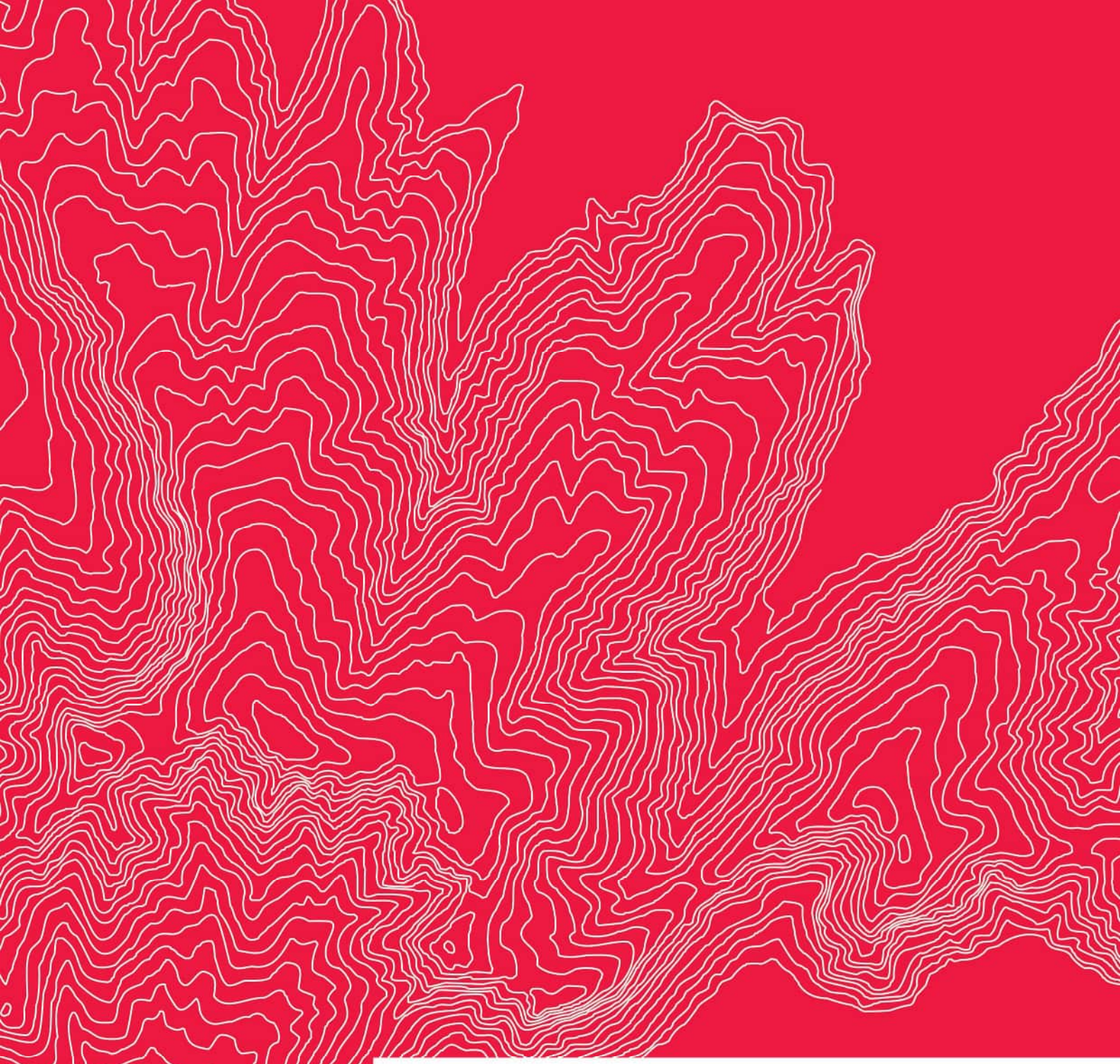


Infrastructure Servicing Report

Version A

Section 41 SO 13711, Tauranga Bay Road, Westport

Prepared for Tauranga Bay Holdings Limited

510322

eliot sinclair

Infrastructure Servicing Report

Section 41 SO 13711, Tauranga Bay Road, Westport

Prepared for Tauranga Bay Holdings Limited

510322

Quality Control Certificate

Eliot Sinclair & Partners Limited

eliotsinclair.co.nz

Action	Name	Signature	Date
Prepared by:	Jenish Manandhar Civil Engineer DipEng Civil jenish.manandhar@eliotsinclair.co.nz		14 March 2024
Reviewed by:	Duncan Kemsley Civil Engineer BE(Hons) Civil CMEngNZ CPEng (Civil) duncan.kemsley@eliotsinclair.co.nz		14 March 2024
Directed and approved for release by:	Shannon Hopkins Survey Technician shannon.hopkins@eliotsinclair.co.nz		14 March 2024
Status:	Version A		
Release date:	08 March 2024		
Distributed to:	Tauranga Bay Holdings Limited Buller District Council		

Version History

Status	Description	Author	Release Date
A	Consent Issue	J. Manandhar	14 March 2024

Contents

1. Introduction

Eliot Sinclair has been engaged by Tauranga Bay Holdings Limited to assist with the subdivision consent application for a rural lifestyle residential development of 21 allotments, 1 reserve allotment, 1 road to vest to Buller District Council and 3 Rights of Way (ROW) in Tauranga Bay, Westport. This development is proposed within Section 41 SO 13711 (referred as "the Site").

Refer to **Appendix A** for the proposed subdivision layout.

2. Existing Site

The Site is located in Tauranga Bay, Westport and is bordered by Wilsons Lead Road to the north-east, Tauranga Bay Road to the north-west, and pasture area to the south.

The aerial imagery illustrating the Site boundary is shown in Figure 1 below.

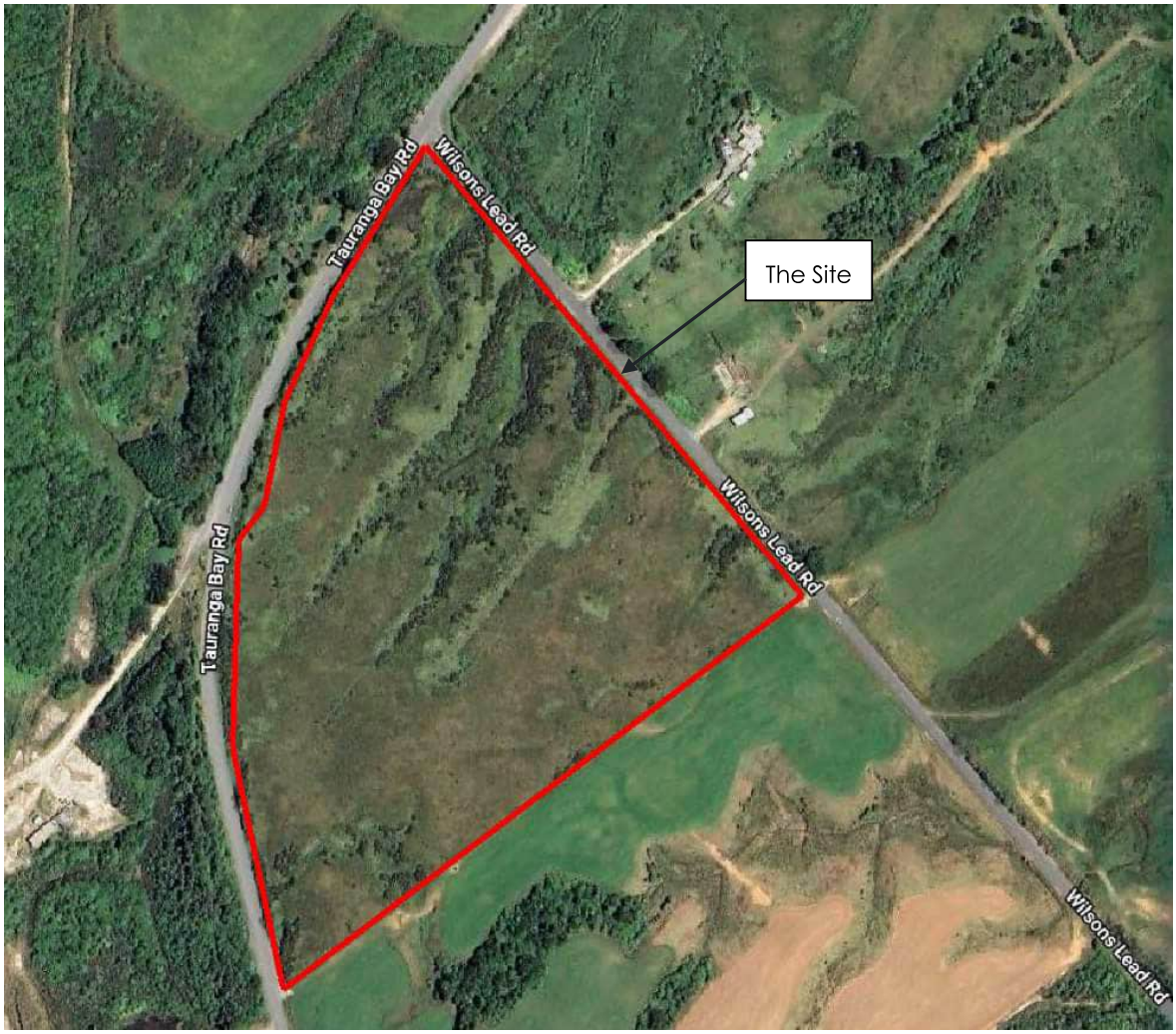


Figure 1. Site Location

The Site is currently a pasture area. The northern portion of the Site falls towards the north-east and the southern portion of site falls towards the southern boundary.

The Site includes two valleys ('A' and 'B') as shown in Figure 2 below. These valleys are drained by culverts under Wilsons Lead Road. The size and inverts of these culverts are unknown at this stage.

There is also one small valley 'C' in the south-east part of the Site which is drained by a culvert under Wilsons Lead Road. The pre-development site with valleys is shown in Figure 2 below.

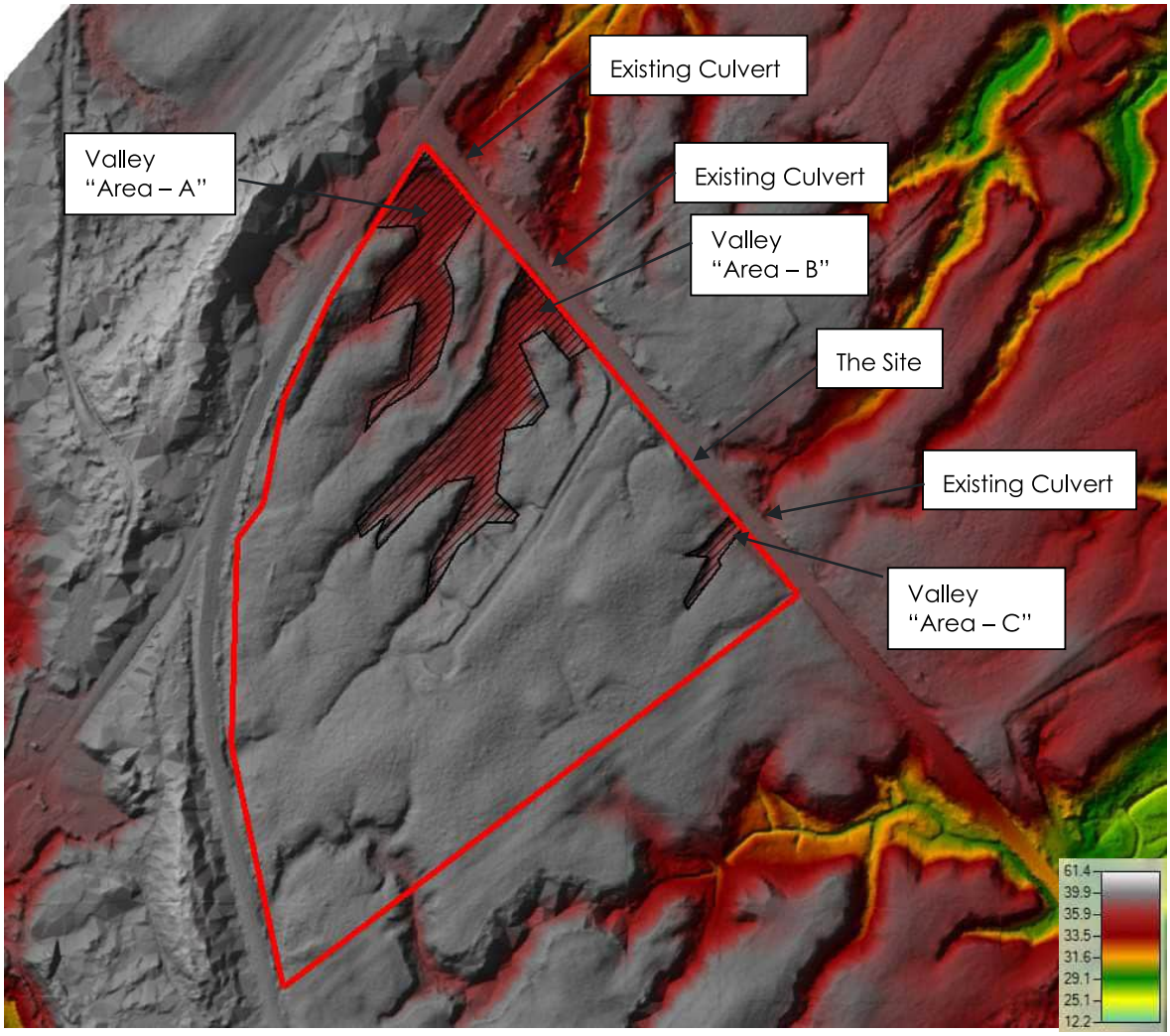


Figure 2. Terrain of the Site showing the valleys

3. Potential for Development

The development is proposed to include 21 residential allotments, 1 reserve lot, 1 road vested to Buller District Council and 3 Rights of Way. Refer to Figure 3.

Figure 3. Post-development Site layout

4. Earthworks and Clearing

A detailed topographical survey of the Submission Site has not been undertaken to-date. However, we have referred to publicly available LiDAR data.

The proposed road is to be cut into existing ground and cut materials will be used to fill within the subdivision (subject to geotechnical requirements) or taken off-site. An earthworks plan demonstrating cut and fill volumes and location of cuts and fill will be prepared during the detailed design stage.

Earthworks will likely consist of stripping the turf layer and disposing off-site, followed by removing the topsoil layer onto a clean insitu subgrade. Once the subgrade has been approved by a suitability qualified Engineer, further cutting or filling can commence to meet the design levels. All earthwork areas will be finished with a layer of topsoil and seeded with grass to provide long term stability.

All earthworks will be undertaken in accordance with NZS 4431:1989 – Code of Practice for Earth Fill for Residential Development.

Accidental discovery protocols will be in place should any archaeology, unexpected uncontrolled fill or contamination be encountered. Deeper localised excavations may also be instructed by the Inspection Engineer to remove unsuitable soils such as large tree roots or stumps.

An erosion, sediment, and dust management plan will be prepared during detailed design stage and implemented in accordance with best practice and the recommendations from Buller District Council.

5. Water Supply

The water supply for each lot is to be managed on-site with rain-water harvesting tanks. The design will be submitted to the Council during building consent stage. The water supply tank is to be sized depending on the water demand of each lot owner and be filled up as required by a water tanker if the water demand is not met by rainwater harvesting. All the potable water tanks are to be designed to meet Taumata Arowai and New Zealand Building Code requirements.

The fire-fighting water supply for each lot is to be a FW2 category as per water supply classification mentioned in Table 1, SBZ PAS 4509: 2008. Minimum fire-fighting water storage of 45 m^3 is required in tanks for each lot, within a distance of 90 m from a dwelling as per Table 2, SNZ PAS 4509: 2008.

6. Stormwater

Refer to the Stormwater Design Report attached in Appendix B.

7. Wastewater

The wastewater discharge for each lot is to be managed, treated and discharged within the lot in accordance with the requirements of New Zealand Building Code – G13/VM4 – Foul water: On-site disposal. The wastewater discharge is also subject to requirements as set by the regional and local council.

8. Roading

It is proposed to have one vested road and three private rights of way for the new subdivision. The vested road accesses off Wilsons Lead Road on the north-east boundary, continues inside the new subdivision towards the south-west and ends with a cul-de-sac. Two rights of way access off the new cul-de-sac each serving a maximum of 6 rural residential lots. One right of way accesses off the vested road and serves 5 residential lots.

The vested road will be designed to Figure E2, NZS4404: 2010, Table 3.2 serving a maximum of 20 dwelling units. The vested road is proposed with a 5.7 m wide movement lane, 0.5 m shoulder each side of the road and minimum of 1.15 m wide road side channel on each side. The road longitudinal gradient varies from approximately 1 in 40 to 1 in 155 and has a crossfall of 3 % from one road edge to the other. The vested road pavement will be designed to Austroads Guide to Pavement Technology Part 2 Pavement Structural Design.

The alignment of the rights of way will be designed to Figure E1, NZS4404: 2010, Table 3.2 serving a maximum of 6 dwelling units. The rights of way are proposed with a 2.5 m wide movement lane, 0.5 m shoulder each side of the road and a minimum of 1.25 m wide road side channel on each side. The rights of way will have a longitudinal grade varying from approximately 1 in 14 to 1 in 230 and have a crossfall of 2 – 3 % from one road edge to the other. Pavements will be designed to Austroads Guide to Pavement Technology Part 2 Pavement Structural Design.

The cul-de-sac will be designed to NZS4404: 2010, Figure 3.3 as a residential cul-de-sac with a radius of 9.5 m and minimum crossfall of 3 %.

The vested road access to Wilsons Lead Road is to be in accordance with Buller District Plan, Part 7 - District Wide Rule – Diagram D. The access for Lot 5 is proposed to be straight off Wilsons Lead Road in accordance with Buller District Plan, Part 7 - District Wide Rule – Diagram C.

Refer to **Appendix A** for Roading drawings.

9. Common Services (Power / Telecommunications / Gas)

Power will be provided to service all allotments in accordance with utility company and industry standards at the time of development. All cables and ducts will be placed below ground, and kiosks will be placed within individual allotments.

No terrestrial communications cables or fibre connections will be provided.

Installation of reticulated gas services will not be provided.

10. Conclusion

The site is able to be serviced for wastewater, stormwater, potable water, access, and electricity subject to preliminary and detailed design in conjunction with appropriate Council consents being obtained. A detailed topographical survey will be undertaken to facilitate the detailed design.

On this basis the submission for the Subdivision Consent is able to be supported in respect of infrastructure and servicing capacity.

11. Disclaimer

This report has been prepared by Eliot Sinclair & Partners Limited ("Eliot Sinclair") only for the intended purpose as an Infrastructure Servicing Report.

The report is based on:

- LINZ LiDAR Westcoast (2020-2022)
- NZS4404: 2010 Land Development and Subdivision Infrastructure
- Infiltration test undertaken on-site

Where data supplied by Tauranga Bay Holdings Limited or other external sources, including previous site investigation reports, have been relied upon, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Eliot Sinclair for incomplete or inaccurate data supplied by other parties.

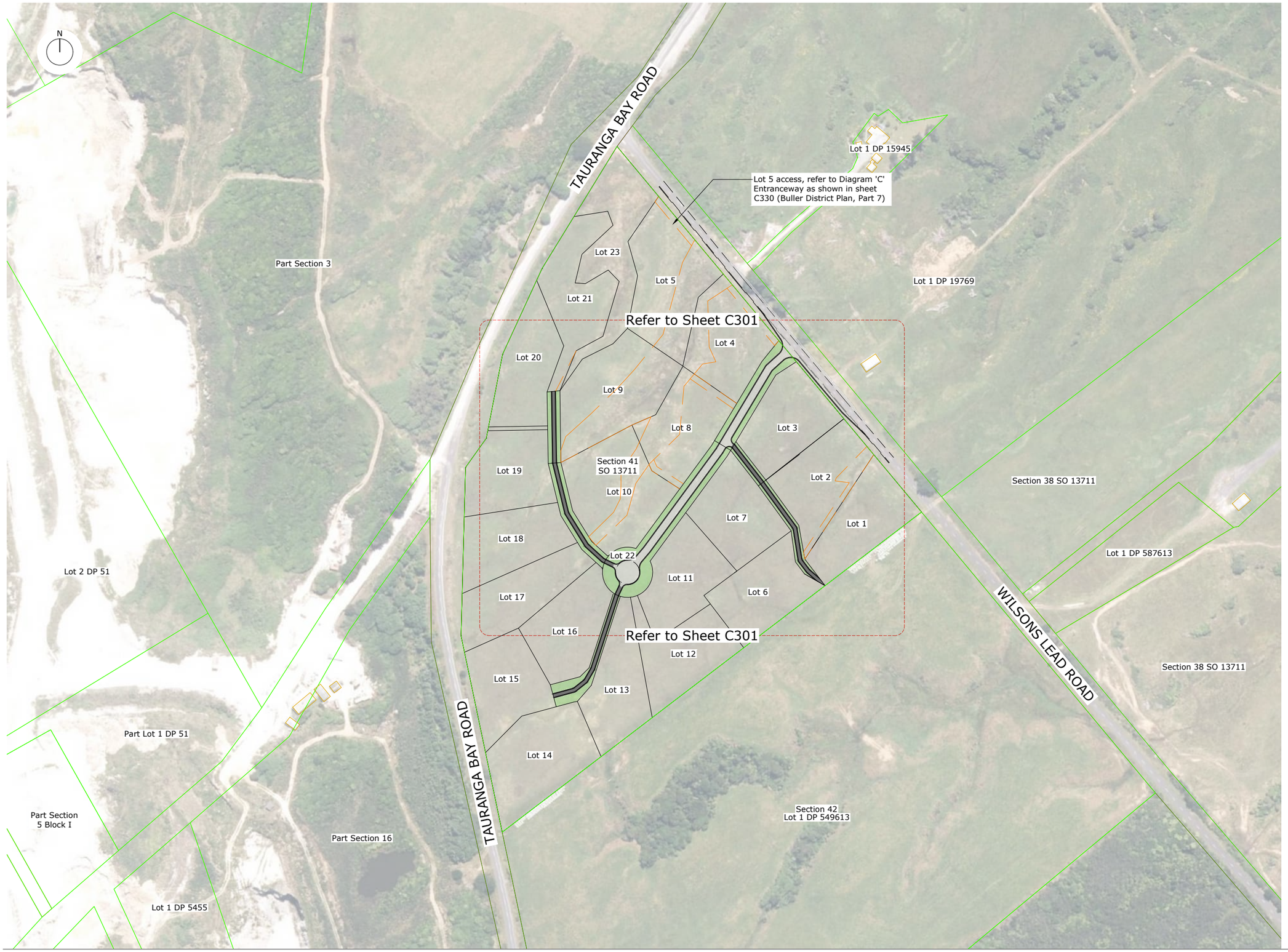
Whilst every care has been taken during our investigation and interpretation of available data to ensure that the conclusions drawn, and the opinions and recommendations expressed are correct at the time of reporting, Eliot Sinclair has not performed an assessment of all possible conditions or circumstances that may exist at the site. Eliot Sinclair does not provide any warranty, either express or implied, that all conditions will conform exactly to the assessments contained in this report.

The exposure of conditions or materials that vary from those described in this report, or occurrence of additional strong seismicity, or any update to the Building Act, NZBC or MBIE's Guidance may require a review of our recommendations. Eliot Sinclair should be contacted to confirm the validity of this report should any of these occur.

This report has been prepared for the benefit of Tauranga Bay Holdings Limited and the Buller District Council for the purposes as stated above. No liability is accepted by Eliot Sinclair or any of their employees with respect to the use of this report, in whole or in part, for any other purpose or by any other party.

Appendix A. Engineering Drawings

G:\Jobs\51\510322\Acad\CAD\510322-C1-C300



0 30m 60m 90m 120m 150m
1:1500

NOTES

1. All works to be in accordance with Project Specification and Buller District Council - District Plan where applicable.

LEGEND:

- Existing LINZ boundary
- Existing building outline
- Existing road - Indicative only
- Proposed edge of carriageway
- Proposed boundary
- Proposed stormwater easement
- Berm area
- 2-coat chipseal or similar
- 2-coat chipseal or unsealed area (TBC)

NOTES
1. Contractors to verify all dimensions and the location of all underground services on site prior to commencing work.
2. Unless noted otherwise, all work shall be undertaken in accordance with the NZBC and any relevant Territorial Authority Engineering Standards and Specifications as a minimum standard.

REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**DJK**
APPROVED	**14.03.24**	**SH**
STATUS		**FOR CONSENT**
SCALE		**1:1500 [A1] 1:3000 [A3]**

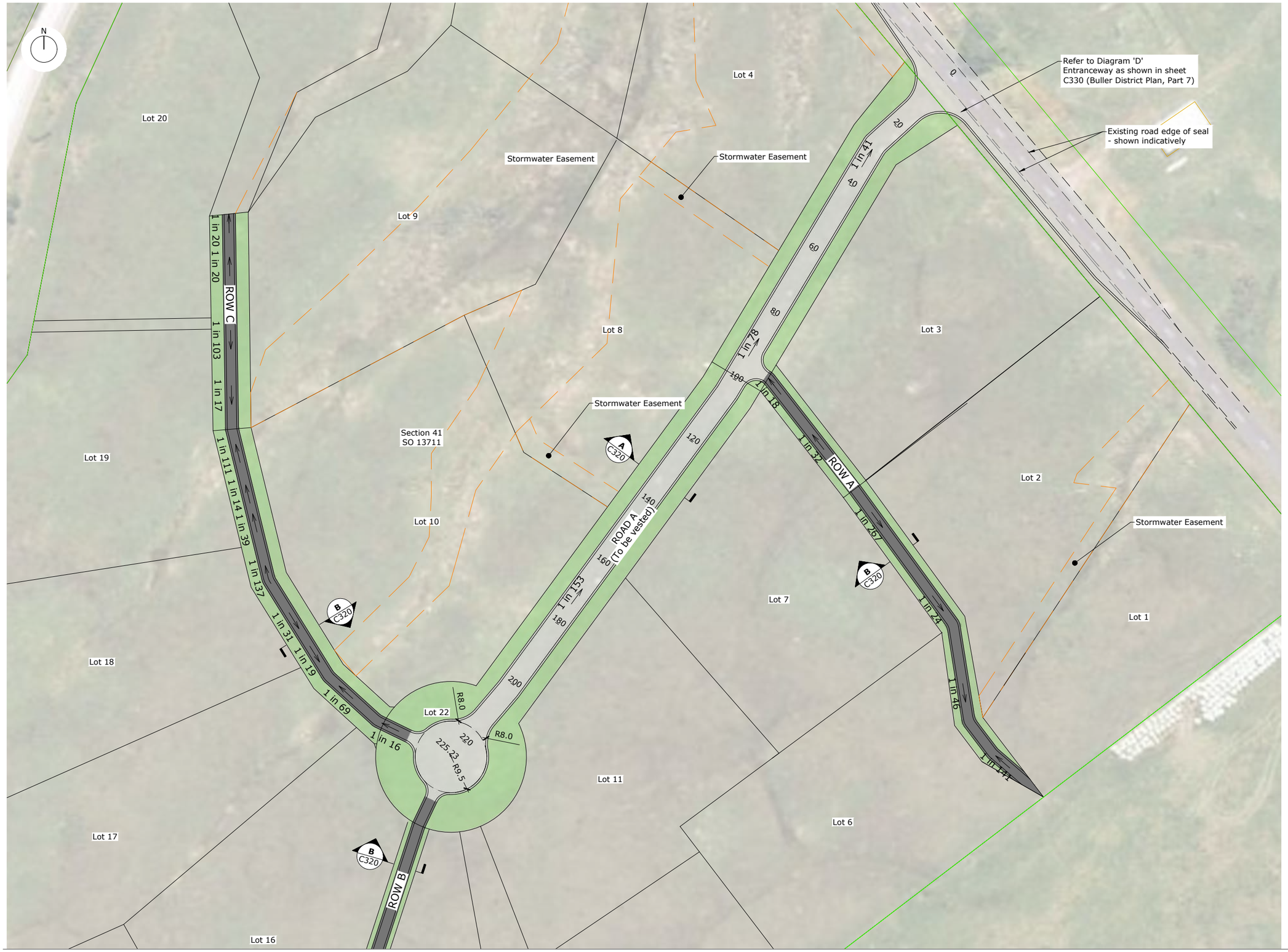
CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING PLAN
SHEET 1 OF 2

PROJECT	REV.
510322	**A**
SET	**SHEET**
C1	**C300**

eliot sinclair

G:\Jobs\51\510322\Acad\CAD\510322-C1-C300



0 10m 20m 30m 40m 50m

1:500

NOTES

1. All works to be in accordance with Project Specification and Buller District Council - District Plan where applicable.

LEGEND:

- Existing LINZ Boundary
- Existing Building Outline
- Existing road - Indicative only
- Proposed edge of carriageway
- Proposed boundary
- Proposed stormwater easement
- 30 Proposed Chainage Markers
- 1 in 99 Road Grade
- Berm area
- 2-coat chipseal or similar
- 2-coat chipseal or unsealed area (TBC)

NOTES
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2. Unless noted otherwise, all work shall be undertaken in accordance with the NZBC and any relevant Territorial Authority Engineering Standards and Specifications as a minimum standard.

REV.	DRAWN	DATE	NOTE
A	GG	08.03.24	For Consent

CLIENT

Tauranga Bay Holdings Ltd

DESIGNED	JM
DRAWN	GG
REVIEWED	DJK
APPROVED	14.03.24 SH
STATUS	FOR CONSENT
SCALE	1:500 [A1] 1:1000 [A3]

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING PLAN
SHEET 2 OF 2

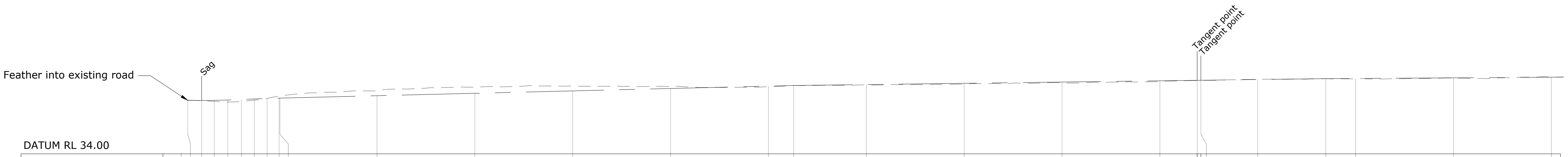
PROJECT	REV.
510322	A
SET	SHEET
C1	C301

eliot sinclair

LEGEND:

Centreline Surface Level

Existing Ground



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VERTICAL GEOMETRY: 1 in -48 (1.42) | 1 in 23 (2.78 1.31 2.62) | 1 in 41 (52.49) | 1 in 78 (54.37) | 1 in 153 (108.28)

CHAINAGE	CENTRELINE LEVEL	EXISTING GROUND	CUT / FILL DEPTH
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0.67	39.47	39.47	-0.00
2.08	39.44	39.44	0.00
3.37	39.46	39.35	-0.11
4.76	39.49	39.28	-0.21
6.15	39.54	39.35	-0.19
7.46	39.60	39.47	-0.13
8.77	39.65	39.65	0.00
10.00	39.68	39.90	0.22
10.08	39.69	39.91	0.22
20.00	39.93	40.44	0.51
30.00	40.18	40.81	0.63
40.00	40.42	40.92	0.50
50.00	40.67	40.88	0.21
60.00	40.91	40.86	-0.05
62.58	40.98	40.98	0.00
70.00	41.07	41.05	-0.02
80.00	41.20	41.11	-0.08
90.00	41.33	41.23	-0.10
100.00	41.45	41.38	-0.08
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120.00	41.69	41.67	-0.02
130.00	41.75	41.73	-0.03
140.00	41.82	41.85	0.03

LONGITUDINAL SECTION ON CENTRELINE VESTED ROAD

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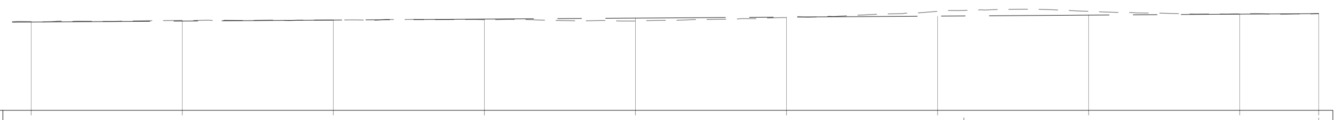

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VERTICAL GEOMETRY: 1 in 153 (108.28)

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150.00	41.89	41.93	0.04
160.00	41.95	41.95	0.00
170.00	42.02	41.97	-0.04
180.00	42.08	41.89	-0.19
190.00	42.15	42.11	-0.03
200.00	42.21	42.53	0.32
210.00	42.28	42.53	0.25
220.00	42.34	42.36	0.02
225.23	42.38	42.38	0.00

LONGITUDINAL SECTION ON CENTRELINE VESTED ROAD

Horizontal 1:250[A1] 1:500 [A3]
Vertical 1:250[A1] 1:500 [A3]

NOTES
1. Contractors to verify all dimensions and the location of all underground services on site prior to commencing work.
2. Unless noted otherwise, all work shall be undertaken in accordance with the NZBC and any relevant Territorial Authority Engineering Standards and Specifications as a minimum standard.

REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**DJK**
APPROVED	**14.03.24**	**SH**
STATUS		**FOR CONSENT**
SCALE		**AS SHOWN**

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING
LONG SECTION

PROJECT **510322** REV. **A**

SET **C1** SHEET **C310**

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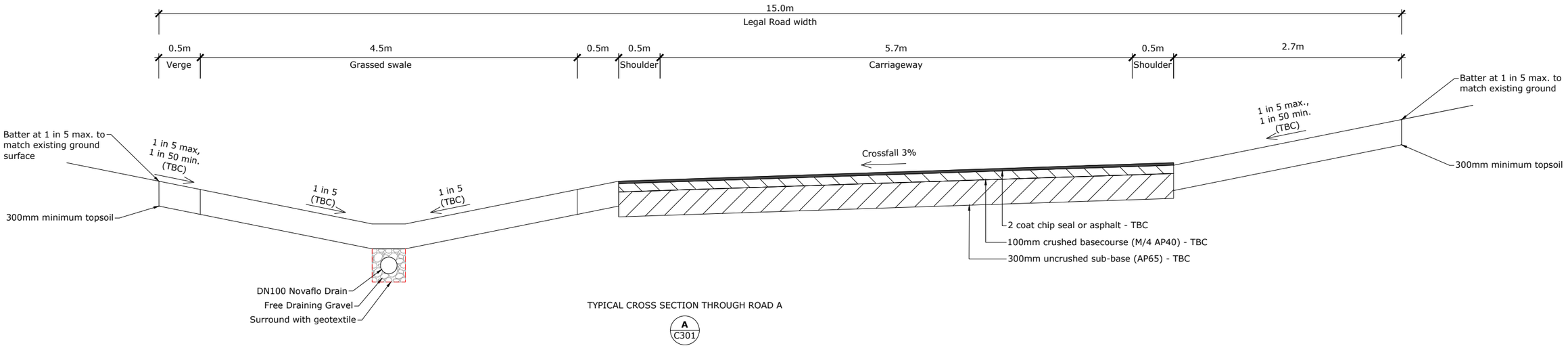
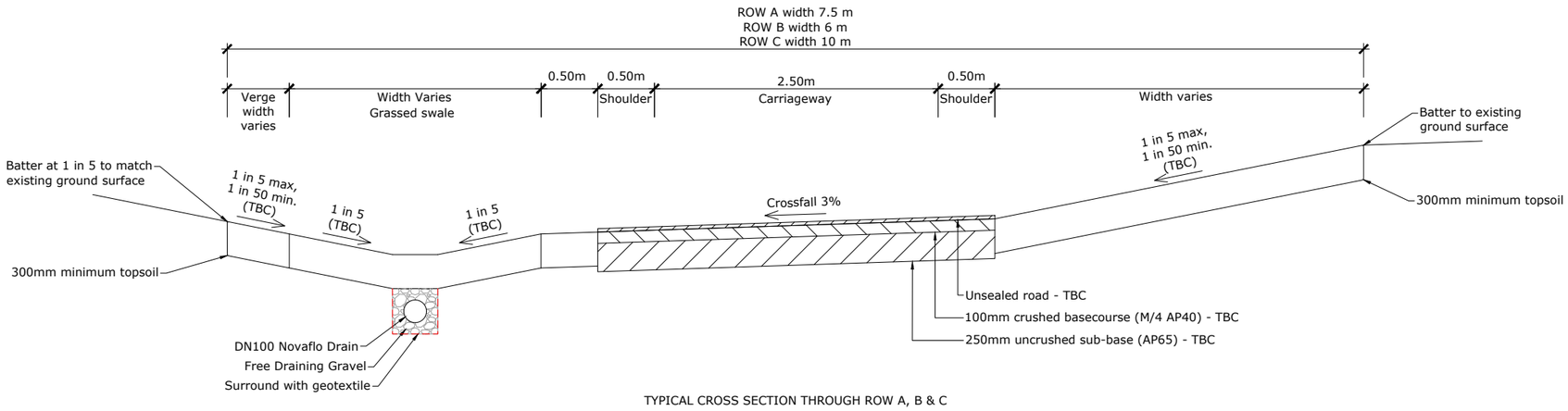


TYPICAL CROSS SECTION THROUGH ROAD A

A
C301



TYPICAL CROSS SECTION THROUGH ROW A, B & C

B
C301

NOTES
1. Contractors to verify all dimensions and the location of all underground services on site prior to commencing work.
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REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

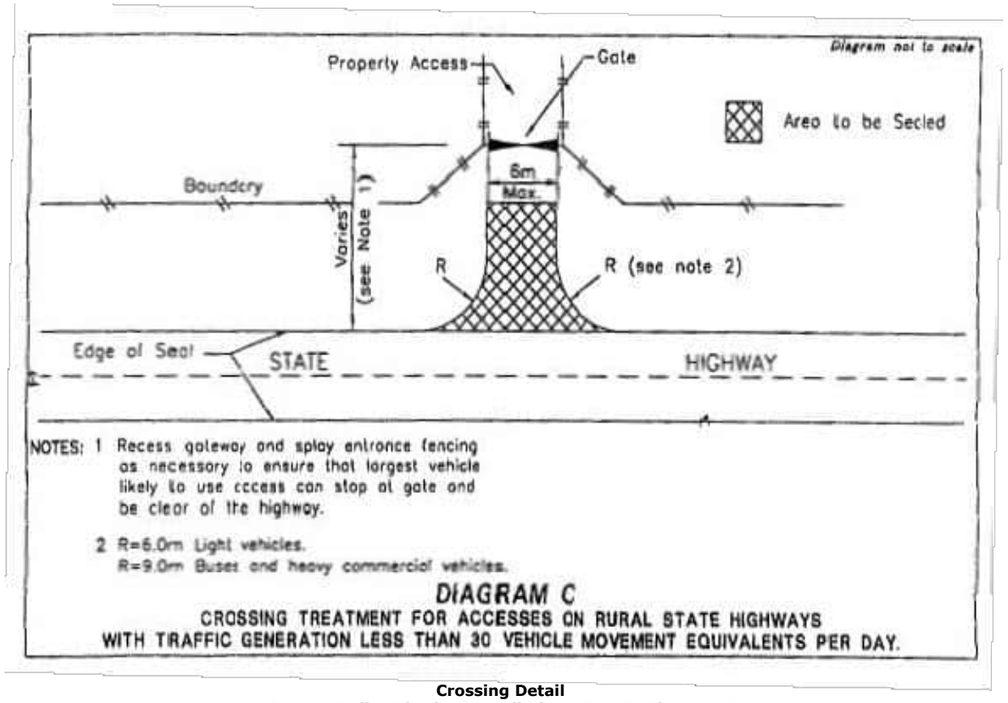
DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**DJK**
APPROVED	**14.03.24**	**SH**
STATUS		**FOR CONSENT**
SCALE		**1:25 [A1] 1:50 [A3]**

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

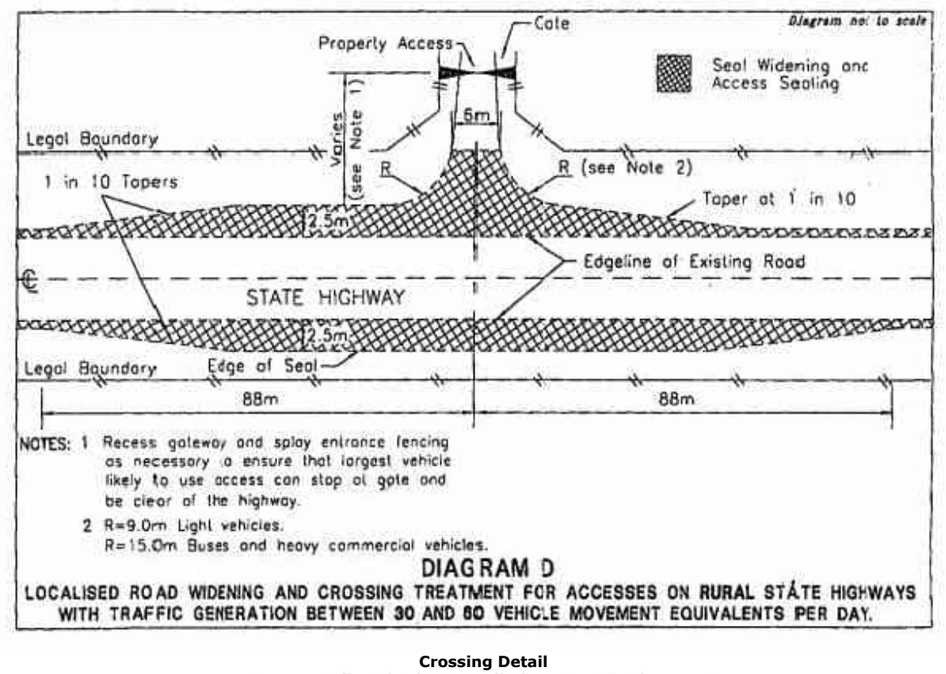
ROADING
CROSS SECTION

PROJECT	REV.
510322	**A**
SET	SHEET
C1	**C320**

eliot sinclair



Crossing Detail
Source: Buller District Council Plan - Part 7, Diagram C



Crossing Detail
Source: Buller District Council Plan - Part 7, Diagram D

NOTES
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REV.	DRAWN	DATE	NOTE
A	GG	08.03.24	For Consent

CLIENT
Tauranga Bay Holdings Ltd

DESIGNED		JM
DRAWN		GG
REVIEWED		DJK
APPROVED	14.03.24	SH
STATUS		FOR CONSENT
SCALE		AS SHOWN

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING DETAILS

PROJECT	REV.
510322	A
SET	SHEET
C1	C330

eliot sinclair

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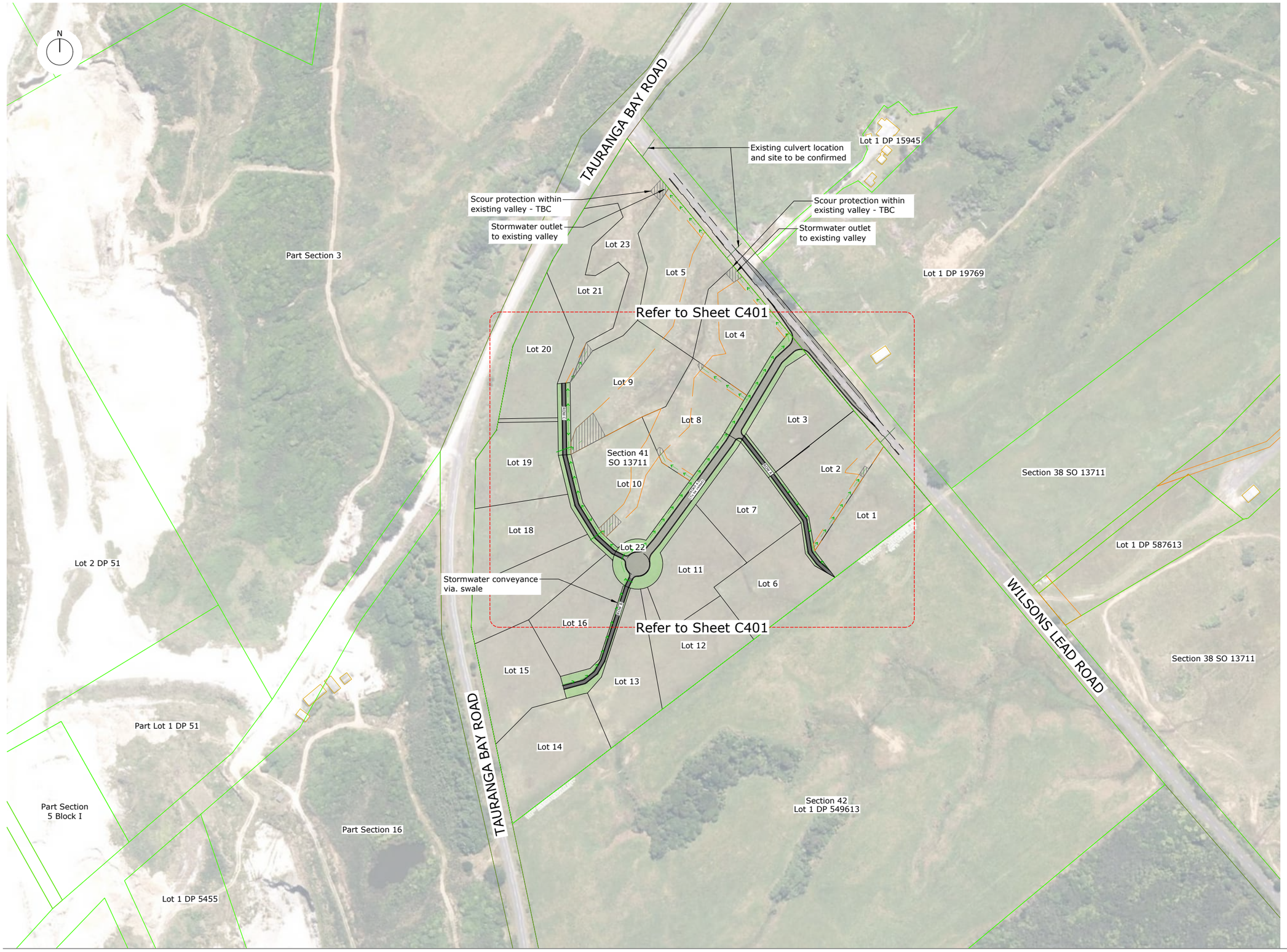

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1:1500

NOTES

1. All works to be in accordance with Project Specification and Buller District Council - District Plan where applicable.

LEGEND:

- Existing LINZ Boundary
- Existing Building Outline
- Existing Stormwater pipe
- Proposed boundary
- Proposed stormwater easement
- Stormwater flows within swale
- Proposed Stormwater pipe
- Proposed scour protection

NOTES

1. Contractors to verify all dimensions and the location of all underground services on site prior to commencing work.
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REV.	DRAWN	DATE	NOTE
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CLIENT

Tauranga Bay Holdings Ltd

DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**JT**
APPROVED	**14.03.24**	**SH**
STATUS	**FOR CONSENT**	
SCALE	**1:500 [A1] 1:1000 [A3]**	

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

DRAINAGE LAYOUT DRAWING SHEET 1 OF 2

PROJECT	REV.
510322	**A**
SET	SHEET
C1	**C400**

eliot sinclair

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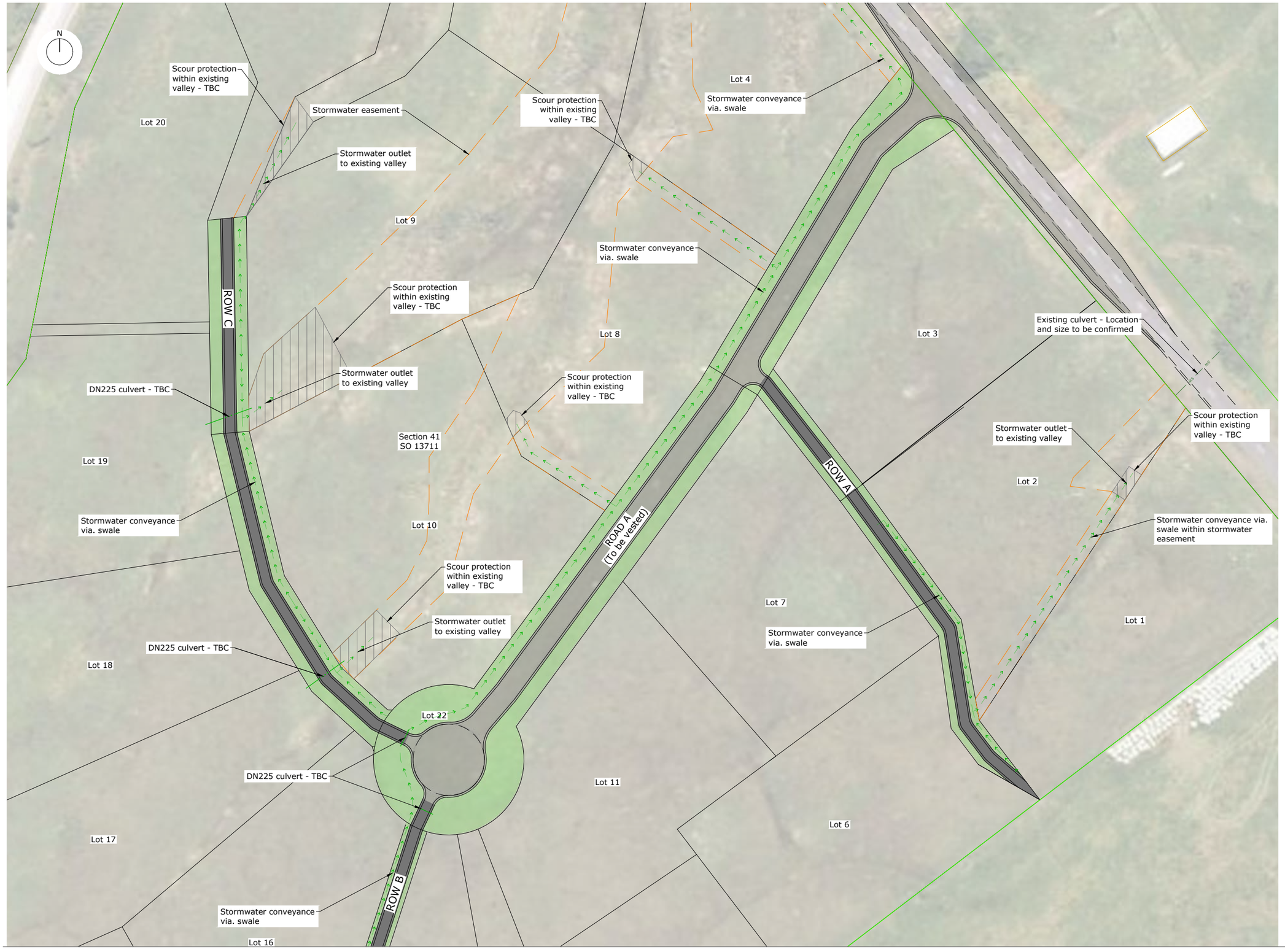

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CLIENT

Tauranga Bay Holdings Ltd

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DRAWN		**GG**
REVIEWED		**JT**
APPROVED	**14.03.24**	**SH**
STATUS	**FOR CONSENT**	
SCALE	**1:500 [A1] 1:1000 [A3]**	

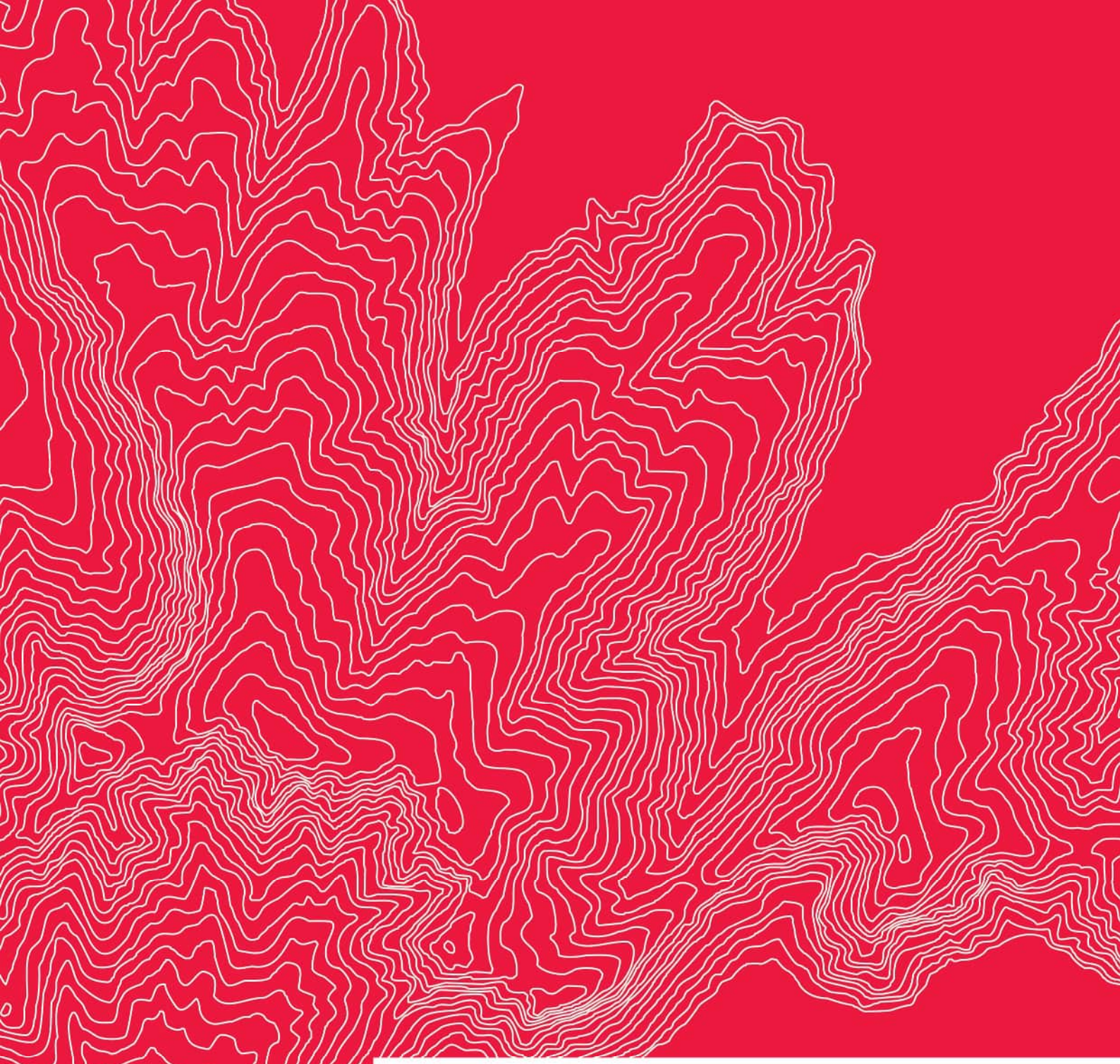
CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

DRAINAGE LAYOUT DRAWING
SHEET 2 OF 2

PROJECT	REV.
510322	**A**
SET	SHEET
C1	**C401**

eliot sinclair

Appendix B. Stormwater Design Report



Stormwater Design Report

Version A

Section 41 SO 13711, Tauranga Bay Road, Westport

Prepared for Tauranga Bay Holdings Limited

510322

eliot sinclair

Stormwater Design Report

Section 41 SO 13711, Tauranga Bay Road, Westport

Prepared for Tauranga Bay Holdings Limited

510322

Quality Control Certificate

Eliot Sinclair & Partners Limited

eliotsinclair.co.nz

Action	Name	Signature	Date
Prepared by:	Jenish Manandhar Civil Engineer DipEng Civil jenish.manandhar@eliotsinclair.co.nz		13 March 2023
Reviewed by:	James Tomkinson Civil Engineer BE CMEngNZ CPEng James.tomkinson@eliotsinclair.co.nz		13 March 2023
Directed and approved for release by:	James Tomkinson Civil Engineer BE CMEngNZ CPEng James.tomkinson@eliotsinclair.co.nz		13 March 2023
Status:	Version A		
Release date:	11 March 2023		
Distributed to:	Tauranga Bay Holdings Limited Buller District Council		

Version History

Status	Description	Author	Release Date
A	Consent Issue	J. Manandhar	13 March 2023

Contents

1. Project Personnel

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Telephone	03 379 4014	**Email**	jm@eliotsinclair.co.nz

Developer

Name			
Company	Tauranga Bay Holdings Ltd		
Address			
Telephone		**Email**	

Design Review

Name	James Tomkinson		
Company	Eliot Sinclair		
Address	PO Box 9339, Tower Junction, Christchurch 8149		
Telephone	03 379 4014	**Email**	jt@eliotsinclair.co.nz

2. Description of the Work

2.1. Introduction

Eliot Sinclair has been engaged by Tauranga Bay Holdings Limited to assist with subdivision consent application for a rural lifestyle residential development of 21 allotments, 1 reserve allotment, 1 road to vest to Buller District Council and 3 Right of Ways (ROW) in Tauranga Bay, Westport. This development is proposed within Section 41 SO 13711 (referred as "the Site").

This report addresses the stormwater drainage conceptual design for proposed development.

The following stormwater design drawings are located in **Appendix A**:

- 510322 – C1 – C400 – Drainage Layout Drawing Sheet 1 of 2
- 510322 – C1 - C401 – Drainage Layout Drawing Sheet 2 of 2

2.2. Design Standards

The design has been carried out in accordance with the NZS 4404: 2010 Land Development and Subdivision Infrastructure.

2.3. Site Location & Description

The Site is located in Tauranga Bay, Westport and is bordered by Wilsons Lead Road to the north-east and Tauranga Bay Road to the north-west, and pasture area to the south.

The aerial imagery illustrating the Site boundary is shown in Figure 1 below.

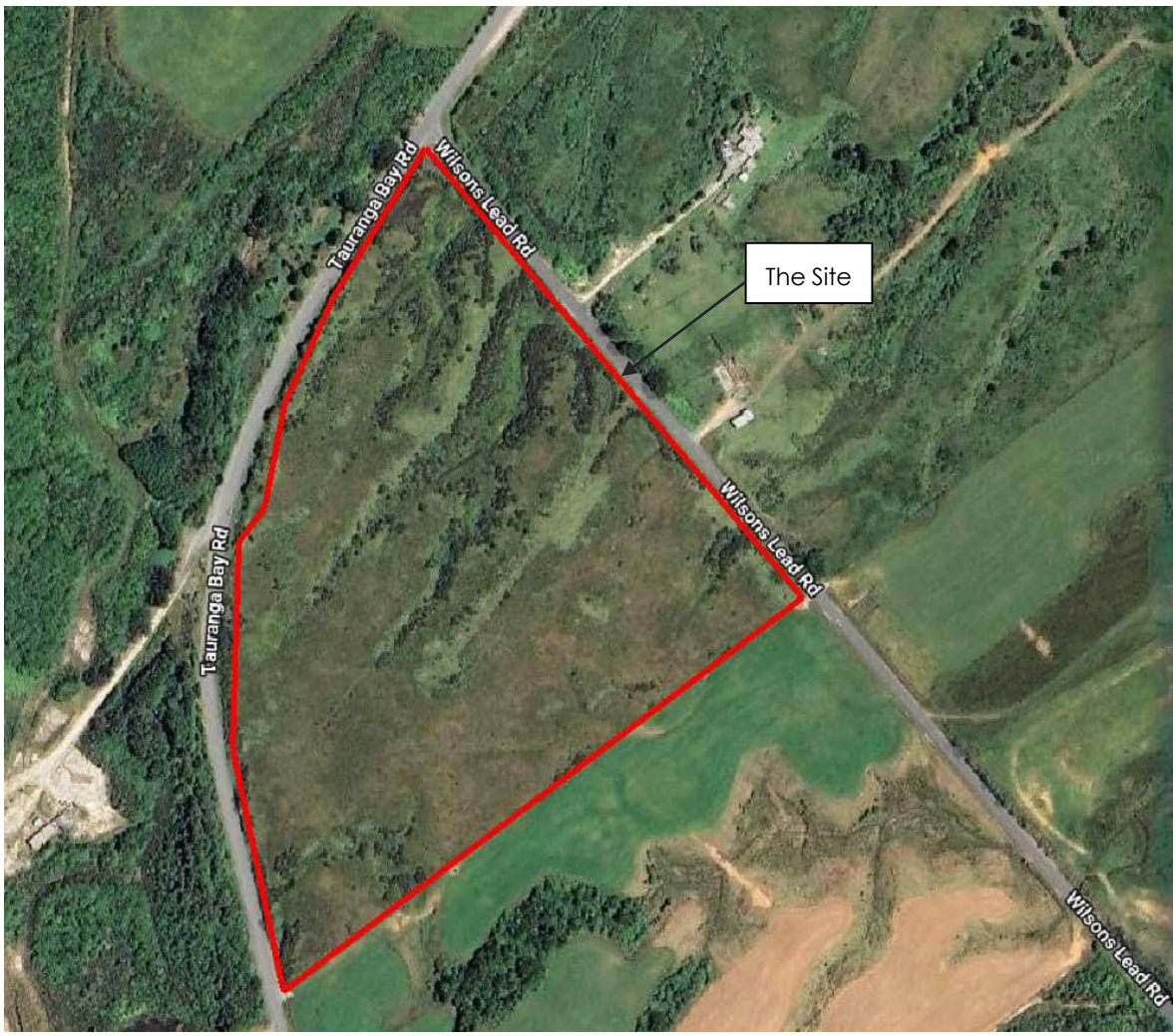


Figure 1. Site Location

2.3.1. The Pre-Development Site

The site currently in pasture with the northern portion falling from west to east and the southern portion falling towards the south. The site has two valleys 'A' and 'B' which drain from the centre of the site towards the north and through a culvert under Wilsons Lead Road near the Tauranga Bay Rd intersection. The culvert size and invert levels are unknown at this stage. A further smaller valley 'C' located in the south-east part of the development. The valleys locations are shown in Figure 2 below.

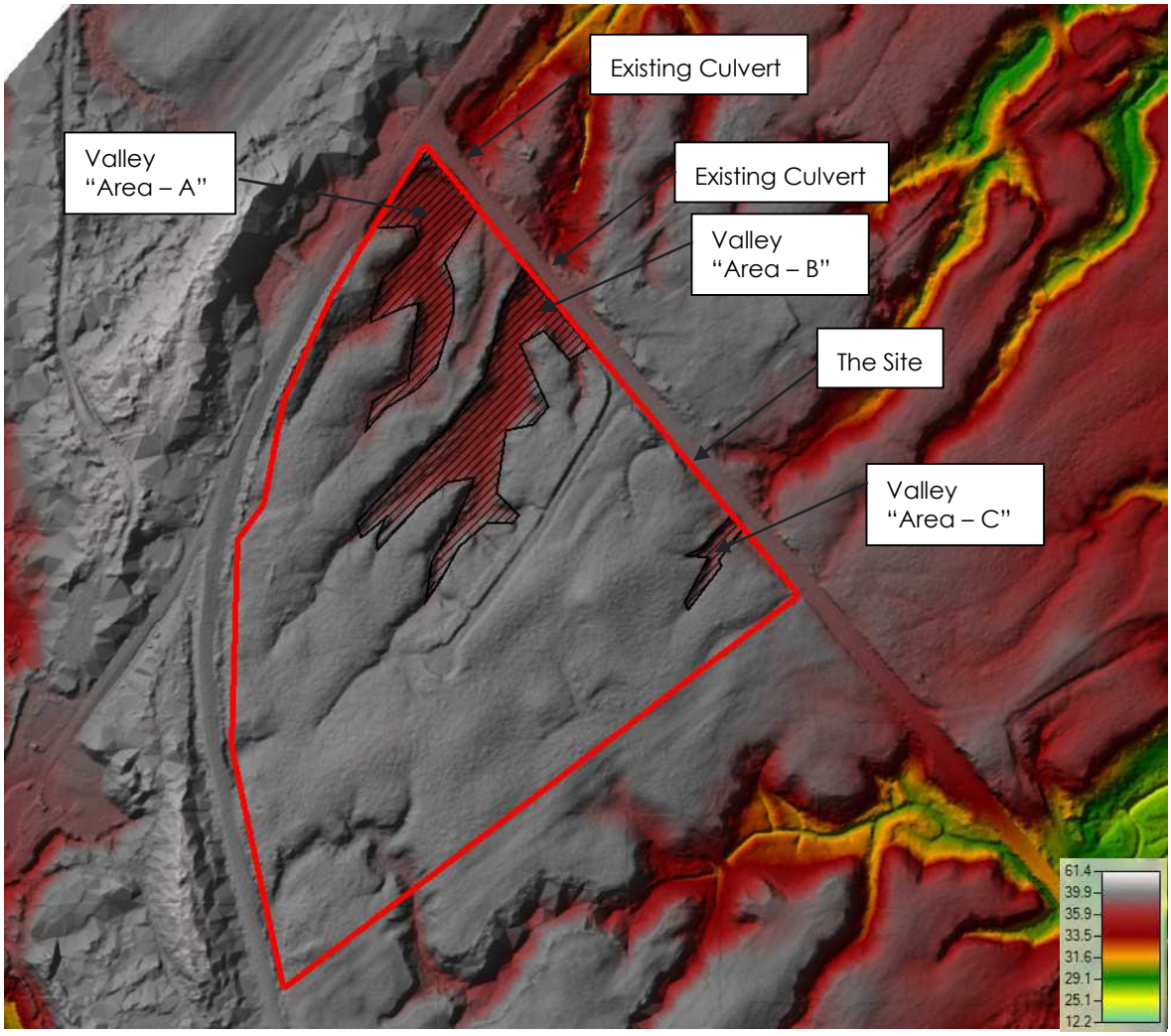


Figure 2. Pre-development Valley Location

2.3.2. The Proposed Development

The proposed development consists of a vested road located approximately central to the Site with an access off Wilsons Lead Road. It is proposed to subdivide existing lot into 23 lots which includes the Lot 23 as a reserve area within one of the valleys within the Site. The post-development layout of the Site is shown in Figure 3 below.

Figure 3. Post-development Site layout

2.4. Concept Design

Roof and hardstand runoff will be stored on site using rainwater harvesting tanks with the overflow discharging to ground soakage pits and sized to mitigate the 1 % AEP storm event. Permeability testing was undertaken on-site resulting in an average rate of 418 mm/hr. A factor of 2 was applied reducing the design permeability rate of 209 mm/hr. Refer to **Appendix C** for infiltration test results.

Stormwater from the vested road and right of ways will discharge to Valleys 'A' and 'B' as shown in Figure 2. This will be conveyed via roadside swales and drains to direct the flow northeast along the main access and the frontage of Lots 4 and 5 off Wilsons Lead Road. Easements will be required through private property to drain stormwater from the greater catchment.

ROW C is to discharge into valleys A and B via road crossings and recreational reserve. Valley B will require stormwater easements over Lots 4, 5, 8, 9 and 10. The ROW A to drain via road side swales to Valley C and require an easement over Lot 2.

Refer to **Appendix A** for Drainage Layout drawings and **Appendix B** for roadside swale calculations designed up to 1 % AEP storm event.

2.5. Reserve Area Assessment

The natural topography contains low lying areas / valleys as shown in Figure 2. These fall from the centre of the development to the north and pass under Wilsons Lead Road and Tauranga Bay Rd via existing culvert pipes. The low lying area becomes Lot 23 to be vested as reserve. Refer to Figure 4 below for catchment location details.

An assessment of catchment area A indicates this extends northwest alongside the Cement Production Zone site which then drains under Tauranga Bay Road into Valley A. The extent of catchment areas to Valley A & B are shown highlighted in Figure 4 below.

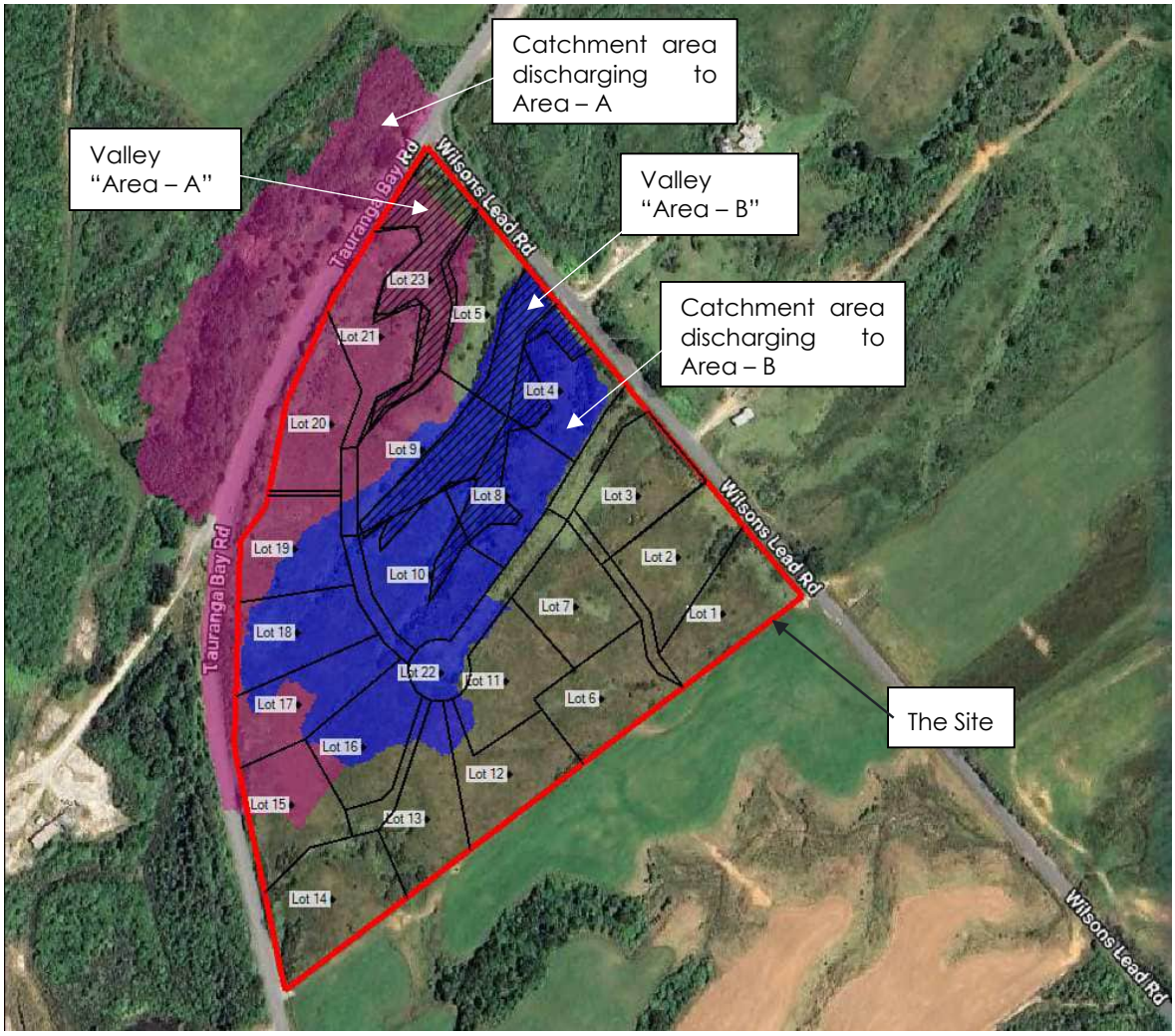


Figure 4. Catchment areas into the valleys

The extent of the flooding for a 1% AEP rainfall event in catchment areas A & B are shown hatched in figure 4 above. Lots 10, 8, 4, 9 and 5 are affected within catchment B, while lots 5 and 21 are affected within catchment A. Its proposed to identify suitable building platforms within these lots and set minimum platform levels 500mm above the 1% AEP flood level over Wilsons Lead and Tauranga Bay Roads.

An assessment of the current LiDAR data and Google Street view indicates that the overflow from Area-B discharges into Area-A. Though Area A drains north under Wilsons Lead Rd via culvert, our assessment assumes this to be blocked with stormwater building up to overtop the carriageway. The

overflow located based on current LiDAR data indicates a level of R.L. 38.1 m on Wilsons Lead Road and R.L. 38.2 m on Tauranga Bay Road.

2.5.1. Floor Levels for New Buildings on flood affected lots

In accordance with NZS 4404: 2010 Land Development and Subdivision Infrastructure, Section 4.3.5.2 freeboard requirements the minimum building platform levels for the habitable dwellings (including attached garages) for Areas - A and Area - B needs to be R.L. 38.7 m to the underside of the floor slab. Refer to Figure 5 below showing the area highlighted green greater than R.L. 38.7 m. Consent notices will be required for lots 21, 5, 9, 4, 8 and 10 to impose the minimum platform level R.L. 38.7 m.

Our assessment to date based on limited LiDAR data and would need to be validated during the subdivision detailed design to confirm road, culvert and topographical features to confirm final building platform levels.

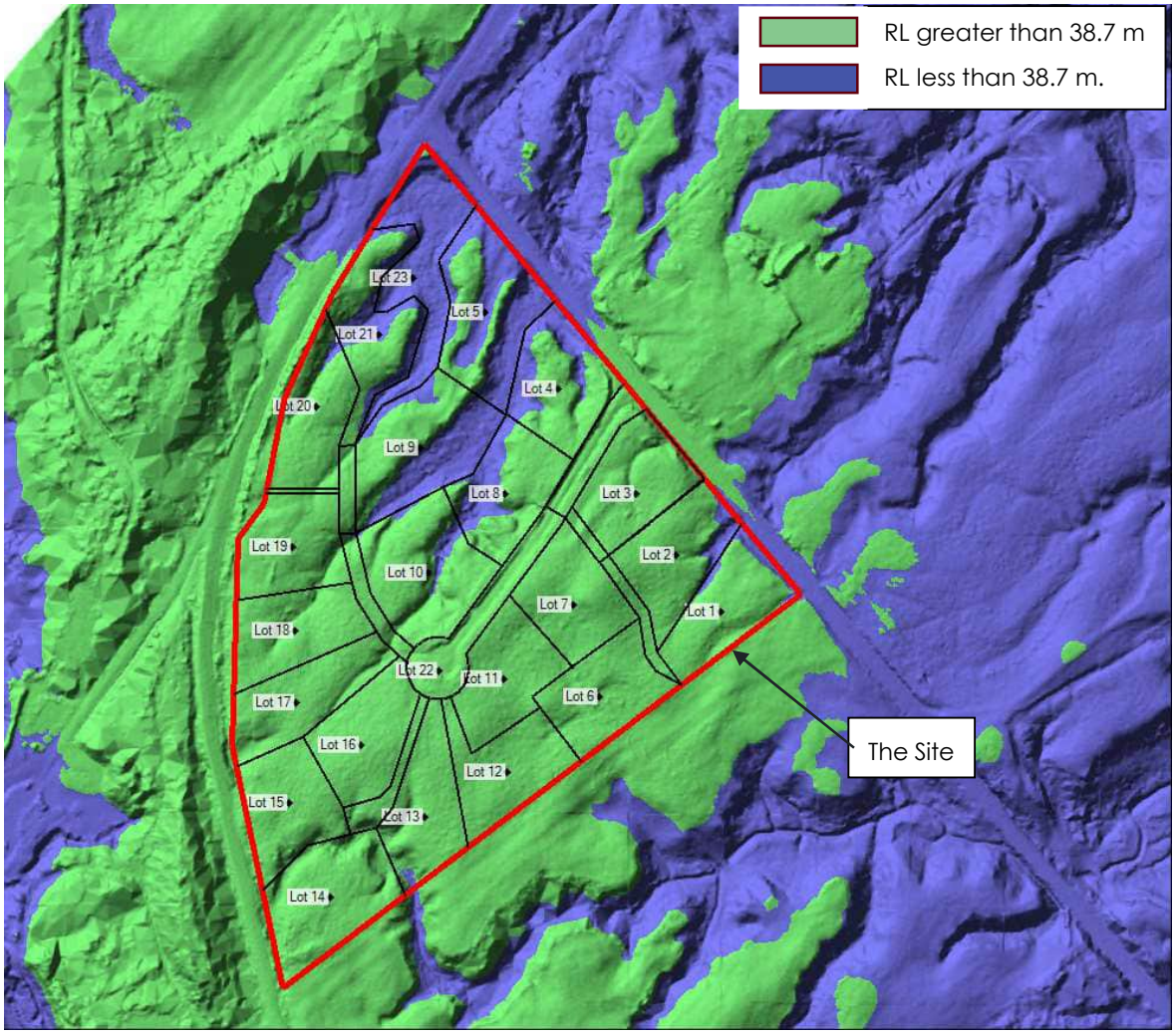


Figure 5. Areas indicating R.L. greater than or less than 38.7 m

As shown in Figure 5, Lot 5 is most affected by the minimum floor level requirement, therefore an assumed 400 m^2 building platform, as shown in Figure 6, is placed to understand the feasibility of building structure within Lot 5.

Note: Lot 5 may require to be filled to provide the area required to establish a building platform. This will need to include a wastewater treatment area that is above flood level for soakage.

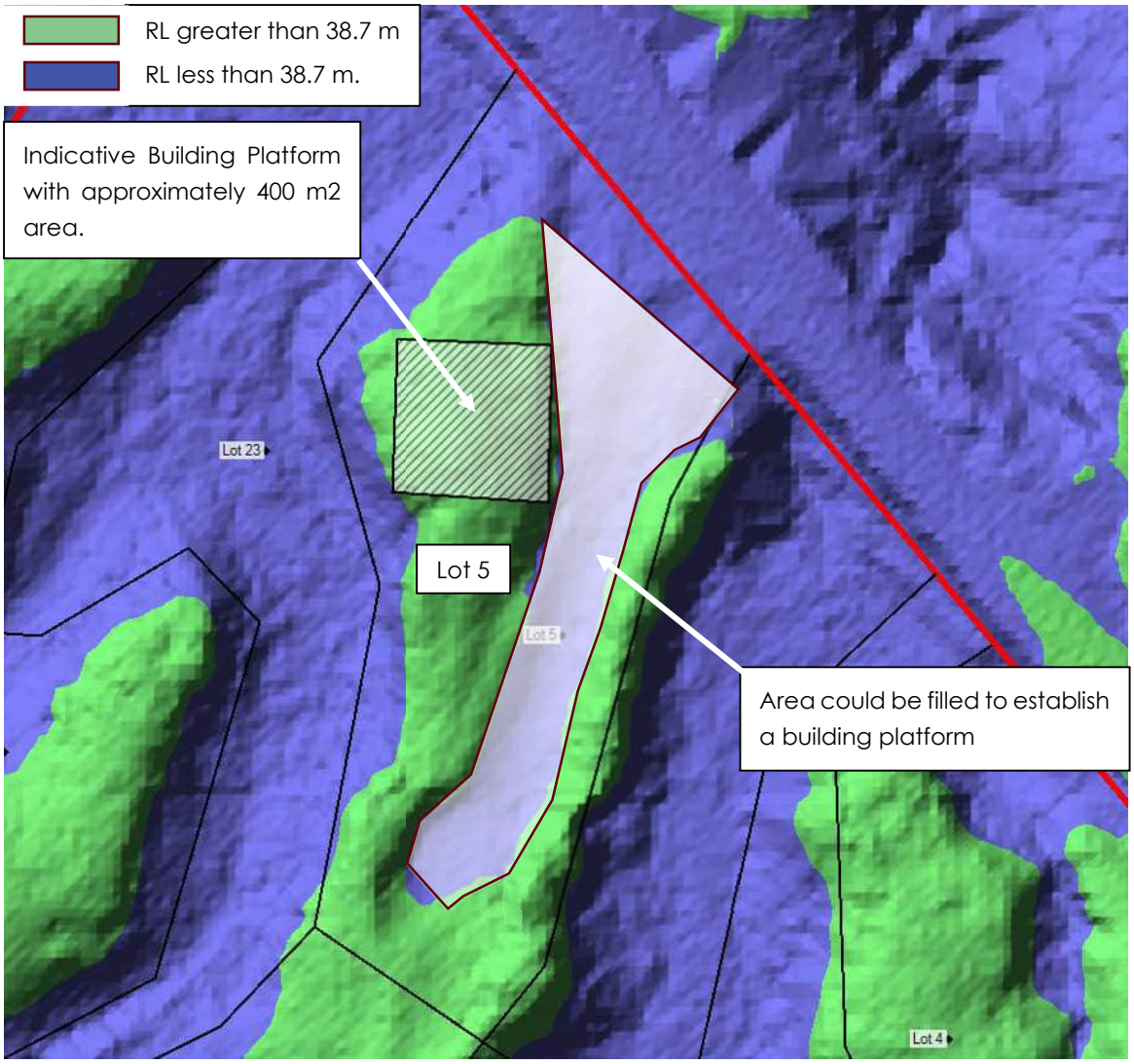


Figure 6. Indicative building location at proposed Lot 5

2.6. Environmental Management

Erosion, Sediment and Dust Management (ESDM) measures are required to mitigate environmental issues associated with earthworks activities, thereby minimising or preventing undue erosion and the risk of sediment laden stormwater discharges entering any drain or waterbody, protection of the surrounding environment from dust emissions and mitigating any other environmental issues that may arise during the construction works.

A ESDM measures will be required in accordance with the Buller District Council requirements during a detailed design stage.

3. Disclaimer

This report has been prepared by Eliot Sinclair & Partners Limited ("Eliot Sinclair") only for the intended purpose as a Stormwater Design Report.

The report is based on:

- LINZ West Cost LiDAR (2020-2022)
- Google Street View (accessed February 2024)
- NZS 4404: 2010 Land Development and Subdivision Infrastructure

Where data supplied by Tauranga Bay Holdings Limited or other external sources, including previous site investigation reports, have been relied upon, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Eliot Sinclair for incomplete or inaccurate data supplied by other parties.

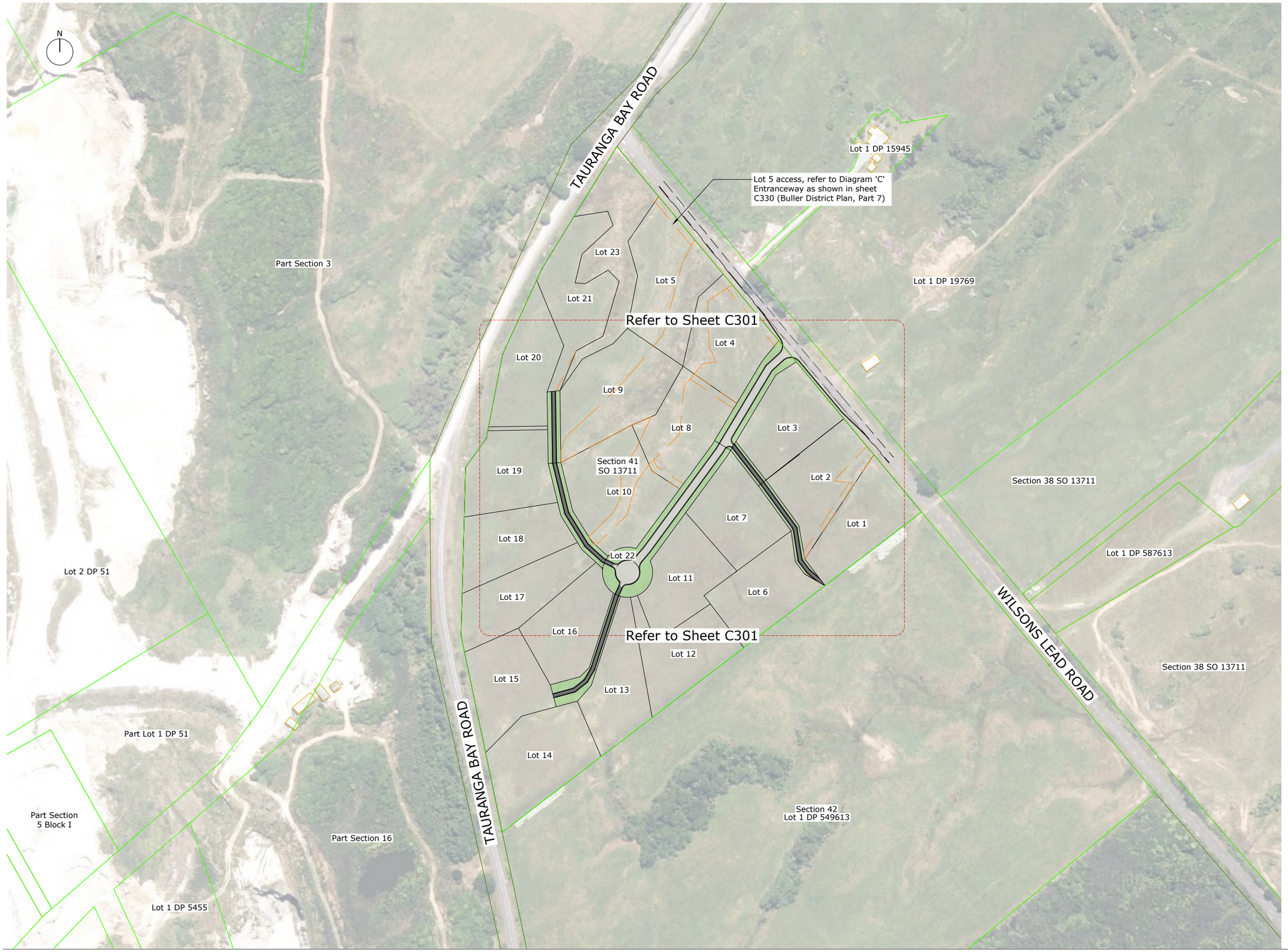
Whilst every care has been taken during our investigation and interpretation of available data to ensure that the conclusions drawn, and the opinions and recommendations expressed are correct at the time of reporting, Eliot Sinclair has not performed an assessment of all possible conditions or circumstances that may exist at the site. Eliot Sinclair does not provide any warranty, either express or implied, that all conditions will conform exactly to the assessments contained in this report.

The exposure of conditions or materials that vary from those described in this report, or occurrence of additional strong seismicity, or any update to the Building Act, NZBC or MBIE's Guidance may require a review of our recommendations. Eliot Sinclair should be contacted to confirm the validity of this report should any of these occur.

This report has been prepared for the benefit of Tauranga Bay Holdings Limited and the Buller District Council for the purposes as stated above. No liability is accepted by Eliot Sinclair or any of their employees with respect to the use of this report, in whole or in part, for any other purpose or by any other party.

Appendix A. Engineering Drawings

G:\Jobs\51\510322\Acad\CAD\510322-C1-C300



0 30m 60m 90m 120m 150m
1:1500

NOTES

1. All works to be in accordance with Project Specification and Buller District Council - District Plan where applicable.

LEGEND:

- Existing LINZ boundary
- Existing building outline
- Existing road - Indicative only
- Proposed edge of carriageway
- Proposed boundary
- Proposed stormwater easement
- Berm area
- 2-coat chipseal or similar
- 2-coat chipseal or unsealed area (TBC)

NOTES
1. Contractors to verify all dimensions and the location of all underground services on site prior to commencing work.
2. Unless noted otherwise, all work shall be undertaken in accordance with the NZBC and any relevant Territorial Authority Engineering Standards and Specifications as a minimum standard.

REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**DJK**
APPROVED	**14.03.24**	**SH**
STATUS		**FOR CONSENT**
SCALE		**1:1500 [A1] 1:3000 [A3]**

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING PLAN
SHEET 1 OF 2

PROJECT	REV.
510322	**A**
SET	**SHEET**
C1	**C300**

eliot sinclair

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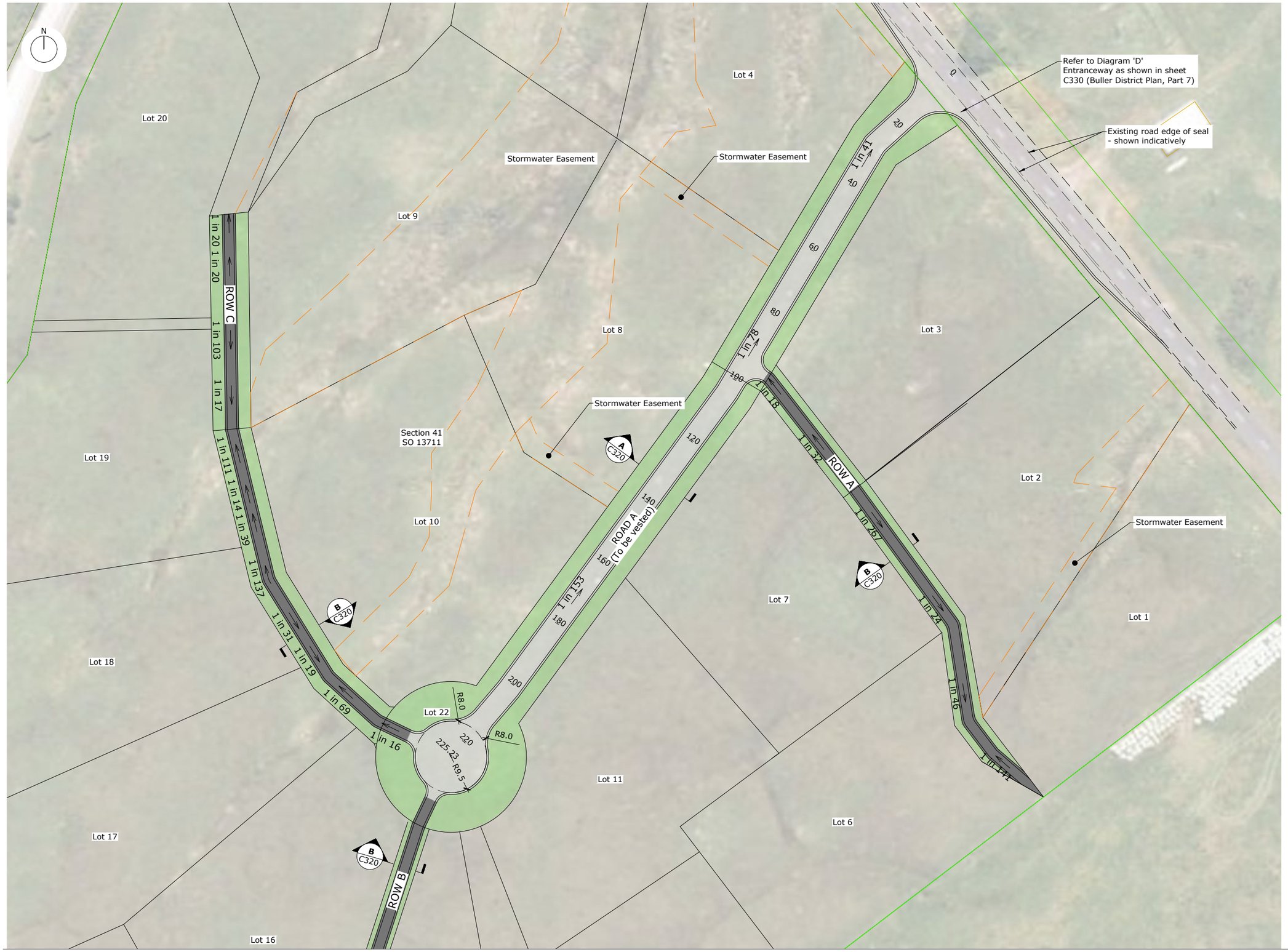

0 10m 20m 30m 40m 50m

1:500

NOTES

1. All works to be in accordance with Project Specification and Buller District Council - District Plan where applicable.

LEGEND:

- Existing LINZ Boundary
- Existing Building Outline
- Existing road - Indicative only
- Proposed edge of carriageway
- Proposed boundary
- Proposed stormwater easement
- 30 Proposed Chainage Markers
- 1 in 99 Road Grade
- Berm area
- 2-coat chipseal or similar
- 2-coat chipseal or unsealed area (TBC)

NOTES
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CLIENT

Tauranga Bay Holdings Ltd

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DRAWN	GG
REVIEWED	DJK
APPROVED	14.03.24 SH
STATUS	FOR CONSENT
SCALE	1:500 [A1] 1:1000 [A3]

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING PLAN
SHEET 2 OF 2

PROJECT	REV.
510322	A
SET	SHEET
C1	C301

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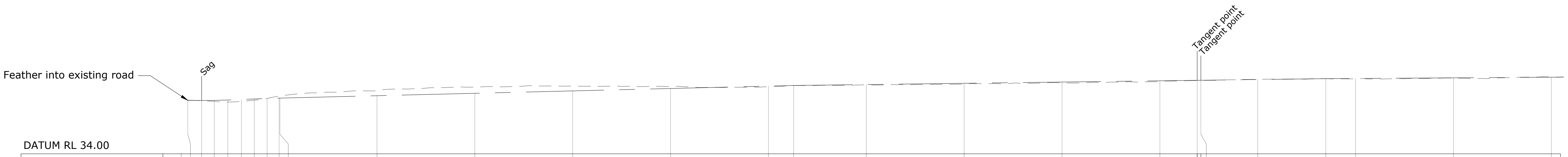
G:\Jobs\51\510322\Acad\CAD\510322-C1-C310

LEGEND:

Centreline Surface Level

Existing Ground



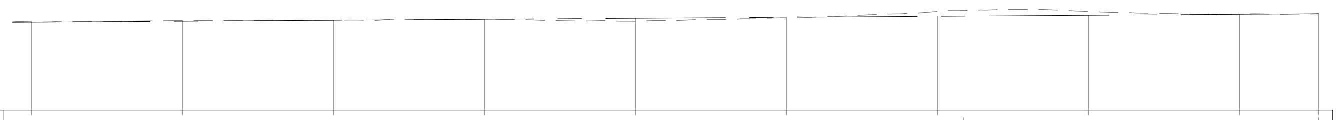
DATUM RL 34.00

HORIZONTAL GEOMETRY	27.37	76.44	R4.00 0.38	97.56		
VERTICAL GEOMETRY	1 in -48 / 1.42	1 in 23 / 2.78	1.31	2.62	1 in 41 / 52.49	1 in 78 / 54.37
						1 in 153 / 108.28

CHAINAGE	CENTRELINE LEVEL	EXISTING GROUND	CUT / FILL DEPTH
0.00		39.44	
0.67	39.47	39.47	-0.00
2.08	39.44	39.44	0.00
3.37	39.46	39.35	-0.11
4.76	39.49	39.28	-0.21
6.15	39.54	39.35	-0.19
7.46	39.60	39.47	-0.13
8.77	39.65	39.65	0.00
10.00	39.68	39.90	0.22
10.08	39.69	39.91	0.22
20.00	39.93	40.44	0.51
30.00	40.18	40.81	0.63
40.00	40.42	40.92	0.50
50.00	40.67	40.88	0.21
60.00	40.91	40.86	-0.05
62.58	40.98	40.98	0.00
70.00	41.07	41.05	-0.02
80.00	41.20	41.11	-0.08
90.00	41.33	41.23	-0.10
100.00	41.45	41.38	-0.08
103.81	41.50	41.48	-0.02
104.19	41.51	41.48	-0.02
110.00	41.58	41.60	0.02
116.95	41.67	41.67	0.00
120.00	41.69	41.67	-0.02
130.00	41.75	41.73	-0.03
140.00	41.82	41.85	0.03

LONGITUDINAL SECTION ON CENTRELINE VESTED ROAD

Horizontal 1:250[A1] 1:500 [A3]
Vertical 1:250[A1] 1:500 [A3]



DATUM RL 36.00

HORIZONTAL GEOMETRY	97.56	23.49
VERTICAL GEOMETRY	1 in 153 / 108.28	

CHAINAGE	CENTRELINE LEVEL	EXISTING GROUND	CUT / FILL DEPTH
140.00	41.82	41.85	0.03
150.00	41.89	41.93	0.04
160.00	41.95	41.95	0.00
170.00	42.02	41.97	-0.04
180.00	42.08	41.89	-0.19
190.00	42.15	42.11	-0.03
200.00	42.21	42.53	0.32
210.00	42.28	42.53	0.25
220.00	42.34	42.36	0.02
225.23	42.38	42.38	0.00

LONGITUDINAL SECTION ON CENTRELINE VESTED ROAD

Horizontal 1:250[A1] 1:500 [A3]
Vertical 1:250[A1] 1:500 [A3]

NOTES
1. Contractors to verify all dimensions and the location of all underground services on site prior to commencing work.
2. Unless noted otherwise, all work shall be undertaken in accordance with the NZBC and any relevant Territorial Authority Engineering Standards and Specifications as a minimum standard.

REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**DJK**
APPROVED	**14.03.24**	**SH**
STATUS		**FOR CONSENT**
SCALE		**AS SHOWN**

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING
LONG SECTION

PROJECT **510322** REV. **A**

SET **C1** SHEET **C310**

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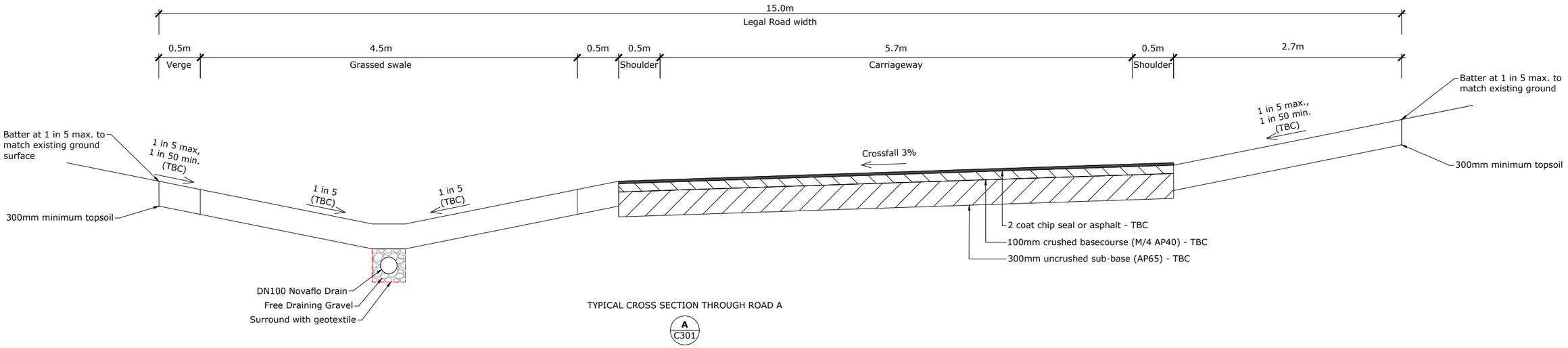
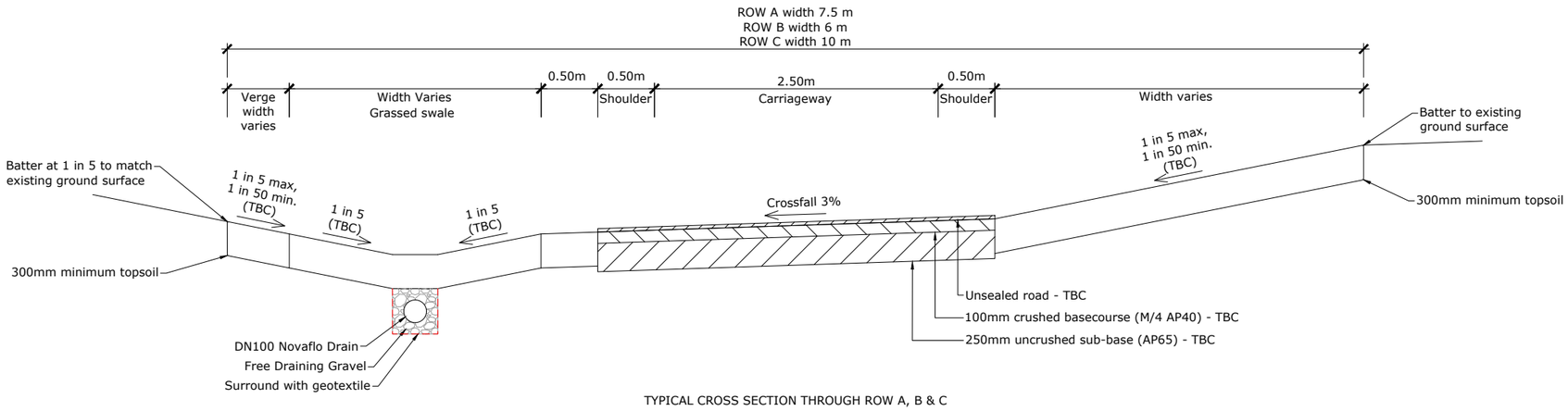


TYPICAL CROSS SECTION THROUGH ROAD A

A
C301



TYPICAL CROSS SECTION THROUGH ROW A, B & C

B
C301

NOTES
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REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

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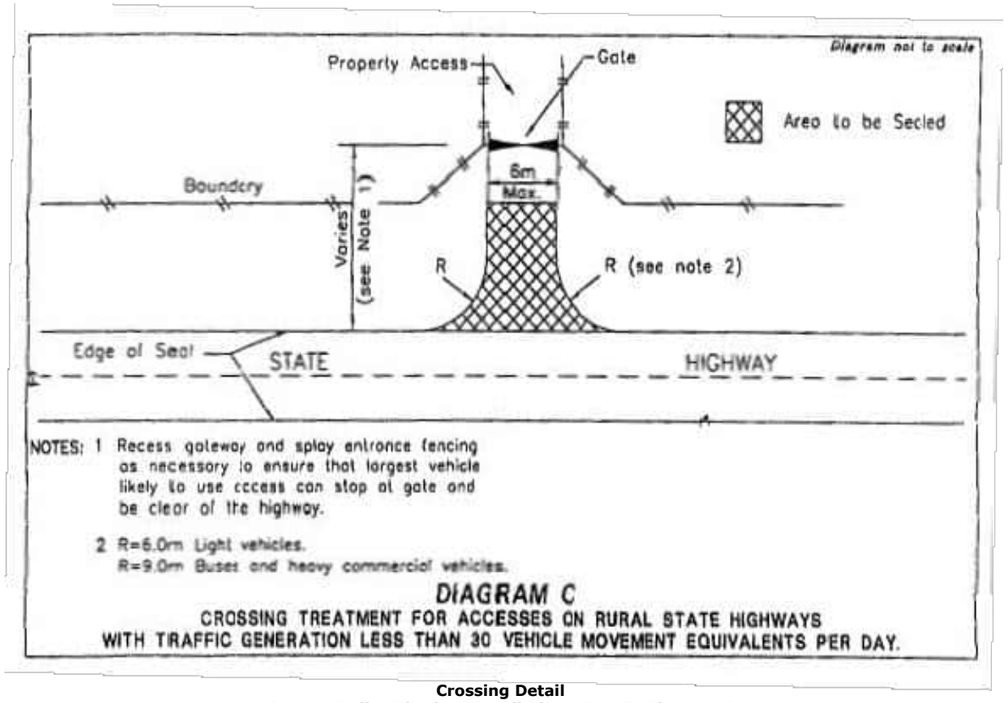
DRAWN		**GG**
REVIEWED		**DJK**
APPROVED	**14.03.24**	**SH**
STATUS		**FOR CONSENT**
SCALE		**1:25 [A1] 1:50 [A3]**

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

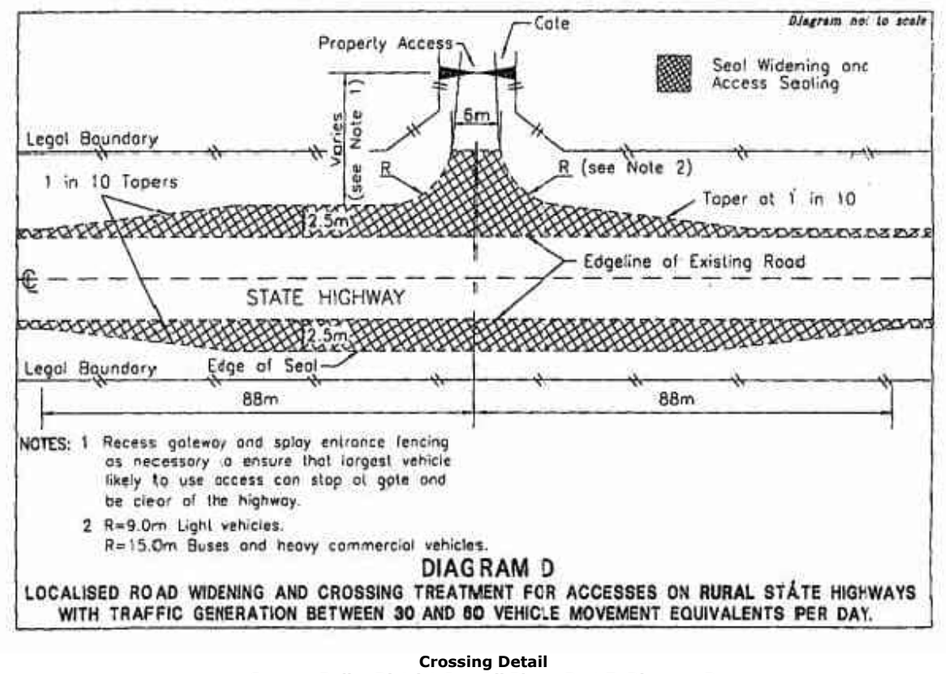
ROADING
CROSS SECTION

PROJECT	REV.
510322	**A**
SET	SHEET
C1	**C320**

eliot sinclair



Crossing Detail
Source: Buller District Council Plan - Part 7, Diagram C



Crossing Detail
Source: Buller District Council Plan - Part 7, Diagram D

NOTES
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REV.	DRAWN	DATE	NOTE
A	GG	08.03.24	For Consent

CLIENT
Tauranga Bay Holdings Ltd

DESIGNED		JM
DRAWN		GG
REVIEWED		DJK
APPROVED	14.03.24	SH
STATUS		FOR CONSENT
SCALE		AS SHOWN

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

ROADING DETAILS

PROJECT	REV.
510322	A
SET	SHEET
C1	C330

eliot sinclair

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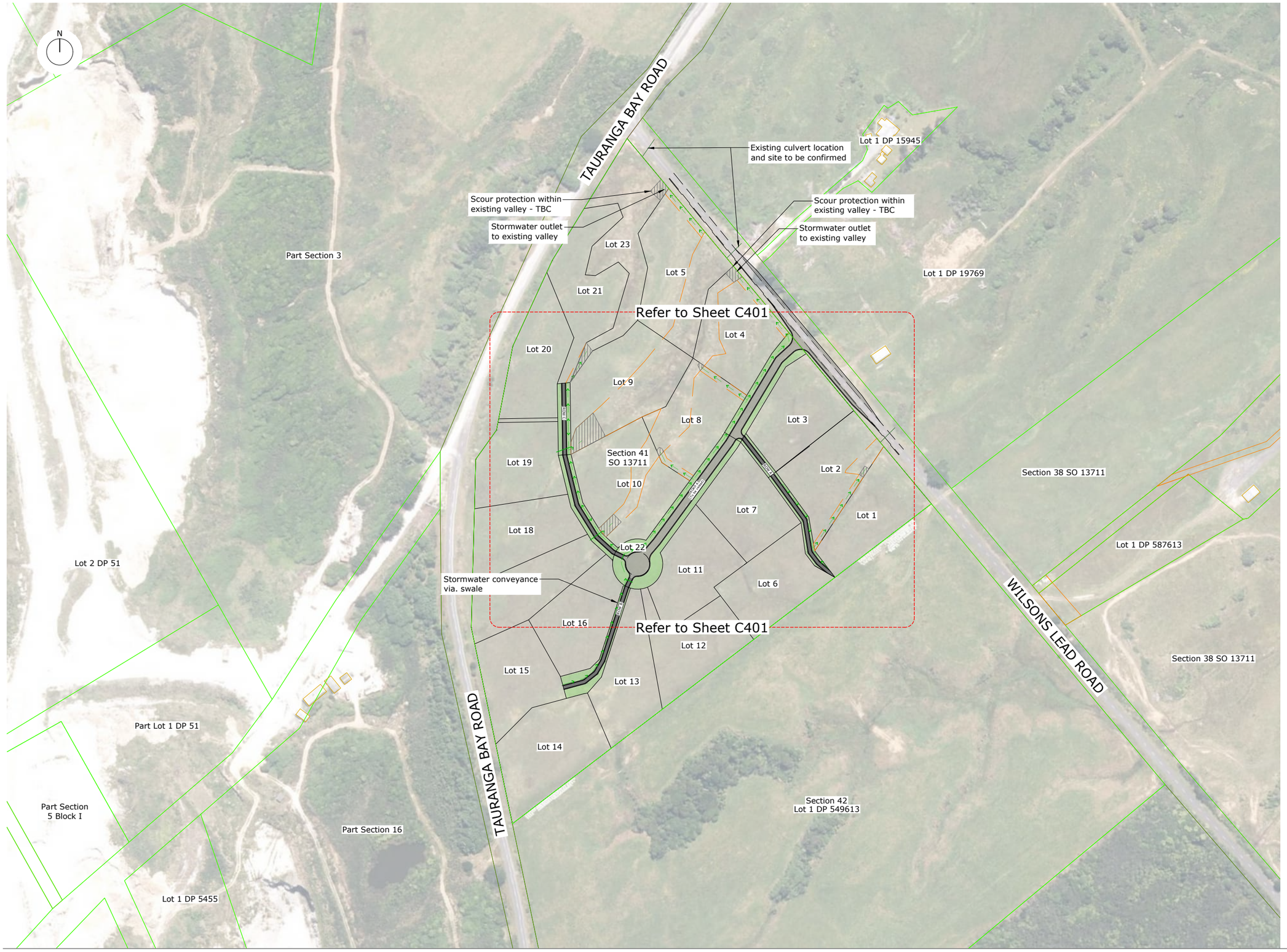

0 30m 60m 90m 120m 150m

1:1500

NOTES

1. All works to be in accordance with Project Specification and Buller District Council - District Plan where applicable.

LEGEND:

- Existing LINZ Boundary
- Existing Building Outline
- Existing Stormwater pipe
- Proposed boundary
- Proposed stormwater easement
- Stormwater flows within swale
- Proposed Stormwater pipe
- Proposed scour protection

NOTES

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2. Unless noted otherwise, all work shall be undertaken in accordance with the NZBC and any relevant Territorial Authority Engineering Standards and Specifications as a minimum standard.

REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**JT**
APPROVED	**14.03.24**	**SH**
STATUS	**FOR CONSENT**	
SCALE	**1:500 [A1] 1:1000 [A3]**	

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

DRAINAGE LAYOUT DRAWING SHEET 1 OF 2

PROJECT	REV.
510322	**A**
SET	SHEET
C1	**C400**

eliot sinclair

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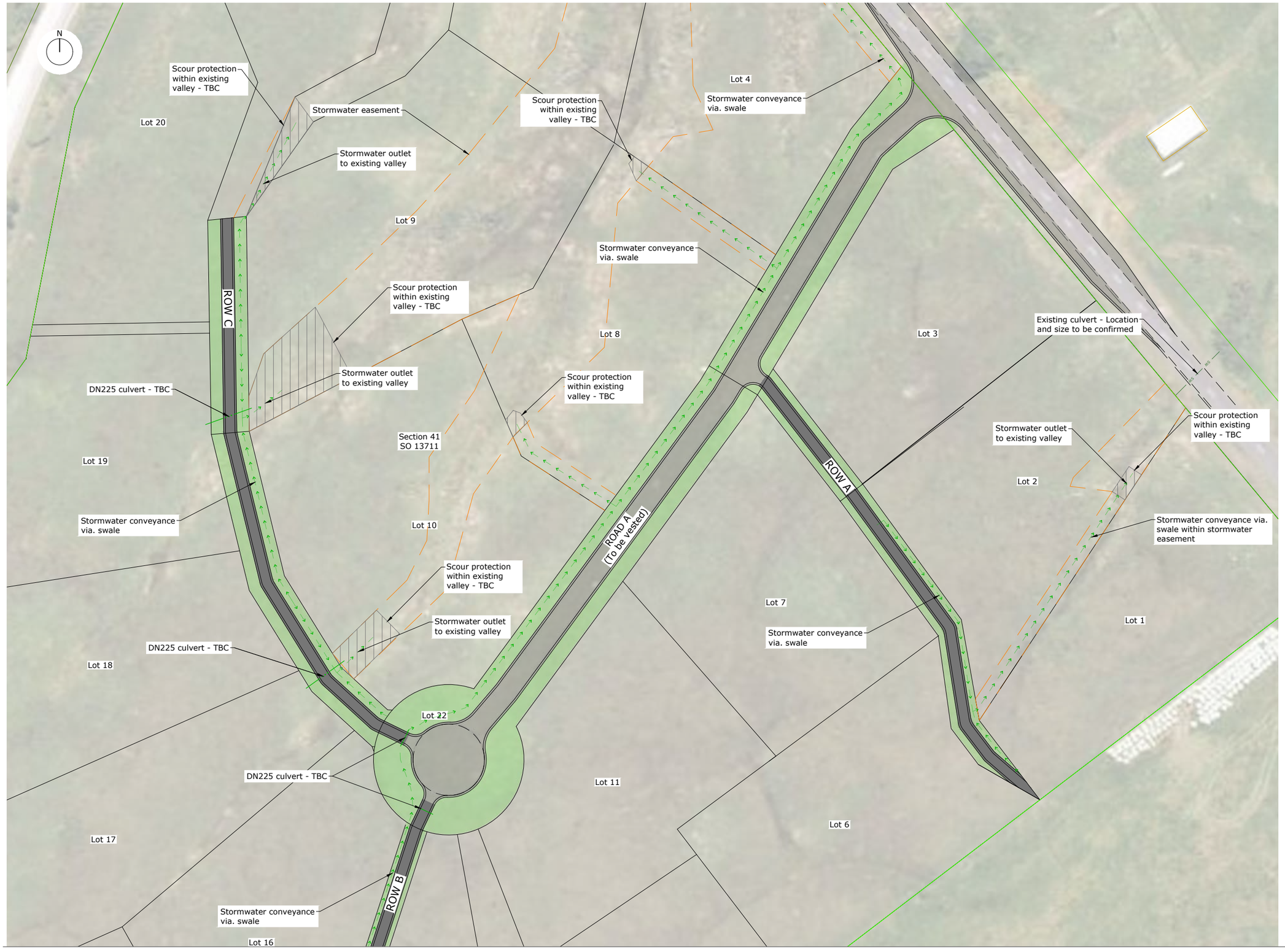

0 10m 20m 30m 40m 50m

1:500

NOTES

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LEGEND:

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- Existing Building Outline
- Existing Stormwater pipe
- Proposed boundary
- Proposed stormwater easement
- Stormwater flows within swale
- Proposed Stormwater pipe
- Proposed scour protection

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REV.	DRAWN	DATE	NOTE
A	**GG**	**08.03.24**	**For Consent**

CLIENT

Tauranga Bay Holdings Ltd

DESIGNED		**JM**
DRAWN		**GG**
REVIEWED		**JT**
APPROVED	**14.03.24**	**SH**
STATUS	**FOR CONSENT**	
SCALE	**1:500 [A1] 1:1000 [A3]**	

CAPE FOULWIND DEVELOPMENT
Section 41 SO 13711
Tauranga Bay Road, Westport

DRAINAGE LAYOUT DRAWING
SHEET 2 OF 2

PROJECT	REV.
510322	**A**
SET	SHEET
C1	**C401**

eliot sinclair

Appendix B. Swale Calculations

Project No:	510322
Project Name:	Cape Foulwind
Subject:	
Date:	12/03/2024
Designed By:	JM
Checked By:	

Swale Calculations

Assumptions

1) The Rainfall was obtained from NIWA Hirds V4 Data assuming RCP6 scenario for 10 % AEP 10 minute
2) Assume Grass length for Swale treatment design is 50mm
3) Assume Grass length for Storm event design is 150mm

Runoff Coefficient		
Lots	0.25	E1/VM1 Table 1 (Grass/lawns)
Road	0.90	Effective Runoff Coefficient (20% perv with C=0.25 & 80% impve with C=0.85)
Berms	0.30	

Rainfall		
Intensity (swale treatment)	10	mm/hr
Intensity (20% AEP 10 min)	138	mm/hr
Intensity (1% AEP 10 min)	228	mm/hr

Manning's Calculation (TP10)

For 150 mm grass and $d < 60$ mm $n = 0.153\, d^{0.10} / (0.75 + 25s)$
$d > 60$ mm $n = 0.013\, d^{0.43} / (0.75 + 25s)$

For 50 mm grass and $d < 75$ mm $n = (0.54 - 228\, d^{1.5}) / (0.75 + 25s)$
$d > 75$ mm $n = 0.0094^{1.5} / (0.75 + 25s)$

								Swale Treatment		20% AEP Storm Event		1% AEP Storm Event		Swale Sizing				Swale Treatment Design (Grass Length = 50mm)							Swale 20% AEP Storm Event Design			Swale 1% AEP Storm Event Design			Swale Size		
Swale	Slope (decimal)	Length	Catchment	Catchment Area (m2)	Number of Lots	Modified Catchment Area	CxA	∑CA (exc. Reserve)	Q (l/s)	∑CA	1 in 5 ARI Storm Q (l/s)	∑CA	1 in 100 yr ARI Storm Q (l/s)	Bottom Width (m)	Side Batter Z1	Side Batter Z2	Grass Length (mm)	Depth at Swale Treatment (m)	n	Q_{Design} (L/s)	V (m/s)	V < 0.8m/s	Hydraulic Residence Time t (min)	t > 9 min	Depth at Swale Treatment (m)	n	Q_{Design} (L/s)	Depth at Swale Treatment (m)	n	Q_{Design} (L/s)	Freeboard	Total Depth with Freeboard	Swale Top Width (m)
Road Swale	0.01	200	Lots		0		0.000	0.32	8.8	0.32	121	0.32	200	0.4	5	5	150	0.10	0.15	8.8	0.10	OK	32.1	OK	0.23	0.08	120.8	0.27	0.06	199.7	0.15	0.42	4.55
			Road	2400			0.216																									
			Berms	3300		0	0.099																									
ROW A Swale	0.04	70	Lots		0		0.000	0.04	1.0	0.04	14	0.04	23	0.4	5	5	150	0.03	0.29	1.0	0.06	OK	20.1	OK	0.08	0.14	13.8	0.10	0.12	22.8	0.15	0.25	2.88
			Road	300			0.027																									
			Berms	300		0	0.009																									
ROW C Swale (Typical)	0.03	18	Lots		0		0.000	0.03	0.7	0.03	10	0.03	17	0.4	5	5	150	0.02	0.35	0.3	0.03	OK	9.2	OK	0.07	0.23	4.6	0.08	0.19	7.6	0.15	0.23	2.67
			Road	200			0.018																									
			Berms	290		0	0.009																									

Appendix C. Infiltration Test Results

Falling Head Infiltration Test

Client Name: Tauranga Bay Holdings Ltd
Project Name: Section 41 SO 13711, Tauranga Bay
Project Number: 510322
Designer: JM
Date: 27 February 2024

Field Data

Time (min)	Duration (hr)	Time Between Filling (s)	Water Level Measurement (mm)	Water Drop (mm)	Cumulative Drop (mm)
0	0.00	0	640	0	0
10	0.17	600	550	90	90
24	0.40	840	460	90	180
34	0.57	600	400	60	240

Infiltration Rate

Parameter	Value	Unit
Hole Depth	2.50	m
Initial Water Depth	0.64	m (above bottom of hole)
K (infiltration rate)	418.05	mm/hr
K	**0.42**	**m/hour**
K	10.03	m/day