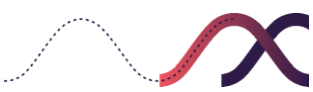
TAINUI GROUP HOLDINGS

Ruakura Development

Infrastructure Report

7 December 2022

BLOXAM BURNETT & OLLIVER



Document control

Project identification		
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Contract numbers	n/a	
Report name and number	Infrastructure Report	
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Report status			
Status	**Name**	**Signature**	**Date**
Report prepared by	Jarred Stent		16/11/2022
Checked by	Constantinos Fokianos		16/11/2022
Approved for issue (V1)	Jarred Stent		16/11/2022

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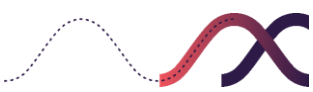
Version	**Changes**	**Signature**	**Issue date**
V2	Minor updates		7/12/2022
V3			
V4			



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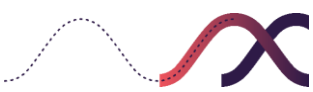


1. Introduction

1.1 Background

This infrastructure report has been prepared for the Hamilton City Council (HCC) by Tainui Group Holdings (TGH) Ruakura Industrial Development Limited to support a request for a Private Plan Change for an area of land identified as Tuumata. The Tuumata development comprises approximately 68Ha of land. The area is currently zoned industrial, and the Private Plan Change is requested to rezone the area to medium density residential and Neighbourhood Centre.

1.2 Purpose of Report

The purpose of this report is to provide an overview at conceptual level of the anticipated infrastructure associated with the Plan Change Area. The information provided outlines the methodology associated with the proposed infrastructure to demonstrate feasibility and capacity. This report is to be read in conjunction with the Plan Change application

1.3 Site Description

The topography of the site is presented in Figure 1-1. The majority of the site is relatively flat at an elevation of 39-40m RL. There are some terraces in the south-western corner, with a maximum elevation of 45m RL, and along the eastern boundary, with a maximum elevation of 45m RL. The site fronts the HCC Wairere drive corridor.

Figure 1-1 – Topography Map of Tuumata Development

1.4 Legal Description

The Tramway block is part of approximately 196 hectares title legally described as Lot 2 Deposited Plan 548526 and Section 4 Survey Office Plan 519316 (Record of Title Identifier 939233).

Figure 1-1 - Location of Tuumata Development

2. Earthworks

Earthworks will be undertaken, as required, throughout the Plan Change Area and will include re-contouring, excavations for drainage reticulation, formation of building platforms and roading networks, and the formation of the swales network and the stormwater wetland. Within each development stage, the site will be further divided into different sub-catchment areas where specific erosion and sediment control measures will be adopted.

A high-level preliminary earthworks plan has been prepared along with a concept level approach on the possible staging of the development. The surface model is based on the results of the preliminary stormwater model and layout that was developed to support the proposed plan change. The staging of the development is indicative and will be detailed and evolve during the next phases of the design.

2.1 Design Standards

An earthworks management plan will be required for each stage in the development. Each plan will address proposed measures for erosion and sediment control. These controls will be designed in accordance with Waikato Regional Council's Guide for Soil Disturbing Activities 2009 and best practice solutions.

2.2 Geotechnical Investigation

Site-specific Geotechnical investigations have been prepared for the development site by CMW Geosciences, dated 2 November 2022 for the Tuumata Rezoning.

These reports concluded that the development site comprises farmland with topsoil on average between 150 and 500mm in depth. Underpinning this the soils comprise of cross-bedded pumice sand, silt, and gravel with interbedded peat of the Hinuera Formation, and the ridges comprising pumiceous mud, silt, sand, and gravel with muddy peat beds of the Walton Subgroup overlain by fine grained volcanic ash. Groundwater was encountered between 0.1 and 5.6m below ground level

2.3 Earthworks Summary

Earthworks may vary for each stage for the project depending on demand, yield, and economics. A higher yield would typically require more earthworks. Whilst the volume of earthworks will be determined as each stage is developed, preliminary modelling has identified that the whole Plan Change Area will require ground disturbance. It is expected the maximum cut will be approximately 6.0 m in depth and maximum fill will be 3.0 m in height.

Preliminary earthwork volumes, split into phases, are below.

Phase	**Cut** (m3)	**Fill** (m3)	**Topsoil Strip** (m3)	**Topsoil Respread** (m3)
1	212,511	93,748	68,329	34,075
2	61,449	136,627	47,827	24,014
3	34,710	118,375	36,052	18,126
4	30,755	30,565	18,529	14,297
5	75,594	20,408	28,394	9,365
Total	**415,018**	**399,723**	**199,131**	**99,876**

Note: solid volumes

2.4 WRC Resource Consent

The extent of earthworks and associated volumes, along with proposed sediment control measures are subject to resource consent for earthworks. A site wide land use consent from WRC will be required prior to commencing any earthworks.

3. Transportation

3.1 Design Standards

The Plan Change Area transportation network will be designed in accordance with RITS and the recommendations of the Stantec ITA. A design speed of no greater than 30-60km/hr will be adopted.

3.2 Integrated Transport Assessment

An Integrated Traffic Assessment (ITA) was carried out by Stantec considering the traffic and transportation effects of the Plan Change Area in the context of the wider Ruakura Development. For further details please refer to the Stantec Integrated Transportation Assessment (ITA).

3.3 Road Typology and Design

The Stantec ITA report provides the proposed cross sections to be adopted. The exact cross-section of the roads will be confirmed at subdivision stage.

4. Stormwater

4.1 Sub catchment ICMP

A sub catchment ICMP report was prepared by BBO to support the Application. Refer to this report for the design calculations and overall philosophy.

4.2 Reticulation

All buildings to be constructed will have to use inert cladding, roofing, and spouting buildings materials to minimize contaminants in lot runoff. Lot runoff will be discharged into the reticulation network through private connections. On-lot treatment is not proposed due to high ground water levels.

Road surface drainage is conveyed through a network of kerb and channel, catchpits, and stormwater reticulation. The reticulated flows will discharge into the swale network. The manholes upstream of the reticulation discharge points into the swales will include sumps and baffles to enable sediment storage. This will enhance maintenance practises and will allow the sediment removal with the use of vacuum trucks without the need to access the swales. This solution has recently been implemented on other projects within Hamilton City (Wairere/Cobham Interchange, Ruakura Road urban upgrade).

4.2.1 Lot Connections

All lots will be serviced with lot connections as per RITS guidelines and specifications.

5. Wastewater

A wastewater strategy has been developed for servicing the development as well as providing flexibility for servicing future Ag-research urban catchment areas adjacent to the subject site. The wastewater reticulation network has been designed to RITS as a gravity system with a new wastewater pump station proposed within the phase 1 area. The wastewater pump station will include a new rising main connecting to HCC far eastern interceptor (due for completion in November 2022) network external to the site.

The proposed gravity reticulation is shown on the drawings 147520-00-0007. Detailed design of the wastewater pump station will be undertaken in conjunction with Hamilton City Council as part of subdivision design.

5.1 Design Flows

The total design flows have been calculated as:

Area (ha)	Zone	Population Rate (Persons/ ha)	Population (persons)	Average Daily Flow (m^3/d)	Peaking Factor	Peak Daily Flow (l/sec)	Peak Wet Weather Flow (l/sec)	Notes
23.37*	Medium Density	135	3,155	684	2.67	20.11	24.57	1,169 Lots at 2.7 persons/dwelling
0.60*	Neighbourhood Centre	450	270	55	3.92	2.47	2.58	100 Lots at 2.7 persons/dwelling
18.60	Ag Research Block Medium density	164	3,050	652	2.69	19.48	23.03	1127 dwellings at 2.7 persons/ dwelling. 31ha total, assumed 60% developable

** Actual development area*

For the purposes of comparison under the HCC PDA the Tramway west block (Stage 3 are in PDA) had a gross area of 68.72Ha and a PWWF of 28.5 l/s.

Currently the Tuumata site is industrial zoned and had PWWF demand of 28.5 l/s and the calculated plan change residential zone PWWF demands are 27.15l/s. Based on this we are of the opinion that the existing wastewater network at the connection point has sufficient capacity to service the proposed plan change footprint.

In addition to the anticipated yield at Tuumata, the design flows for the wastewater network factors in 3,050 persons at Ag Research based on a nominal 1127 dwellings and a simple equation of potentially developable land there and theoretical density. This additional design flow for Ag Research has been added at the request of HCC officers to factor in potential future development of that block, **which is not part of this Plan Change**.

5.2 Gravity Reticulation

The proposed gravity wastewater reticulation within the development has been preliminary sized as 150 - 300mm nominal diameter uPVC SN16 to RITS hydraulic requirements. Sections of reticulation will be upsized to allow for flows from future catchments. Manholes will be designed to resist flotation due to high groundwater levels.

5.3 Pump Station

The proposed pump station is located on the main access road. The pump station will be designed to service the development, with details at the subdivision design phase to take into consideration upgrades for pump set and electrical in the future to meet ultimate flows from the Ag-research campus.

The pump design for the ultimate flows is documented above. The ultimate flows are:

- Average Dry Flow = 16.10l/s
- Peak Wet Weather Flow = 50.18 l/s

The design of the wet well will be based on 16.10 l/s.

The pump station requires a total of 277m³ of storage (9 hrs at ADF, not accounting for future AgResearch area) which would comprise of two 40m long chamber comprising DN2300 pipes, as per RITS standard drawings. The ultimate storage volume required is estimated to be 521 m^3. The required area for the ultimate storage requirements will be provided as part of the proposed wastewater pump station site. Based on the future size requirement, an additional 45m-long, RITS standard chamber would likely be required.

The pump station wet well internal fitout and valve chamber configuration will follow RITS standard drawings. The pump station will house a motor control cubicle to control the pump start/ stop. Access to the pump station will be provided off the adjacent road. Power, water, and communication services will be provided at the pump station.

The wastewater pump station wet well, valves and valve chamber will be designed for the ultimate flows. The pump sets will be designed for the Stage 1 Tuumata Plan change area flows only, however, the wet well will have sufficient operating room to upgrade for the ultimate pump sets once the ag research block is developed.

Based on the above the land to vest would be in the order of 100m^2 for the pump station compound and storage tanks.

5.4 Rising Main

The proposed pump station rising main will be sized to achieve self-cleansing velocity of 1.0 m/s. The length of the proposed rising main was approximately 2,050 m.

The rising main will be designed with an alignment from the pump station site, as indicated on drawing 147520-00-0007. A discharge manhole will connect the rising main and existing Far Eastern Interceptor gravity pipe. The alignment of the new pipe network will fall within the proposed vested road reserve network.

The rising main will be designed and constructed to meet the requirements of RITS.

As such, we conclude that this wastewater solution above will adequately safeguard the public and residents from illness and injury and will provide reliable and efficient service.

6. Water

The RITS sets out design and construction standards for water reticulation, potable water supply and firefighting supply in accordance with SNZPAS 4509:2008 (NZ Fire Service Firefighting Water Supplies Code of Practice.

6.1 Demand

Water demand for Tuumata has been estimated in accordance with RITS. The overall water demand has been summarised in Table 1 below. It was assumed that population density would be 2.7 people per residential unit, 45 people per hectare for the school, and 90 people per hectare for the neighbourhood centre.

Fire flow demand was based on SNZ PAS 4509 which classifies firefighting water demand as FW2 to meet the Fire Hazard Category for the proposed residential area. FW2 requires a minimum of two fire hydrants to provide 25 l/s.

Table 1; Tuumata Plan change Water Demand

Units	Residential	Neighbourhood Centre	Total
Area	22.5 ha*	0.6 ha*	
Equivalent Population	3,155	270	3,425
Daily Demand	260l/person/day	260l/person/day	
Average Daily Demand	9.49l/s	0.81l/s	10.30l/s
Peak Demand	47.45l/s	4.05l/s	51.50l/s
Fire Flow (highest selected)	25.00l/s	50.00l/s	50.00l/s
Total			**101.50l/s**

* Actual development area

For the purposes of comparison under the HCC PDA the Tramway west block (Stage 3 are in PDA) had a gross area of 68.72Ha and an average daily water demand of 1.49 l/s.

Currently the Tuumata site is industrial zoned and had water demand of 1.49 l/s and the calculated plan change residential zone PWWF demands are 10.3 l/s. Based on this and the modelling undertaken by HCC we are of the opinion that the existing water network at the connection point has sufficient capacity to service the proposed plan change footprint.

6.2 Water Reticulation

The nearest existing public watermain for connection is at the south-eastern corner of the proposed site. This connection point is fed from the existing Ruakura Reservoir. As part for the wider Ruakura Development, a stage 2 phase of the bulk main is to be run north to connect up Chedworth properties. A second connection is to be provided off this line in the vicinity of the Fifth Ave intersection/ Eastern Transport Corridor.

For the bulk feed into the Tuumata Development, it is proposed that a 500mm PE100 SDR11 main will be installed from the new bulk man connection to be installed and along fifth Ave to connect to the site. A second supply main of 250mm OD MPVC will also be installed along Fifth Ave Extension. HCC carried out initial modelling of the site which has confirmed that the Ruakura network has sufficient capacity to supply the development.

The proposed subdivision will contain a 250mm OD MPVC pipe along the main collector. The rest of the network consists of dual 150mm uPVC mains. This design will be subject to separate EPA approval from HCC. The proposed layout is shown on the drawing 147520-00-008.

Based on the demands above and the proposed reticulation, the water supply system will be designed to provide sufficient pressure and flows for the development to comply with FW2.

6.2.1 Lot Connections

All lots will be serviced with lot connections as per RITS guidelines and specifications.

7. Other Services

7.1 Power Supply

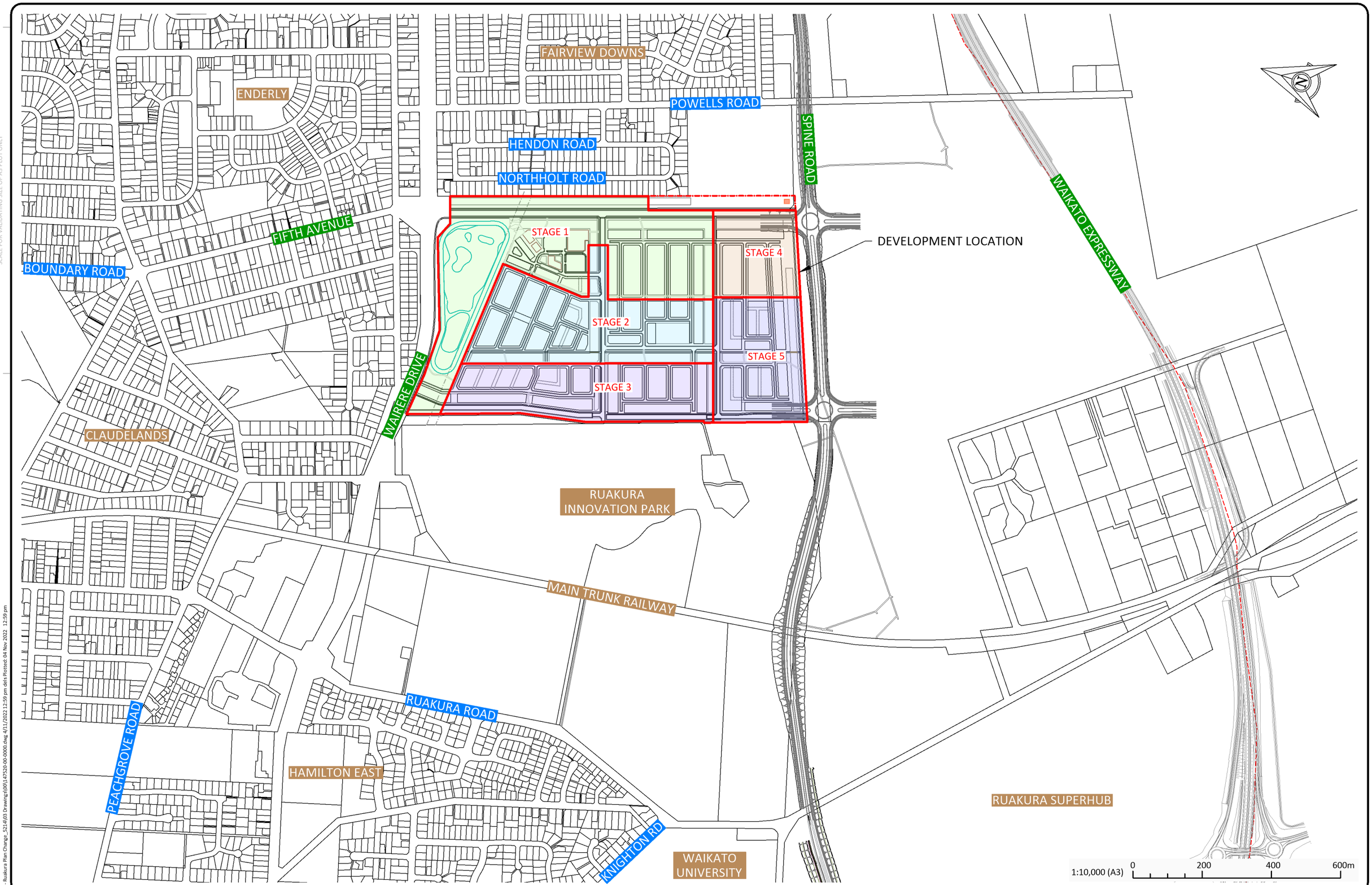
Power will be provided by a third-party service provider. WEL networks have confirmed that sufficient capacity in the existing utility network to service the Plan Change Area. A copy of the confirmation letter is attached in appendix B

7.2 Telecommunications

Communications will be provided by a third-party service provider. Tautahi first fibre networks have confirmed that sufficient capacity in the existing utility network to service the Plan Change Area. A copy of the confirmation letter is attached in appendix B

7.3 Gas

No provision for gas reticulation has been assumed. This will be reviewed at the subdivision consenting phase.



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Version 4.0 - March 2020

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BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: LOCATION DRAWING

STATUS: PRELIMINARY

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Version 4.0 - March 2020

BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: CONCEPT LAYOUT PLAN
GENERAL ARRANGEMENT

STATUS: PRELIMINARY

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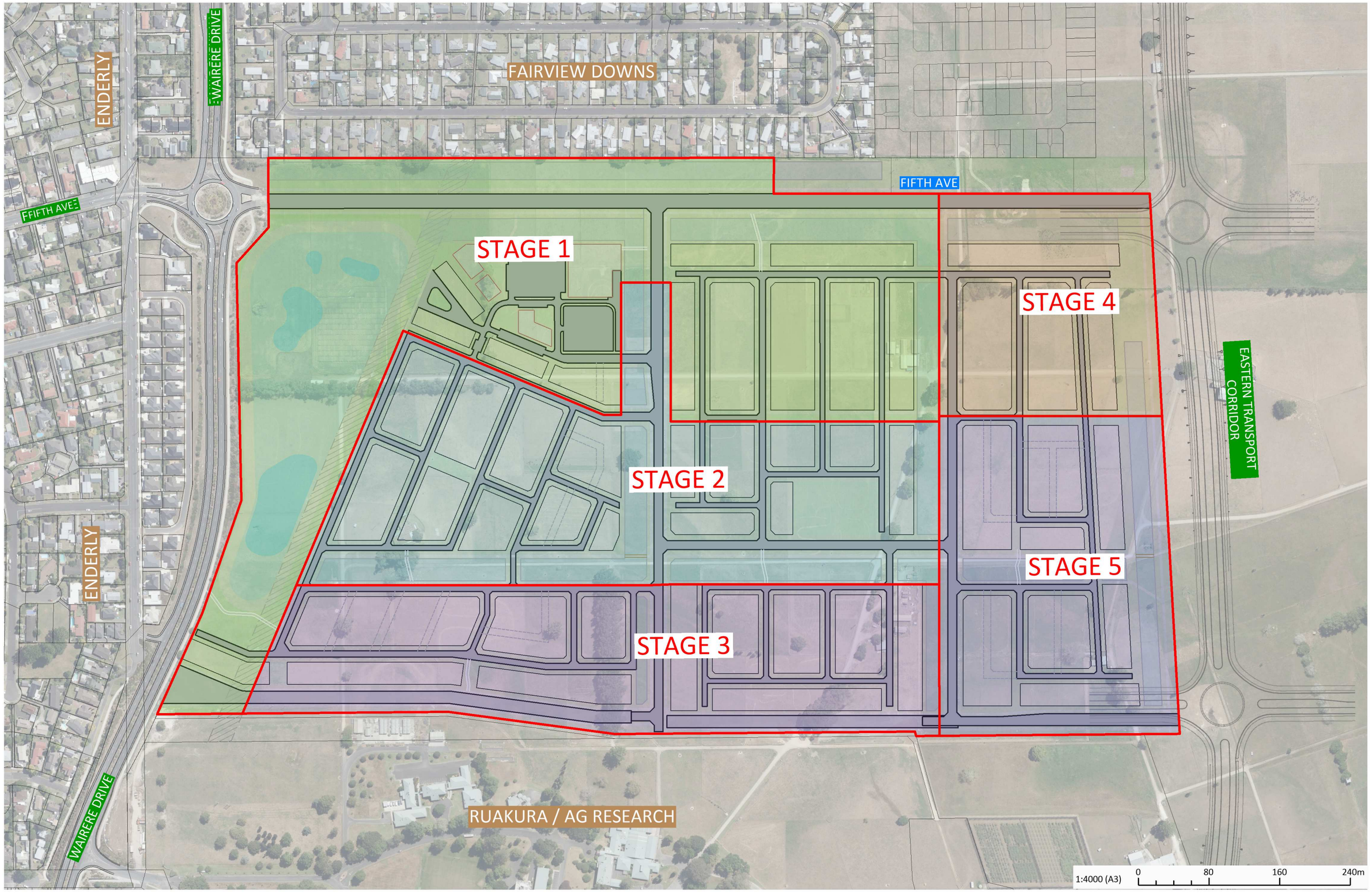

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BLOXAM BURNETT & OLLIVER

CLIENT

PROJECT
TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING
CONCEPT LAYOUT PLAN
STAGING PLAN

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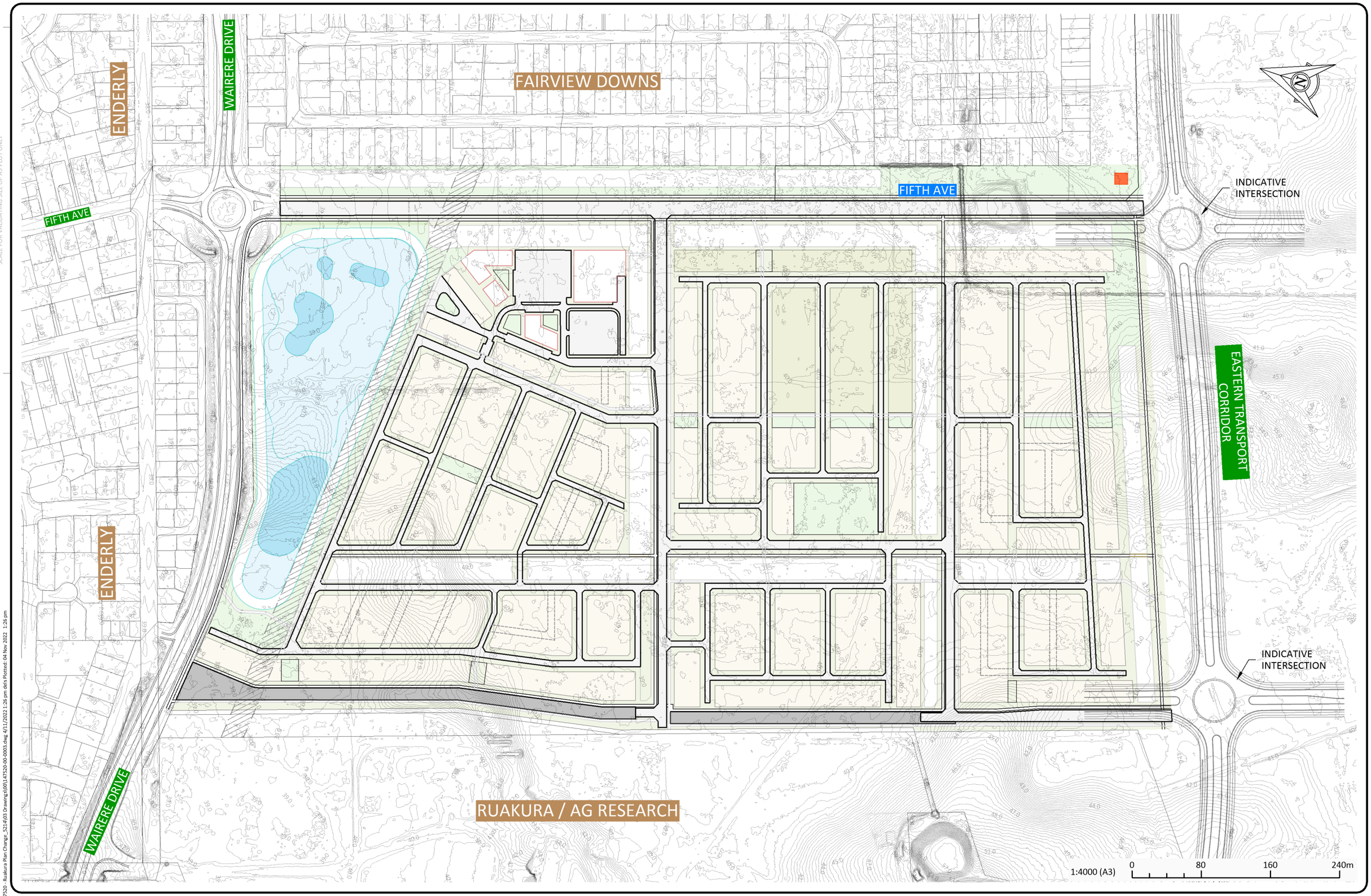

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Version 4.0 - March 2020

BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: CONCEPT LAYOUT PLAN
EXISTING CONTOURS

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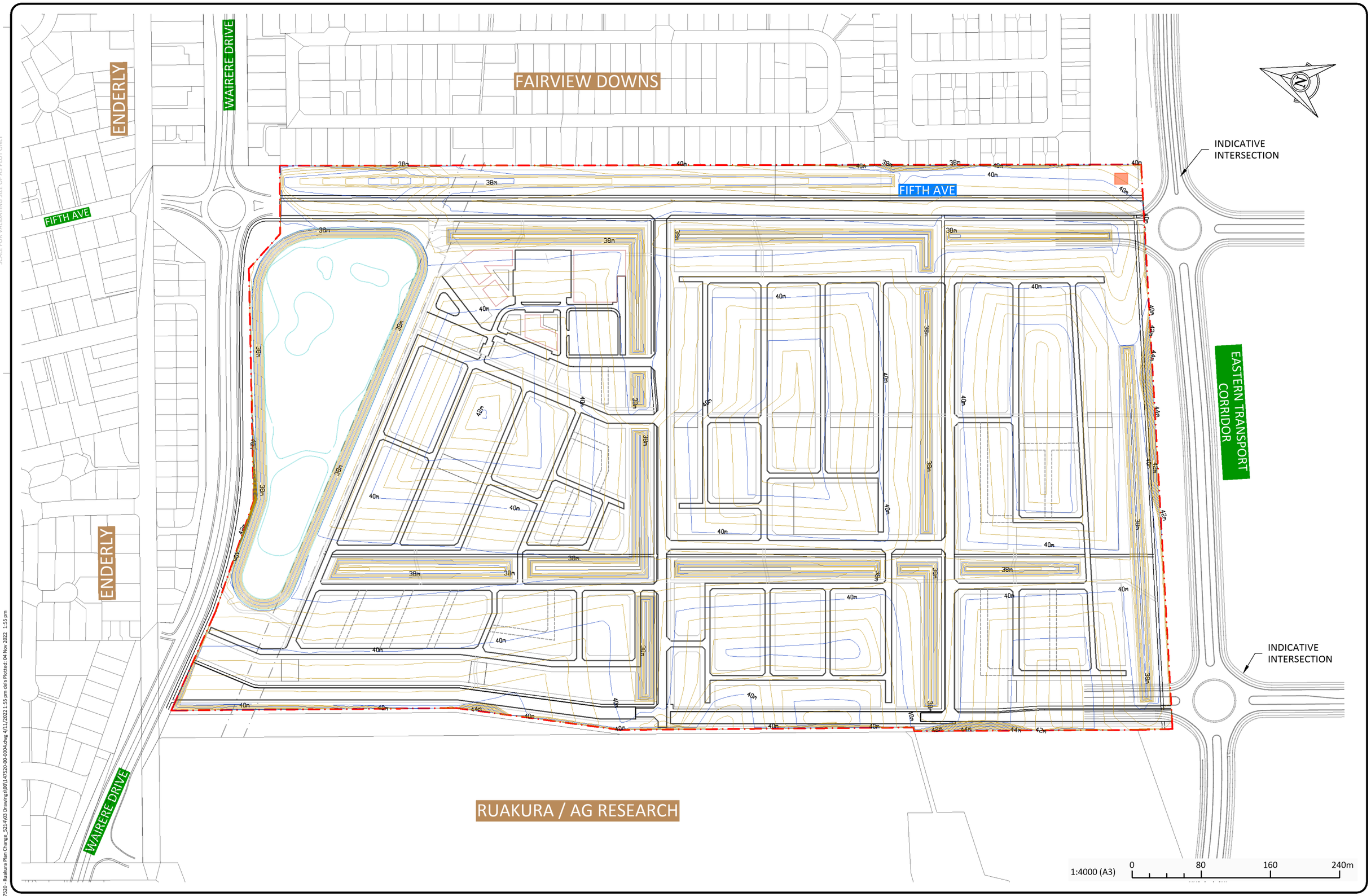

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BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: CONCEPT LAYOUT PLAN
DESIGN CONTOURS

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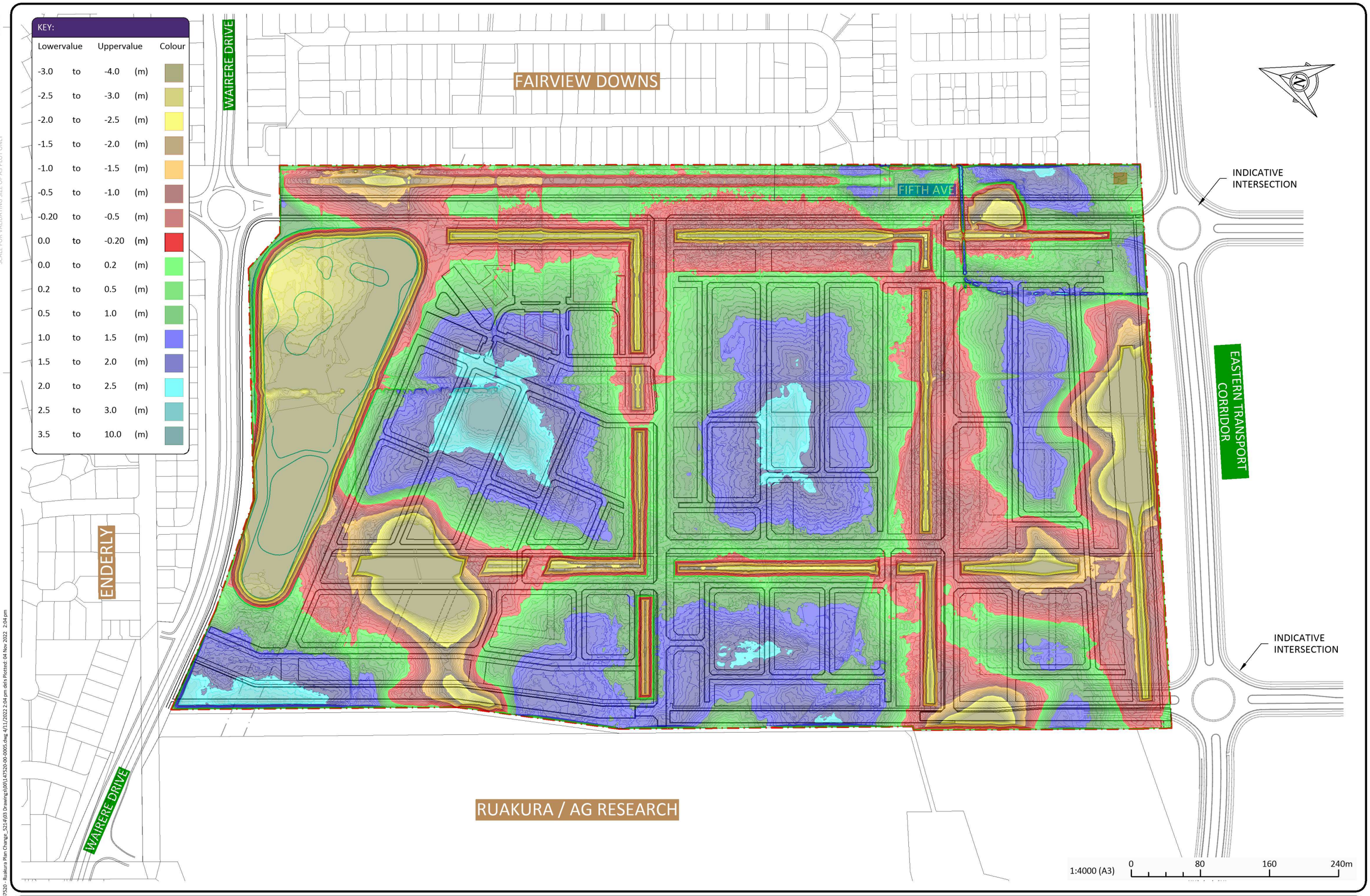

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Version 4.0 - March 2020

BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: DEPTH RANGE
CUT AND FILL CONTOURS
(EXISTING GROUND TO DESIGN)

STATUS: PRELIMINARY

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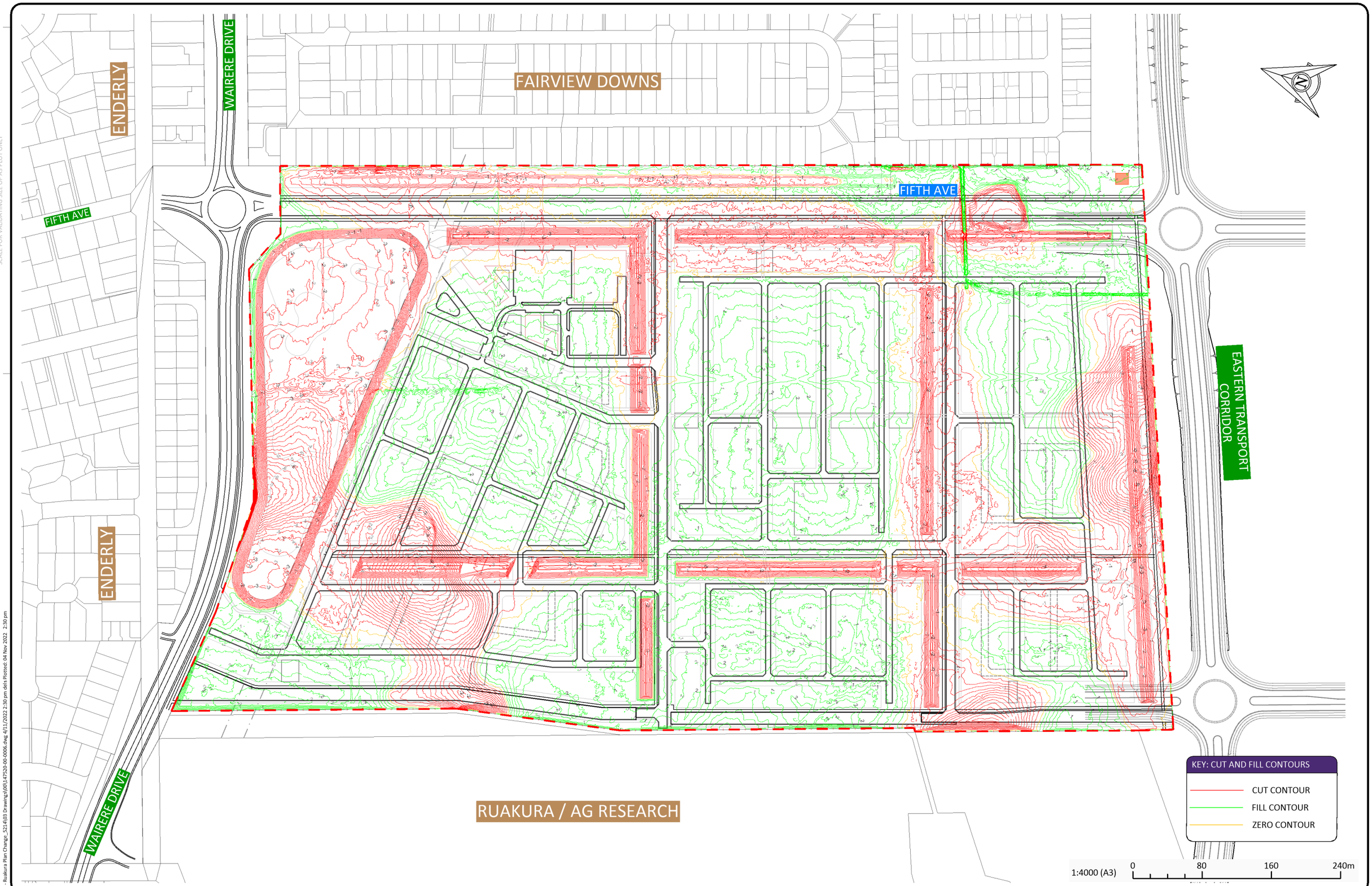

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CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: DEPTH RANGE
CUT AND FILL CONTOURS

STATUS: PRELIMINARY

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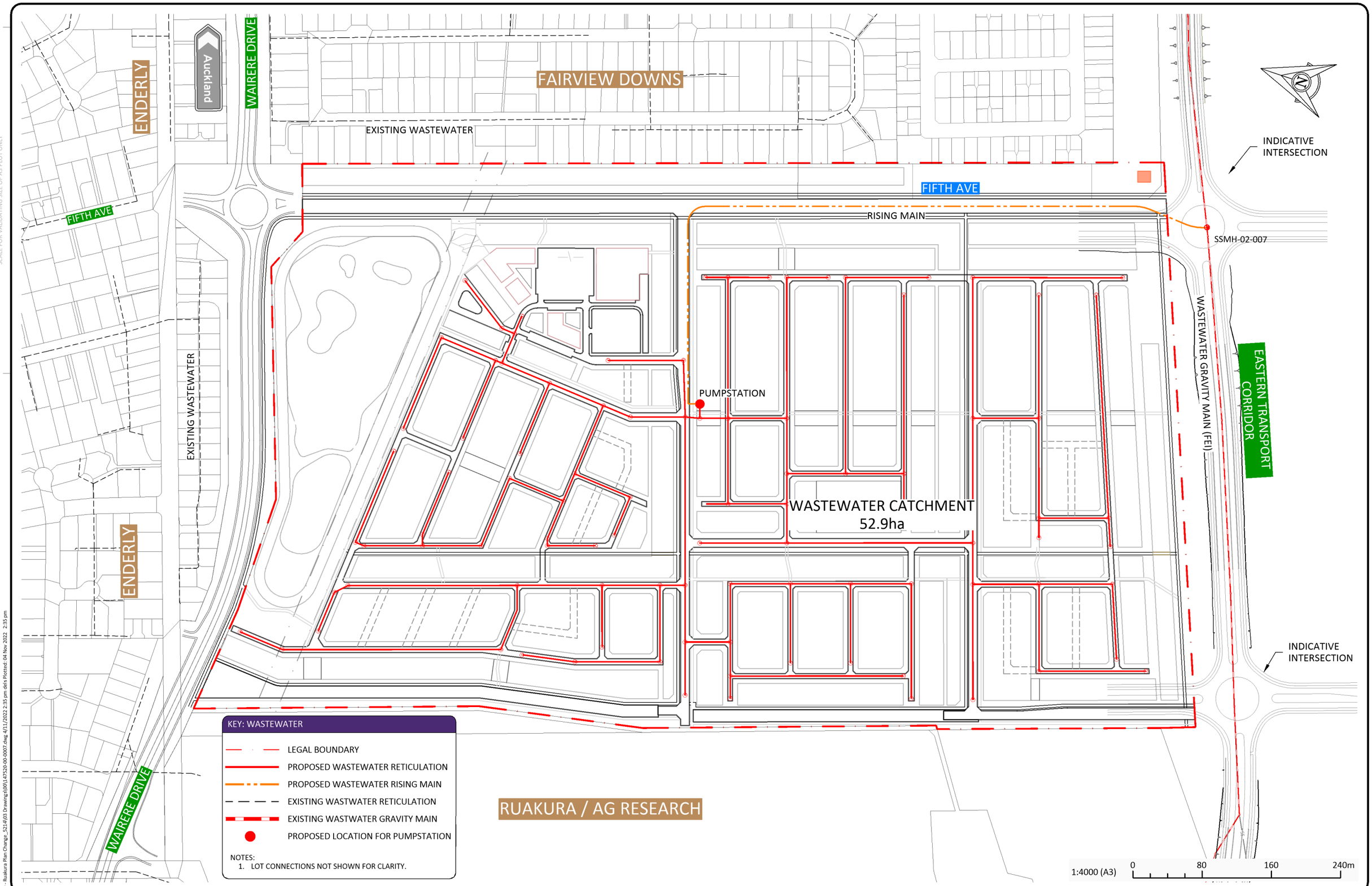

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BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: CONCEPT LAYOUT PLAN
WASTEWATER CONVEYANCE

STATUS: PRELIMINARY

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DRAWING NUMBER	REVISION
147520-00-0007	A

Version 4.0 - March 2020

KEY: WATER

- LEGAL BOUNDARY
- WATER TRUNK MAINS (DIA 500 PE100 SDR11)
- WATER DISTRIBUTION MAINS (DIA250 MPVc)
- WATER PRINCIPLE MAINS (DIA 150 MPVc BOTH SIDES OF THE ROAD RESERVE)
- EXISTING WATER TRUNK MAINS (DIA 600)
- EXISTING RESERVOIR FILL MAINS (DIA 650)
- EXISTING RESERVOIR SUPPLY MAINS (DIA 650)
- EXISTING WATER RETICULATION

NOTES:
1. LOT CONNECTIONS NOT SHOWN FOR CLARITY.

FAIRVIEW DOWNS

EXISTING WATER RETICULATION

WATER RETICULATION MAINS

FIFTH AVE

WATER TRUNK MAINS

EASTERN TRANSPORT CORRIDOR

EXISTING WATER RETICULATION

Ø600 EXISTING TRUNK MAINS

DISTRIBUTION NETWORK

WATER TRUNK MAINS

WATER RETICULATION MAINS

WATER RETICULATION MAINS

DISTRIBUTION NETWORK

ENDERLY

EXIST. Ø650mm (D.I) FILL MAIN

EXIST. Ø650 (D.I) SUPPLY MAIN

EXIST. Ø650 (D.I) SUPPLY MAIN

EXIST. Ø710 CLS

RESERVOIR

EXIST. Ø630 (PE100) MAIN

WAIRERE DRIVE

RUAKURA / AG RESEARCH

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BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: CONCEPT LAYOUT PLAN
WATER DISTRIBUTION

STATUS: PRELIMINARY

DATE: 01.07.22

SCALE (ORIGINAL SIZE A3): 1:4000

DRAWING NUMBER: 147520-00-0008

REVISION: A

KEY: STORMWATER

- LEGAL BOUNDARY
- FLOW DIRECTION
- PROPOSED NEW STORMWATER PIPES
- EXISTING STORMWATER PIPES
- STORMWATER SWALE
- GREEN CORRIDOR
- TREATMENT WETLAND
- PIPE CULVERT
- BROADWALK CROSSING
- PROPOSED STORMWATER MANHOLE

NOTES:
1. LOT CONNECTIONS NOT SHOWN FOR CLARITY.

HENDON RD

FAIRVIEW DOWNS

REEVES CL

NORTHOLT RD

EXIST. STORMWATER PIPE

STORMWATER SWALE SW03

FIFTH AVE

FIFTH AVE. EXTENSION

Ø900 RRJC PIPE

INDICATIVE INTERSECTION

POWELL RD DRAIN DIVERSION PIPE

Ø900 RRJC PIPE

POWELLS RD DRAIN INLET

STORMWATER SWALE SW02

STORMWATER SWALE SWD04

WETLAND SWD01

EXISTING MANHOLE (SWP25014)

OUTLET TO EXISTING RETICULATION

ENDERLEY AVE

TRAMWAY RD

WAIKAKI CL

SPINE ROAD (EASTERN TRANSPORT CORRIDOR)

EASTERN TRANSPORT CORRIDOR

STORMWATER SWALE SWD04

STORMWATER SWALE SWD04

STORMWATER SWALE SWD05

STORMWATER SWALE SWD06

SANDRINGHAM RD

ENDERLY

ORCHARD AVE

NEWPORT PL

STORMWATER SWALE SW01

WAIRERE DR.

Ø750 RRJC PIPE

STORMWATER SWALE SWD09

STORMWATER SWALE SWD10

STORMWATER SWALE SWD11

INDICATIVE INTERSECTION

CUT-OFF SWALE

CUT-OFF SWALE

CUT-OFF SWALE

DISCHARGE POINT FOR FUTURE OFF-SITE CATCHMENTS DEVELOPMENT. TO DIVERT TREATED WQ FLOWS DOWNSTREAM OF SWD01.

WAIRERE DRIVE

RUAKURA / AG RESEARCH

CUT-OFF SWALES TO DIVERT OVERLAND FLOWS INTO THE PROPOSED SWALE NETWORK

1:4000 (A3) 0 80 160 240m

						DESIGNED: DE	CHECKED: JS	
						DRAWN: SC	APPROVED:	
A	-	-	-	-	-	mx model version:		
	DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR			

BLOXAM BURNETT & OLLIVER

CLIENT: Tainui Group Holdings

PROJECT: TRAMWAY DEVELOPMENT
RUAKURA NORTH

DRAWING: CONCEPT LAYOUT PLAN
STORMWATER MANAGEMENT SYSTEM

STATUS: PRELIMINARY

DATE: 01.07.22

SCALE (ORIGINAL SIZE A3): 1:4000

DRAWING NUMBER: 147520-00-0009

REVISION: A

Appendix B – Service Authority Letters

Tuatahi First Fibre

PO Box 27050
Garnett Avenue 3257
0800 Fibre LTD
tuatahifibre.co.nz

16th December 2022

CONDITIONAL ACCEPTANCE BY TUATAHI FIRST FIBRE LIMITED AS TELECOMMUNICATIONS OPERATOR

Development: Ruakura Tramway Block- TGH
Legal Name: PT LOT 2 DP 548526

1. Tuatahi First Fibre Limited (TFF) confirms that a TFF telecommunications connection will be made available for each site in the development, **providing the developer was to sign an TFF Installation Agreement.** Upon approval of this agreement, TFF will undertake to become the telecommunications operator of the telecommunications reticulation in the proposed public roads for the Tramway Block Development (the "**Subdivision**"), to provide network connections to all lots in the Subdivision (the "**Reticulation**").

2. The Reticulation will be installed in accordance with:

   (a) the requirements and standards set by the Hamilton City Council and advised to TFF via the Council's website; and

   (b) the requirements of the Telecommunications Act 2001 and all other applicable laws, regulations and codes (as amended).

3. The Reticulation will be installed by our preferred provider to TFF's satisfaction.

4. TFF will be the owner, operator and maintainer of the Reticulation.

5. One or more retail service providers will be available to supply telecommunications services over the completed Reticulation when service is available, provided that TFF shall not be responsible if the retail service provider's offer to supply such telecommunications services or the number of such providers varies from time to time.

SIGNED for and on behalf of **TUATAHI FIRST FIBRE LIMITED** by:

Signature: *D J Rugaas*

Name: Daniel Rugaas

Your Ref: BM211065

15 July 2022

Jarred Stent
BBO
P O Box 9041
HAMILTON

Dear Jarred

RE: PROPOSED SUBDIVISION – TAINUI GROUP HOLDINGS, RUAKURA TRAMWAY DEVELOPMENT

Thank you for your enquiry regarding the power availability for the proposed subdivision of Lot 2 DP 548526 on Wairere Drive.

We have investigated the electricity supply requirements for the above proposed subdivision and we are able to supply the electrical reticulation.

In order for us to give clearance to the Hamilton City Council it will be necessary for the power to be extended to the boundary of each lot.

An easement will be required in favour of WEL Networks Ltd over any existing reticulation crossing the property.

WEL will prepare the easement and apportionment of any costs associated with this, the survey, LINZ registration fees will be determined once the design for the new lots is completed. Any landowner legal fees will be the developer's responsibility.

Please advise if this project is likely to proceed and we will arrange for the necessary easement documents to be forwarded for signing.

If you wish us to proceed with pricing for the installation of the electrical reticulation please contact us at www.wel.co.nz/get-connected/subdivision .

We thank you for your enquiry. If you have any further queries or require additional information, please do not hesitate to contact me.

Yours faithfully

Miranda McLean
PROJECT MANAGER