B and A Stokes – Gressons Road, Waikuku

Submission on Variation 1: Housing Intensification

ATTACHMENT C

INFRASTRUCTURE

Infrastructure Options Report

Stokes Farm – Westside Country Ltd

Gressons Road, Waikuku

Proposed Plan Change Submission

20605

November 2021

DAVIE LOVELL-SMITH

PLANNING SURVEYING ENGINEERING

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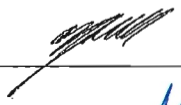
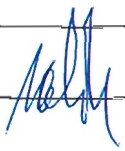
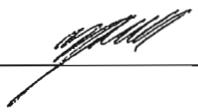
Revision History

Rev Number:	Prepared By:	Description:	Date:

Document Control

Action:	Name:	Signed:	Date:
Prepared By	Andy Hall		12/11/2021
Reviewed By	Mike Walsh		12/11/2021
Approved By	Andy Hall		12/11/2021

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CONTENTS

1. Executive Summery

This report assesses servicing of the proposed Stokes Farm development area north of Ravenswood in Woodend. The site requires a full Plan Change Assessment but for the purposes of a submission for potential development, this report investigates the most likely and realistic options for Water Supply, Wastewater, Stormwater, Power and Telecommunications for 1500 lots.

Water Supply – Best Option is to follow the Councils Strategy investigation and connect to the Woodend Pegasus Facility but further investigation is required into pipe sizing and bore yields.

Wastewater – Best option is to connect to the Woodend Treatment Facility and carry out upgrades to suit and as prescribed by the WDC Activity Management Plan.

Stormwater – Design a facility on site to attend to the treatment and attenuation of stormwater, connect to existing WDC facilities and consider other areas of potential catchment.

Power – Able to be provided by Mainpower.

Telecommunications – Able to be provided by Chorus

2. General

2.1. Introduction

This infrastructure report addresses the servicing of the proposed residential development at 33, 33A, 81, 107 & 149 Gressons Road, and 1263, 1281, 1301, 1319, 1323, 1323B, 1341 & 1375 State Highway 1, between Woodend and Waikuku. It is proposed to divide the approximate 144ha hectare property into 1500 residential lots. Primarily this report will address viable options for Water Supply, Stormwater, Wastewater, Power and Telecommunications.

This area has been identified in the Waimakariri District Development Strategy (DDS) 'Our District, Our Future – Waimakariri 2048', which guides the District's anticipated residential and business growth over the next 30 years.

A pre-submission meeting was held between Davie Lovell-Smith (DLS) and Waimakariri District Council (WDC) Strategic Planners and Infrastructure Engineers to discuss the servicing requirements and design of the proposed development. These options described in this report will form the basis for further investigation that will be compiled as part of a Plan Change Application.

A geotechnical assessment report has shown that the site is suitable for residential development but with some areas of Technical Category 3(TC3) land requiring remediation. A copy of the report is included with the submission.

A Preliminary Site Investigation for Contamination has been completed and is attached to the submission. There appears to be some areas that require testing. A Detailed Site Investigation will be completed as part of a future application.

The design and construction of the proposed sub-division infrastructure will comply with the requirements the WDC standards or the Building Code.

It is anticipated that the density of the development will be affected by a general expectation that houses should be more dense in the future. Whilst the actual density will be fully considered as part of a plan change, a density of 15 homes per hectare has been adopted here.

2.2. Site

Please refer to the attached Aerial Photograph in Appendix A.

The site is predominantly level pasture and is utilised as a Dairy Unit. There are two centre pivot irrigators in the north east corner of the property. Stok races feed to a number of paddocks. Access to the Dairy operation is off State Highway 1.

There are a number of treed wind breaks over the site but no trees of significance.

Some years ago, the applicant, in collaboration with local Iwi, retired an area of land from production opposite the intersection of Preeces Road and State Highway 1. It is expected that this area holds archaeological features of importance.

There are existing houses and sheds on the site that are not considered significant in terms of heritage. All buildings will be removed during development.

The site undulates to form three distinct stormwater features on the site. Please refer to the attached topographical plan in Appendix B and the Outline Development Plan in Appendix C for the location of these features. It is proposed that these will be naturalised and utilised within the development for the passage of flood flows. Please also refer to the Flood Assessment attached to the overall submission.

There are bores registered on the site. All bores will be capped and abandoned in compliance with Environment Canterbury regulations. The bores may be utilised during construction as a water supply for dust suppression and irrigation of new grass areas. The water permits will most probably be transferred to WDC.

There are a number of drainage channels on the property that will be abandoned.

The property is bounded by State Highway 1 to the East, Gressons Road to the North and Wards Road to the South. The property shares a boundary to the south with the Ravenswood development and road connections will be made between the two areas.

The land abuts a number of rural, rural-residential and residential sites.

3. Water Supply

WDC have a water supply strategy for the next 50 years that includes for the land proposed in this submission. Please refer to the attached WDC Water Strategy Plan in Appendix D.

The Strategy stipulates a connection be made from the Pegasus Town water supply, along Pegasus Boulevard and then north along the State Highway to the site. The intended pipe size is 250mm(ID). Attached also find a plan connecting to the site via two alternative routes. Connection through the golf course will cause significantly less disruption but will require the clubs approval.

As a check on the proposed pipe sizing, a peak hourly flow of 0.1l/s/dwelling is adopted from the WDC Code of Practice. Working backwards from the 250mm pipe with a roughness coefficient of 0.15mm and a maximum velocity of 1.5m/s we get the following calculation from the Colebrook-White equation.

Pipe diameter	250mm	
Headloss - 1 in	117	
Pipe Roughness - ks		0.15mm
Velocities	1.499	m/s
Discharge	73.61	litres/sec

At 0.1l/s/dwelling, this equates to 736 lots.
1500 lots would be 150l/s and a 340mm ID pipe

While this simplistic assessment needs to be properly modelled, it demonstrates that perhaps a far greater flow may be required for the area.

With reference to the Activity Management Plan 2021 - Woodend-Pegasus Water Supply Scheme, demand on the Woodend-Pegasus water supply scheme is expected to increase by 60% between the July 2019 rates strike base year, and year ten of the 2021-31 Long Term Plan (LTP). This projection is based on:

1. 822 new connections from Ravenswood during the 2021-31 LTP period as identified as part of the 2020 WDC 50 Year Water and Sewer Connection Growth Forecast Work
2. 282 new connections from in Pegasus township during the 2021-31 LTP period as identified as part of the 2020 WDC 50 Year Water and Sewer Connection Growth Forecast Work
3. 438 new connections from East Woodend and Woodend Beach during the 2021-31 LTP period as identified as part of the 2020 WDC 50 Year Water and Sewer Connection Growth
4. 400 new connections in the Tuahiwi area, developing over the next 50 year period as identified as part of planning development work.

This 10 year projection does not include for the proposed development area in this submission.

Whilst the applicant is very happy to coordinate the water supply to the development land in accordance with the Water Supply Strategy, it appears that neither the proposed capacity of the pipework or 10 year projection fully address the potential demand for a denser form of development. That said, if the denser form were to be adopted then the strategy may easily be augmented with additional water take from the Pegasus bore or an additional new bore on site.

Feasible Options for Future Water Supply

A. Expansion of the existing Pegasus-Woodend Water Supply

B. New On-site Bore

4. Sewer

The options for the disposal of wastewater consist of:

1. Pumping to the Waikuku Treatment Plant
2. Pumping to the Woodend Treatment Plan

Neither of these Treatment Plants have sufficient capacity for the proposal. Neither option has connecting pipework to the site. Disposal on site is not an option due to ground conditions and the preference of Council to expand on existing systems.

Using the Waimakariri Code of practice, 1500 lots would create approximately 62l/s Peak Wet Weather Flow.

Please refer to the attached plans in Appendix F for potential pipe routes from the site to the two treatment plants.

4.1. Waikuku Treatment Plant

The Waikuku Beach Wastewater Scheme is part of the Eastern Districts Wastewater Scheme. It is generally an urban gravity reticulation scheme. The sewage is conveyed via a network of gravity pipes to the Reserve Road Pump Station where it is transferred to the Waikuku Beach Treatment Plant via a rising main.

The treatment plant consists of an automatic step screen to remove large solid particles and two oxidation ponds with a mechanical aerator that discharges via a pump station to the Woodend Wastewater Treatment Plant for further treatment and disposal via the ocean outfall. No provision has been made for future expansion. The oxidation ponds have sufficient capacity to treat the flow from all likely growth in the Waikuku Beach area.

Whilst there appears to be a very simple route for a pipe between the development site and the Waikuku Treatment Plant, and the land for the most part is owned by the applicant, the Plant itself may prove difficult to upgrade and the system relies on the transfer of the flows to the Woodend Plant for final treatment. The addition of the flows from this proposal would most probably necessitate the upgrading of the pipe between the two plants.

4.2. Woodend Treatment Plant

The Woodend Wastewater Scheme is part of the Eastern Districts Sewer Scheme. It is generally an urban gravity reticulation scheme, except for four small pump stations that discharge into the reticulation. There are 3 terminal pump stations that convey wastewater to the Woodend WWTP. The Tuahiwi wastewater scheme discharges directly into a manhole at the northern end of the Woodend wastewater reticulation and the Pegasus wastewater scheme pumps directly to the Woodend wastewater treatment plant. The Waikuku WWTP discharges directly into the Woodend WWTP inlet structure.

The Treatment Plant consists of an automatic step screen to remove large solid particles and three aeration basins followed by two facultative ponds and 2.5 ha planted wetland. UV treatment is used to ensure the final effluent meets the consent conditions. Following UV treatment, the flows are discharged to the sea.

The Activity Management Plan for the Woodend Treatment Plant details an expectation that any development north of Woodend would be pumped to the Plant. The Plan also details the future expansion of the Plant to accommodate future flow.

There is potential that the Plant may require upgrading prior to the projected growth rates. This is not expected to be a concern as long as the details of the works required is attended to in a timely fashion.

In terms of the wastewater, there are two options but the direct pumping from the site to the Woodend Treatment Plant appears to be the most obvious solution.

5. Stormwater

The existing gradient of the site is from west to east. As described previously, there are three distinct stormwater drainage features running through the site. The stormwater design will include for the naturalisation of these existing streams but it is noted that for the most part, the streams will not act as conduits for the untreated stormwater flows. The streams will flow through the site, bypassing any treatment. They will also act as safe secondary flow routes for floodwaters from upstream.

All stormwater emanating from roads, berms and lots will be collected by sumps and pipes and directed to the proposed stormwater facility at the eastern end of the site or the existing WDC stormwater facility in Ravenswood. The untreated flows will drain through the site via pipework to a storage and treatment facility including for a first flush basin, Storage basin and wetland. The treated and attenuated flows will be released to the streams

A stormwater facility is to be designed for the proposed ODP area but other areas could be included with additional funding from WDC. It is recognised that single large integrated facilities are better long-term assets for the Council rather than a number of small localised basins.

Once the designs are agreed with WDC, Discharge Consents will need to be sought from Ecan by the developer. The conditions of consent will be agreed with WDC and the consents will be transferred to WDC at the end of any prescribed maintenance period.

All cut material from the construction process is to remain on site for the filling of lots, elevating them above the roads. Roads will provide the secondary overflow path for storm events greater than 2% AEP. Secondary flow paths within the site will follow the road network and reserves towards the proposed stormwater facility.

In terms of stormwater infrastructure, there really is only the one option and that is to deal with it on site. This will not be an inhibitor to development.

8. Power, Telecommunications, and Street Lights

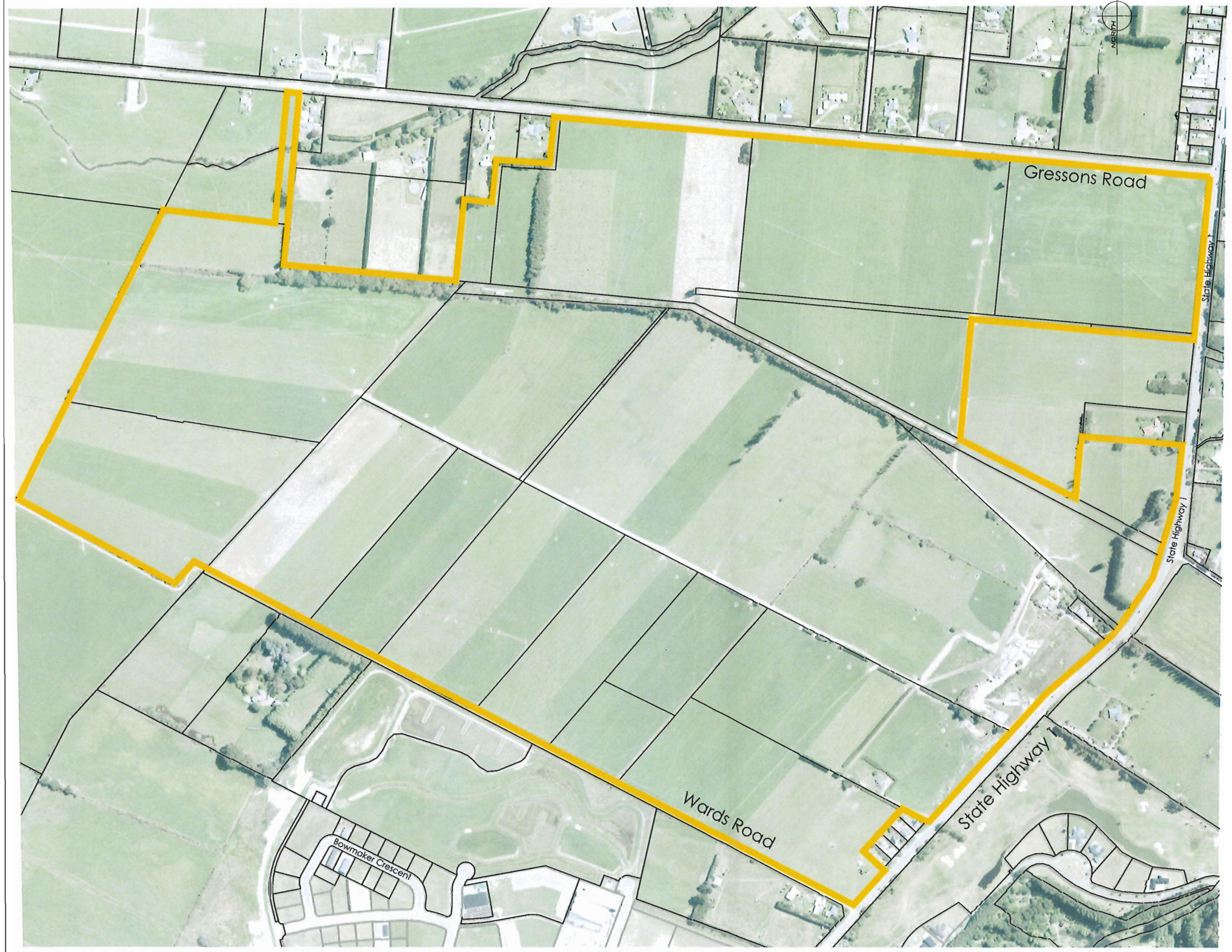
Power in this area will be provided by Mainpower. Mainpower have been contacted and asked to confirm that they will be able to service 1500 new lots in this area. Whilst there does not appear to be a formal design or strategy in place, they have confirmed that services will be able to be provided for this proposal.

Similarly, Chorus have been contacted and were also able to confirm that services would be available.

Power and Telecommunications will be provided to all residential lots to utility company and industry standards. All cables will be placed underground and all kiosks will be constructed on separate individual lots. The kiosk sites will be forwarded to Council for approval following the power design.

Street lights will be provided to the roading and reserves to Council standards. The applicant will also provide a street light style to Council for approval.

Appendix A – Aerial Photograph



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AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

1. Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
2. Service easements to be created as required.
3. This plan has been prepared for subdivision concept & discussion purposes only. No liability is accepted if the plan is used for any other purposes.
4. Contours shown are from Christchurch City Council Lidar Data at 0.25m Contour Intervals and Interms of LINZ Vertical Datum 2016.

Total Area :

Comprised in:

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JOB TITLE:

Stokes - Waikuku

SHEET TITLE:

BASE PLAN

DRAWING STATUS

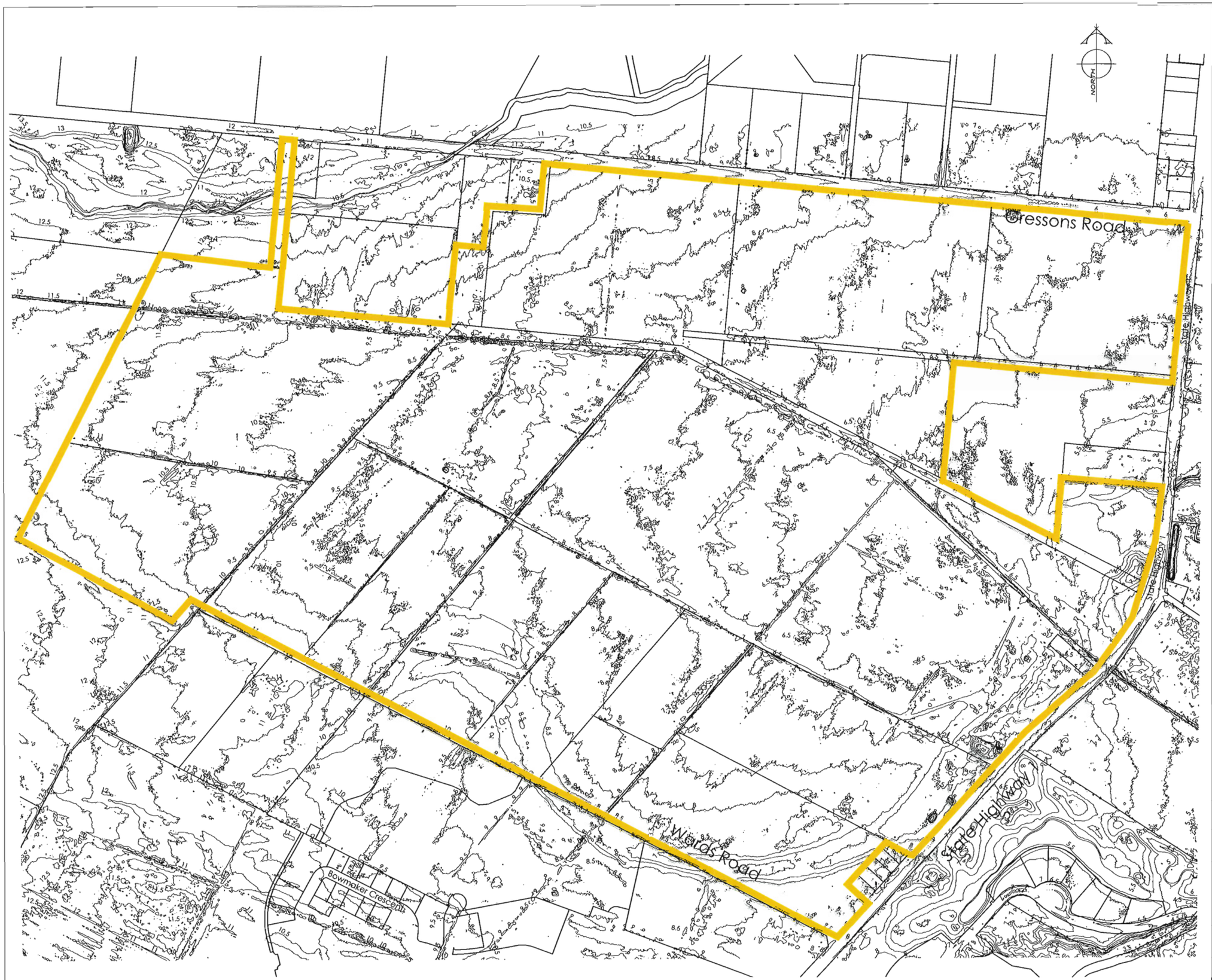
For Discussion Purposes

SCALE : 1:3000@A1 1:6000@A3 DATE : November 2021

CAD FILE : J:\20605\Wa3uku.dwg REVISION :

DRAWING No : **E20605** SHEET No: 1 OF 1 **R0**

Appendix B – Topographical Plan (LiDAR)



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1:6000@A3

DATE : November 2021

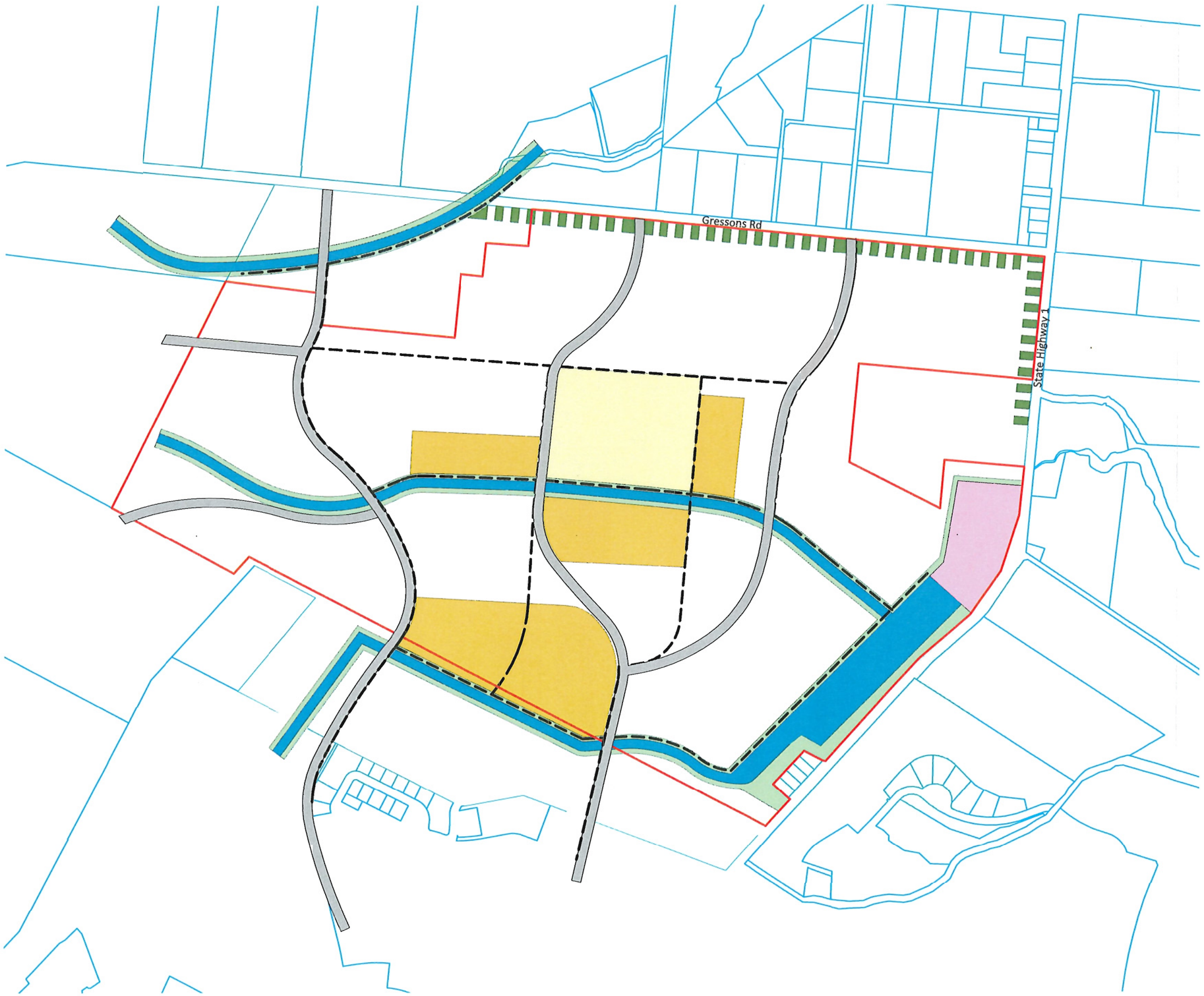
CAD FILE : J:\20605\Waikuku.dwg

REVISION :
R0

DRAWING No :
E20605

SHEET No
1 OF 1

Appendix C – Outline Development Plan



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REV DATE NOTES

Legend

- Proposed Plan Change Area
- Proposed Cycleway
- Proposed Road
- Proposed Reserve Link
- Proposed Stormwater & Flood Link
- Proposed Ngāi Tahu Reserve
- Proposed Recreation Reserve
- Proposed High Density Residential
- Proposed Open sapce buffer
- Existing Land Parcels

NORTH

Draft

RMM
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CHECKED	CHECKED BY
STATUS	
DRAWING No.	REVISION

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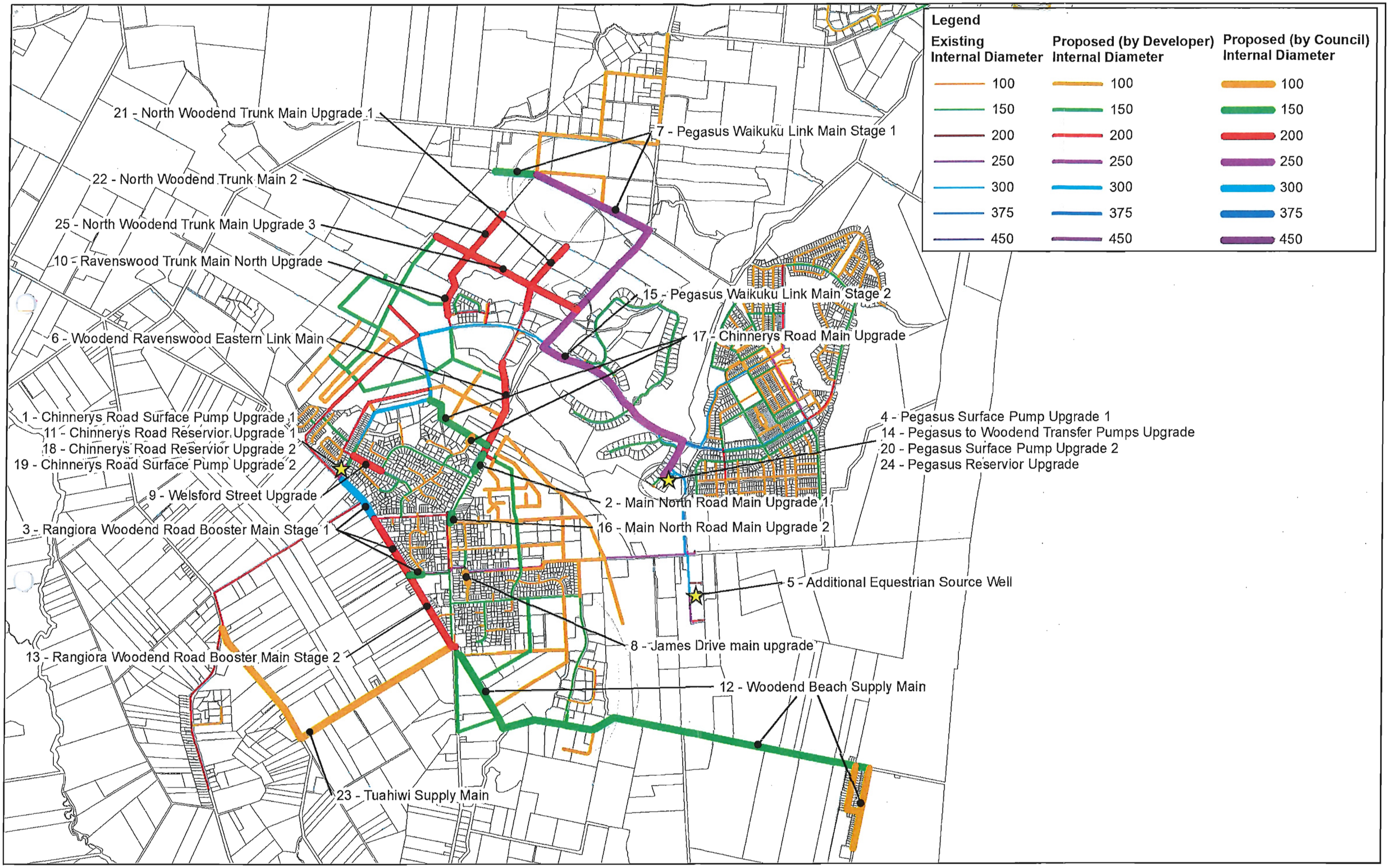
SERIES

1 of 1

Appendix D – WDC Water Supply Strategy



WAIMAKARIRI DISTRICT COUNCIL

Woodend Pegasus Water Supply
50 YEAR GROWTH PROJECTS
ALL WORKS

SCALE (A4)
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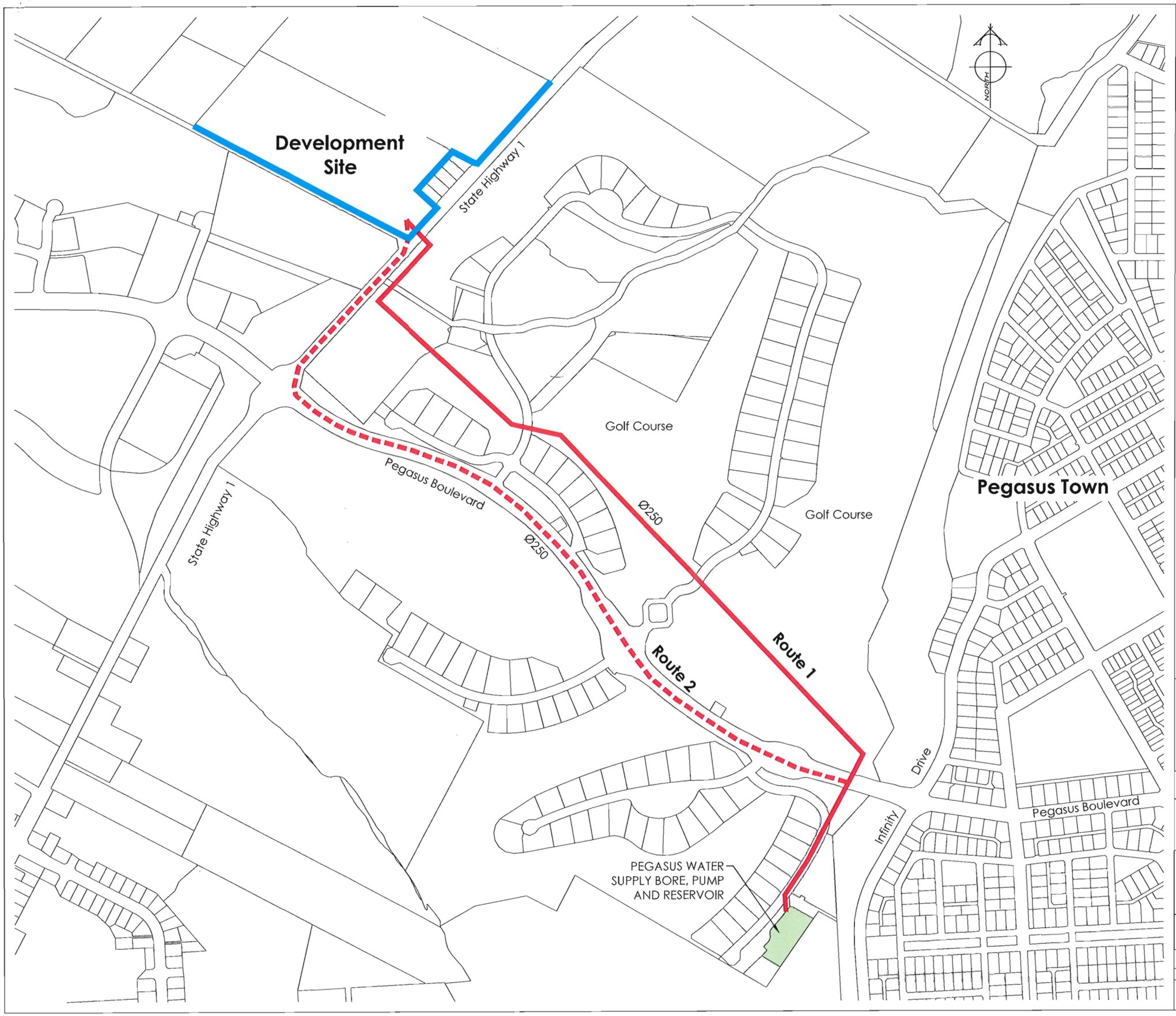
DATE
29/09/2020

Appendix E – Potential Water Supply Routes



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

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Westside Country
Waikuku Development

SHEET TITLE :
Potential Water Supply

DRAWING STATUS
For Discussion Purposes

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DRAWING No : E20605	SHEET No : 1
	REVISION:

Appendix F – Potential Wastewater Pumping Routes

AMENDMENTS :		
AMENDMENT	DATE	DESCRIPTION

Waikuku

NORTH

State Highway 1

Gressons Road

Stokes Road

Waikuku Treatment Plant

Route A1

Development site

Route A2

Kaiapoi Pa Road

Route A3

Pegasus Town

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JOB TITLE :

Westside Country
Waikuku Development

SHEET TITLE :

Potential Sewer
Route A

DRAWING STATUS

For Discussion Purposes

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DRAWING No : E20605	SHEET No : 1
	REVISION:

Development Site

State Highway T

Golf Course

Golf Course

Pegasus Boulevard

Route B1

Route B2

Drive

Infinity

Pegasus Boulevard

Pegasus Town

Gladstone Road

Woodend Waste Water Treatment Plant

Gladstone Road

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

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JOB TITLE :

Westside Country
Waikuku Development

SHEET TITLE :

Potential Sewer
Route B

DRAWING STATUS

For Discussion Purposes

SCALE : 1:7500@A3	DATE : October 2021	
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