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South Geelong, Vic, 3220

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LEVEL 1 INSPECTION & TESTING CORIDALE ESTATE STAGE 10 LARA

Prepared for Creo Consultants Pty Ltd

Report Reference: GSSW1713.1 AA

Date: 24 January 2023

ABN: 51 612 825 313

10 Dowsett Street

South Geelong, Vic, 3220

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PROJECT DETAILS

Project Reference	GSSW1713.1	Rev	AA
Project Title	Coridale Estate Stage 10		
Project Location	Lara	State	VIC
Date	24 January 2023		

CLIENT DETAILS

Prepared For (Client)	Creo Consultants Pty Ltd
Client Address	Level 7/176 Wellington Parade, East Melbourne VIC 3002

DISTRIBUTION

Original Held By	Ground Science South West Pty Ltd
One (1) Electronic Copy	Creo Consultants Pty Ltd

This document presents the results of the Level 1 Inspection and Testing performed by Ground Science South West for the aforementioned project, as the nominated project Geotechnical Inspection & Testing Authority (GITA). This report is detailed for the sole use of the intended recipient(s). Should you have any questions related to this report please do not hesitate to contact the undersigned.

AUTHOR:



Michael Knez
Graduate Geotechnical Engineer

REVIEWED:



Gee Singh, RPEng
Senior Geotechnical Engineer

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FIGURES

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APPENDICES

APPENDIX A	PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS TEST REPORT SHEETS
APPENDIX B	FIELD DENSITY TEST REPORT SUMMARY SHEET
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1. INTRODUCTION

This report presents the results of the inspection activities, compaction control and laboratory testing services performed by Ground Science South West Pty Ltd for the Coridale Estate Stage 10 project, located in Lara, Victoria (the site).

2. PROJECT UNDERSTANDING

It is understood that the project involves the placement of fill as part of the bulk earthworks phase for Coridale Estate Stage 10. Ground Science was engaged to provide Level 1 Inspection and Testing services for the construction of these areas. Authorisation to proceed was provided by Creo Consultants Pty Ltd (the 'Client').

Level 1 Inspection & Testing, as defined in AS3798 (2007) 'Guidelines on Earthworks for Commercial and Residential Developments' provides for full time inspection of the construction of controlled fill and compaction testing in accordance with AS1289 'Methods of Testing Soils for Engineering Purposes' and AS1726 (2017) 'Geotechnical Site Investigations'.

Ground Science performed the role of the project Geotechnical Inspection & Testing Authority (GITA) with all Level 1 Inspection and Testing services described in this report undertaken by an experienced GITA site representative.

3. SCOPE OF WORK

3.1 AREAS OF WORK

Ground Science provided Level 1 Inspection and Testing services for the construction of fill in areas requiring greater than 200mm of fill to achieve finished levels. The areas requiring Level 1 Inspection & Testing are shown on the supplied construction drawing, on Figures 1 and 2, prepared by Creo Consultants Pty Ltd (Coridale Estate - Stage 10 Layout Plan – 1 [No. 180014.10 R200 Rev A] and Coridale Estate - Stage 10 Layout Plan – 2 [No. 180014.10 R201 Rev A]).

This report details the Level 1 earthworks process performed on site which commenced on 30th of November 2022 and was completed on the 10th of January 2023, requiring 15 full days of inspection and testing works.

3.2 PLACEMENT METHODOLOGY

A technical specification for the fill operations was not provided. The placement of controlled fill on the above-mentioned areas was carried out in accordance with Level 1 fill procedures as detailed in AS3798 (2007) 'Guidelines on Earthworks for Commercial and Residential Developments'. The following fill placement guideline was adopted for the works:

- All existing loose surficial fill, topsoil, soft material, vegetation and materials containing significant organic matter were removed to expose the natural soil subgrade;
- Suitable fill material, sourced by the contractor and approved by Ground Science, was placed in loose horizontal layers not exceeding 300mm in thickness;
- The controlled fill material was compacted to achieve a target Dry Density Ratio of at least 95% Standard Compaction (AS 1289: 5.1.1, 5.4.1 or 5.7.1), based on our understanding that future building loads would be similar to residential type structures (i.e. non-commercial structural loading);
- The fill was moisture conditioned to within +/- 3% of the standard optimum moisture content;
- The fill material was sorted and mixed to eliminate particles greater than 20% by volume, particles coarser than 37.5mm and no particle over 200mm in any dimension;
- The frequency of field density testing adopted for the project was generally in line with the requirements for large scale developments (Type 1), as detailed in AS3798 (2007), which nominates a frequency of

not less than:

- 1 test per layer or 200mm per 2500m²;
- 1 test per 500m³ distributed reasonably evenly throughout the full depth and area; or
- 3 tests per site visit; whichever requires the most tests.

4. INSPECTION AND TESTING

4.1 SUBGRADE PREPARATION

It is understood that the on-site contractor, Winslow Constructors removed all organics, topsoil and compressible (soft) soils between the 28th of January and the 30th of November 2022. Inspection of the prepared subgrade surface was carried out on 30st of November 2022 by the representative geotechnician from Ground Science South West.

At the time of the inspection, the prepared subgrade was proof rolled with a 20T water truck. During this inspection, organics materials and boulders were found in the prepared subgrade surface to the east of the proposed Watercourse Road, prompting further stripping works in this area. The prepared subgrade surface in all other areas was considered suitable for subsequent works to proceed. A supplementary inspection of the prepared subgrade to east of the proposed Watercourse Road was carried out

on the 5th of December 2022 by the representative geotechnician from Ground Science South West. At the time of the inspection, the prepared subgrade in this area was deemed acceptable, proof rolled with a 20T water truck and considered suitable for subsequent works to proceed.

It is important to note that this further stripping past the levels nominated on the plans has resulted in an increase in areas that require Level 1 Inspection and Testing. Contractor survey data should be reviewed to obtain a true representation of fill thicknesses, where required.

The above stripped subgrade was visually assessed using tactile methods described in AS1726 (2017) and approved by the GITA representative throughout the project.

4.2 CONSTRUCTION MATERIALS

The fill material used in this project was nominated by the on-site contractor. All materials used for the project were sourced from onsite. The material was carted across site in dump trucks and stockpiled adjacent to the fill zones. Ground Science performed an assessment of the fill source to identify the following material characteristics:

- Material suitability as an engineering property;
- Cohesiveness;
- Free of building debris and vegetative matter;
- Free of oversize rock particles.

Visual assessments on the above-mentioned properties were conducted on-site and the fill material used was considered acceptable for use on this project. The nominated fill products were visually assessed to comprise of gravelly CLAY (CH), high plasticity, brown, with sand, moist.

Quality assurance tests were performed on the stockpiled fill material before placement during the construction of a previous stage of works. These tests include Particle Size Distribution and Atterberg Limits tests. The test report sheets are presented in Appendix A. Ground Science did not perform any chemical or environmental analysis on the above fill material.

The fill source was assessed to range from dry to close of the optimum moisture content. Portions of the fill material that were found to be dry were moisture conditioned using a water cart prior to compaction. All fill materials were generally considered suitable for use as engineered fill.

4.3 FILL CONSTRUCTION

The contractor had the following plant available on site during the construction period for use in the fill placement;

- Bulldozer;
- Grader;
- Scraper;
- Excavator;
- Water Cart;
- Compactor.

During fill placement, the weather conditions ranged from sunny to rainy with temperatures typically ranging from 9 to 30 degrees Celsius.

The filling process was generally consistent throughout the project and involved the approved fill stockpiled adjacent to the fill placement zones. The material was spread using a grader into thin, loose layers. These layers were moisture conditioned by a water cart, applying a minimum of 1-2 passes to bring the placed material close to optimum moisture content.

Each layer was compacted using a padfoot roller applying a minimum of 5-8 passes, per layer observed. The thin layers of fill were compacted to form a composite layer, measuring 200mm thick, prior to undertaking the field density testing. This process was adopted for the fill placement works.

Rain was forecasted multiple times over the course of the works. A sacrificial layer of material was placed by a compactor to protect the previously placed and tested layers from rain. This material was removed when works recommenced and blended with the stockpile for moisture control and reuse.

4.4 RESULTS OF COMPACTION CONTROL TESTING

Level 1 Inspection and Testing was undertaken by experienced technicians from Ground Science who attended the site for the duration of the construction phase and nominated the location of the in-situ density tests. Testing comprised a total of 49 in-situ density tests using a nuclear moisture-density gauge in accordance with Australian Standard (AS1289 5.8.1) together with 49 "Rapid HILF" Compaction tests (AS1289 5.7.1).

A summary of the field density and compaction control testing is presented in Appendix B. Field density and compaction control testing report sheets are presented in Appendix C. It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed.

2 test areas (#35 and #37) failed to reach the required target density ratio. 2 test areas (#10 and #11) failed to reach the required moisture condition. These areas were subsequently reworked, recompacted and retested (#16, #17, #39 and #43) with compliant test results achieved.

4.5 FINAL SURFACE LEVELS

Observations were made by a Ground Science staff member that filling had been complete up to the nominated finished levels designated on Figure 1 as per confirmation provided from the contractor's site foreman. We understand that the observed final levels are the constructed finished surface levels of the controlled fill. The overall fill depths are estimated using onsite visual tactile methods and may not be a true representation of fill depths

given that conditions on site may change over time. True fill depths should be obtained from the contractor's survey data.

5. COMPLIANCE

Ground Science Staff have undertaken Level 1 Inspection and Testing services of the construction of the controlled fill in the areas designated on Figure 1. Ground Science field staff have also observed that the prepared subgrade provided an adequate base for the subsequent placement of controlled fill.

Based on observations made by Ground Science staff and the results of density tests, we consider that the controlled fill placed has been constructed in accordance with the guidelines in AS3798 (2007).

It should be noted that the final fill layers may be subjected to adverse weather conditions resulting in either surface softening or drying and cracking over time; regardless of the compactive efforts and moisture conditioning applied during the works. The integrity of the top 200mm to 300mm of the fill will deteriorate with time and should be taken into account by the foundation engineer prior to the construction of dwellings or buildings. The levels nominated in this report are a guide to amounts of fill placed and do not necessarily reflect an accurate survey of the fill levels.

6. UNDERSTANDING LEVEL 1 INSPECTION & TESTING

The purpose of performing Level 1 Inspection and Testing is to ensure compliance of the fill with the specification. The engagement of a Geotechnical Inspection Testing Authority (GITA) allows the contractor to perform their role in the construction of the filling operation while the GITA monitors the quality control process of the fill placement. The visual observations of thorough processes and work practices by the contractor allows the GITA to approve the subsequent placement of fill without having to wait for the completion of testing and the extended time it takes to get a test result back. The GITA will however, carry out random spot checks of the filling operations throughout the day's production as confirmation that the placement procedures and the fill moisture content is appropriate. At the end of a day's production the GITA will sign off the completed works as satisfactory. Any failed tests will result in that particular area of operation requiring rectification in the following mornings activities. This may be as simple as extra rolling with compaction plant if moisture conditioning is suitable. Sometimes these areas may be retested if the GITA feels it is necessary.

While AS3798 (2007) is a guideline on the minimum requirements of filling on commercial and residential developments, some projects require a more detailed project specification to deal with site specific issues. While moisture conditioning of fill sources aids in the ease with which compaction is achieved, it is not necessarily a physical characteristic that determines if the placed fill is acceptable. In some situations, the moisture requirement is an extremely important function of the final constructed product. In these situations, a specific project specification should apply to the project as detailed by the designing geotechnical engineer. These are typical of clay liners for wetlands, dams, landfill liners and caps and an array of other engineering situations. Creating a consolidated platform of which is similar to equivalent surrounding natural conditions is the primary aim of level one processes, preventing the occurrence of differential ground movements to footing structures.

Level 1 Inspection & Testing requires full time inspection and testing of the fill placement undertaken on a site. Ground Science (project GITA), are notified daily (or at the completion of each day's work) by the project foreman where subsequent days of fill placement under Level 1 is to occur. On projects that rely upon the importation of a fill source, there can be delays in the receipt of sufficient materials to warrant fill placement works which may result in periods of time where a GITA representative is not required on site. It is the contractor's responsibility to notify the GITA when works proceed and their attendance on site is required again. A GITA relies upon the integrity of the contractor to advise when site attendance is required and makes all reasonable visual attempts to assess if the works are the same as the previous days attendance.



Ground Science

**For & on behalf of
Ground Science South West Pty Ltd**

AUTHOR:

A handwritten signature in black ink, appearing to read 'MKnez'.

**Michael Knez
Geotechnical Engineer**

REVIEWED:

A handwritten signature in black ink, appearing to read 'Gee Singh'.

**Gee Singh, RPEng
Senior Geotechnical Engineer**

7. LIMITATIONS

This type of investigation (as per our commission) is not designed or capable of locating all soil conditions, (which can vary even over short distances). The advice given in this report is based on the assumption that the test results are representative of the overall soil conditions. However, it should be noted that actual conditions in some parts of the Site might differ from those found. If further sampling reveals soil conditions significantly different from those shown in our findings, Ground Science must be consulted. Maintenance and upkeep of finished fill placement must be regularly monitored as exposure to extended weather periods/other elements may cause surface drying which may lead to cracking. Conversely, excessive exposure to moisture may cause heaving/softening in the soils.

It is recognised that the passage of time affects the information and assessment provided in this document. Ground Science's assessment is based on information that existed at the time of the preparation of this document. It is understood that the services provided allowed Ground Science to form no more than an opinion of the actual site conditions observed during sampling and observations of the site visit and cannot be used to assess the effects of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

The scope and the period of Ground Science services are described in the proposal and are subject to restrictions and limitations. Ground Science did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Ground Science in regards to it.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Ground Science for incomplete or inaccurate data supplied by others.

Any drawings or figures presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

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GroundScience

8. REFERENCES

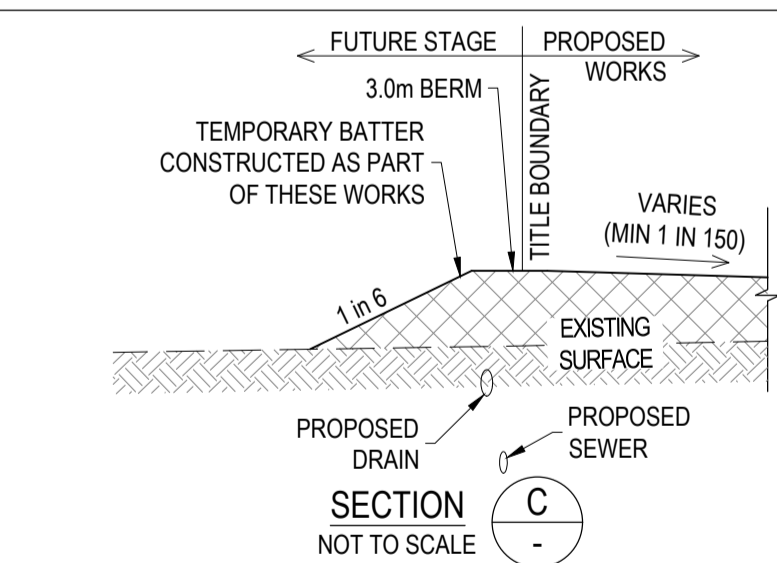
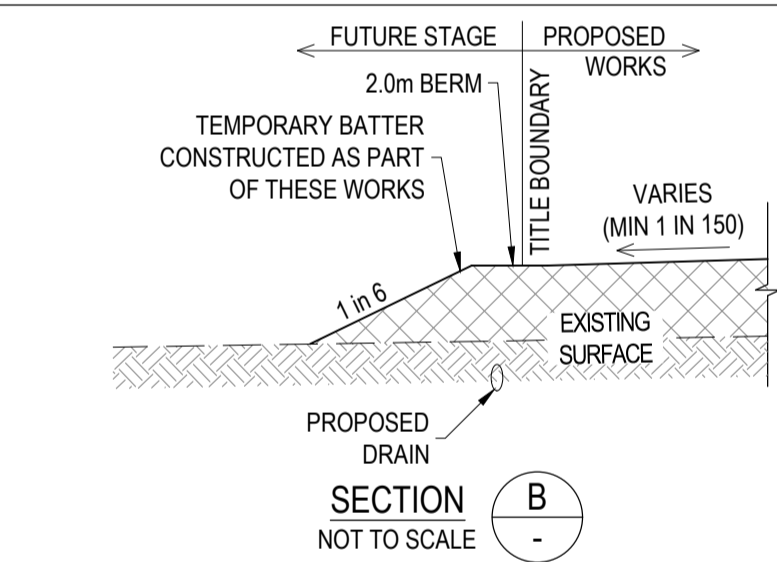
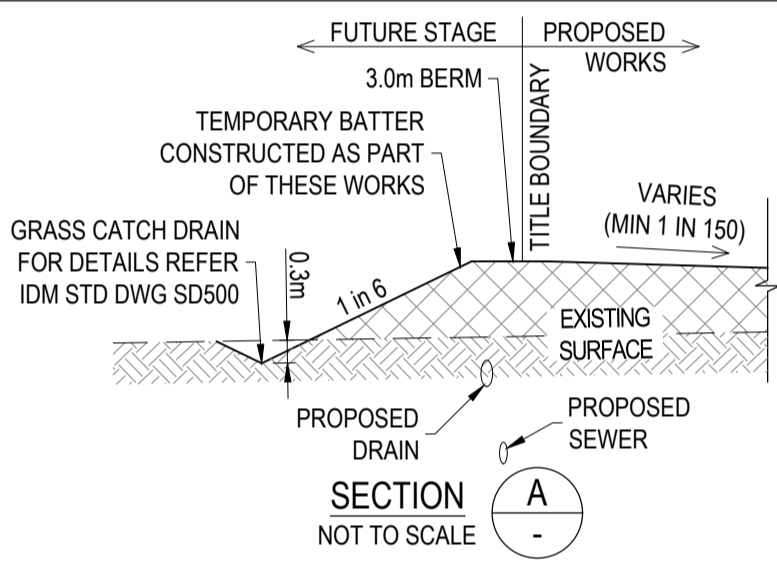
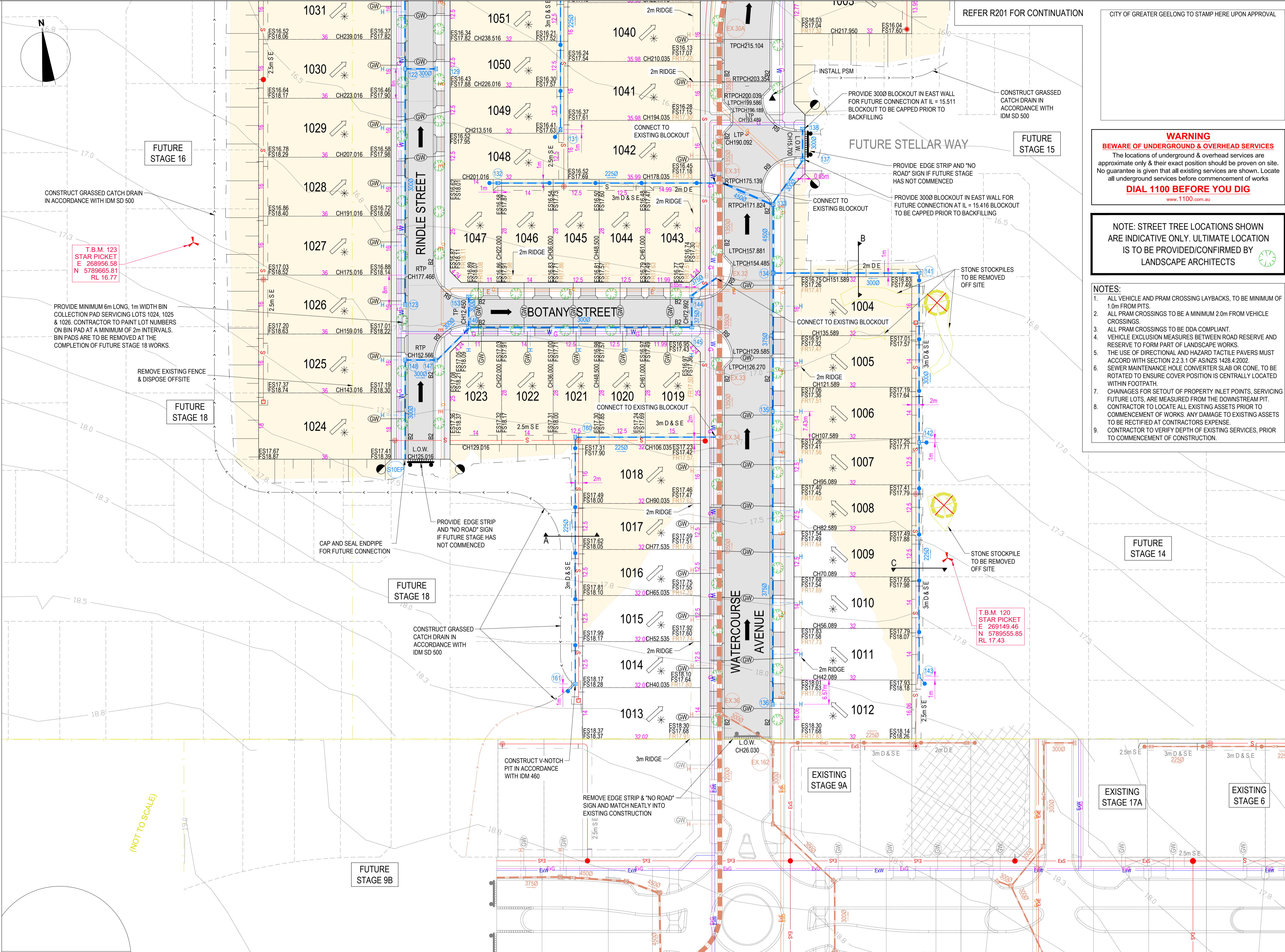
- AS3798 (2007) Guidelines on Earthworks for Residential and Commercial Developments.
- AS1289 Methods of Testing Soils for Engineering Purposes.
- AS1726 (2017): Geotechnical Site Investigations

FIGURE 1

Coridale Estate - Stage 10 Layout Plan – 1 [No. 180014.10 R200 Rev 0]

LEGEND - LAYOUT PLAN

- STORMWATER DRAIN, PIT & PROPERTY INLET
- SWALE DRAIN
- SEWER & MAINTENANCE STRUCTURES
- HOUSE DRAIN
- EXISTING HOUSE DRAIN
- SERVICE CONDUITS
- EXISTING ELECTRICITY (UNDERGROUND)
- EXISTING ELECTRICITY (OVERHEAD)
- EXISTING GAS
- EXISTING OPTIC FIBRE
- EXISTING TELSTRA
- EXISTING WATER
- EXISTING RECYCLED WATER
- EXISTING STORMWATER DRAIN
- EXISTING SEWER
- EXISTING SURFACE LEVEL
- FINISHED BUILDING LINE LEVEL
- FINISHED RIDGE LINE LEVEL
- PAVEMENT TREATMENT
- STRUCTURAL FILL > 200mm DEEP
- EX. STRUCTURAL FILL > 200mm DEEP
- DIRECTION OF FALL
- OVERLAND FLOW
- ALLOTMENT TO BE GRADED EVENLY IN DIRECTION OF FALL TO LEVELS INDICATED
- CONCRETE EDGE STRIP WITH SUBSOIL DRAIN, "NO ROAD" SIGN & BARRIER
- LIMIT OF WORKS
- INDICATIVE STREET TREE
- EXISTING TREE TO BE REMOVED
- PERMANENT SURVEY MARK
- TEMPORARY BENCH MARK
- PROPOSED DRIVEWAY
- 1.8m HIGH CAPPED TIMBER PALING FENCE INCLUDING 190 x 35 H4 TREATED PINE PLINTH
- STORM WATER PIT SETOUT POINT



REVISION	DATE	ISSUE DESCRIPTION	DRAWN	CHECKED	APPROVED
0	14/10/22	ISSUED FOR CONSTRUCTION	I.HOGAN	C.ROHDE	M.TROUNCE

villawood properties
Communities Designed for Living

creo CONSULTANTS
Suite 1, 2 Bloombsbury Street
Geelong, VIC, Australia 3220

Coridale
LARA

CORIDALE ESTATE - STAGE 10
LAYOUT PLAN - 1
DRAWING TITLE
PLANNING PERMIT No: PP-496-2018

ISSUED FOR CONSTRUCTION

SCALE AT A1	DRAWN	DESIGNED
1:500 @ A1	B.BLEECH	I.HOGAN
PROJECT ENGINEER	PROJECT MANAGER	DATE FIRST ISSUE
M.TROUNCE	T.PALIOS	MAY 2022
PROJECT No.	DRAWING No.	REVISION
180014.10	R200	0

FIGURE 2

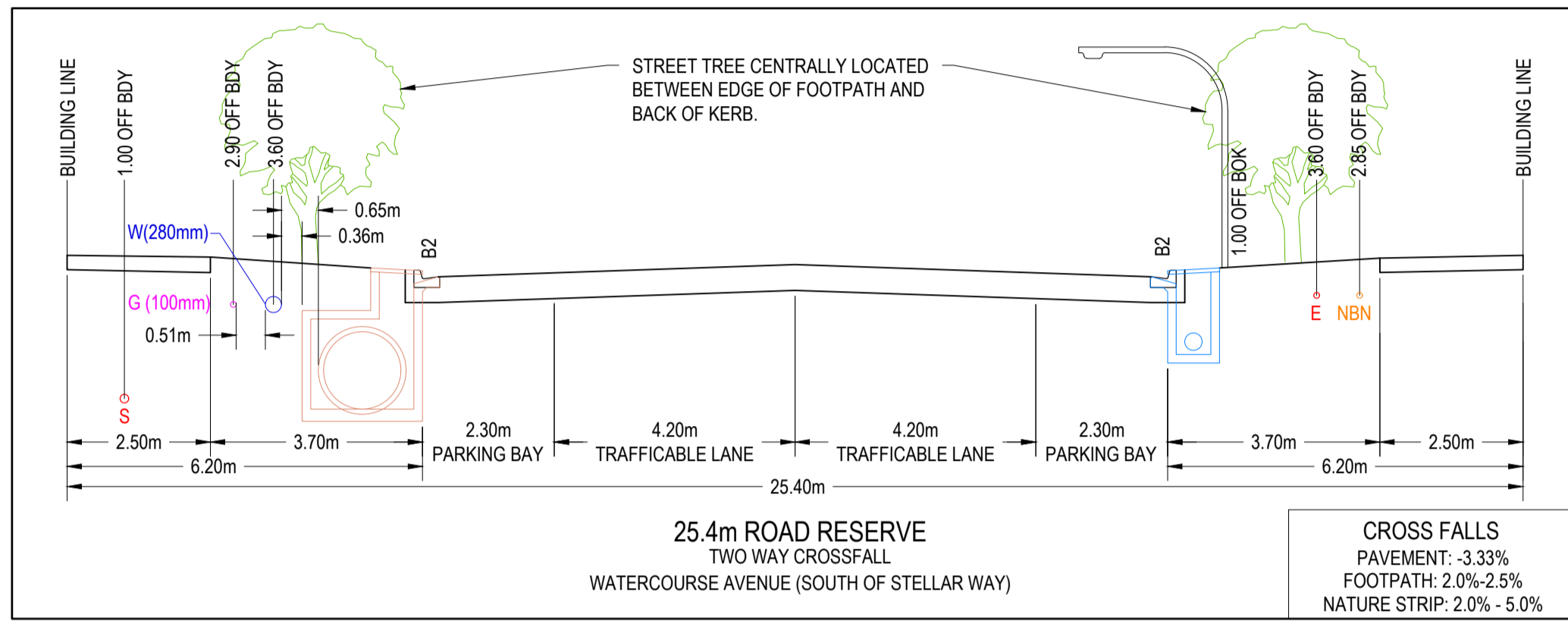
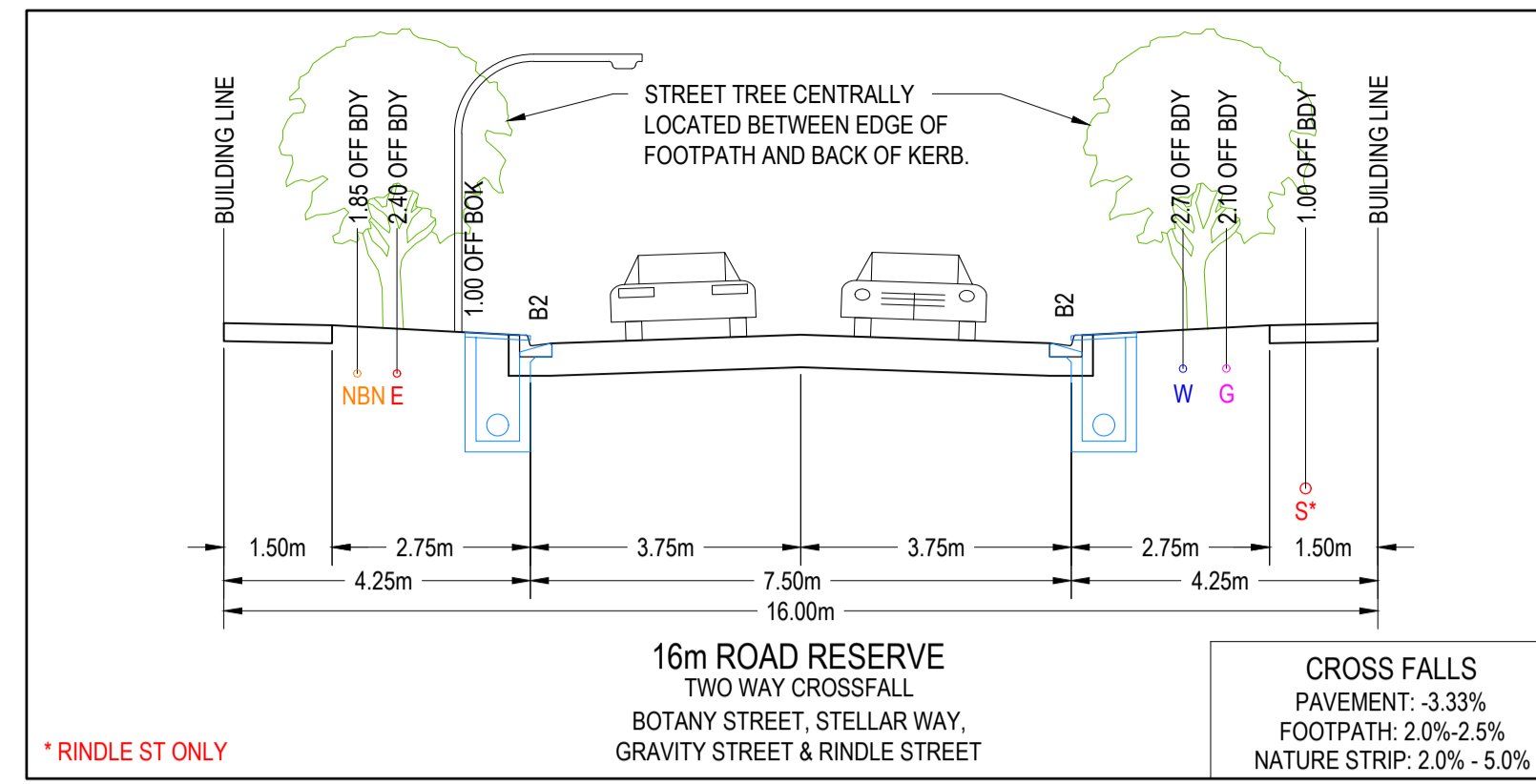
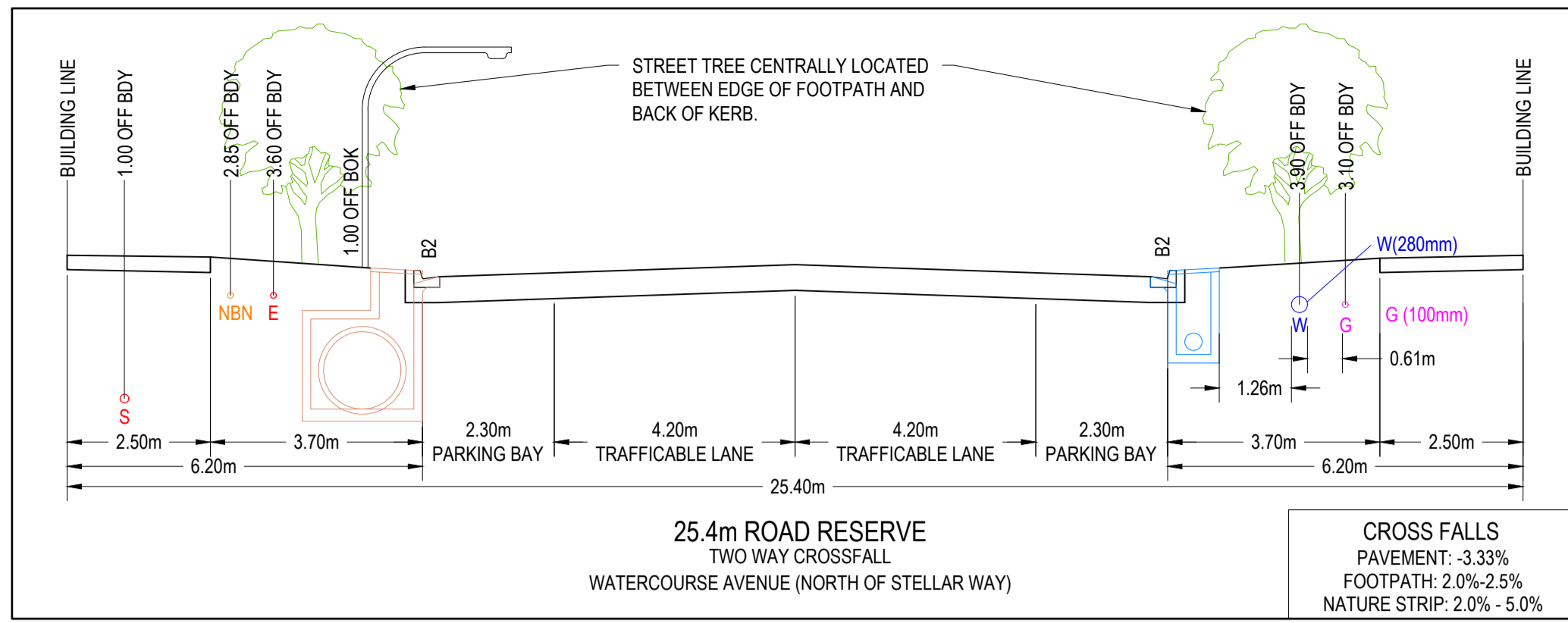
Coridale Estate - Stage 10 Layout Plan – 2 [No. 180014.10 R201 Rev 0]

WARNING
BEWARE OF UNDERGROUND & OVERHEAD SERVICES
 The locations of underground & overhead services are approximate only & their exact position should be proven on site. No guarantee is given that all existing services are shown. Locate all underground services before commencement of works
DIAL 1100 BEFORE YOU DIG
 www.1100.com.au

NOTE: STREET TREE LOCATIONS SHOWN ARE INDICATIVE ONLY. ULTIMATE LOCATION IS TO BE PROVIDED/CONFIRMED BY LANDSCAPE ARCHITECTS

NOTES:

- ALL VEHICLE AND PRAM CROSSING LAYBACKS, TO BE MINIMUM OF 1.0m FROM PITS.
- ALL PRAM CROSSINGS TO BE A MINIMUM 2.0m FROM VEHICLE CROSSINGS.
- ALL PRAM CROSSINGS TO BE DDA COMPLIANT.
- VEHICLE EXCLUSION MEASURES BETWEEN ROAD RESERVE AND RESERVE TO FORM PART OF LANDSCAPE WORKS.
- THE USE OF DIRECTIONAL AND HAZARD TACTILE PAVERS MUST ACCORD WITH SECTION 2.2.3.1 OF AS/NZS 1428-4:2002.
- SEWER MAINTENANCE HOLE CONVERTER SLAB OR CONE, TO BE ROTATED TO ENSURE COVER POSITION IS CENTRALLY LOCATED WITHIN FOOTPATH.
- CHAINAGES FOR SETOUT OF PROPERTY INLET POINTS, SERVICING FUTURE LOTS, ARE MEASURED FROM THE DOWNSTREAM PIT. CONTRACTOR TO LOCATE ALL EXISTING ASSETS PRIOR TO COMMENCEMENT OF WORKS. ANY DAMAGE TO EXISTING ASSETS TO BE RECTIFIED AT CONTRACTORS EXPENSE.
- CONTRACTOR TO VERIFY DEPTH OF EXISTING SERVICES, PRIOR TO COMMENCEMENT OF CONSTRUCTION.



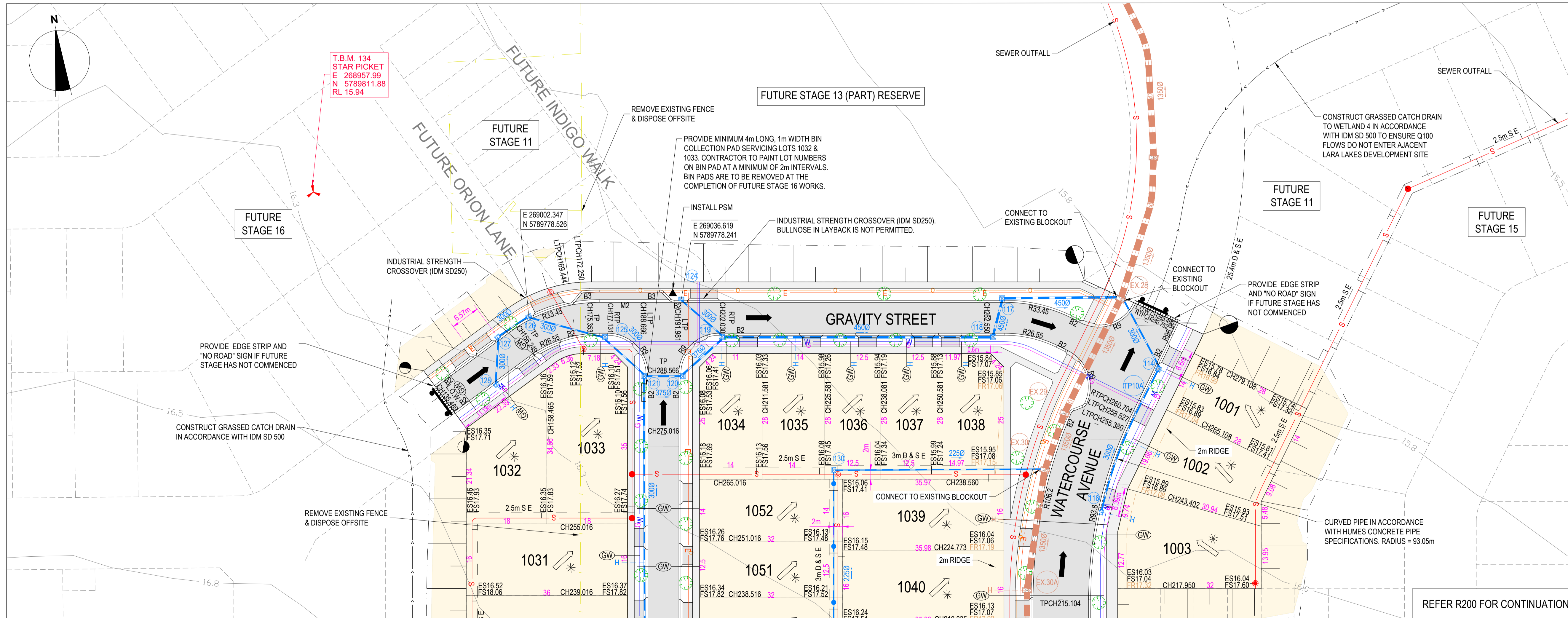
ROAD NAME	GAS		WATER		OPTIC FIBRE		ELECTRICITY		PUBLIC LIGHTING	
	SIDE	OFFSET (m)	SIDE	OFFSET (m)	SIDE	OFFSET (m)	SIDE	OFFSET (m)	SIDE	OFFSET (m)
WATERCOURSE AVENUE (NORTH OF STELLAR WAY)	EAST	3.10	EAST	3.90	WEST	2.85	WEST	3.60	WEST	1.00*
WATERCOURSE AVENUE (SOUTH OF STELLAR WAY)	WEST	2.90	WEST	3.60	EAST	2.85	EAST	3.60	EAST	1.00*
BOTANY STREET	SOUTH	2.10	SOUTH	2.70	NORTH	1.85	NORTH	2.40	NORTH	1.00*
RINDLE STREET	WEST	2.10	WEST	2.70	EAST	1.85	EAST	2.40	EAST	1.00*
GRAVITY STREET	SOUTH	2.10	SOUTH	2.70	NORTH	1.85	NORTH	2.40	NORTH	1.00*
FUTURE STELLAR WAY	NORTH	2.10	NORTH	2.70	SOUTH	1.85	SOUTH	2.40	SOUTH	1.00*
FUTURE ORION LANE	-	-	-	-	WEST	1.20	WEST	1.80	-	-
FUTURE INDIGO WALK	WEST	0.80	WEST	1.30	-	-	-	-	-	-

1. * DENOTES OFFSET FROM BACK OF KERB.

LEGEND - LAYOUT PLAN

- STORMWATER DRAIN, PIT & PROPERTY INLET
- SWALE DRAIN
- SEWER & MAINTENANCE STRUCTURES
- HOUSE DRAIN
- EXISTING HOUSE DRAIN
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- EXISTING ELECTRICITY (UNDERGROUND)
- EXISTING ELECTRICITY (OVERHEAD)
- EXISTING GAS
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- STORM WATER PIT SETOUT POINT

Scale: 1:500 (A1), 1:1000 (A3)



REVISION	DATE	ISSUE DESCRIPTION	DRAWN	CHECKED	APPROVED
0	14/10/22	ISSUED FOR CONSTRUCTION	I.HOGAN	C.ROHDE	M.TROUNCE

villawood properties
 Communities Designed for Living

creo CONSULTANTS
 Suite 1, 2 Bloomsbury Street
 Geelong, VIC, Australia 3220

Coridale
 LARA

CORIDALE ESTATE - STAGE 10
 LAYOUT PLAN - 2
 PLANNING PERMIT No: PP-496-2018

ISSUED FOR CONSTRUCTION

SCALE AT A1	DRAWN	DESIGNED
1:500 @ A1	B.BLEECH	I.HOGAN
PROJECT ENGINEER	PROJECT MANAGER	DATE FIRST ISSUE
M.TROUNCE	T.PALIOS	MAY 2022
PROJECT No.	DRAWING No.	REVISION
180014.10	R201	0

REFER R200 FOR CONTINUATION

APPENDIX A

Particle Size Distribution and Atterberg Limits Test Report Sheets

Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1029-1
Issue Number: 1
Date Issued: 19/10/2020
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1029
Project Name: CORIDALE ESTATE STAGE 4
Work Request: 7868
Sample Number: 1029-S1
Date Sampled: 12/10/2020
Dates Tested: 12/10/2020 - 16/10/2020
Sampling Method: AS 1289.1.2.1 6.2 - Sampling from stockpiles
Remarks: Material classified as per AS 1726:2017
Sample Location: Stockpile 1 (Winslow)
Material: CH - CLAY, with sand, trace gravel, brown, high plasticity, sand 18% fine to coarse grained, gravel 15% fine to medium.
Material Source: Onsite

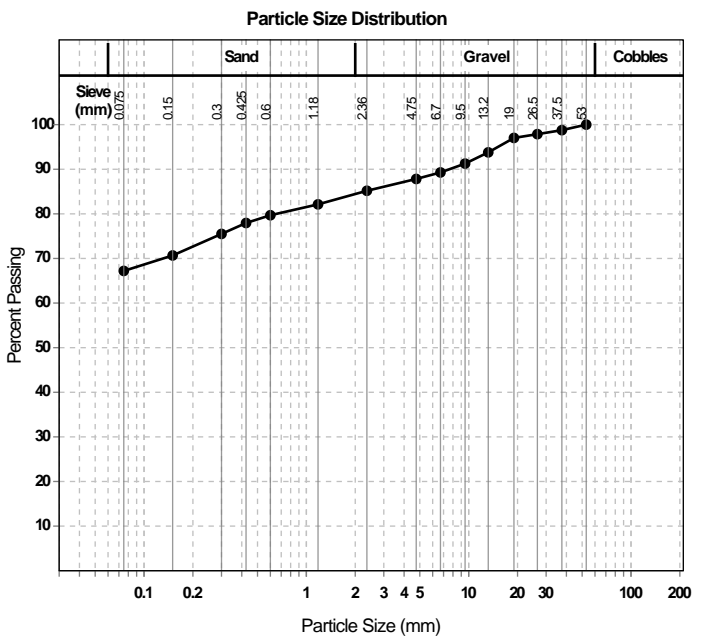
Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Mamalis
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Particle Size Distribution (AS1289 3.6.1)				
Sieve	Passed %	Passing Limits	Retained %	Retained Limits
53 mm	100		0	
37.5 mm	99		1	
26.5 mm	98		1	
19 mm	97		1	
13.2 mm	94		3	
9.5 mm	91		3	
6.7 mm	89		2	
4.75 mm	88		1	
2.36 mm	85		3	
1.18 mm	82		3	
0.6 mm	80		2	
0.425 mm	78		2	
0.3 mm	76		2	
0.15 mm	71		5	
0.075 mm	67		3	



Moisture Content (AS1289.2.1.1)	
Moisture Content (%)	29.8

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	74		
Plastic Limit (%)	24		
Plasticity Index (%)	50		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	18.0		
Cracking Crumbling Curling	Cracking & Curling		

Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1029-1
Issue Number: 1
Date Issued: 19/10/2020
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1029
Project Name: CORIDALE ESTATE STAGE 4
Work Request: 7868
Sample Number: 1029-S2
Date Sampled: 12/10/2020
Dates Tested: 12/10/2020 - 15/10/2020
Sampling Method: AS 1289.1.2.1 6.2 - Sampling from stockpiles
Remarks: Material classified as per AS 1726:2017
Sample Location: Stockpile 2 (BituMill)
Material: CH - gravelly CLAY, with sand, brown, high plasticity, 36% gravel fine to coarse, sand 23% fine to coarse grained.
Material Source: Onsite

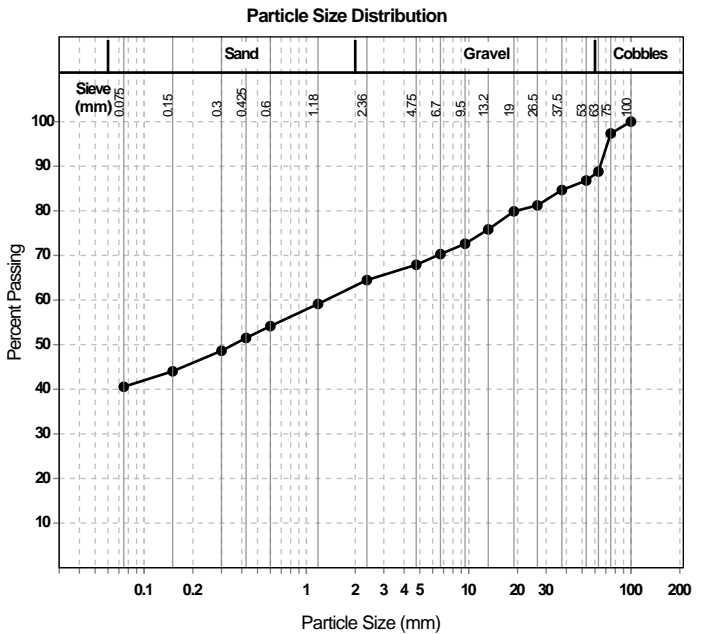
Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Mamalis
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Particle Size Distribution (AS1289 3.6.1)				
Sieve	Passed %	Passing Limits	Retained %	Retained Limits
100 mm	100		0	
75 mm	97		3	
63 mm	89		9	
53 mm	87		2	
37.5 mm	85		2	
26.5 mm	81		3	
19 mm	80		1	
13.2 mm	76		4	
9.5 mm	73		3	
6.7 mm	70		2	
4.75 mm	68		2	
2.36 mm	64		3	
1.18 mm	59		5	
0.6 mm	54		5	
0.425 mm	52		3	
0.3 mm	49		3	
0.15 mm	44		5	
0.075 mm	41		3	



Moisture Content (AS1289.2.1.1)	
Moisture Content (%)	21.3

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	51		
Plastic Limit (%)	22		
Plasticity Index (%)	29		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	12.0		
Cracking Crumbling Curling	Cracking		

APPENDIX B

Field Density Test Report Summary Sheet

Project Summary Report



Ground Science South West

Geotechnical & Environmental Consultants

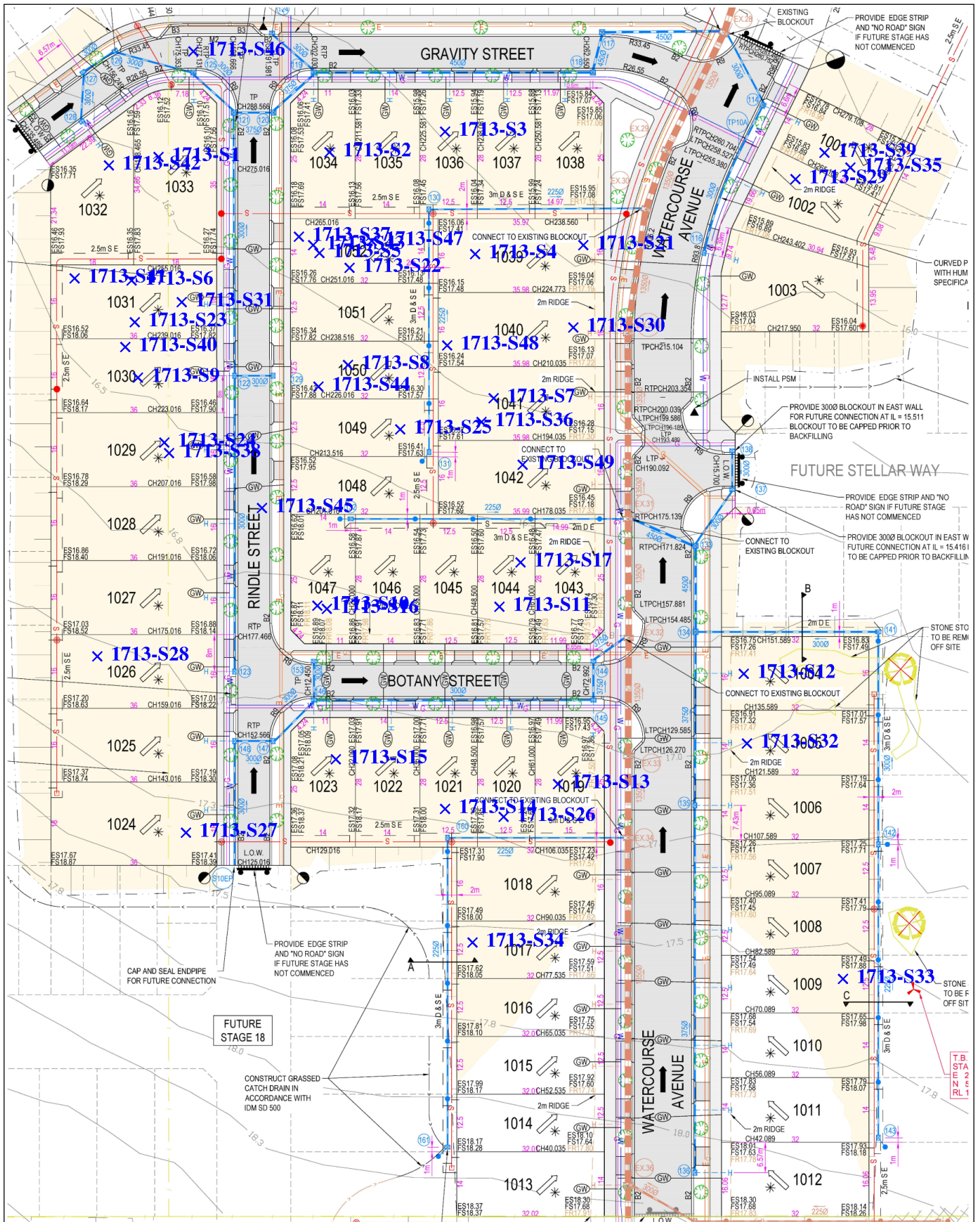
Report Date: 23/01/2023
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Test Methods: AS 1289 5.7.1 STD & 5.8.1 & 2.1.1

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 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au

Lot #	Sample #	Date Sampled	Location	Location		Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
1032-1038	1713-S1	01/12/2022	Lot 1033	**	**	**	Layer 1	95.5	3.0	24.0	1.84
1032-1038	1713-S2	01/12/2022	Lot 1034	**	**	**	Layer 1	99.0	1.0	32.7	1.79
1032-1038	1713-S3	01/12/2022	Lot 1036	**	**	**	Layer 1	96.0	2.0	26.0	1.81
**	1713-S4	02/12/2022	Lot # 1039 - See attached plan	**	**	**	1	97.5	-2.0	22.2	2.06
**	1713-S5	02/12/2022	Lot # 1052 - See attached plan	**	**	**	1	96.5	-0.5	18.3	2.01
**	1713-S6	02/12/2022	Lot # 1031 - See attached plan	**	**	**	1	100.5	1.0	21.5	2.03
**	1713-S7	05/12/2022	Lot 1041	**	**	**	Layer 1	98.5	3.0	16.9	1.92
**	1713-S8	05/12/2022	Lot 1050	**	**	**	Layer 1	95.5	3.0	16.1	1.82
**	1713-S9	05/12/2022	Lot 1030	**	**	**	Layer 1	95.0	2.5	18.8	1.84
**	1713-S10	06/12/2022	Lot 1047	**	**	**	Layer 1	105.5	5.0	16.4	1.95
**	1713-S11	06/12/2022	Lot 1044	**	**	**	Layer 1	103.0	4.0	16.6	1.97
**	1713-S12	06/12/2022	Lot 1004	**	**	**	Layer 1	102.5	1.5	18.0	1.96
**	1713-S13	07/12/2022	Lot 1019	**	**	**	Layer 1	101.5	0.0	22.2	1.85
**	1713-S14	07/12/2022	Lot 1021	**	**	**	Layer 1	99.0	2.0	19.6	1.91
**	1713-S15	07/12/2022	Lot 1023	**	**	**	Layer 1	97.5	2.5	20.9	1.86
**	1713-S16	07/12/2022	Lot 1047 Retest 1713-S10	**	**	**	Layer 1	96.0	2.0	21.5	1.87
**	1713-S17	07/12/2022	Lot 1044 Retest 1713-S11	**	**	**	Layer 1	98.5	0.0	18.6	1.86
**	1713-S18	08/12/2022	Lot 1035	**	**	**	Layer 2	99.5	2.0	20.8	1.92
**	1713-S19	08/12/2022	Lot 1037	**	**	**	Layer 2	102.0	2.5	20.7	1.92
**	1713-S20	08/12/2022	Lot 1018	**	**	**	Layer 1	104.5	1.5	20.5	2.01
**	1713-S21	09/12/2022	Lot 1039	**	**	**	Layer 2	98.0	-2.5	25.5	1.87
**	1713-S23	09/12/2022	Lot 1031	**	**	**	Layer 2	101.0	0.5	21.5	1.85
**	1713-S22	09/12/2022	Lot 1052	**	**	**	Layer 2	101.5	-2.5	18.4	1.90
**	1713-S24	13/12/2022	Lot 1029	**	**	**	Layer 3	97.5	0.5	22.6	1.96
**	1713-S25	13/12/2022	Lot 1049	**	**	**	Layer 3	99.0	0.5	21.5	1.96
**	1713-S26	13/12/2022	Lot 1020	**	**	**	Layer 2	102.0	0.5	22.2	1.86
**	1713-S27	14/12/2022	Lot 1024	**	**	**	Layer 3	105.0	2.5	21.2	1.92
**	1713-S28	14/12/2022	Lot 1026	**	**	**	Layer 3	100.0	2.5	23.8	1.88
**	1713-S29	14/12/2022	Lot 1002	**	**	**	Layer 3	99.0	2.5	23.5	1.86
**	1713-S30	14/12/2022	Lot 1040	**	**	**	Layer 3	98.5	1.5	22.0	1.94
**	1713-S31	14/12/2022	Lot 1031	**	**	**	Layer 1	106.5	2.0	23.4	1.94
**	1713-S32	15/12/2022	Lot 1005	**	**	**	Layer 3	97.5	-0.5	23.6	1.84
**	1713-S33	15/12/2022	Lot 1009	**	**	**	Layer 2	98.5	2.5	21.9	1.83
**	1713-S34	15/12/2022	Lot 1017	**	**	**	Layer 2	100.0	2.0	19.7	1.97
**	1713-S35	15/12/2022	Lot 1001	**	**	**	Layer 2	89.5	0.5	20.6	1.85
**	1713-S36	16/12/2022	Lot 1041	**	**	**	Layer 4	98.5	2.0	21.0	1.91
**	1713-S37	16/12/2022	Lot 1052	**	**	**	Layer 4	92.5	2.5	19.3	1.84
**	1713-S38	16/12/2022	Lot 1029	**	**	**	Layer 4	100.5	2.0	20.1	2.02
**	1713-S39	16/12/2022	Retest 1713-S35 Lot 1001	**	**	**	Layer 2	100.5	0.5	22.6	1.98
**	1713-S40	19/12/2022	Lot 1030	**	**	**	Layer 4	100.5	2.0	19.3	1.98
**	1713-S41	19/12/2022	Lot 1031	**	**	**	Layer 4	102.5	2.5	20.3	1.99
**	1713-S42	19/12/2022	Lot 1032	**	**	**	Layer 4	102.5	2.5	20.7	1.99
**	1713-S43	20/12/2022	Retest 1713- s37 Lot 1052	**	**	**	Layer 4	101.5	2.5	19.9	1.97
**	1713-S44	09/01/2023	Lot 1050	**	**	**	Layer 5	105.5	3.0	22.9	1.95
**	1713-S45	09/01/2023	Rendle street	**	**	**	Layer 4	107.0	3.0	23.8	1.96
**	1713-S46	09/01/2023	Gravity street	**	**	**	Layer 3	107.0	3.0	24.9	1.96
**	1713-S47	10/01/2023	Lot 1052	**	**	**	Layer 5	105.0	3.0	20.7	1.91
**	1713-S48	10/01/2023	Lot 1040	**	**	**	Layer 5	101.0	1.0	22.6	1.97
**	1713-S49	10/01/2023	Lot 1042	**	**	**	Layer 5	100.5	1.0	20.8	1.95

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



APPENDIX C

Field Density Test Report Sheets & Test Locations

Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-1
Issue Number: 1
Date Issued: 02/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14192
Date Sampled: 01/12/2022
Dates Tested: 01/12/2022 - 02/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lara
Lot Number: 1032-1038
Material: gravelly CLAY, with sand, high plasticity
Material Source: Insitu

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



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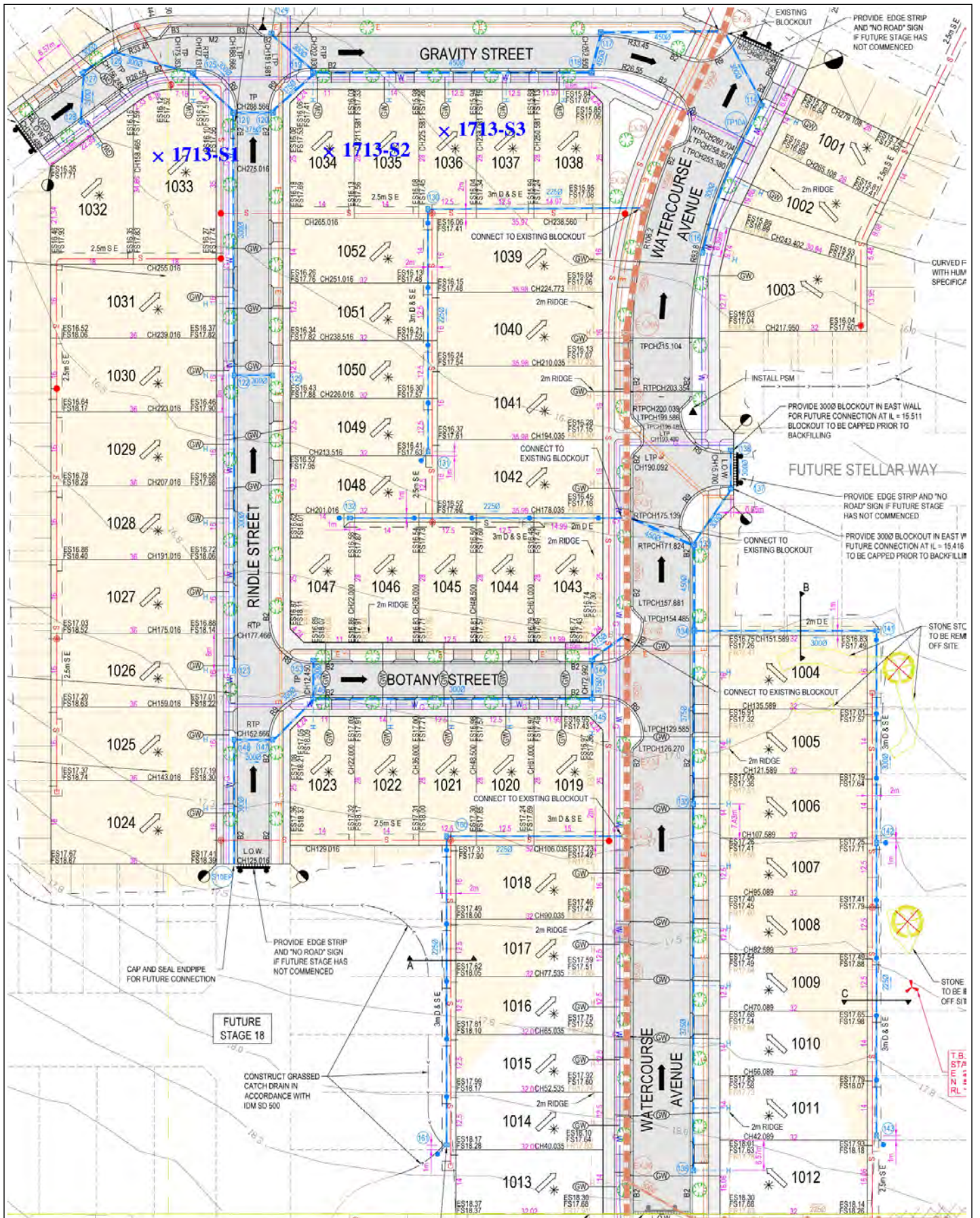
Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S1	1713-S2	1713-S3
Date Tested	01/12/2022	01/12/2022	01/12/2022
Time Tested	16:42	17:02	17:06
Test Request #/Location	Lot 1033	Lot 1034	Lot 1036
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Field Wet Density (FWD) t/m ³	1.84	1.79	1.81
Field Moisture Content %	24.0	32.7	26.0
Field Dry Density (FDD) t/m ³	1.48	1.35	1.44
Peak Converted Wet Density t/m ³	1.93	1.81	1.89
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	3.0	1.0	2.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	95.5	99.0	96.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-2
Issue Number: 1
Date Issued: 06/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14210
Date Sampled: 02/12/2022
Dates Tested: 02/12/2022 - 05/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: CLAY, with gravel & sand, high plasticity
Material Source: On Site Sourced

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



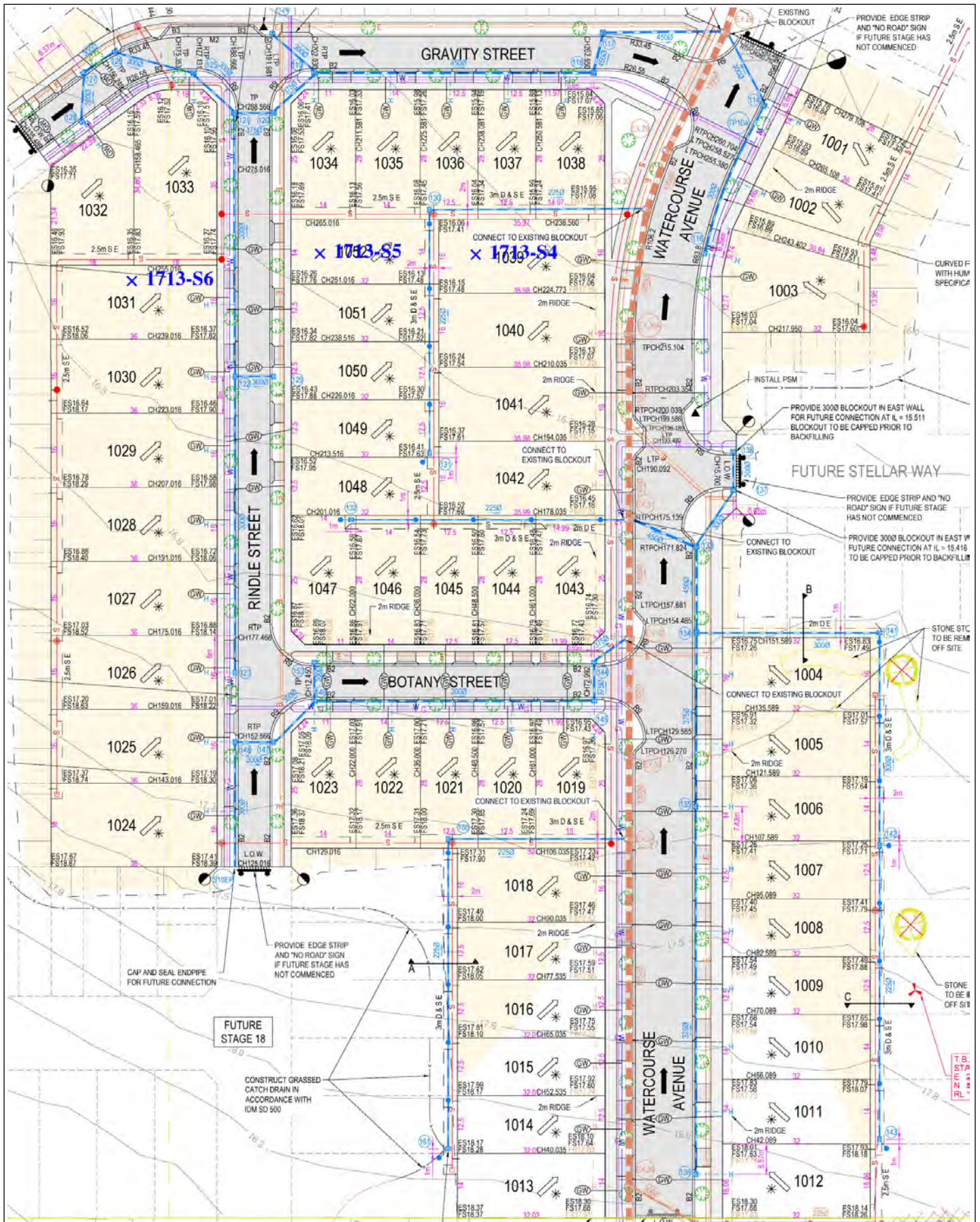
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Mamalis
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S4	1713-S5	1713-S6
Date Tested	02/12/2022	02/12/2022	02/12/2022
Time Tested	12:29	12:40	12:52
Test Request #/Location	Lot # 1039 - See attached plan	Lot # 1052 - See attached plan	Lot # 1031 - See attached plan
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	300	300	300
Soil Description	CLAY, with gravel & sand, high plasticity	CLAY, with gravel & sand, high plasticity	CLAY, with gravel & sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	8	8	4
Field Wet Density (FWD) t/m ³	2.06	2.01	2.03
Field Moisture Content %	22.2	18.3	21.5
Field Dry Density (FDD) t/m ³	1.69	1.70	1.67
Peak Converted Wet Density t/m ³	**	**	**
Adjusted Peak Converted Wet Density t/m ³	2.11	2.09	2.02
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	-2.0	-0.5	1.0
Hilf Density Ratio (%)	97.5	96.5	100.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-3
Issue Number: 1
Date Issued: 07/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14233
Date Sampled: 05/12/2022
Dates Tested: 05/12/2022 - 06/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lara, Coridale State
Material: gravelly CLAY, with sand, high plasticity
Material Source: Insitu

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

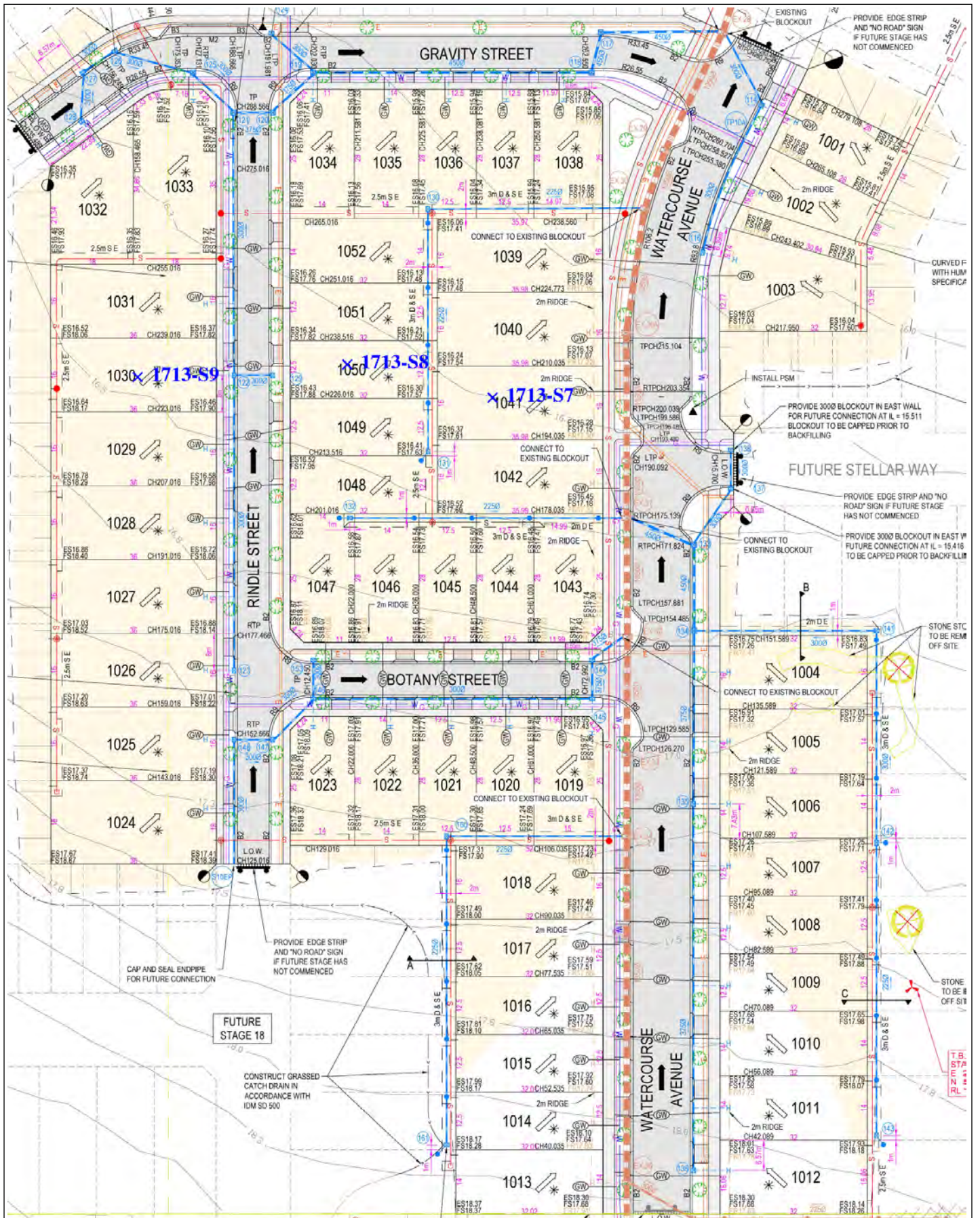
Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S7	1713-S8	1713-S9
Date Tested	05/12/2022	05/12/2022	05/12/2022
Time Tested	14:56	15:11	15:16
Test Request #/Location	Lot 1041	Lot 1050	Lot 1030
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	gravelly CLAY, with sand, high plasticity	gravelly CLAY, with sand, high plasticity	gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	9	4	9
Field Wet Density (FWD) t/m ³	1.92	1.82	1.84
Field Moisture Content %	16.9	16.1	18.8
Field Dry Density (FDD) t/m ³	1.64	1.57	1.55
Peak Converted Wet Density t/m ³	**	**	**
Adjusted Peak Converted Wet Density t/m ³	1.95	1.91	1.93
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	3.0	3.0	2.5
Hilf Density Ratio (%)	98.5	95.5	95.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-4
Issue Number: 1
Date Issued: 07/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14245
Date Sampled: 06/12/2022
Dates Tested: 06/12/2022 - 07/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: CORIDALE ESTATE STAGE 10 - LARA
Material: Gravel Clay, with Sand, high plasticity
Material Source: Insitu

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



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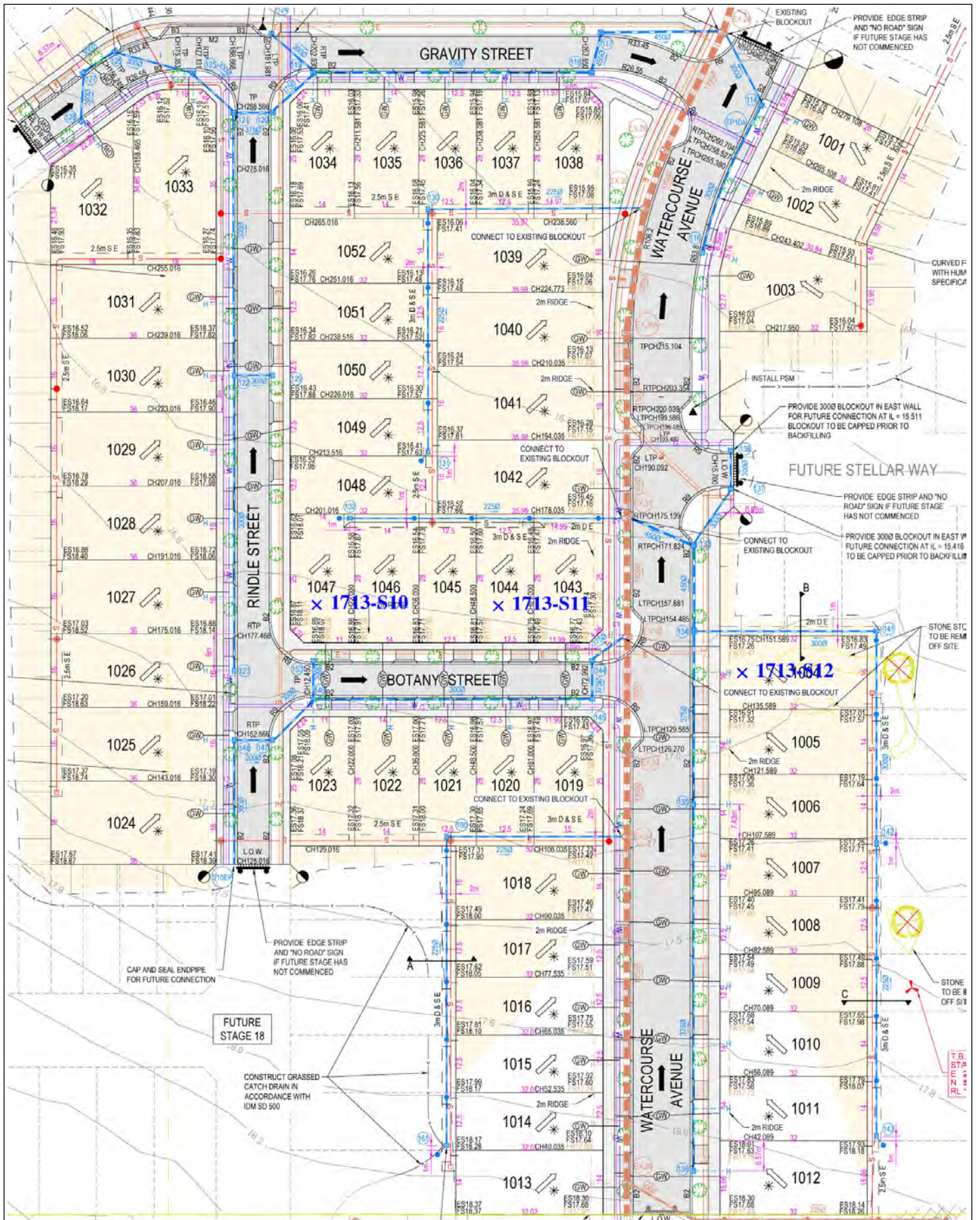
Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S10	1713-S11	1713-S12
Date Tested	06/12/2022	06/12/2022	06/12/2022
Time Tested	11:59	12:10	12:21
Test Request #/Location	Lot 1047	Lot 1044	Lot 1004
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	4	2	6
Field Wet Density (FWD) t/m ³	1.95	1.97	1.96
Field Moisture Content %	16.4	16.6	18.0
Field Dry Density (FDD) t/m ³	1.68	1.69	1.66
Peak Converted Wet Density t/m ³	**	**	**
Adjusted Peak Converted Wet Density t/m ³	1.85	1.91	1.91
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	5.0	4.0	1.5
Hilf Density Ratio (%)	105.5	103.0	102.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-5
Issue Number: 1
Date Issued: 09/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14271
Date Sampled: 07/12/2022
Dates Tested: 07/12/2022 - 09/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: CORIDALE ESTATE STAGE 10 - LARA
Material: Gravelly clay, with sand, high plasticity
Material Source: Insitu

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	1713-S13	1713-S14	1713-S15	1713-S16	1713-S17
Date Tested	07/12/2022	07/12/2022	07/12/2022	07/12/2022	07/12/2022
Time Tested	10:41	10:52	11:15	14:25	14:46
Test Request #/Location	Lot 1019	Lot 1021	Lot 1023	Lot 1047 Retest 1713-S10	Lot 1044 Retest 1713-S11
Layer / Reduced Level	Layer 1	Layer 1	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	4	0	0	4	3
Field Wet Density (FWD) t/m ³	1.85	1.91	1.86	1.87	1.86
Field Moisture Content %	22.2	19.6	20.9	21.5	18.6
Field Dry Density (FDD) t/m ³	1.52	1.60	1.54	1.54	1.57
Peak Converted Wet Density t/m ³	**	1.93	1.91	**	**
Adjusted Peak Converted Wet Density t/m ³	1.83	**	**	1.95	1.89
Moisture Variation (Wv) %	**	2.0	2.5	**	**
Adjusted Moisture Variation %	0.0	**	**	2.0	0.0
Hilf Density Ratio (%)	101.5	99.0	97.5	96.0	98.5
Compaction Method	Standard	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-6
Issue Number: 1
Date Issued: 12/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14292
Date Sampled: 08/12/2022
Dates Tested: 08/12/2022 - 09/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: CORIDALE ESTATE STAGE 10 - LARA
Material: Gravelly clay, with sand, high plasticity
Material Source: Insitu

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



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Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S18	1713-S19	1713-S20
Date Tested	08/12/2022	08/12/2022	08/12/2022
Time Tested	10:42	10:54	11:12
Test Request #/Location	Lot 1035	Lot 1037	Lot 1018
Layer / Reduced Level	Layer 2	Layer 2	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY with sand, high plasticity	Gravelly CLAY with sand, high plasticity	Gravelly CLAY with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	6	0	5
Field Wet Density (FWD) t/m ³	1.92	1.92	2.01
Field Moisture Content %	20.8	20.7	20.5
Field Dry Density (FDD) t/m ³	1.59	1.59	1.67
Peak Converted Wet Density t/m ³	**	1.88	**
Adjusted Peak Converted Wet Density t/m ³	1.92	**	1.92
Moisture Variation (Wv) %	**	2.5	**
Adjusted Moisture Variation %	2.0	**	1.5
Hilf Density Ratio (%)	99.5	102.0	104.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC

Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-7
Issue Number: 1
Date Issued: 13/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14313
Date Sampled: 09/12/2022
Dates Tested: 09/12/2022 - 13/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



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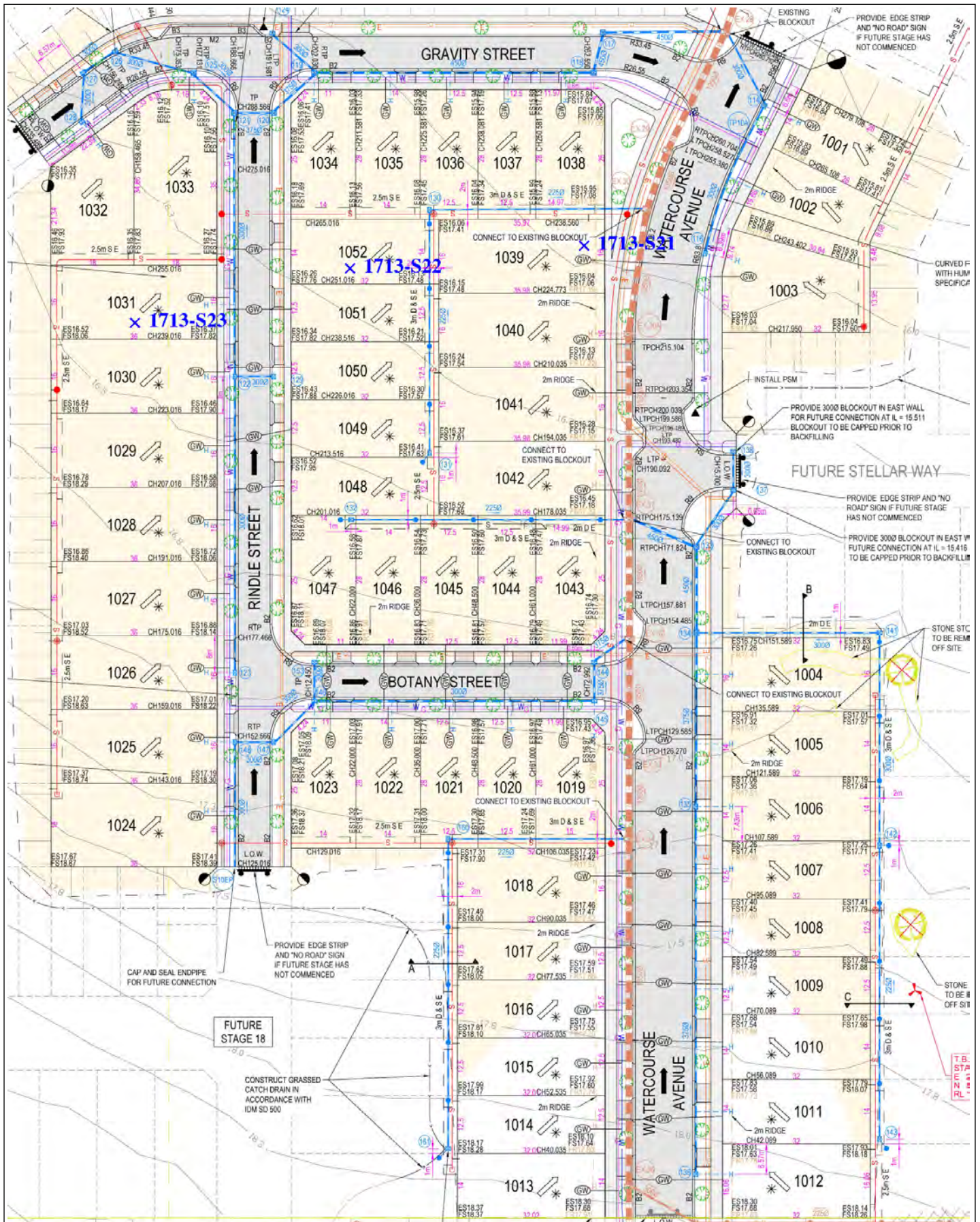
Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S21	1713-S22	1713-S23
Date Tested	09/12/2022	09/12/2022	09/12/2022
Time Tested	10:31	11:46	11:01
Test Request #/Location	Lot 1039	Lot 1052	Lot 1031
Layer / Reduced Level	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly Clay, with sand, high plasticity	Gravelly Clay, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	4	0	0
Field Wet Density (FWD) t/m ³	1.87	1.90	1.85
Field Moisture Content %	25.5	18.4	21.5
Field Dry Density (FDD) t/m ³	1.49	1.60	1.53
Peak Converted Wet Density t/m ³	**	1.87	1.84
Adjusted Peak Converted Wet Density t/m ³	1.91	**	**
Moisture Variation (Wv) %	**	-2.5	0.5
Adjusted Moisture Variation %	-2.5	**	**
Hilf Density Ratio (%)	98.0	101.5	101.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-8
Issue Number: 1
Date Issued: 15/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14380
Date Sampled: 13/12/2022
Dates Tested: 13/12/2022 - 14/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: CORIDALE ESTATE STAGE 10 - LARA
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au



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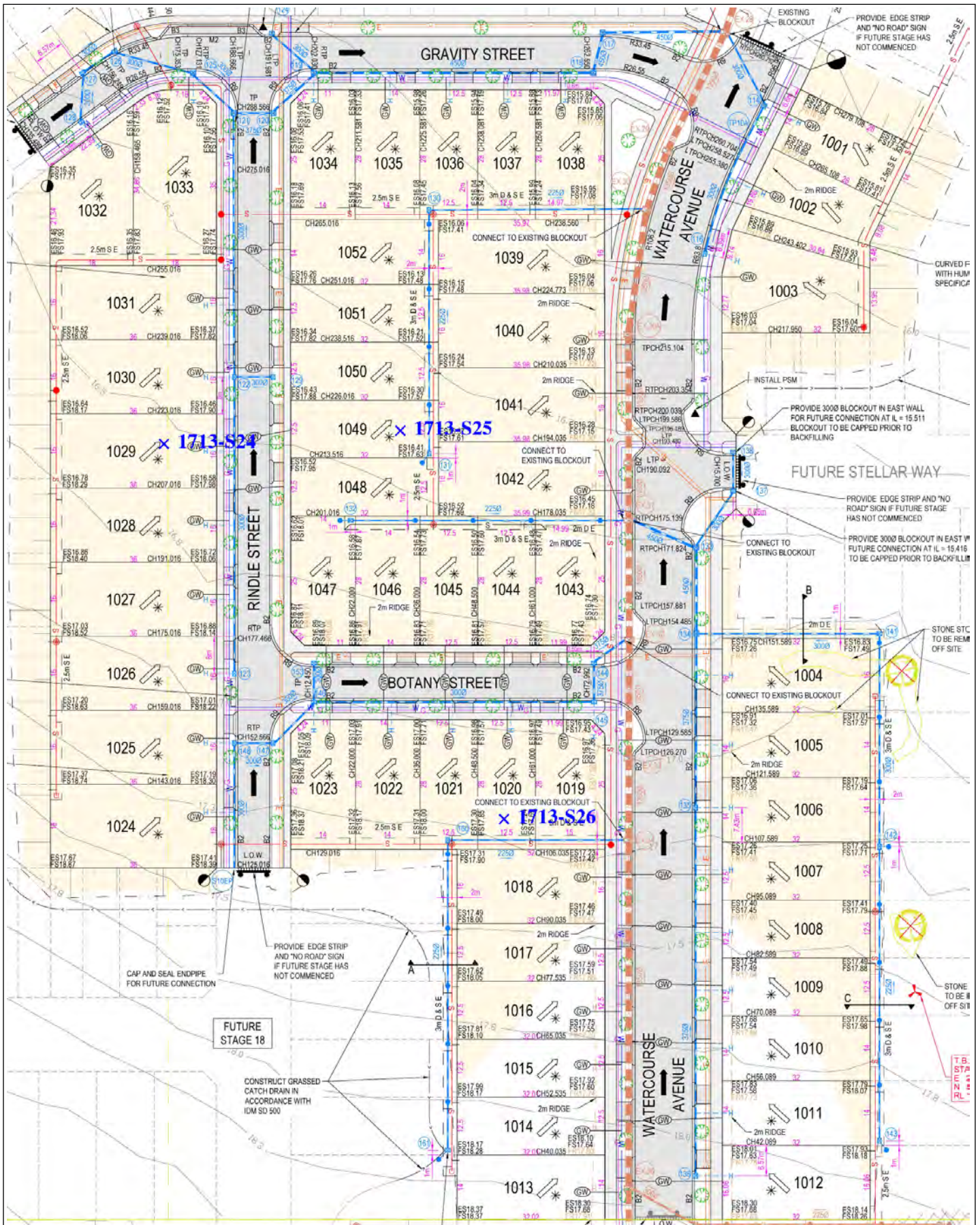
Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S24	1713-S25	1713-S26
Date Tested	13/12/2022	13/12/2022	13/12/2022
Time Tested	10:37	10:50	11:08
Test Request #/Location	Lot 1029	Lot 1049	Lot 1020
Layer / Reduced Level	Layer 3	Layer 3	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	8	4	0
Field Wet Density (FWD) t/m ³	1.96	1.96	1.86
Field Moisture Content %	22.6	21.5	22.2
Field Dry Density (FDD) t/m ³	1.60	1.61	1.52
Peak Converted Wet Density t/m ³	**	**	1.83
Adjusted Peak Converted Wet Density t/m ³	2.01	1.98	**
Moisture Variation (Wv) %	**	**	0.5
Adjusted Moisture Variation %	0.5	0.5	**
Hilf Density Ratio (%)	97.5	99.0	102.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	9

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-9
Issue Number: 1
Date Issued: 16/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14393
Date Sampled: 14/12/2022
Dates Tested: 14/12/2022 - 15/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: CORIDALE ESTATE STAGE 10 - LARA
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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 Email: chrism@groundscience.com.au



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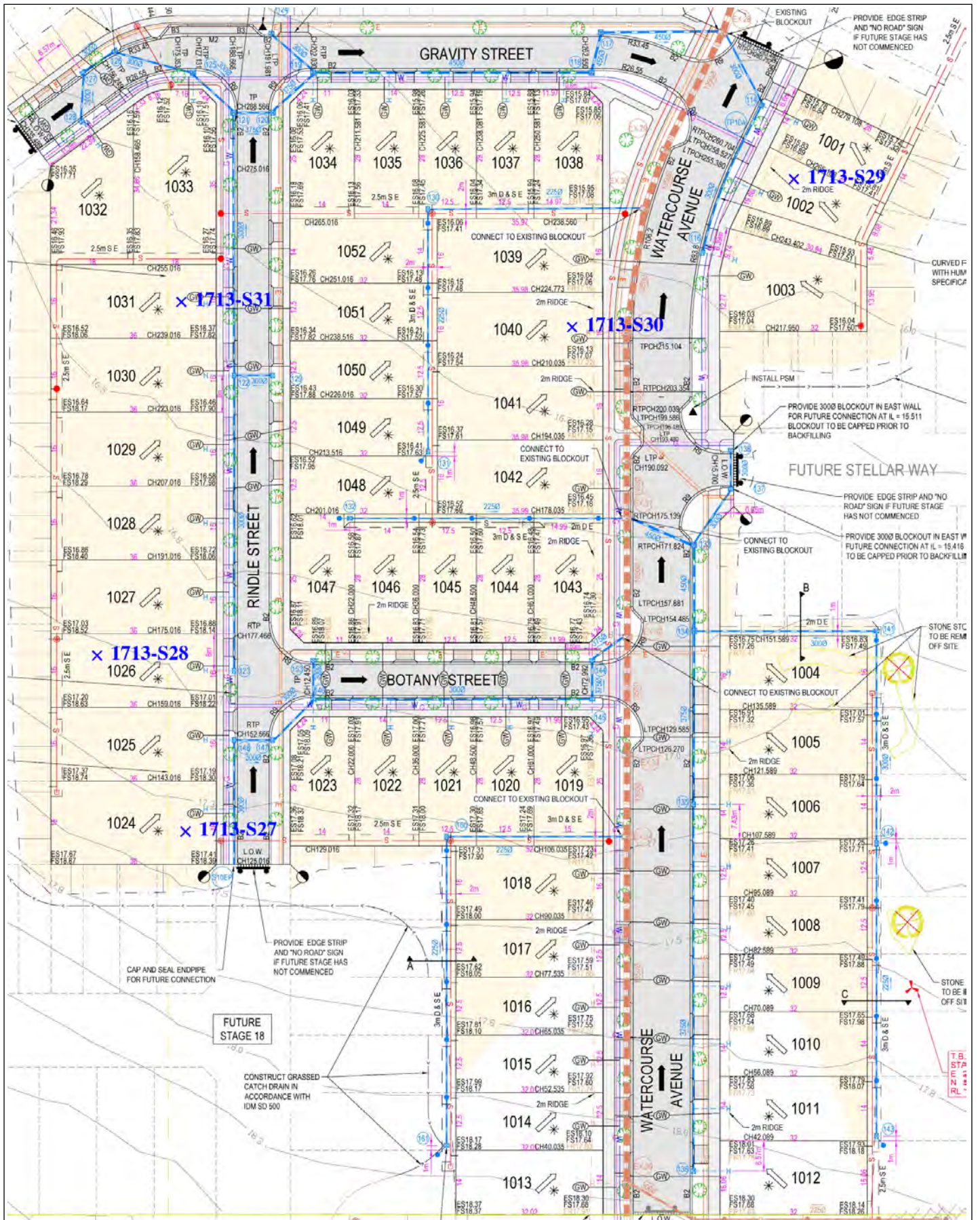
Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	1713-S27	1713-S28	1713-S29	1713-S30	1713-S31
Date Tested	14/12/2022	14/12/2022	14/12/2022	14/12/2022	14/12/2022
Time Tested	12:56	13:11	13:30	13:46	14:01
Test Request #/Location	Lot 1024	Lot 1026	Lot 1002	Lot 1040	Lot 1031
Layer / Reduced Level	Layer 3	Layer 3	Layer 3	Layer 3	Layer 1
Thickness of Layer (mm)	300	300	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	7	7	0	5	5
Field Wet Density (FWD) t/m ³	1.92	1.88	1.86	1.94	1.94
Field Moisture Content %	21.2	23.8	23.5	22.0	23.4
Field Dry Density (FDD) t/m ³	1.58	1.52	1.50	1.59	1.58
Peak Converted Wet Density t/m ³	**	**	1.88	**	**
Adjusted Peak Converted Wet Density t/m ³	1.83	1.88	**	1.97	1.82
Moisture Variation (Wv) %	**	**	2.5	**	**
Adjusted Moisture Variation %	2.5	2.5	**	1.5	2.0
Hilf Density Ratio (%)	105.0	100.0	99.0	98.5	106.5
Compaction Method	Standard	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-10
Issue Number: 1
Date Issued: 20/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14408
Date Sampled: 15/12/2022
Dates Tested: 15/12/2022 - 16/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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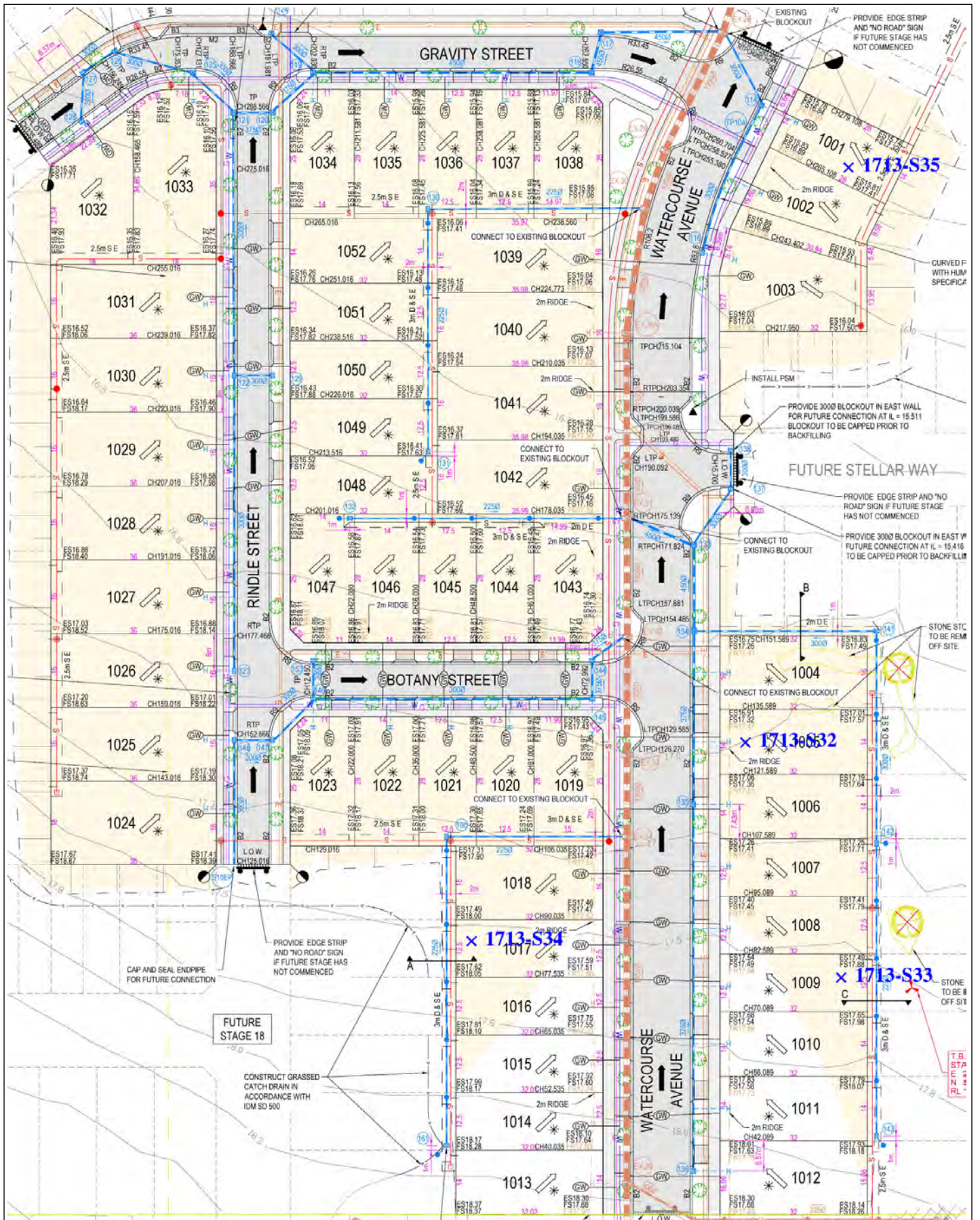


Approved Signatory: James Howell
 Senior Construction Materials Technician
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	1713-S32	1713-S33	1713-S34	1713-S35
Date Tested	15/12/2022	15/12/2022	15/12/2022	15/12/2022
Time Tested	13:51	13:58	14:18	15:45
Test Request #/Location	Lot 1005	Lot 1009	Lot 1017	Lot 1001
Layer / Reduced Level	Layer 3	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	5	3	4	8
Field Wet Density (FWD) t/m ³	1.84	1.83	1.97	1.85
Field Moisture Content %	23.6	21.9	19.7	20.6
Field Dry Density (FDD) t/m ³	1.49	1.50	1.64	1.53
Peak Converted Wet Density t/m ³	**	**	**	**
Adjusted Peak Converted Wet Density t/m ³	1.90	1.86	1.96	2.07
Moisture Variation (Wv) %	**	**	**	**
Adjusted Moisture Variation %	-0.5	2.5	2.0	0.5
Hilf Density Ratio (%)	97.5	98.5	100.0	89.5
Compaction Method	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-11
Issue Number: 1
Date Issued: 20/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14419
Date Sampled: 16/12/2022
Dates Tested: 16/12/2022 - 19/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au

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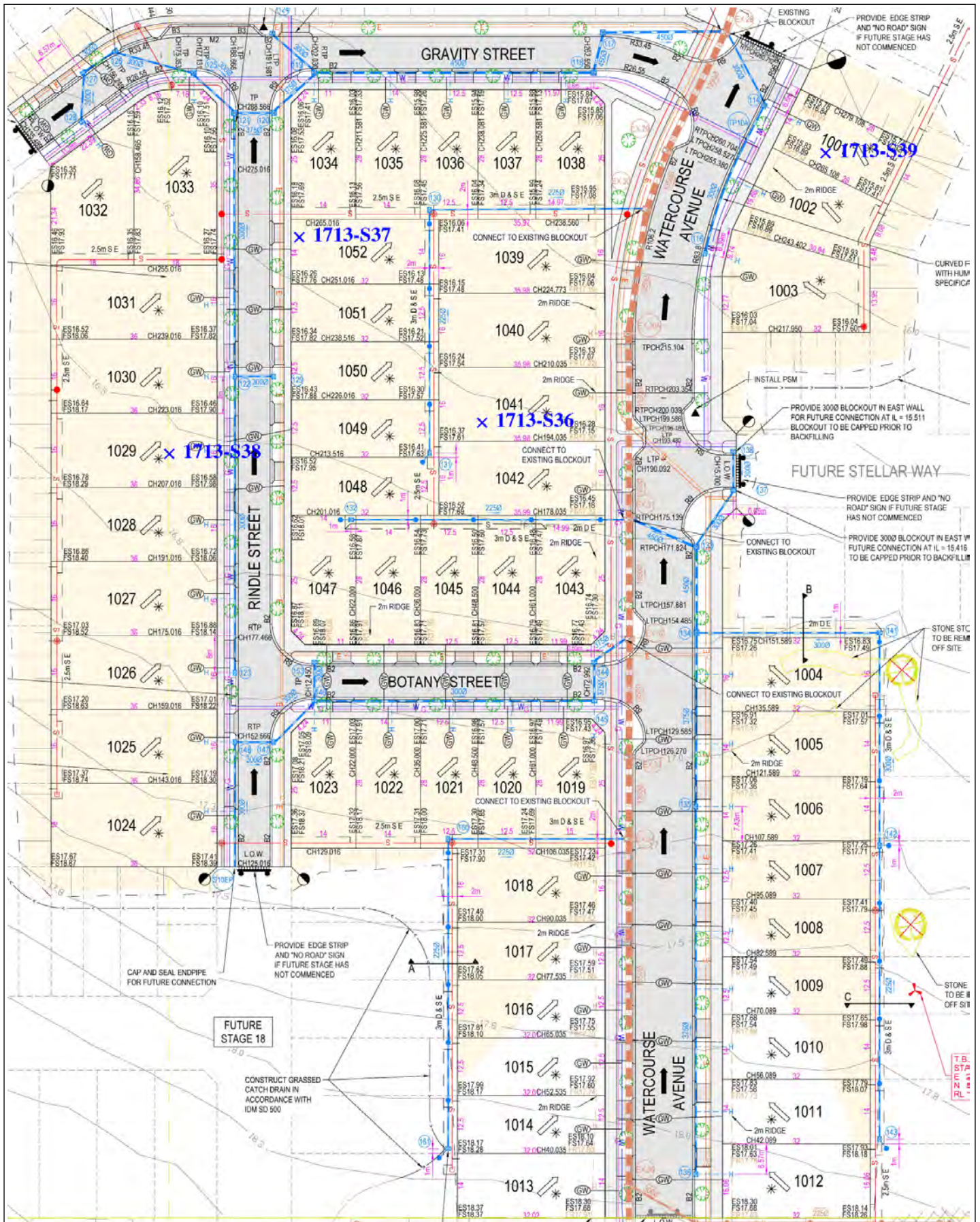


Approved Signatory: James Howell
 Senior Construction Materials Technician
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	1713-S36	1713-S37	1713-S38	1713-S39
Date Tested	16/12/2022	16/12/2022	16/12/2022	16/12/2022
Time Tested	10:40	10:58	13:06	13:44
Test Request #/Location	Lot 1041	Lot 1052	Lot 1029	Retest 1713-S35 Lot 1001
Layer / Reduced Level	Layer 4	Layer 4	Layer 4	Layer 2
Thickness of Layer (mm)	300	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	4	4	3	3
Field Wet Density (FWD) t/m ³	1.91	1.84	2.02	1.98
Field Moisture Content %	21.0	19.3	20.1	22.6
Field Dry Density (FDD) t/m ³	1.58	1.54	1.68	1.61
Peak Converted Wet Density t/m ³	**	**	**	**
Adjusted Peak Converted Wet Density t/m ³	1.94	1.99	2.00	1.97
Moisture Variation (Wv) %	**	**	**	**
Adjusted Moisture Variation %	2.0	2.5	2.0	0.5
Hilf Density Ratio (%)	98.5	92.5	100.5	100.5
Compaction Method	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-12
Issue Number: 1
Date Issued: 21/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14441
Date Sampled: 19/12/2022
Dates Tested: 19/12/2022 - 20/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

Ground Science South West Pty Ltd
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 Phone: (03) 5282 1566
 Email: chrism@groundscience.com.au

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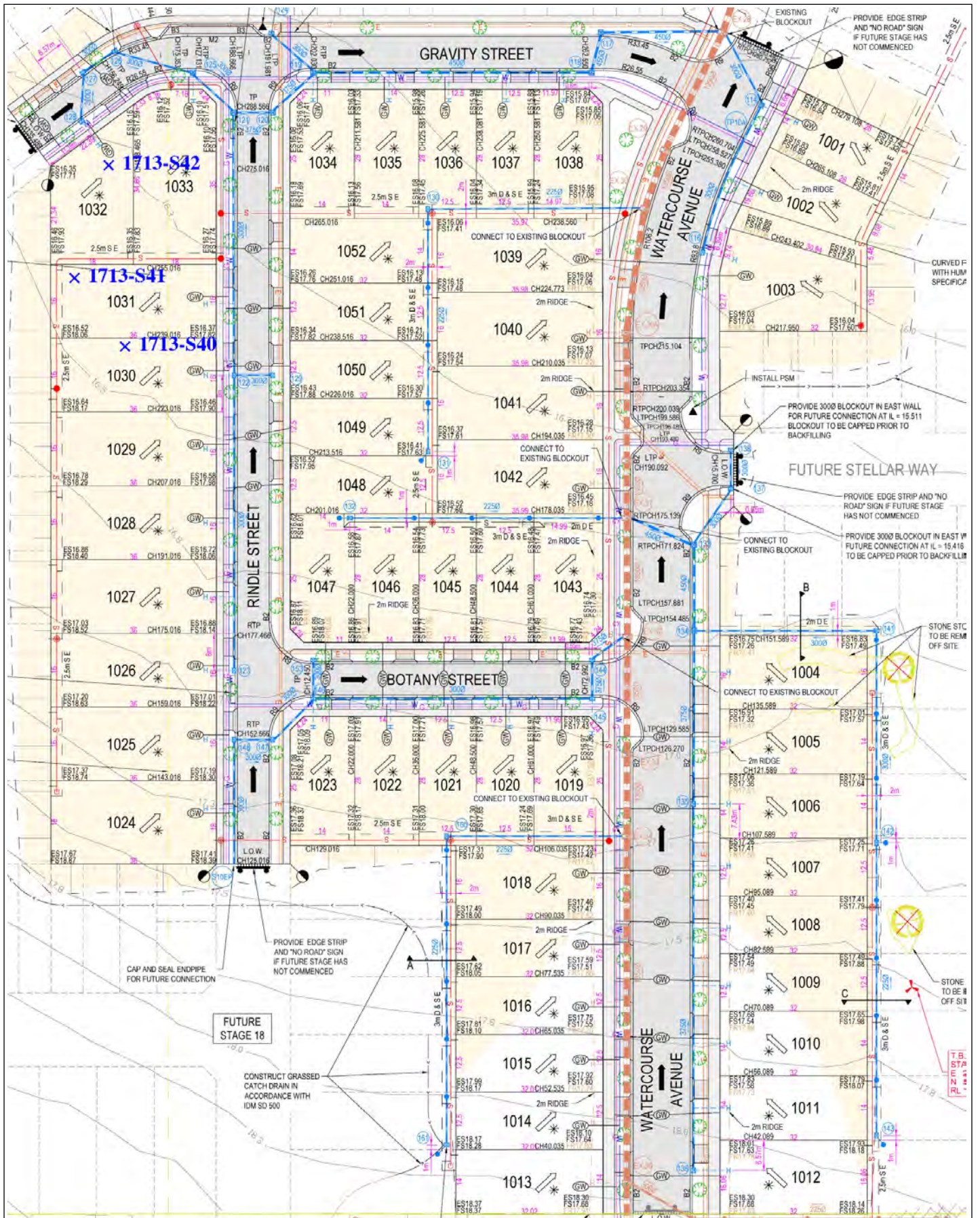
Approved Signatory: James Howell
 Senior Construction Materials Technician

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S40	1713-S41	1713-S42
Date Tested	19/12/2022	19/12/2022	19/12/2022
Time Tested	13:14	13:27	13:42
Test Request #/Location	Lot 1030	Lot 1031	Lot 1032
Layer / Reduced Level	Layer 4	Layer 4	Layer 4
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Field Wet Density (FWD) t/m ³	1.98	1.99	1.99
Field Moisture Content %	19.3	20.3	20.7
Field Dry Density (FDD) t/m ³	1.66	1.66	1.64
Peak Converted Wet Density t/m ³	1.97	1.94	1.94
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	2.0	2.5	2.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	100.5	102.5	102.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-13
Issue Number: 1
Date Issued: 22/12/2022
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14477
Date Sampled: 20/12/2022 15:01
Dates Tested: 20/12/2022 - 21/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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 Phone: (03) 5282 1566
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Approved Signatory: James Howell
 Senior Construction Materials Technician

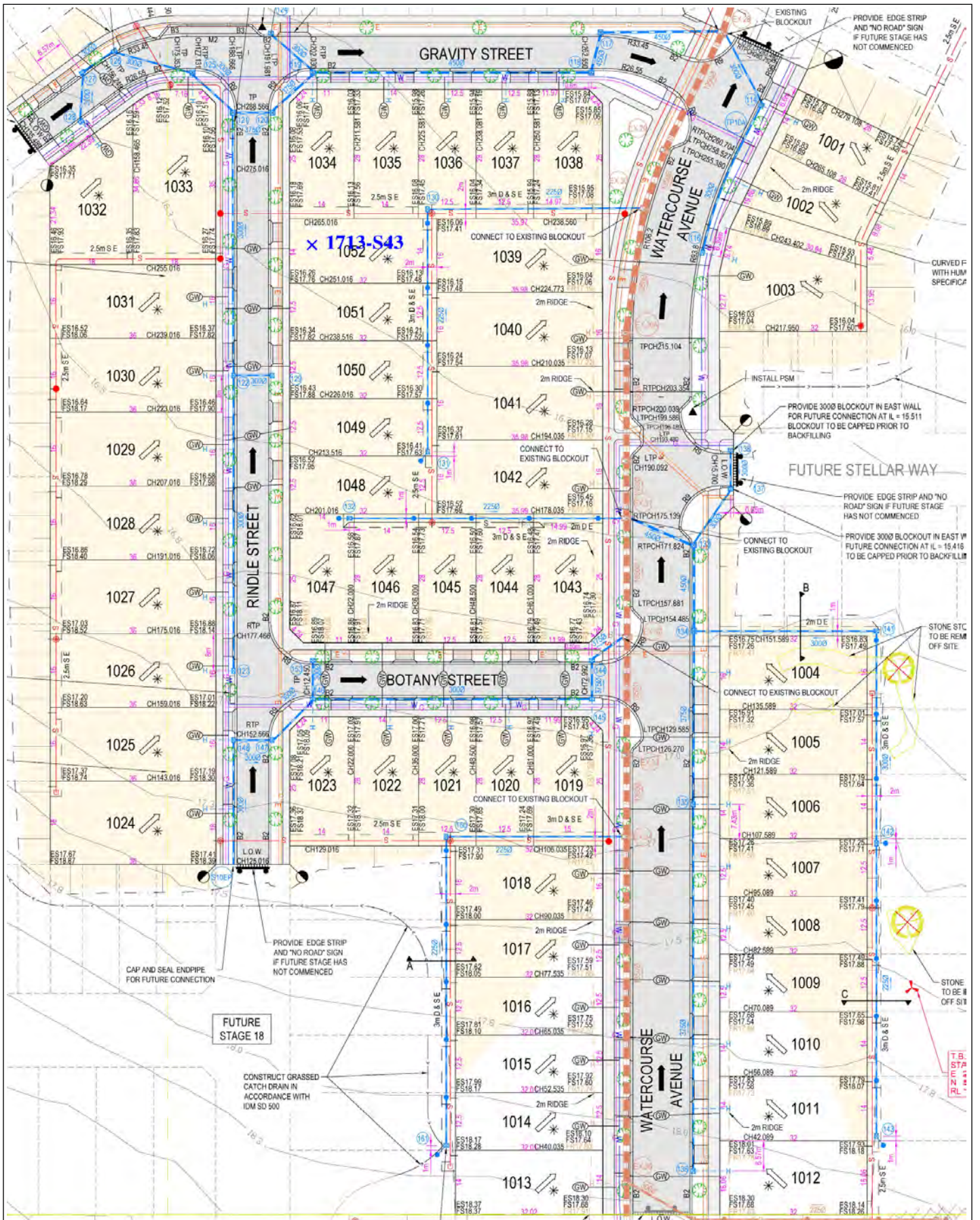
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1713-S43		
Date Tested	20/12/2022		
Time Tested	15:01		
Test Request #/Location	Retest 1713- s37 Lot 1052		
Layer / Reduced Level	Layer 4		
Thickness of Layer (mm)	300		
Soil Description	Gravelly CLAY, with sand, high plasticity		
Test Depth (mm)	275		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0		
Field Wet Density (FWD) t/m ³	1.97		
Field Moisture Content %	19.9		
Field Dry Density (FDD) t/m ³	1.64		
Peak Converted Wet Density t/m ³	1.94		
Adjusted Peak Converted Wet Density t/m ³	**		
Moisture Variation (Wv) %	2.5		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	101.5		
Compaction Method	Standard		
Report Remarks	**		

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-14
Issue Number: 1
Date Issued: 11/01/2023
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14493
Date Sampled: 09/01/2023
Dates Tested: 09/01/2023 - 10/01/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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 Phone: (03) 5282 1566
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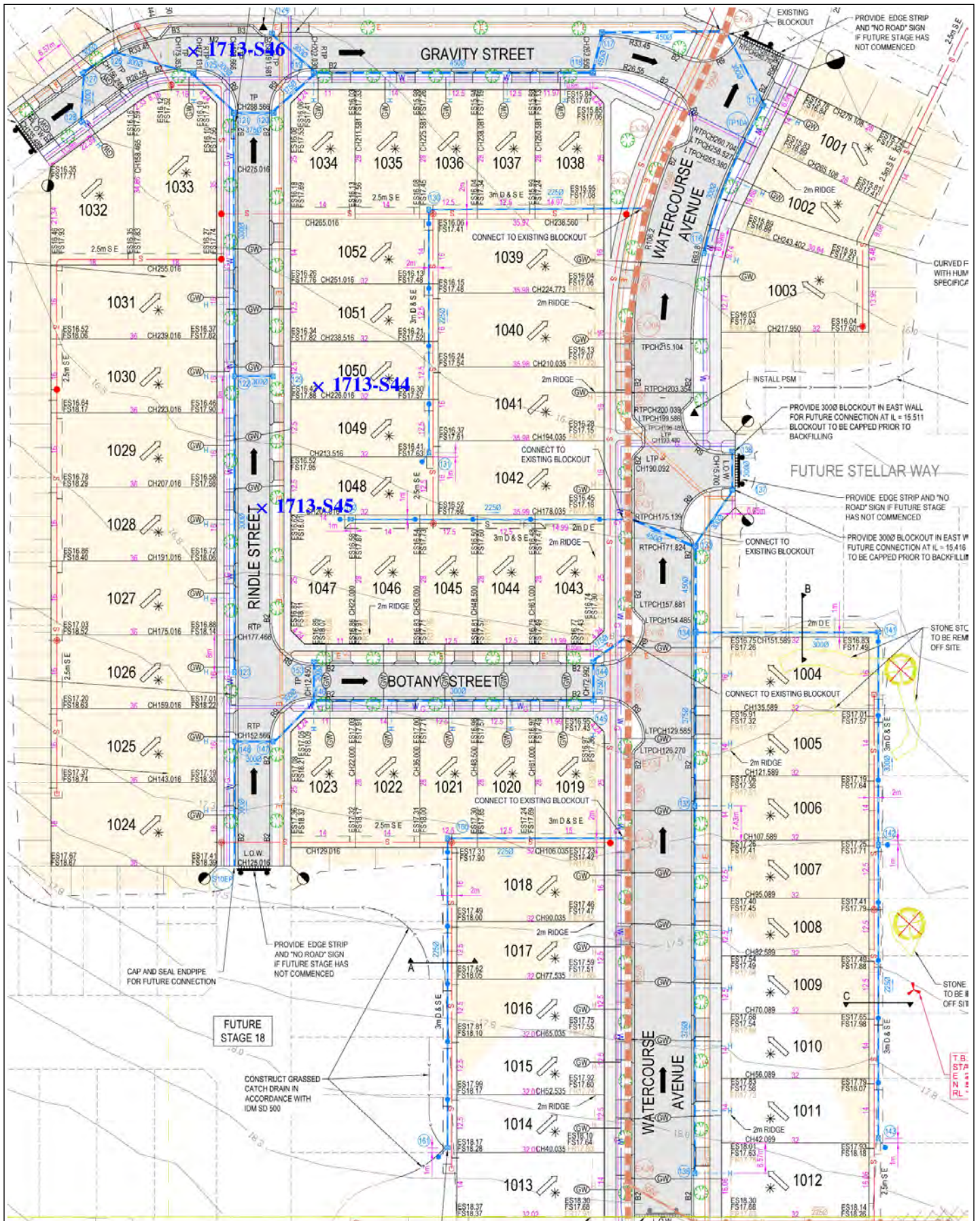


Approved Signatory: James Howell
 Senior Construction Materials Technician
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S44	1713-S45	1713-S46
Date Tested	09/01/2023	09/01/2023	09/01/2023
Time Tested	13:26	13:44	13:57
Test Request #/Location	Lot 1050	Rendle street	Gravity street
Layer / Reduced Level	Layer 5	Layer 4	Layer 3
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Field Wet Density (FWD) t/m ³	1.95	1.96	1.96
Field Moisture Content %	22.9	23.8	24.9
Field Dry Density (FDD) t/m ³	1.58	1.58	1.57
Peak Converted Wet Density t/m ³	1.85	1.83	1.83
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	3.0	3.0	3.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	105.5	107.0	107.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1713-15
Issue Number: 1
Date Issued: 12/01/2023
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW1713
Project Name: CORIDALE ESTATE STAGE 10
Project Location: LARA
Work Request: 14494
Dates Tested: 10/01/2023 - 11/01/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Material: Gravelly CLAY, with sand, high plasticity
Material Source: Insitu

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Accredited for compliance with ISO/IEC 17025 - Testing

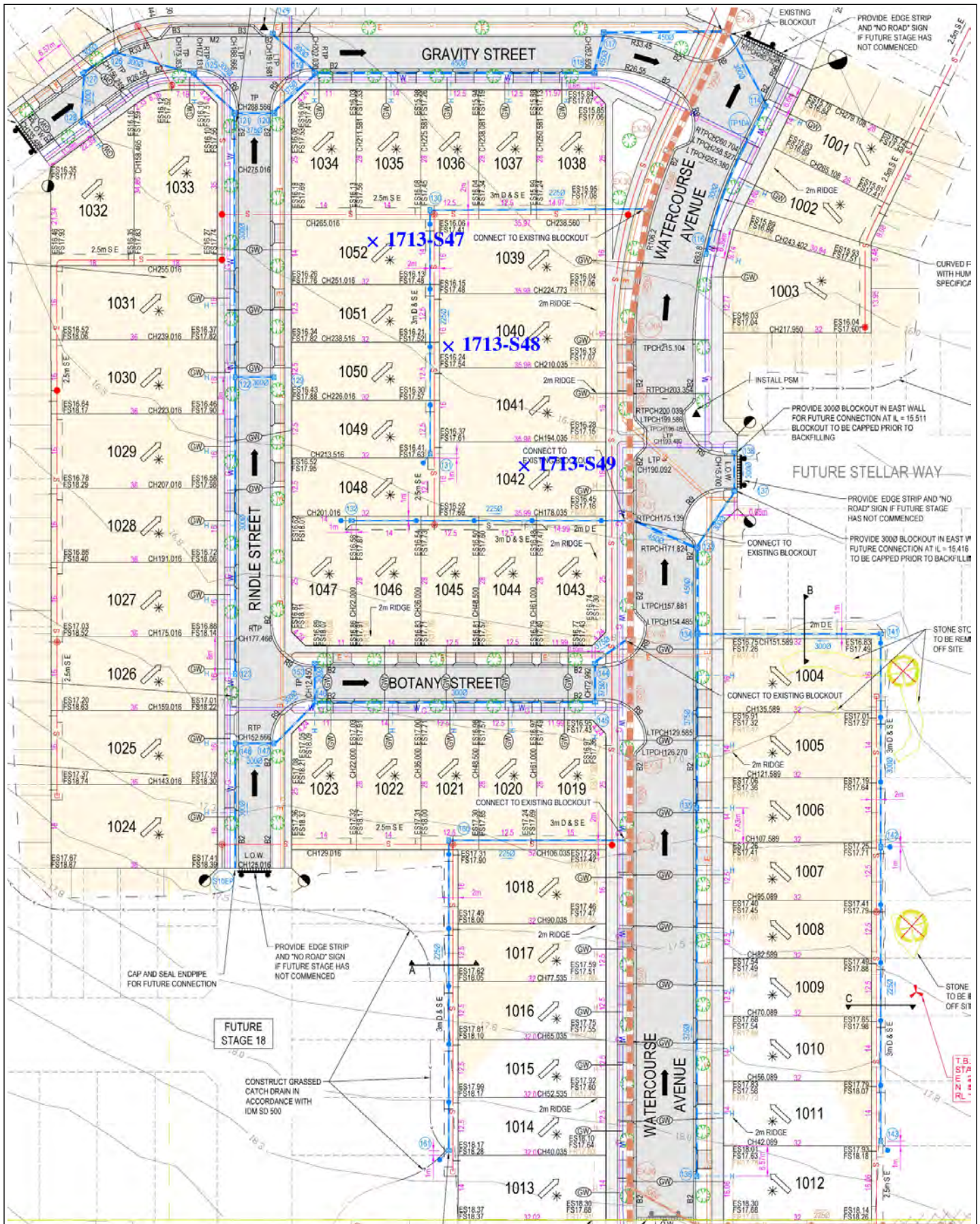


Approved Signatory: James Howell
 Senior Construction Materials Technician
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	1713-S47	1713-S48	1713-S49
Date Tested	10/01/2023	10/01/2023	10/01/2023
Time Tested	13:20	13:36	13:51
Test Request #/Location	Lot 1052	Lot 1040	Lot 1042
Layer / Reduced Level	Layer 5	Layer 5	Layer 5
Thickness of Layer (mm)	300	300	300
Soil Description	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity	Gravelly CLAY, with sand, high plasticity
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	4	3
Field Wet Density (FWD) t/m ³	1.91	1.97	1.95
Field Moisture Content %	20.7	22.6	20.8
Field Dry Density (FDD) t/m ³	1.59	1.60	1.61
Peak Converted Wet Density t/m ³	1.82	**	**
Adjusted Peak Converted Wet Density t/m ³	**	1.95	1.94
Moisture Variation (Wv) %	3.0	**	**
Adjusted Moisture Variation %	**	1.0	1.0
Hilf Density Ratio (%)	105.0	101.0	100.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC
 Negative values = test is wet of OMC



APPENDIX D

Site Photographs









