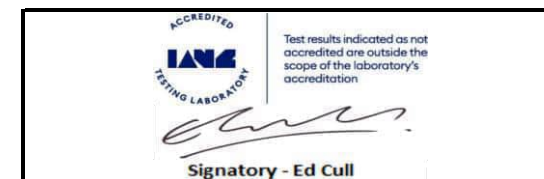
FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 31
Date of Order : 29.04.22

[illegible]

Checked By: DT
Date: 03.03.23
Page: 1 of 2

NT = Not Tested

[illegible]

152C Foundry Road, Silverdale 0932

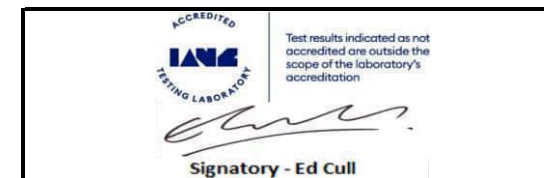
FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

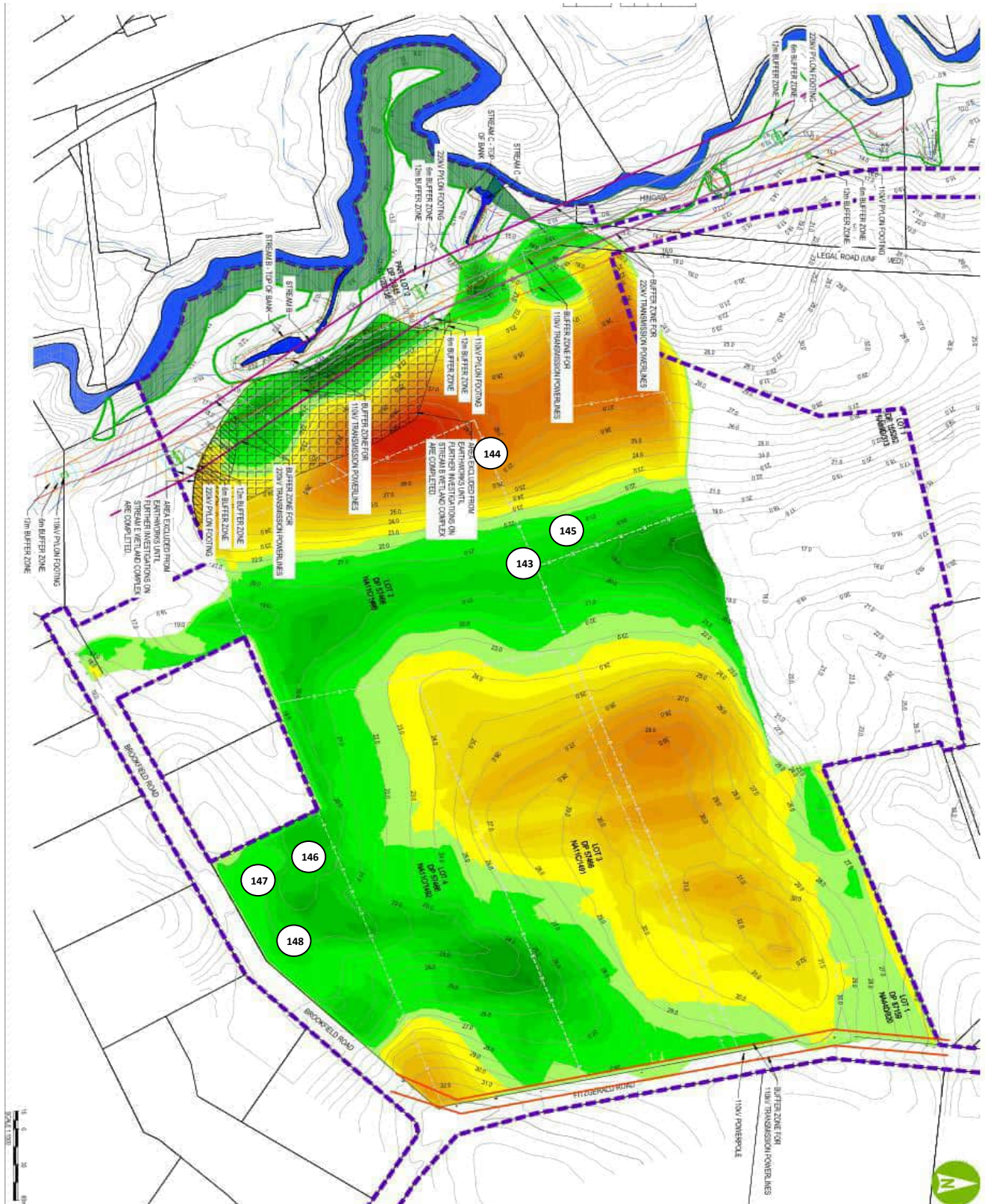
Project No. : 22 0101 32
Date of Order : 02.03.23

[illegible]

Checked By: HC
Date: 06.03.23
Page: 1 of 2

NT = Not Tested

Site Plan - Not to scale



152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
Botany
Attention : Deon DeRidder

Project No. : 22 0101 33
Date of Order : 05.03.23

[illegible]

Checked By: HC
Date: 09.03.23
Page: 1 of 1

NT = Not Tested

152C Foundry Road, Silverdale 0932

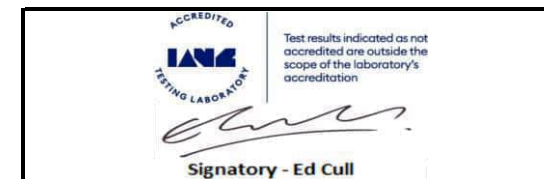
FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 34
Date of Order : 07.03.23

[illegible]

Checked By: HC
Date: 08.03.23
Page: 1 of 1

NT = Not Tested

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 38
Date of Order : 27.03.23

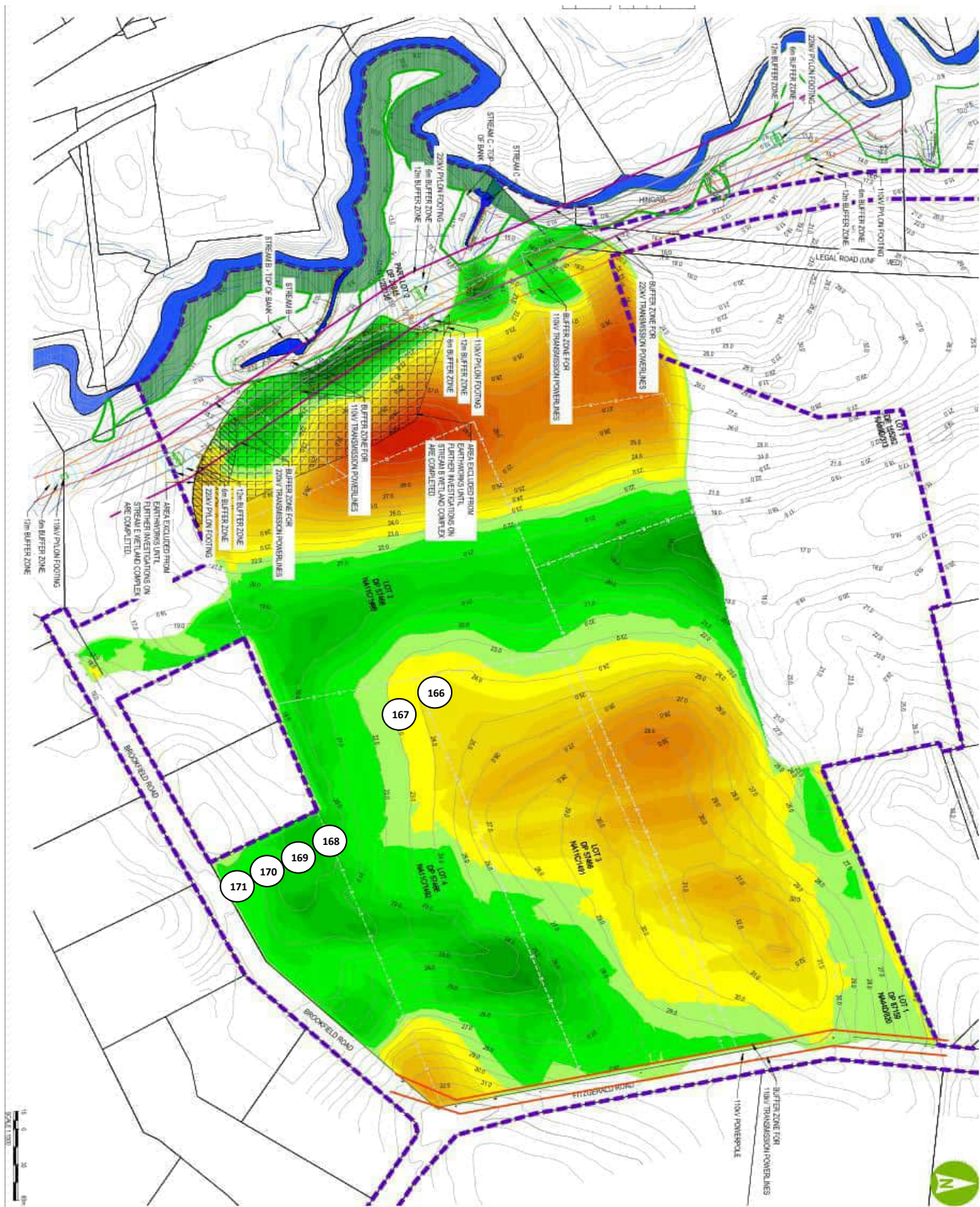
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Checked By: HC
Date: 29.03.23
Page: 1 of 2

NT = Not Tested

Job Name : **Drury Town Centre**
Location : **-**

Site Plan - Not to scale



152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 47
Date of Order : 29.04.22

[illegible]

15B Foundry Road, Silverdale 0932
PROVISIONAL RESULTS - SUBJECT TO VALIDATION

FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001
(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
Botany
Attention : Deon DeRidder

Project No. : 22 0100
Date of Order : 29.04.22

TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	WET DENSITY (Average) (t/m ³)	OVEN WATER CONTENT (%)	OVEN WATER CONTENT (Average) (%)	DRY DENSITY (t/m ³)	DRY DENSITY (Average) (t/m ³)	SOLID DENSITY (t/m ³) Measured	AIR VOIDS %	AIR VOIDS (Average) %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
1	AS	02.05.22	See Plan	150	1.68	1.69	40.4	42.7	1.19	1.18	2.54	4.8	3.0	1.13	104.5	182	212++	212++	212++	-	SRP 5 - Cut area
					1.70		45.1		1.17			1.3									
2	AS	02.05.22	See Plan	150	1.64	1.68	28.4	32.1	1.28	1.28	2.54	13.2	8.9	1.13	112.8	212++	212++	212++	212++	-	SRP 5 - Cut area
					1.73		35.8		1.27			4.5									
3	AS	02.05.22	See Plan	150	1.77	1.77	33.1	37.9	1.33	1.28	2.54	3.8	1.9	1.13	113.4	212++	212++	212++	212++	-	SRP 5 - Fill area
					1.77		42.6		1.24			0.0									
4	AS	02.05.22	See Plan	150	1.83	1.84	29.7	33.9	1.41	1.38	2.54	2.7	1.3	1.13	121.7	212++	212++	212++	212++	-	SRP 5 - Fill area
					1.86		38.1		1.34			0.0									
5	AS	02.05.22	See Plan	150	1.67	1.64	42.1	45.4	1.17	1.13	2.54	4.4	4.4	1.13	99.8	212++	212++	212++	212++	-	SPR 6 - Fill Area
					1.61		48.8		1.08			4.5									
6	AS	02.05.22	See Plan	150	1.80	1.78	34.1	38.0	1.34	1.29	2.54	1.3	0.6	1.13	114.0	212++	212++	212++	212++	-	SPR 6 - Fill Area
					1.75		41.8		1.24			0.0									
7	AS	02.05.22	See Plan	150	1.64	1.62	54.5	61.4	1.06	1.00	2.54	0.2	0.1	1.13	88.7	167	167	185	212+	-	SPR 6 - Cut Area
					1.60		68.4		0.95			0.0									
8	AS	02.05.22	See Plan	150	1.74	1.72	36.2	41.6	1.27	1.21	2.54	3.7	2.0	1.13	107.3	212++	212++	212++	212++	-	SPR 6 - Cut Area
					1.70		46.9		1.15			0.4									
9	AS	16.05.22	See Plan	150	1.56	1.58	43.8	45.6	1.09	1.08	2.54	9.7	8.1	1.13	95.7	201++	201++	201++	201++	16.69	Lift 2
					1.59		47.3		1.08			6.5									
10	AS	16.05.22	See Plan	150	1.63	1.62	55.7	59.3	1.05	1.02	2.54	0.2	0.1	1.13	90.2	201++	201++	201++	201++	16.48	Lift 2
					1.61		62.8		0.99			0.0									
11	AS	16.05.22	See Plan	150	1.78	1.79	37.9	36.9	1.29	1.31	2.54	0.1	0.1	1.13	115.9	201++	201++	201++	201++	16.13	Lift 1
					1.81		36.0		1.33			0.0									
12	AS	16.05.22	See Plan	150	1.68	1.68	53.7	52.9	1.09	1.10	2.54	0.0	0.0	1.13	97.5	201+	201+	201+	201+	16.21	Lift 1
					1.69		52.1		1.11			0.0									
13	AS	16.05.22	See Plan	150	1.67	1.66	56.5	56.9	1.07	1.06	2.54	0.0	0.0	1.13	93.9	201+	201+	201+	201+	16.57	Lift 2
					1.66		57.4		1.06			0.0									
14	AS	16.05.22	See Plan	150	1.62	1.61	49.3	53.0	1.09	1.05	2.54	3.5	2.7	1.13	93.2	201+	201+	201+	201+	16.60	Lift 2
					1.60		56.8		1.02			1.9									

Checked By:

Date:

Page: 1 of

NT = Not Tested

152C Foundry Road, Silverdale 0932
PROVISIONAL RESULTS - SUBJECT TO VALIDATION

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
Botany
Attention : Deon DeRidder

Project No. : 22 0101
Date of Order : 29.04.22

TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
15	DT	12.10.22	See Plan	150	1.63	59.4	1.02	2.54	0.0	0.0	1.13	88	214+	214+	174	158	21.13	
					1.60	64.7	0.97	2.54	0.0									
16	DT	12.10.22	See Plan	150	1.66	41.5	1.17	2.54	5.4	5.1	1.13	104	214+	214+	214+	214+	21.14	
					1.67	41.2	1.18	2.54	4.8									
17	DT	12.10.22	See Plan	150	1.60	59.4	1.01	2.54	0.7	1.6	1.13	89	153	89	158	72	21.16	
					1.58	58.0	1.00	2.54	2.4									
18	DT	12.10.22	See Plan	150	1.65	43.3	1.15	2.54	5.0	3.7	1.13	103	140	214+	157	157	27.87	
					1.70	42.7	1.19	2.54	2.5									
19	DT	13.10.22	See Plan	150	1.71	45.4	1.18	2.54	0.2	0.8	1.13	105	178	160	214+	214+	27.85	
					1.71	43.4	1.19	2.54	1.4									
20	DT	13.10.22	See Plan	150	1.65	52.3	1.08	2.54	0.7	2.3	1.13	97	210	157	214+	214+	26.89	
					1.64	46.5	1.12	2.54	3.9									

152C Foundry Road, Silverdale 0932

FILL CONTROL SUMMARY SHEET
TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:2015 TEST 4.2; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

Job Name : Drury Town Centre
Client : Ross Reid Contractors Ltd
Address : PO Box 58545
 Botany
Attention : Deon DeRidder

Project No. : 22 0101 02
Date of Order : 29.04.22



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m ³)	OVEN WATER CONTENT (%)	DRY DENSITY (t/m ³)	SOLID DENSITY (t/m ³) Supplied	AIR VOIDS %	AVERAGE AIR VOIDS %	MDD (t/m ³) Supplied	MDD (%)	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
15	DT	12.10.22	See Plan	150	1.63	59.4	1.02	2.54	0.0	0.0	1.13	88	214+	214+	174	158	21.13	East - 417078.376 North - 774066.607
					1.60	64.7	0.97	2.54	0.0									
16	DT	12.10.22	See Plan	150	1.66	41.5	1.17	2.54	5.4	5.1	1.13	104	214+	214+	214+	214+	21.14	East - 417139.411 North - 774066.607
					1.67	41.2	1.18	2.54	4.8									
17	DT	12.10.22	See Plan	150	1.60	59.4	1.01	2.54	0.7	1.6	1.13	89	153	89	158	72	21.16	East - 417148.648 North - 774116.060
					1.58	58.0	1.00	2.54	2.4									
18	DT	12.10.22	See Plan	150	1.65	43.3	1.15	2.54	5.0	3.7	1.13	103	140	214+	157	157	27.87	East - 417227.887 North - 774298.292
					1.70	42.7	1.19	2.54	2.5									

[illegible]

ROADTE

DETERMINATION OF THE CLEGG IMPACT VALUE (CIV)
TEST METHOD ASTM D 5874
PROVISIONAL RESULTS - SUBJECT TO VALIDATION

Report No: _____
Page: 1 of 2
Layer Tested _____

[illegible]

Comments : $\text{Equiv. CBR} = 0.07 \times (\text{CIV})^2$

KEY:	DAR	Distance Across Road from *edge of shoulder/*edge of kerb/*centreline
	CIV	Clegg Impact Value (*Delete inappropriate words)
	LHS	Left hand side
	RHS	Right hand side

Tested By: <u>DT</u>	Date: <u>2/11/22</u>
Checked By:	Date:

Site Plan - Not to scale



Tested By : 07
Checked By :

Date : 2/11/22
Date :

DETERMINATION OF THE CLEGG IMPACT VALUE (CIV)
TEST METHOD ASTM D 5874
PROVISIONAL RESULTS - SUBJECT TO VALIDATION

Job: Drury Town Centre

Client Reids

Date of Order : 3/11/22

Location: Refer to site plan

Report No:

Page:

Layer Tested

1
SPR

of $\mathcal{Z}$ [illegible]

Comments : $\text{Equiv. CBR} = 0.07 \times (\text{CIV})^2$

KEY:	DAR	Distance Across Road from *edge of shoulder/*edge of kerb/*centreline
	CIV	Clegg Impact Value
	LHS	Left hand side
	RHS	Right hand side

(*Delete inappropriate words)

Tested By : DT

Date : 4/11/22

Checked By :

Date : _____

[illegible]

07

Date: 4/11/22
Date:

Site Inspection Reports

Site Inspection Record

Project Number	510611	Date	12 October 2022
Project Name	Drury Precinct	From	Suresh Nuthalapati
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny		

SUBJECT **Drury Precinct – Site Inspection**

General

An Aurecon Ground Engineering Consultant attended site on 11 October 2022 to observe the site works undertaken to date. The purpose of the inspection was to inspect topsoil strip and subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations and Discussions

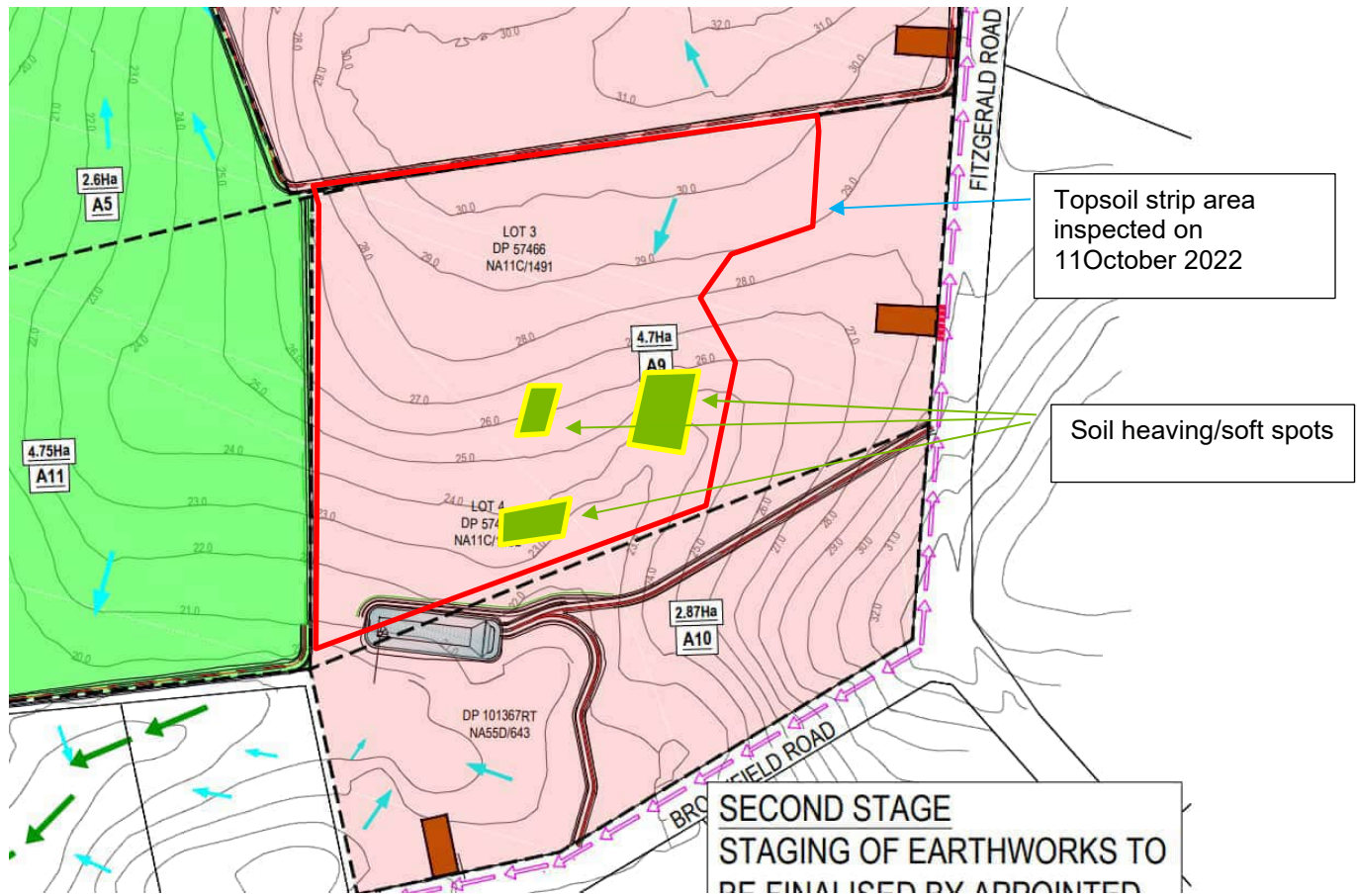
- Part of the Lot 4 DP 57466 (Area 1A9) had been stripped on 11th October 2022 and inspected by a Ground Engineering consultant from Aurecon (Figure 1).
- Topsoil has been stripped. Approximately 0.3-0.4m of the topsoil was stripped across the area of inspection.
- The underlying subgrade was firm underfoot.
- Soil heaving/soft spots were observed at three locations in the area as marked in the Figure 1.
- The soft spots are ranged between 30-40m in length and 10-15m in width.
- The soft spot located southwest of the inspected area was undercut to 0.5m to examine the soil condition. Silty clays were observed at the base of the cut.

The site features including topsoil strip and soft spots are presented in the photos appended to this report.

Recommendations

- The ground conditions being exposed during the earthworks are as anticipated.
- The soft spots located in the fill area should be undercut to a depth of 0.5m or at level where shear vane values of 100kPa or greater are encountered.
- The undercut to be backfilled using a well graded, clean imported fill approved by the Engineer. A layer of geotextile (A19 or similar) should be placed on the subgrade prior to filling.
- The backfilling of the undercut should be undertaken immediately so excavations are not left open overnight.
- Material from the undercut is to be stockpiled and conditioned for use as bulk filling elsewhere onsite. This may require mixing with other site won material.

Figure 1: Extent of works observed.



PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
--	---	------------------------------

Photo No. 1	Date: 11/10/22
Description: View of the area 1A9 towards northeast.	

A wide-angle photograph of a large, flat, brown dirt area, likely a construction or cleared site. The ground is uneven with some tire tracks and small mounds of earth. In the background, there is a line of green trees and a few tall, thin power line towers. A small yellow excavator is visible on the right side of the horizon. The sky is bright blue with many white, fluffy clouds.

Photo No. 2	Date: 11/10/22
Description: View of the area 1A9 towards north. Area circled in red indicates a soft spot. The area is part of the cut. The soft/wet soils will be mixed with dry soils at later stage. No action required from Aurecon.	



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

3

Date:

11/10/22

Description:

View of the area 1A9 towards northwest.


Photo No.

4

Date:

11/10/22

Description:

View of the area 1A9 towards east. The area circled in the red indicates the soft spot/wet soils.



PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
--	---	------------------------------

Photo No. 5	Date: 11/10/22	
Description: View of the soils underneath the topsoil. Sandy SILT with minor clay.		

Photo No. 6	Date: 11/10/22	
Description: View of the base of the soft spot at 0.5m below the surrounding area. Ross Reid planned to conduct shear vanes and scala testing on 12 October. Perch water seeped into the pit, unable to test.		

Site Inspection Record

Project Number	510611	Date	13 October 2022
Project Name	Drury Precinct	From	Suresh Nuthalapati
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny		

SUBJECT Drury Precinct – Site Inspection

General

An Aurecon Ground Engineering Consultant attended site on 12 October 2022 to observe the site works undertaken to date. The purpose of the inspection was to inspect topsoil strip and subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations and Discussions

- Part of the Lot 4 DP 57466 (Area 2A9) and Stormwater Retention Pond (SRP) 4 had been stripped on 12th October 2022. In addition, a soft spot observed in southwestern corner of the 1A9 area was undercut to the extent of length and width, to conduct geotechnical testing. The site observations were noted by a Ground Engineering consultant from Aurecon (Figure 1).

Area 2A9:

- Topsoil has been stripped from 2A9. Approximately 0.3-0.4m of the topsoil was stripped across the area of inspection.
- The underlying subgrade was firm underfoot.
- According to Ross Reid, the geotechnical tests (Nuclear Densometer and shear vane) conducted in 2A9 area complied with the specification requirements.
- Soil heaving/soft spots were not evident during the inspection. However, a potential soft spot was observed towards the southern portion of the area as marked in the Figure 1. The soft spot ranged between 20-30m in length and 10m in width. We understand that testing was undertaken of this area and testing results indicate the ground is competent.

Area 1A9 (soft sport undercut):

- The soft spot located southwest of the inspected area in 1A9 was undercut to 0.5m across the length and width (28m by 10m) to examine the soil condition.
- Perch water was observed toward the southwestern corner of the excavated area. No visual or olfactory evident of contaminants observed in the water.
- Shear vane readings were ranged between 25 to 140+ kPa (uncorrected). The lower bound shear vane readings were typically in localised areas.
- The underlying subgrade in the excavated area was firm underfoot.

SRP4:

- Topsoil was stripped from the base of the SRP4. Approximately 0.15 – 0.2m of the topsoil was stripped across the area of inspection.
- The subgrade observed underneath the topsoil consist of silty clay with fresh roots and rootlets.

- According to Ross Reid contractors, shear vane readings were ranged between 25 to 60 kPa.
- A trench was excavated across SRP4 to divert the surface and perch water to a pit along the embankment towards 69 Brookfield Road.
- The embankment towards the south of the SRP4 comprised of reworked fill to 2m depth underlain by topsoil.

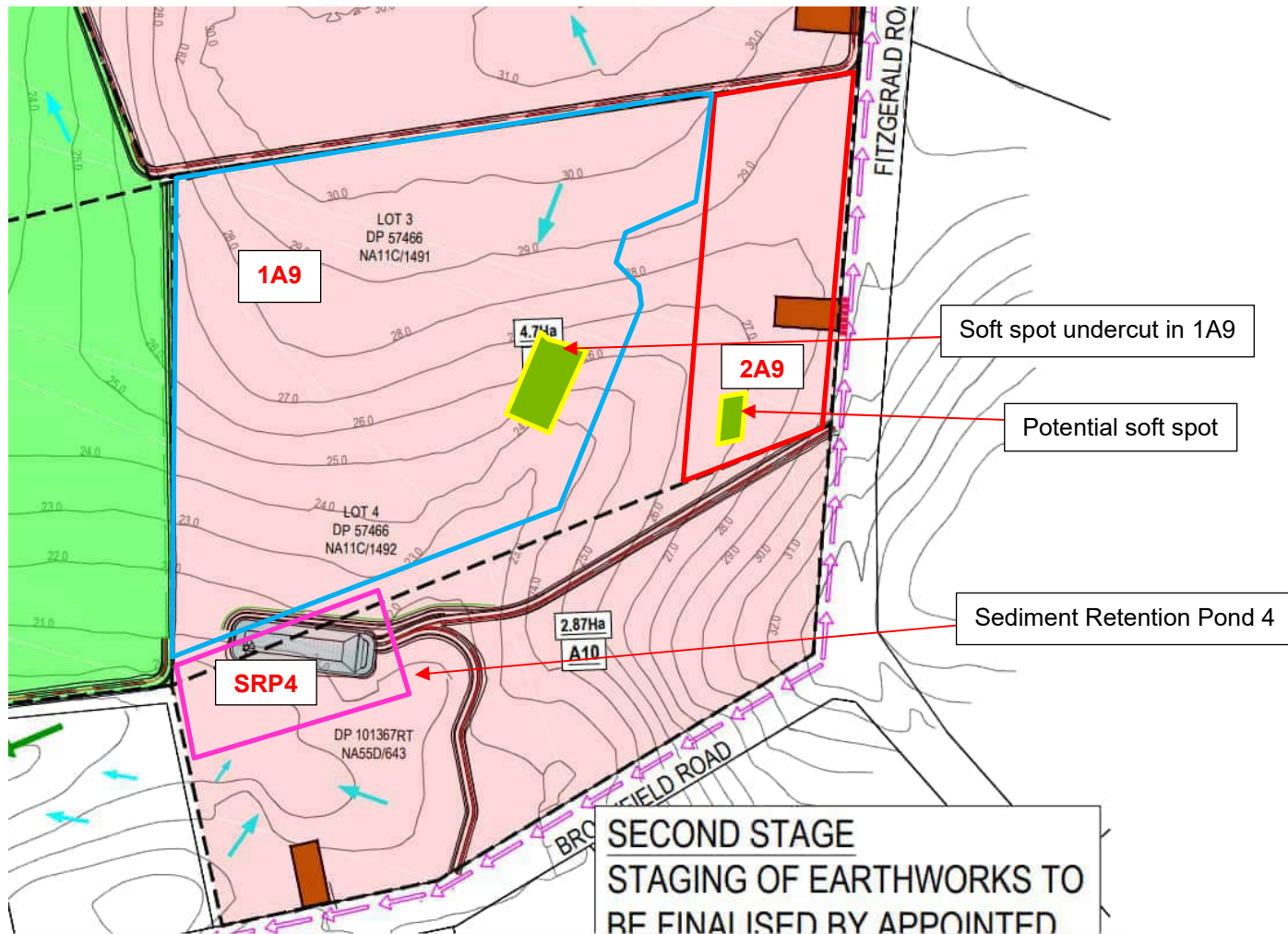
We understand the plan for SRP4 is that Ross Reid will strip the topsoil, bring in site won to build the pond to 2m high, compact the fill in layers to achieve the required compaction standards. Then dig out a hole in the middle to convert it into a retention pond. The reason for achieving the proposed pond embankment compaction standards is that the pond can hold the sediment and water during construction and can be backfilled at the end of construction, to form part of the permanent earthworks.

The site features including topsoil strip from A9 and SRP4 are presented in the photos appended to this report.

Recommendations

- The subgrade, where undercutting is not required, is suitable for fill placement.
- The perch water retained in the 1A9 soft spot undercut should be pumped out to a retention pond located in SRP4 area.
- The undercut to be backfilled using a well graded, clean imported fill approved by the Engineer. A layer of geotextile (A19 or similar) should be placed on the subgrade prior to filling. Fill shall comprise a GAP65 type material. Contractor is to confirm the source material and provide laboratory testing (Compaction curve and particle size distribution). As excavation is approximately 0.5m deep, backfill material is to be placed as follows:
 - Place geotextile.
 - Place 300mm layer of backfill
 - Static roll the first layer.
 - Place 200mm of backfill material and compact with vibration.
 - Contractor to monitor compaction to ensure it is not over compacted.
 - NDM testing to be completed on top surface of backfilled materials. Compaction to achieve 95% of MDD.
- The backfilling of the undercut should be undertaken immediately so excavations are not left open overnight.
- Material from the undercut is to be stockpiled and conditioned for use as bulk filling elsewhere onsite. This may require mixing with other site won material.
- For SRP4 we understand the embankments for the pond will form part of the permanent earthworks. Therefore, the excavations for the embankments shall be cleared of topsoil, organic material (include roots) and soft spots, prior to the embankment fill being placed.
- If the soft spot in Area 2A9 deteriorates then this area may require undercutting.
- NDM and shear vane test results of the subgrade to be supplied to Aurecon.

Figure 1: Extent of works observed.



PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 1	Date: 12/10/22	
Description: View of the area 2A9 facing south towards Brookfield Road.		

Photo No. 2	Date: 12/10/22	
Description: View of the area 2A9 facing north towards site office along the Fitzgerald Road		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 3	Date: 12/10/22	
Description: View of the area 2A9 towards north with possible heaving/soft spots appearing in the foreground.		

Photo No. 4	Date: 12/10/22	
Description: View of the area 1A9 with one of the soft spots/heaved areas undercut to 0.5m for testing the soil strength. The perch water can be observed in the pit. Shearvane readings ranged from 25 to 140+ kPa.		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 5	Date: 12/10/22	
Description: View of the area 1A9 undercut soft spot geology in closeup (Clayey SILT, some fine sand).		

Photo No. 6	Date: 12/10/22	
Description: View of the area 1A9 undercut soft spot being waterlogged towards south eastern corner.		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 7	Date: 12/10/22	
Description: View of the SRP4 topsoil being excavated. The embankment from the former dwelling at 61 Brookfield Road can be seen in the background.		

Photo No. 8	Date: 12/10/22	
Description: View of the SRP4 surface area after removing topsoil. Shear vane readings ranged between 25 to 60 kPa.		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 9	Date: 12/10/22	
Description: View of the SRP4 embankment with reworked fill underlain by topsoil at the base.		

Photo No. 10	Date: 12/10/22	
Description: Closeup view of the embankment with topsoil overlaid by reworked fill.		

Site Inspection Record

Project Number	510611	Date	17 October 2022
Project Name	Drury Precinct	From	Brent Wilson
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny		

SUBJECT **Drury Precinct – Site Inspection**

General

An Aurecon Ground Engineering Consultant attended site on 14 October 2022 to observe the site works undertaken to date. The purpose of the inspection was to inspect topsoil strip and subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations and Discussions

- Part of the Lot 4 DP 57466 (Area A9) had been stripped on 14th October 2022. The approximate location of the site observed is noted in as the yellow hatched area in Figure 1.

Area A9:

- Topsoil has been stripped from an area bordering A9. Approximately 0.3-0.4m of the topsoil was stripped across the area of inspection.
- The underlying subgrade was firm underfoot.
- Negligible amounts of topsoil were in evident across the site on the ground surface. This was attributed to the 'sticking' of the material to the wheels of the Caterpillar scrapers during wet days immediately prior to the topsoil removal.
- Heaving was observed across the area of inspection. The heaving was a result of heavy vehicle passage on a freshly exposed subgrade on a rainy day.

At the time of this inspection the plan for the area noted to be heaving was to leave to see if dries out.

Based on a subsequent inspection on 19th October 2022 the area is drying and was firm under dump truck movement. It is expected this will improve with continual drier weather and should be suitable for filling. Contractor can monitor this area and advise Aurecon if it does not dry out.

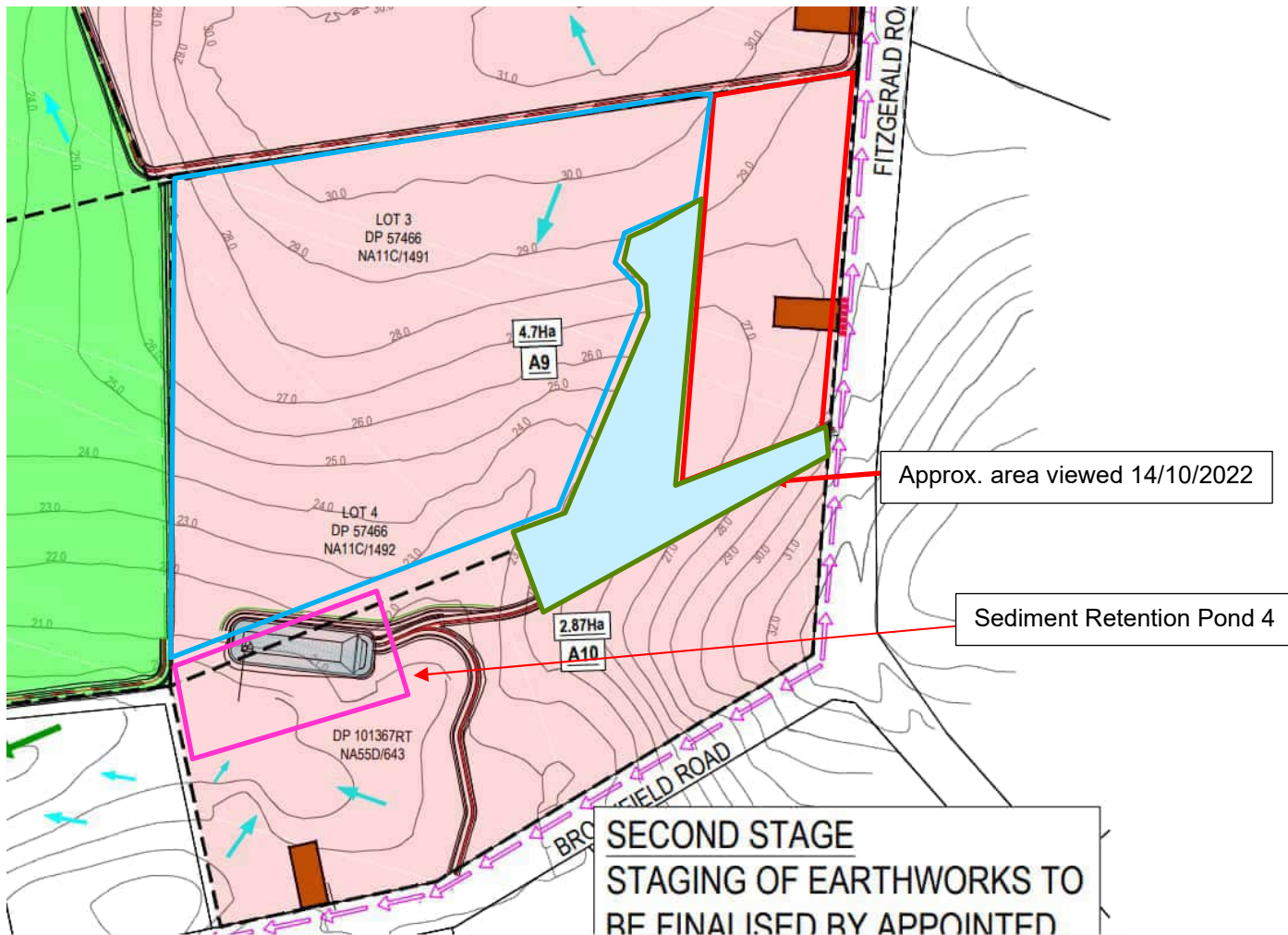


Figure 1: Extent of works observed.

Site Inspection Record

Project Number	510611	Date	19 October 2022
Project Name	Drury Precinct	From	Suresh Nuthalapati
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny		

SUBJECT **Drury Precinct – Site Inspection**

General

An Aurecon Ground Engineering Consultant attended site on 19 October 2022 to observe the site works undertaken to date. The purpose of the inspection was to inspect the topsoil strip and subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations and Discussions

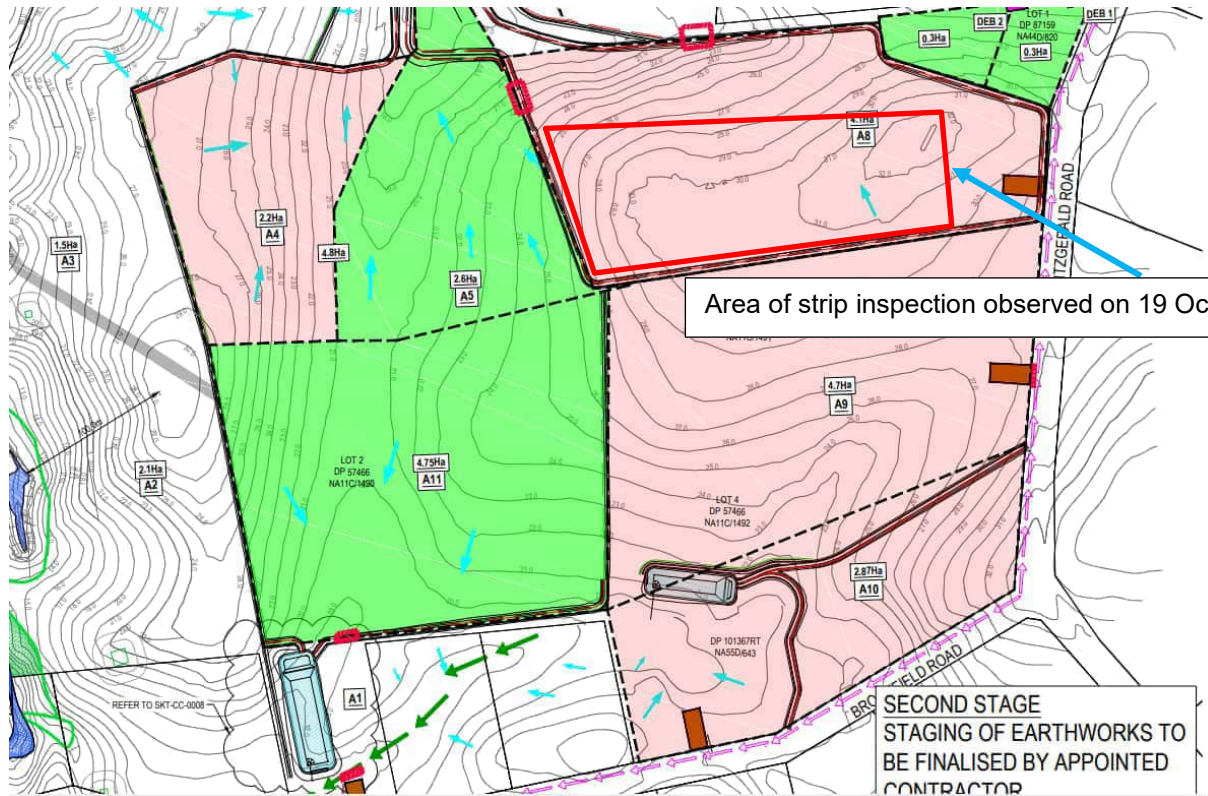
- Part of the Lot 3 DP 57466 (Area A8) had been stripped on 19 October 2022. The site observations were noted by a Ground Engineering consultant from Aurecon (Figure 1).
- Topsoil has been stripped from A8. Approximately 0.3-0.4m of the topsoil was stripped across the area of inspection.
- The underlying subgrade was firm underfoot.
- Evidence of heavy haulage vehicle passage was observed across the stripped area as part of the initial compaction.
- Soil heaving/soft spot was observed at one location towards west during the inspection. However, the entire stripped area is to be excavated to 3.0m bgl as part of the cut/fill for the bulk earthworks.
- Import fill has been stockpiled in A8 to backfill the undercut strip from 1A9.
- The large volume of perch water observed in the 1A9 undercut strip had dissipated by 19 October.

The site features including topsoil strip from A8 is presented in the photos appended to this report.

Recommendations

- The subgrade, where the excavation is required, is suitable to be used as fill elsewhere on site.
- The remaining perch water retained in the 1A9 soft spot undercut should be pumped out to a retention pond located in SRP4 area, if required. The undercut to be backfilled as per the recommendation made in SIR report dated 12 October 2022.
- Material from the A8 excavation is to be stockpiled and conditioned, if required, for use as bulk filling elsewhere onsite.

Figure 1: Extent of works observed.



PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 1	Date: 19/10/22	
Description: View of the area A8 facing west towards 120 Flanagan Road. No soft spots are heaving observed during the inspection. Approximately 3.0m cut to be actioned in the current area of inspection.		

Photo No. 2	Date: 19/10/22	
Description: View of the area A8 facing south towards A9.		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 3	Date: 19/10/22	
Description: View of the area A8 facing east towards Fitzgerald Road.		

Photo No. 4	Date: 19/10/22	
Description: View of the area A8 facing west towards Ross Reid lay down area.		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 5	Date: 19/10/22	
Description: View of the import fill facing towards area 1A9. The import fill will be used to backfill the undercut in 1A9 area.		

Photo No. 6	Date: 19/10/22	
Description: View of the area A8 with soft spot. The existing subgrade to be undercut to 3.0m bgl as part of the bulk earthworks		

Site Inspection Record

Project Number	510611	Date	4 November 2022
Project Name	Drury Precinct	From	Suresh Nuthalapati
Contractor	Ross Reid Contractors Limited	Total Pages	5
Weather	Sunny		

SUBJECT Drury Precinct – Site Inspection

General

An Aurecon Ground Engineering Consultant attended site on 26 October 2022 to observe the site works undertaken to date. The purpose of the inspection was to inspect the topsoil strip and subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations and Discussions

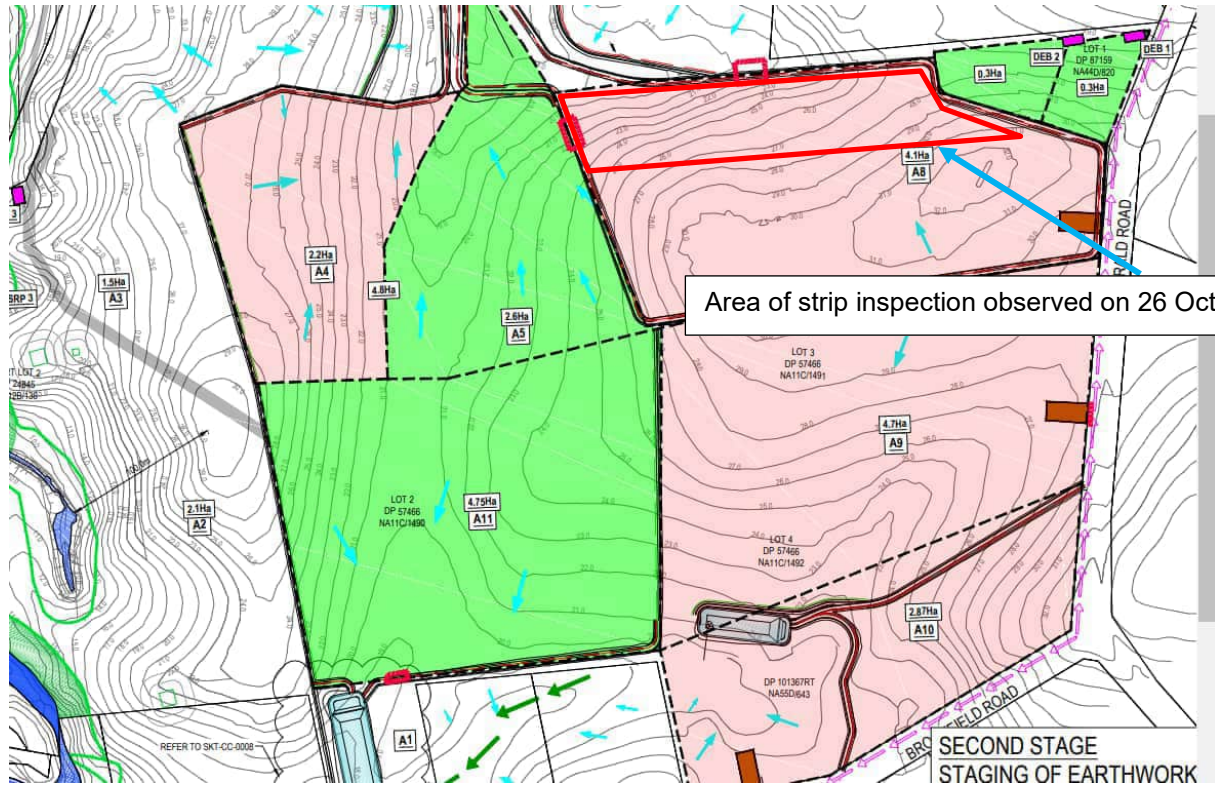
- Part of the Lot 3 DP 57466 (Area 2A8) had been stripped on 26 October 2022. The site observations were noted by a Ground Engineering consultant from Aurecon (Figure 1).
- Topsoil has been stripped from 2A8. Approximately 0.3-0.4m of the topsoil was stripped across the area of inspection.
- The underlying subgrade was firm underfoot.
- Evidence of heavy haulage vehicle passage was observed across the stripped area as part of the initial compaction.
- Soil heaving/soft spots were not observed during the inspection. The entire stripped area is to be excavated up to 3.0m bgl as part of the cut/fill for the bulk earthworks.
- Topsoil from A8, A9 and A10 were stockpiled on the north-eastern corner of area 2A8 for onsite use.
- Gravel and thin strip of asphalt was observed underneath the topsoil close to the former 133 Fitzgerald Road. The asphalt and gravel could be former driveway to the residential dwelling.
- Gravel receding from the farm track appeared underneath the topsoil at certain locations across the area 2A8.

The site features including topsoil strip from 2A8 is presented in the photos appended to this report.

Recommendations

- The subgrade, where the excavation is required, is suitable to be used as fill elsewhere on site.
- Material from the A8 excavation is to be stockpiled and conditioned, if required, for use as bulk filling elsewhere onsite.
- The gravel and asphalt observed across the area 2A8 to be stripped and stockpiled as unsuitable. The unsuitable to be used to backfill the silage pit as discussed during the monthly site meeting on 1 November 2022.

Figure 1: Extent of works observed.



PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 1	Date: 26/10/22	
Description: View of the area 2A8 facing east towards Fitzgerald Road. Gravel Farm track can be seen on the right along the strip. No soft spots are heaving observed during the inspection. Approximately 3.0m cut to be actioned in the current area of inspection.		

Photo No. 2	Date: 26/10/22	
Description: View of the gravel scattered below the topsoil was observed across the strip site.		

PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

3

Date:

26/10/22

Description:

View of the area 2A8 facing west towards Area A5.

Area A5 to be ready for topsoil strip inspecting in the first week of November.


Photo No.

4

Date:

26/10/22

Description:

View of the area 2A8 facing east towards Ross Reid lay down area.

Gravel can be observed underneath the topsoil.

As per Reid contractors, the gravel layer to be excavated and placed on a stockpile deemed as unsuitable.



PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 5	Date: 26/10/22	
Description: View of the topsoil stockpile located towards north-eastern corner of the area 2A8.		

Photo No. 6	Date: 26/10/22	
Description: View of the gravel farm track adjacent to Area 2A8. As per Reid contractors, the gravel extends few meters into Area 2A8 and need to be removed as unsuitable.		

Site Inspection Record

Project Number	510611	Date	4 November 2022
Project Name	Drury Precinct	From	Suresh Nuthalapati
Contractor	Ross Reid Contractors Limited	Total Pages	5
Weather	Sunny		

SUBJECT Drury Precinct – Site Inspection

General

An Aurecon Ground Engineering Consultant attended site on 26 October 2022 to observe the site works undertaken to date. The purpose of the inspection was to inspect the topsoil strip and subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations and Discussions

- Part of the Lot 3 DP 57466 (Area 2A8) had been stripped on 26 October 2022. The site observations were noted by a Ground Engineering consultant from Aurecon (Figure 1).
- Topsoil has been stripped from 2A8. Approximately 0.3-0.4m of the topsoil was stripped across the area of inspection.
- The underlying subgrade was firm underfoot.
- Evidence of heavy haulage vehicle passage was observed across the stripped area as part of the initial compaction.
- Soil heaving/soft spots were not observed during the inspection. The entire stripped area is to be excavated up to 3.0m bgl as part of the cut/fill for the bulk earthworks.
- Topsoil from A8, A9 and A10 were stockpiled on the north-eastern corner of area 2A8 for onsite use.
- Gravel and thin strip of asphalt was observed underneath the topsoil close to the former 133 Fitzgerald Road. The asphalt and gravel could be former driveway to the residential dwelling.
- Gravel receding from the farm track appeared underneath the topsoil at certain locations across the area 2A8.

The site features including topsoil strip from 2A8 is presented in the photos appended to this report.

Recommendations

- The subgrade, where the excavation is required, is suitable to be used as fill elsewhere on site.
- Material from the A8 excavation is to be stockpiled and conditioned, if required, for use as bulk filling elsewhere onsite.
- The gravel and asphalt observed across the area 2A8 to be stripped and stockpiled as unsuitable. The unsuitable to be used to backfill the silage pit as discussed during the monthly site meeting on 1 November 2022.

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 1	Date: 26/10/22	
Description: View of the area 2A8 facing east towards Fitzgerald Road. Gravel Farm track can be seen on the right along the strip. No soft spots are heaving observed during the inspection. Approximately 3.0m cut to be actioned in the current area of inspection.		

Photo No. 2	Date: 26/10/22	
Description: View of the gravel scattered below the topsoil was observed across the strip site.		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 3	Date: 26/10/22	
Description: View of the area 2A8 facing west towards Area A5. Area A5 to be ready for topsoil strip inspecting in the first week of November.		

Photo No. 4	Date: 26/10/22	
Description:		
View of the area 2A8 facing east towards Ross Reid lay down area. Gravel can be observed underneath the topsoil. As per Reid contractors, the gravel layer to be excavated and placed on a stockpile deemed as unsuitable.		

PHOTOGRAPHS

Client Name: Kiwi Property Group	Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
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Photo No. 5	Date: 26/10/22	
Description: View of the topsoil stockpile located towards north-eastern corner of the area 2A8.		

Photo No. 6	Date: 26/10/22	
Description: View of the gravel farm track adjacent to Area 2A8. As per Reid contractors, the gravel extends few meters into Area 2A8 and need to be removed as unsuitable.		

Site Inspection Record

Project Number	510611	Date	14 November 2022
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny		Dry

SUBJECT Topsoil Strip Inspection

Representatives from Aurecon attended site on the 11 November 2022 to inspect an area of subgrade surface post topsoil striping. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 0.2 ha of the topsoil had been stripped within catchment A8 and top loaded to a stockpile, refer to **Figure 1: Extent of works observed**,

The underlying subgrade was firm underfoot,

- An isolated pocket of organic material was identified within the area stripped and scalloped out.

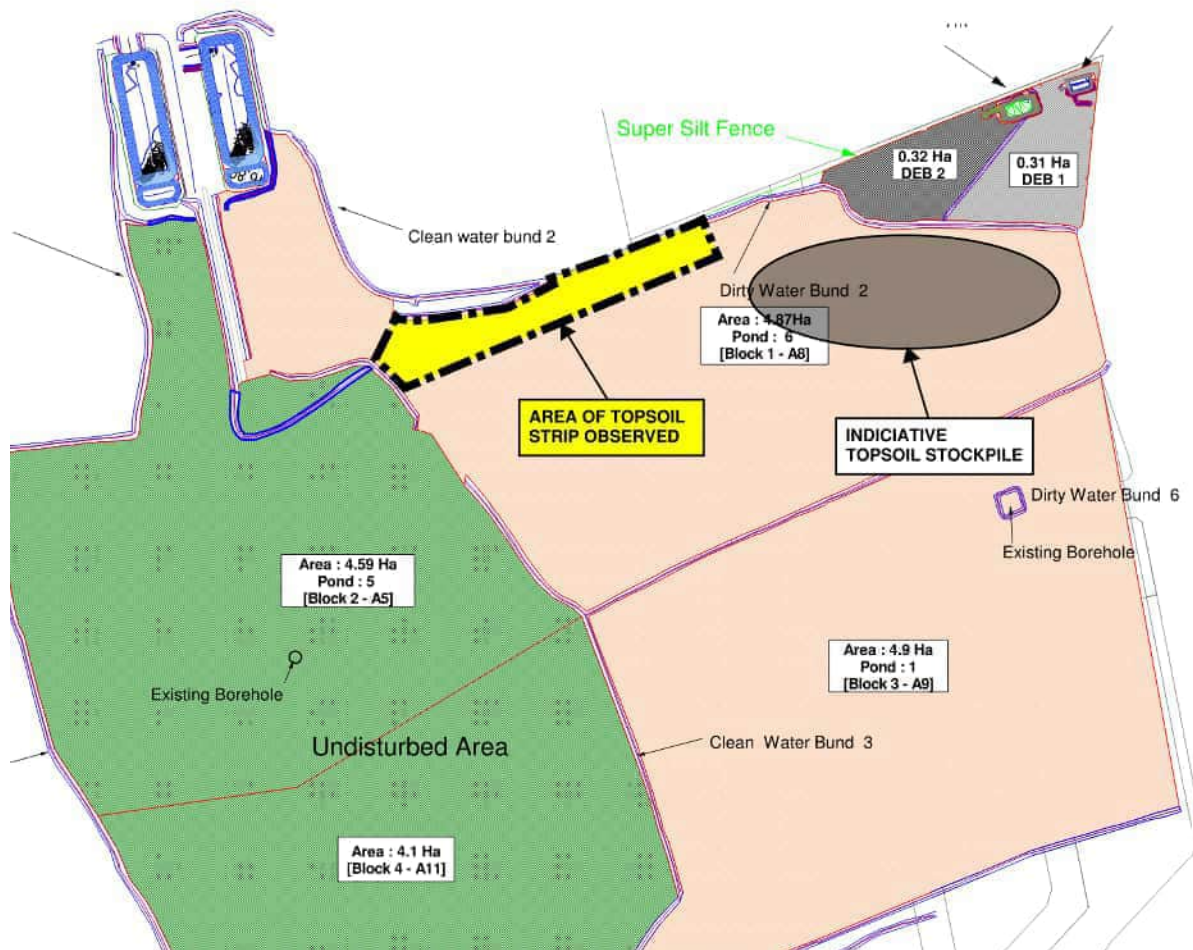
Recommendations

- Tidy up area where organic material was scalloped out with padfoot compactor blade prior to filling.

Closing Comments

The site features including topsoil strip from A8 is presented in the photos appended to this report.

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

1

Date:

11/11/22

Description:

View of the area stripped facing west towards Hingaia stream.


Photo No.

2

Date:

11/11/22

Description:

Isolated soft spot removed.



Site Inspection Record

Project Number	510611	Date	17 November 2022
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Raining		Wet

SUBJECT Topsoil Strip Inspection

Representatives from Aurecon attended site on the 17 November 2022 to inspect an area of subgrade surface post topsoil striping. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 0.4 ha of clean topsoil had been stripped within catchment A5 and loaded to a stockpile, refer to **Figure 1: Extent of works observed**,
- Approximately 0.1 ha of contaminated topsoil had been stripped and taken off-site, refer to **Figure 1: Extent of works observed**,
- The underlying subgrade was firm underfoot,
- Evidence of heavy haulage vehicle passage was observed across the stripped area as part of the initial compaction and sealing of subgrade,
- Surface water present due to recent rainfall event.

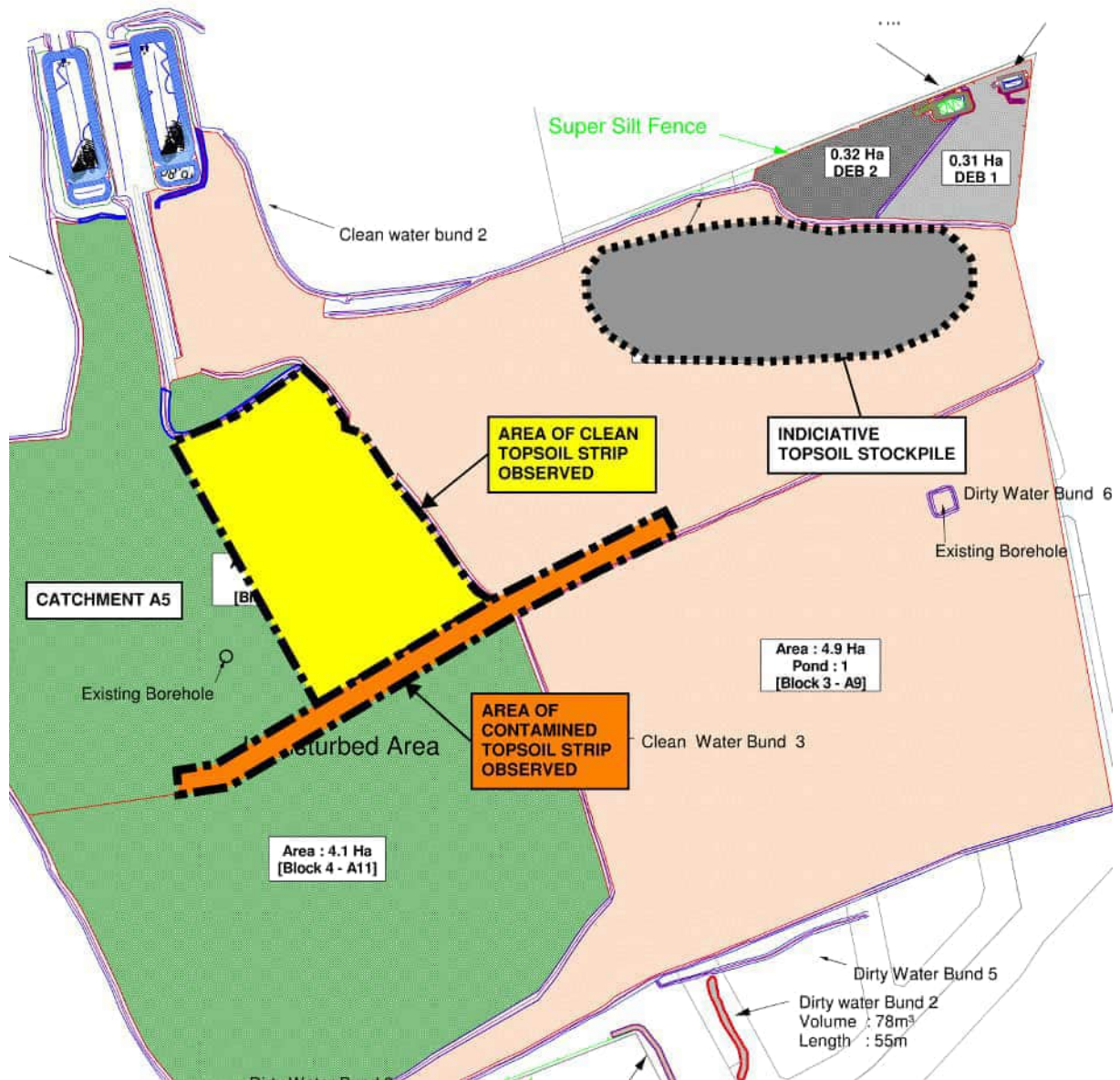
Recommendations

- Hold off on any cut/fill operations until stripped area is dry again.

Closing Comments

The site features including topsoil strip is presented in the photos appended to this report.

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

1

Date:

17/11/22

Description:

View of the area
stripped facing North.

**Photo No.**

2

Date:

17/11/22

Description:

View of the area
stripped facing South.



Photo No. 3	Date: 17/11/22	
Description: View of the area stripped facing west towards Hingaia stream.		

Photo No. 4	Date: 17/11/22	
Description: View of the area stripped facing East towards Fitzgerald Road.		

Site Inspection Record

Project Number	510611	Date	19 January 2023
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny		Dry

SUBJECT Topsoil Strip Inspection

Representatives from Aurecon attended site on the 19 Jan 2023 to inspect an area of subgrade surface post topsoil strip. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 1.3 ha of topsoil had been stripped within catchment A10 and loaded to a stockpile, refer to **Figure 1: Extent of works observed**.
- The underlying subgrade was firm underfoot, and there were no observable soft areas.
- Evidence of heavy haulage vehicle passage was observed across the stripped area as part of the initial compaction and sealing of subgrade.

Recommendations

- Earthwork can proceed in this area.

Figure 1: Extent of works observed



PHOTOGRAPHS			
Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 1	Date: 19/01/23		
Description: Topsoil strip progress underway.			
Photo No. 2	Date: 19/01/23		
Description: Topsoil strip complete.			

Site Inspection Record

Project Number	510611	Date	23 January 2023
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny	Condition	Dry

SUBJECT Finished Subgrade Level Inspection

Representatives from Aurecon attended site on 23 Jan 2023 to inspect areas of finished subgrade surface for residential lots. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 1.79 ha has been trimmed to finished subgrade level on Lots 15,17,18,19 and 20. refer to ***Figure 1: Extent of works observed.***
- The underlying subgrade was firm underfoot, and there were no observable soft areas.
- Minor surface water present in a few locations due to recent overnight rainfall event.

Recommendations

- The finished subgrade for the lots is suitable for topsoil.

Closing Comments

The site features including finished surface areas inspected is presented in the photos appended to this report.

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:
Kiwi Property Group

Site Location:
133 Fitzgerald Road, Drury

Project No.
510611

Photo No.
1

Date:
17-01-23

Description:
Half of Lot 15 FSL.



Photo No.
2

Date:
17-01-23

Description:
Half of Lot 15 FSL.



Photo No. 3	Date: 19-01-23	
Description: Lot 18 FSL.		

Photo No. 4	Date: 19-01-23	
Description: Lot 18 FSL and progression into Lot 19.		

Photo No. 5	Date: 23-01-23	
Description: Lot 17 FSL.		

Photo No. 6	Date: 23-01-23	
Description: Lot 17 FSL.		

Photo No. 7	Date: 23-01-23	
Description: Lot 20 FSL.		

Photo No. 8	Date: 23-01-23	
Description: Lot 20 FSL.		

Site Inspection Record

Project Number	510611	Date	24 January 2023
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny		Dry

SUBJECT Topsoil Strip Inspection

Representatives from Aurecon attended site on the 24 Jan 2023 to inspect an area of subgrade surface post topsoil strip. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 0.5 ha of topsoil had been stripped within catchment A11 and loaded to a stockpile, refer to **Figure 1: Extent of works observed**.
- The underlying subgrade was firm underfoot, and there were no observable soft areas.
- Evidence of heavy haulage vehicle passage was observed across the stripped area as part of the initial compaction and sealing of subgrade.

Recommendations

- Earthworks can proceed in this area.

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

1

Date:

19/01/23

Description:

Area of topsoil striped.



Site Inspection Record

Project Number	510611	Date	10 February 2023
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Sunny	Condition	Dry

SUBJECT Finished Subgrade Level Inspection

Representatives from Aurecon attended site to inspect areas of finished subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 1.28 ha has been trimmed to finished subgrade level on Lots 16 and the reserve. refer to **Figure 1: Extent of works observed**.
- The underlying subgrade was firm underfoot, and there were no observable soft areas.

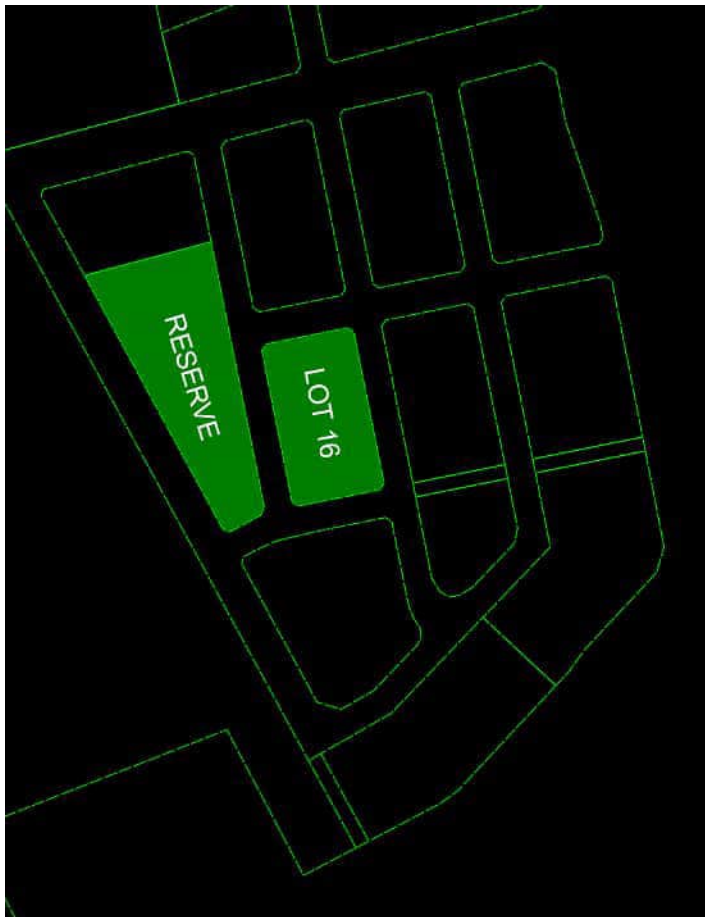
Recommendations

- The finished subgrade is suitable for topsoil spread.

Closing Comments

- The site features including finished surface areas inspected is presented in the photos included in this report.

Figure 1: Extent of works observed (green hatch)



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aurecon

Photographs

Lot 16



Reserve



Site Inspection Record

Project Number	510611	Date	12 February 2023
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	2
Weather	Overcast	Condition	Damp

SUBJECT Finished Subgrade Level Inspection

Representatives from Aurecon attended site to inspect areas of finished subgrade surface.

Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 0.43 ha has been trimmed to finished subgrade level on Lot 12. refer to **Figure 1: Extent of works observed.**
- The underlying subgrade was firm underfoot, and there were no observable soft areas.

Recommendations

- The finished subgrade is suitable for topsoil spread.

Closing Comments

- The site features including finished surface areas inspected is presented in the photos included in this report.

Figure 1: Extent of works observed (green hatch)



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Photographs

Lot 12



Site Inspection Record

Project Number	510611	Date	20 February 2023
Project Name	Drury Precinct	From	Ho Zhin Man
Contractor	Ross Reid Contractors Limited	Total Pages	8
Weather	Sunny		Dry

SUBJECT Subgrade Inspection

Representatives from Aurecon attended site on the 20 February 2023 to inspect an area of finished subgrade surface for residential lots and platform proposed for backfill stockpile. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 1.13 ha has been trimmed to finish subgrade level on Lot 13, 19 and approximately half of Lot 14 refer to **Figure 1: Extent of works observed**.
 - Underlying subgrade was firm underfoot, and there were no observable soft spots.
 - Subgrade consisted of clayey material which have been dried up as evident by cracking.
 - Small amounts of surface water present at low points of Lot 13.
 - No soft spots observed.
 - Batter on the side of Fitzgerald Rd to be completed at the time of visit.
- Approximately 0.28 ha has been filled to match road levels on Lot 200, proposed to be used as a platform for backfill stockpiling **Figure 1: Extent of works observed**.
 - Subgrade was firm underfoot, and there were no observable soft spots.
 - Tyre tracks left behind from compaction of fill.

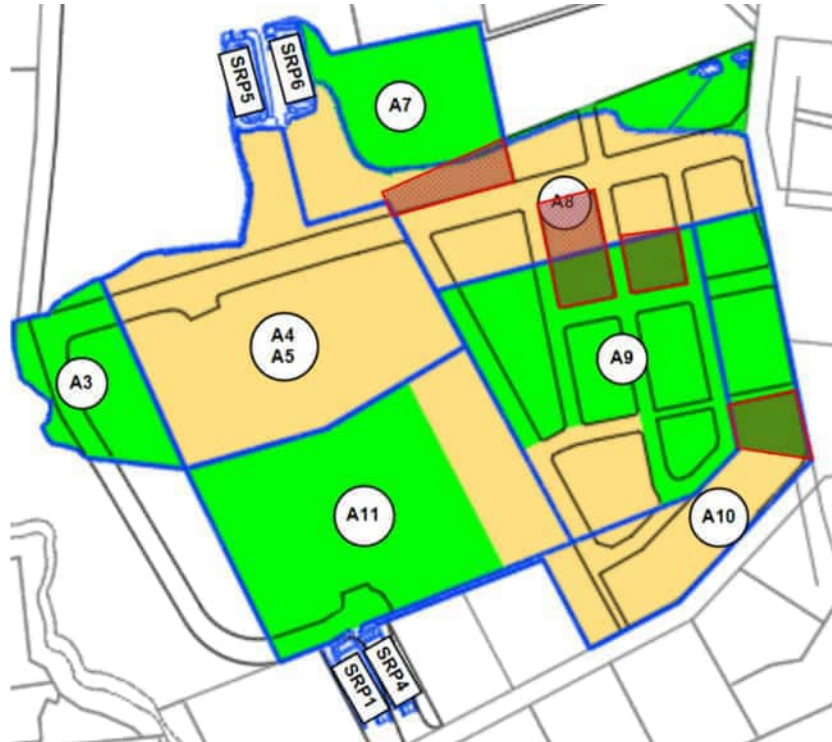
Recommendations

- Lot 13, 14 and proposed stockpile platform finished subgrade is suitable for topsoil spread. Lot 19 finished subgrade is suitable for topsoil spread after batter has been completed.

Closing Comments

- The site features including finished surface areas inspected is presented in the photos included in this report.

Figure 1: Extent of works observed



PHOTOGRAPHS			
Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 1.1	Date: 20/02/23		
Description: Lot 13 Finished subgrade level. Insitu material. Some surface water.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 1.2	Date: 20/02/23		
Description: Lot 13 Finished subgrade level. Engineering fill.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 1.3	Date: 20/02/23		
Description: Lot 13 Finished subgrade level. Insitu material – dried clay			

Client Name:		Site Location:	Project No.
Kiwi Property Group		133 Fitzgerald Road, Drury	510611
Photo No.	Date:		
1.4	20/02/23		
Description:			
Lot 13			
Low point with gathered surface water.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 2.1	Date: 20/02/23		
Description: Lot 14 Finished subgrade level			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 2.2	Date: 20/02/23		
Description: Lot 14 Finished subgrade level			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 2.3	Date: 20/02/23		
Description: Lot 14 Finished subgrade level			

Client Name:		Site Location:	Project No.
Kiwi Property Group		133 Fitzgerald Road, Drury	510611
Photo No.	Date:		
3.1	20/02/23		
Description:			
Lot 19			
Final subgrade level (looking towards north)			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 3.2	Date: 20/02/23		
Description: Lot 19 Final subgrade level (looking towards south)			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 3.3	Date: 20/02/23		
Description: Lot 19 Batter still to be completed			
Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 4.1	Date: 20/02/23		
Description: Backfill platform final subgrade level to road level.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 4.2	Date: 20/02/23		
Description: Backfill platform final subgrade level. Tracks from compaction of fill.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 4.3	Date: 20/02/23		
Description: Backfill platform final subgrade level. Tracks from compaction of fill.			

Site Inspection Record

Project Number	510611	Date	21 February 2023
Project Name	Drury Precinct	From	Ho Zhin Man
Contractor	Ross Reid Contractors Limited	Total Pages	5
Weather	Sunny		Dry

SUBJECT Topsoil Strip Inspection

Representatives from Aurecon attended site on the 21 February 2023 to inspect an area of subgrade surface post topsoil strip. Representatives from Ross Reid Contractors were present during the inspection.

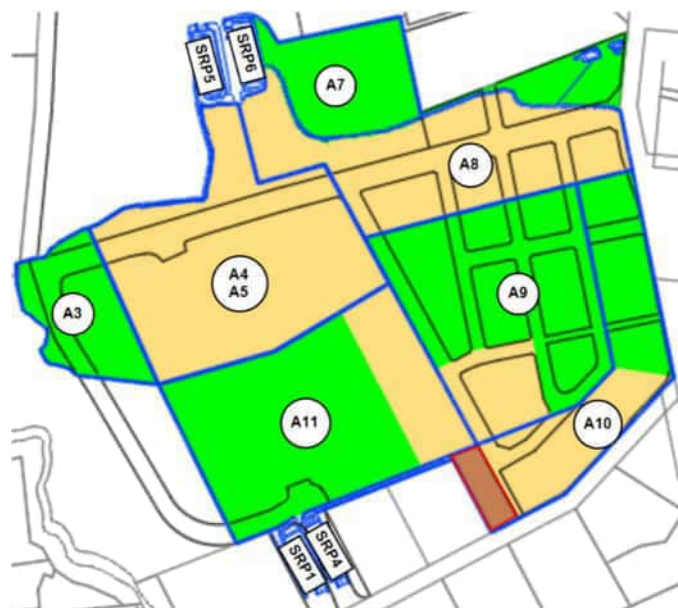
Site Observations

- Approximately 0.3 ha of topsoil had been stripped in area between Lot 7 and Lot 22 (A10) and loaded to a stockpile, refer to **Figure 1: Extent of works observed**.
 - The underlying subgrade was firm underfoot, with no observable soft spots.
 - Decently sized tree roots were spotted where the treeline previously existed. Tree roots were removed via digger during the inspection, leaving disturbed soil where the roots once were.
 - Contractors in the process of removing rubbish and unsuitable soil as a result of removing pre-existing farmhouse.
 - Bushes located up against treeline on the perimeter of the lot to be removed at a later stage of earthworks to avoid disruption to neighbours.

Recommendations

- Earthworks may proceed in the area after rubbish and unsuitable soil have been removed from site.

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

1

Date:

21/02/23

Description:

Topsoil stripped at site.


Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

2

Date:

21/02/23

Description:

Evidence of roots still beneath ground along removed treeline.



Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 3	Date: 21/02/23		
Description: Tree root in the process of being removed.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 4	Date: 21/02/23		
Description: Disturbed soil along treeline from digging up roots.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 5	Date: 21/02/23		
Description: Tree roots removed.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 6	Date: 21/02/23		
Description: Stockpile on the perimeter of site to be used as fill.			

Client Name:		Site Location:	Project No.
Kiwi Property Group		133 Fitzgerald Road, Drury	510611
Photo No.	Date:		
7	21/02/23		
Description:			
Rubbish and unsuitable pile being removed from site.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 8	Date: 21/02/23		
Description: Tree line and bushes on one side of site to be removed at a later stage.			

Site Inspection Record

Project Number	510611	Date	22 February 2023
Project Name	Drury Precinct	From	Ho Zhin Man
Contractor	Ross Reid Contractors Limited	Total Pages	4
Weather	Sunny		Dry

SUBJECT Subgrade Inspection

Representatives from Aurecon attended site on the 22 February 2023 to inspect an area of finished subgrade surface for residential lots. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 0.88 ha has been trimmed to finish subgrade level on half of Lot 19 and half of Lot 22 refer to **Figure 1: Extent of works observed.**
 - Underlying subgrade was firm underfoot, and there were no observable soft spots.
 - Subgrade consisted of clayey material which have been dried up as evident by cracking.
 - Some medium sized boulder observed in the ground, have been marked to be removed in Lot 22.

Recommendations

- Inspected portion of Lot 19 and 22 finished subgrade is suitable for topsoil spread after removal of boulder.

Closing Comments

- The site features including finished surface areas inspected is presented in the photos included in this report.

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

1

Date:

22/02/23

Description:

Final Subgrade level
from top of Lot 19.


Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

2

Date:

22/02/23

Description:

Final Subgrade level
from bottom of Lot 22.



Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 3	Date: 22/02/23		
Description: Boulder in Lot 22 marked for removal.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 4	Date: 22/02/23		
Description: Soil present in subgrade.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 5	Date: 22/02/23		
Description: Soil present in subgrade.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 6	Date: 22/02/23		
Description: Cracking of subgrade, evidence of clayey soil.			

Site Inspection Record

Project Number	510611	Date	24 February 2023
Project Name	Drury Precinct	From	Ho Zhin Man
Contractor	Ross Reid Contractors Limited	Total Pages	7
Weather	Drizzling		Wet

SUBJECT Subgrade Inspection

Representatives from Aurecon attended site on the 24 February 2023 to inspect an area of finished subgrade surface for residential lots. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

- Approximately 0.73 ha has been trimmed to finish subgrade level on Lot 20 and 21 refer to **Figure 1: Extent of works observed**.
 - Underlying subgrade was firm underfoot, and there were no observable soft spots.
 - Subgrade consists of clayey material and due to the drizzling, subgrade material exhibited increased plasticity on the surface, as expected.
 - Settlement plate is present on Lot 21.
 - Contour drain filled in on Lot 21.

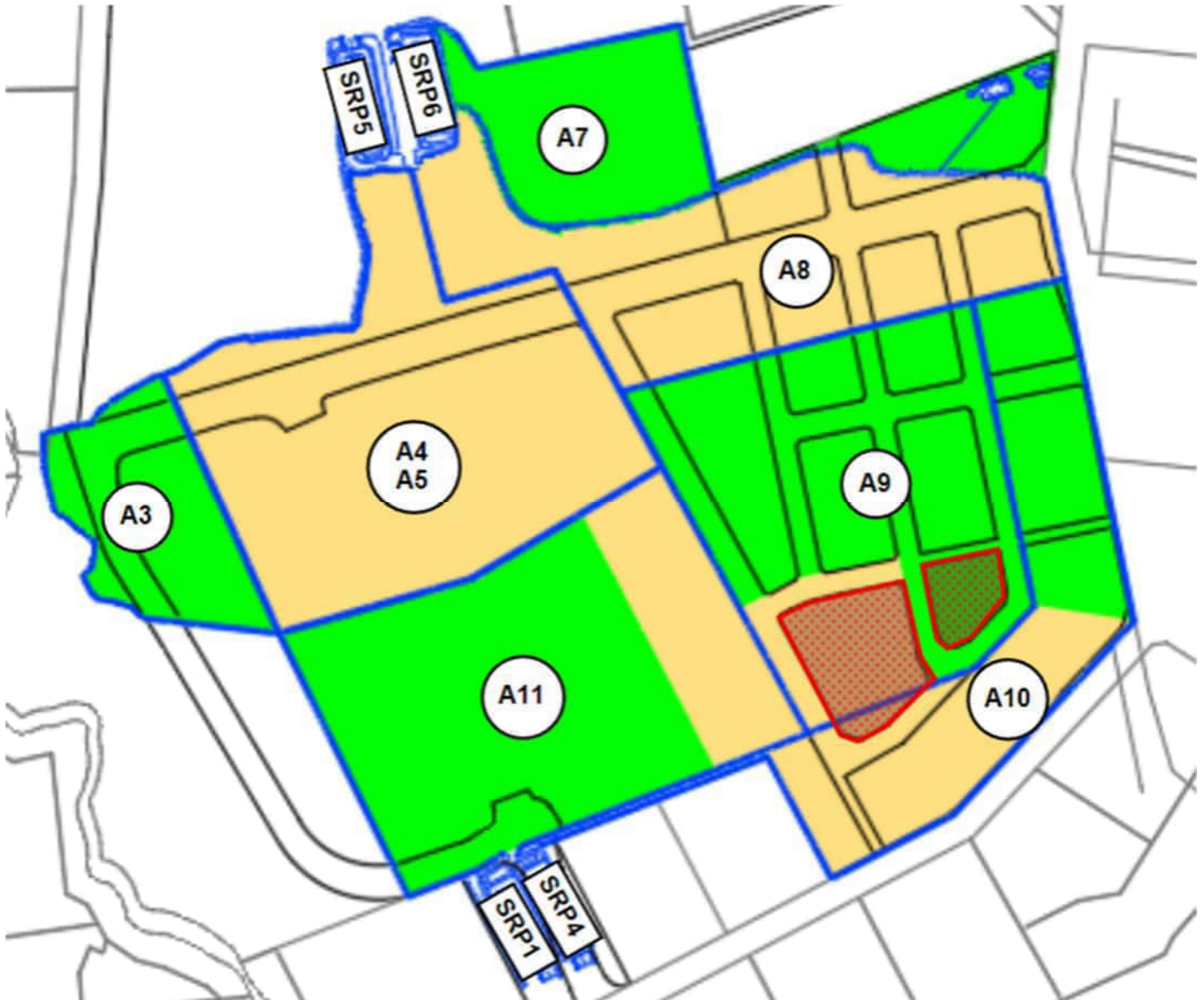
Recommendations

- Lot 20 and 21 finished subgrade is suitable for topsoil spread after removal of boulder.
- Keep settlement plate on Lot 21 installed and topsoil around settlement plate upstand.

Closing Comments

- The site features including finished surface areas inspected is presented in the photos included in this report.

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

1

Date:

24/02/23

Description:

Lot 21
Final Subgrade level.



Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.

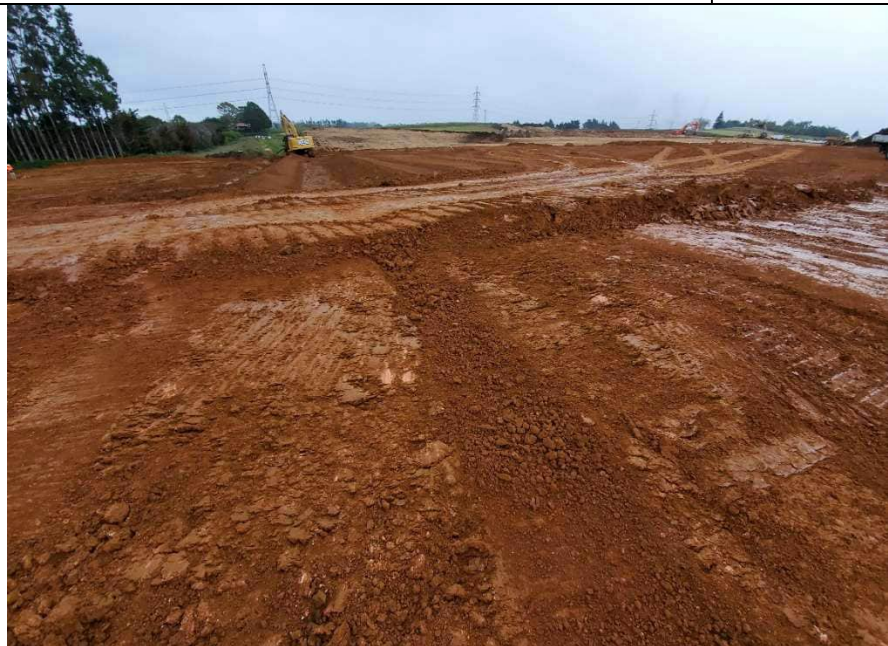
2

Date:

24/02/23

Description:

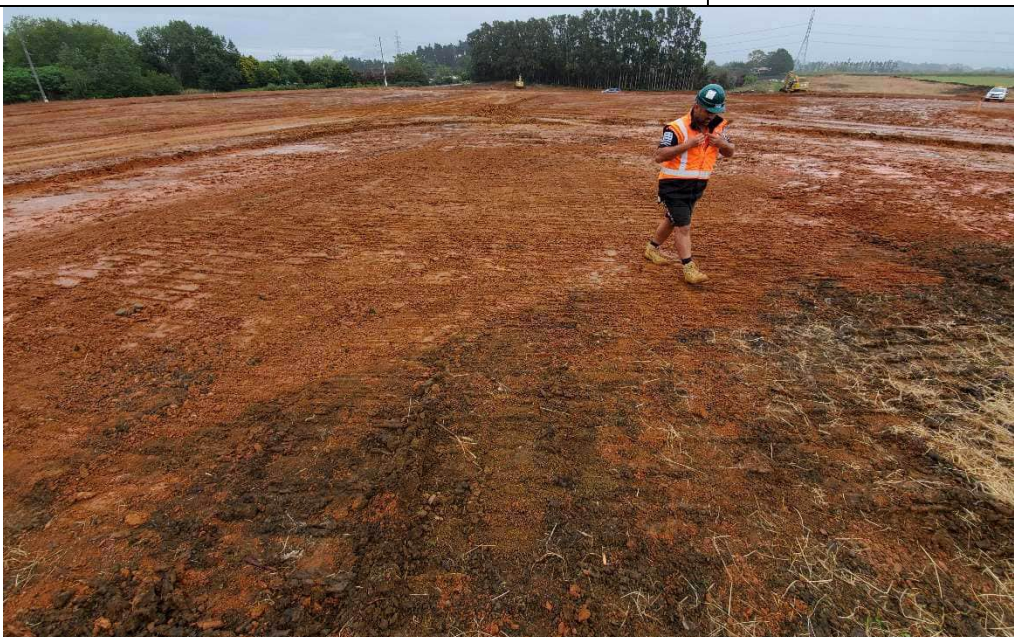
Lot 21
Contour drain
backfilled.



Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 3	Date: 24/02/23		
Description: Lot 21 Settlement Plate.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 4	Date: 24/02/23		
Description: Lot 21 Subgrade soil.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 5	Date: 24/02/23		
Description: Lot 21 Final subgrade level.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury	Project No. 510611
Photo No. 6	Date: 24/02/23		
Description: Lot 20 Final subgrade level.			

Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury		Project No. 510611	
Photo No. 6	Date: 24/02/23				
Description: Lot 20 Final subgrade level.					
Client Name: Kiwi Property Group		Site Location: 133 Fitzgerald Road, Drury		Project No. 510611	
Photo No. 6	Date: 24/02/23				
Description: Lot 20 Subgrade soil.					

Site Inspection Record

Project Number	510611	Date	05 March 2023 15 March 2023
Project Name	Drury Precinct	From	Bryn Pattison
Contractor	Ross Reid Contractors Limited	Total Pages	8
Weather	Sunny with light wind	Conditions	Dry

SUBJECT Bulk Earth Works Subgrade Inspection

Representatives from Aurecon attended site to inspect areas of finished subgrade. Representatives from Ross Reid Contractors were present during the inspection.

Site Observations

Residential Lot Area	10.5 ha
Retail Lot Area	13.0 ha
Roads and Berms Area	8.9 ha

Firm underfoot	Yes
Uniformly graded	Yes
Free draining	Yes
Free of rutting and weaving	Yes
Free of organic material	Yes
Free of soft spots	Yes

Closing Comments

- Areas inspected to be covered as soon as possible to protect subgrade from drying out and cracking
- Visual inspection only, as-built levels for areas on grade to be approved separately

Figure 1: Extent of works observed



PHOTOGRAPHS

Client Name:

Kiwi Property Group

Site Location:

133 Fitzgerald Road, Drury

Project No.

510611

Photo No.1

Date: 05 March 2023



Photo No.2

Date: 05 March 2023



Photo No.3

Date: 05 March 2023



Photo No.4

Date: 05 March 2023



Photo No.5

Date: 05 March 2023



Photo No.6

Date: 05 March 2023

