Appendix C – Transportation Assessment

Project Number: 6-DHLHH.01 / 60026

Rangiora Eastern Road Connection

Technical Assessment - Transportation

16 April 2021

CONFIDENTIAL

wsp

150 YEARS IN AOTEAROA

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1 Introduction

This Transportation Assessment has been prepared to identify the magnitude of impacts that would result from the proposed designation of the Rangiora Eastern Link. This report is intended to form part of the project's Notice of Requirement and support any resource consents associated with the project.

2 Description of Project

The Waimakariri District Council (WDC) is preparing a Notice of Requirement (NOR) for a new road designation on the eastern side of Rangiora.

The designation connects Lineside Road and Northbrook Road. The area to which the NOR applies is referred to as 'Rangiora East Road Connection' and is shown in Figure 2-1 on the following page. The proposed designation will form part of a roading link that will ultimately connect Lineside Road through to Coldstream Road (referred to as the 'Rangiora Eastern Link'). Those parts of the Rangiora Eastern Link that do not form part of the proposed designation are:

- MacPhail Avenue, which is an existing road that connects Northbrook Road and Kippenberger Avenue; and
- The connection from Kippenberger Avenue through to Coldstream Road.

Although the designation and NOR only relates to the Rangiora East Road Connection' (i.e. southern section of the route - Lineside Road to Northbrook Road), this transportation assessment considers the effects of the whole route. The transport assessment looks at the operation of the entire network, hence, the need to assess the whole length of the route. Full plans are included in Appendix A.

The Rangiora Eastern Link (as well as southern and western routes) were originally proposed in the Rangiora Transport Study, Beca, September 2001 and a subsequent Scheme Assessment Report, Opus, February 2005, developed alignment options for study and provided preliminary details for the selected alignment.

WSP have been commissioned to prepare technical assessments to inform and support the proposed NOR. This Landscape and Visual Technical Assessment is one of those technical assessments.

These technical assessments and reports are at a high-level and are intended to provide:

- an awareness of the types of effects and their magnitude that may occur as a result of the designation; and
- identify potential measures that would avoid, remedy or mitigate adverse effects.

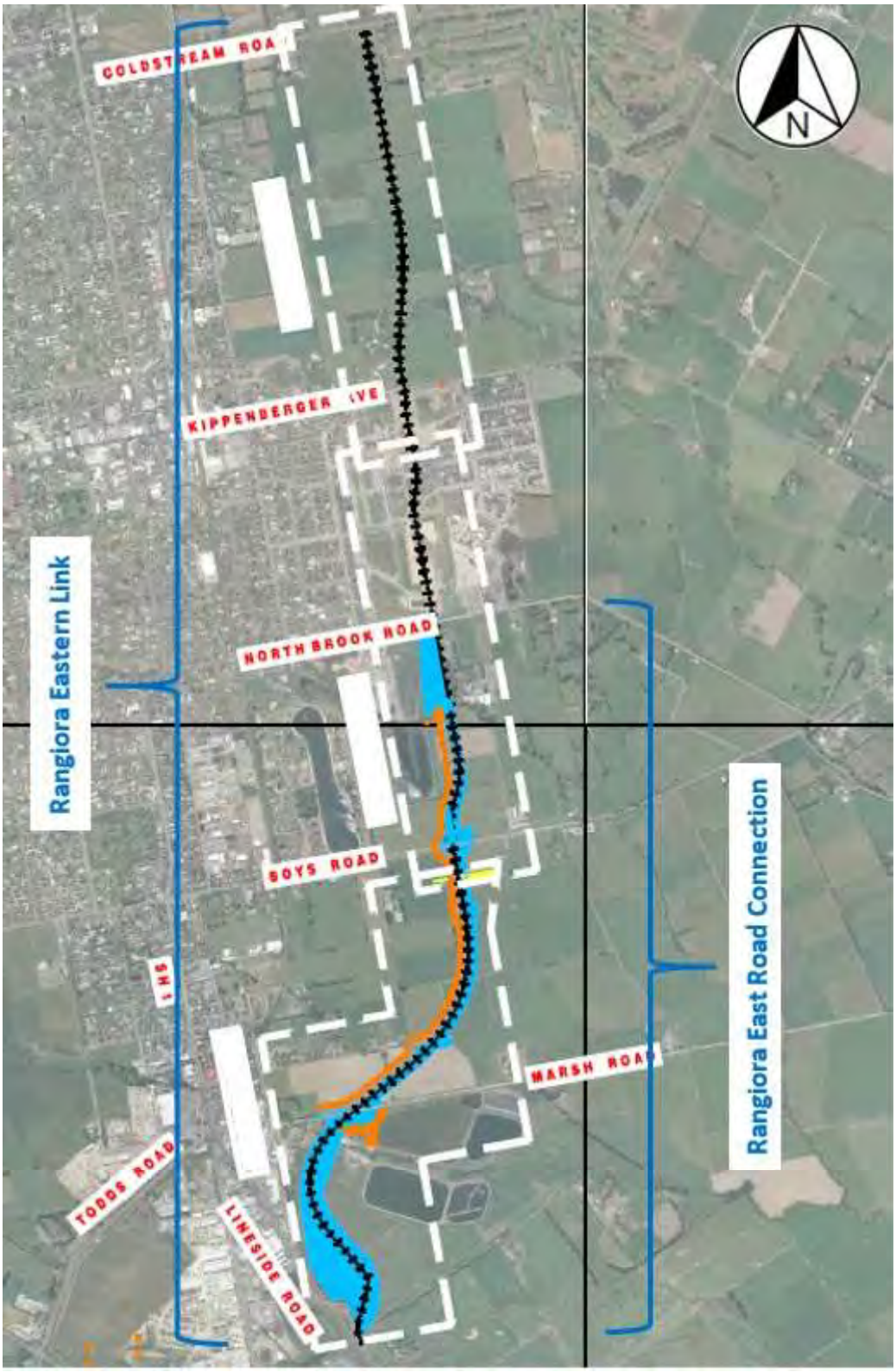


Figure 2-1. Rangiora Eastern Link

3 Background

The Rangiora Eastern Link was proposed as part of the 2001 Rangiora Transport Study. This study recommended several links (East, South and West) which together had the following aims:

- To provide alternative routes into Rangiora;
- Reduce congestion on the Rangiora north-to-south strategic route (Ashley/ Ivory/ Percival/ Southbrook); and
- To service the expected household growth to the east and west of the town and industrial development to the south.

They were further developed in the 2005 Scheme Assessment Report, which recommended routes and alignments. Referring specifically to the Rangiora Eastern Link, the Scheme Assessment Report stated:

> *"The Outline Development Plan includes provision for significant residential development to the east of Rangiora. This development is likely to put increasing pressure on the Percival Street, Southbrook Road route south. A link from North Brook Road to Lineside Road is proposed to ease the pressure on the Percival Street, South Brook Road route."*

3.1 Methodology and Assumptions

Traffic modelling was used to assess the impacts of the proposed alteration to the Rangiora Eastern Link designation. This section outlines the assumptions regarding road network and land use that are inherent in this modelling.

- The basis of the traffic modelling is the Christchurch Transport Model (CTM) Version 18, and the associated Christchurch Assignment and Simulation Traffic (CAST) Model. These models include all of Greater Christchurch and are the most appropriate existing tool to assess large-scale changes to the transport network such as this proposed new road.
- Transport modelling has been completed for peak periods in forecast years 2028, 2038 and 2048.
- The Rangiora Eastern Link is assumed to be constructed between the 2028 and 2038 model years.
- The model includes future land use assumptions previously developed in collaboration with Waimakariri District Council. The modelled land use is discussed further in section 3.1.1.
- The Do Minimum network includes a range of projects detailed in Appendix B. Local projects include:
  - Rangiora NW bypass (Silverstream)
  - Northern Motorway congestion – park'n'ride infrastructure
  - Boys/ Harris/ Rangiora Woodend/Tuahiwi Upgrade
  - Rangiora Woodend Road speed reduction
- The model does not include possible traffic lights at Rangiora Woodend Road and State Highway 1, but the effect of this will be consider as part of preliminary design.
- The model originally included the Rangiora Eastern Link in future years (from 2038 onwards). For the purposes of assessing it's impacts, it has been removed for the Do Minimum case, and included in the assessment case.
- The designation of the Rangiora Eastern Link (as described in Section 2 and shown in Figure 2-1) is the assessment road network.
- It has been assumed that the speed limit on the Rangiora Eastern Link would be 50 and 60km/hr (this would be confirmed at design stage).

3.1.1 Modelled Land Use

The transport model is based on land use forecasts given by Waimakariri District Council via the Greater Christchurch Partnership and their sub-committee, the Model Management Group. The forecasts are broadly consistent with Statistics NZ (sub-national) population forecasts released in 2017 when applying the Medium-High projection to Waimakariri District, with localised adjustments where considered appropriate.

Future land use forecasts previously agreed includes significant growth in Eastern Rangiora. Figures have been extracted for the model zones that bordered the designation.

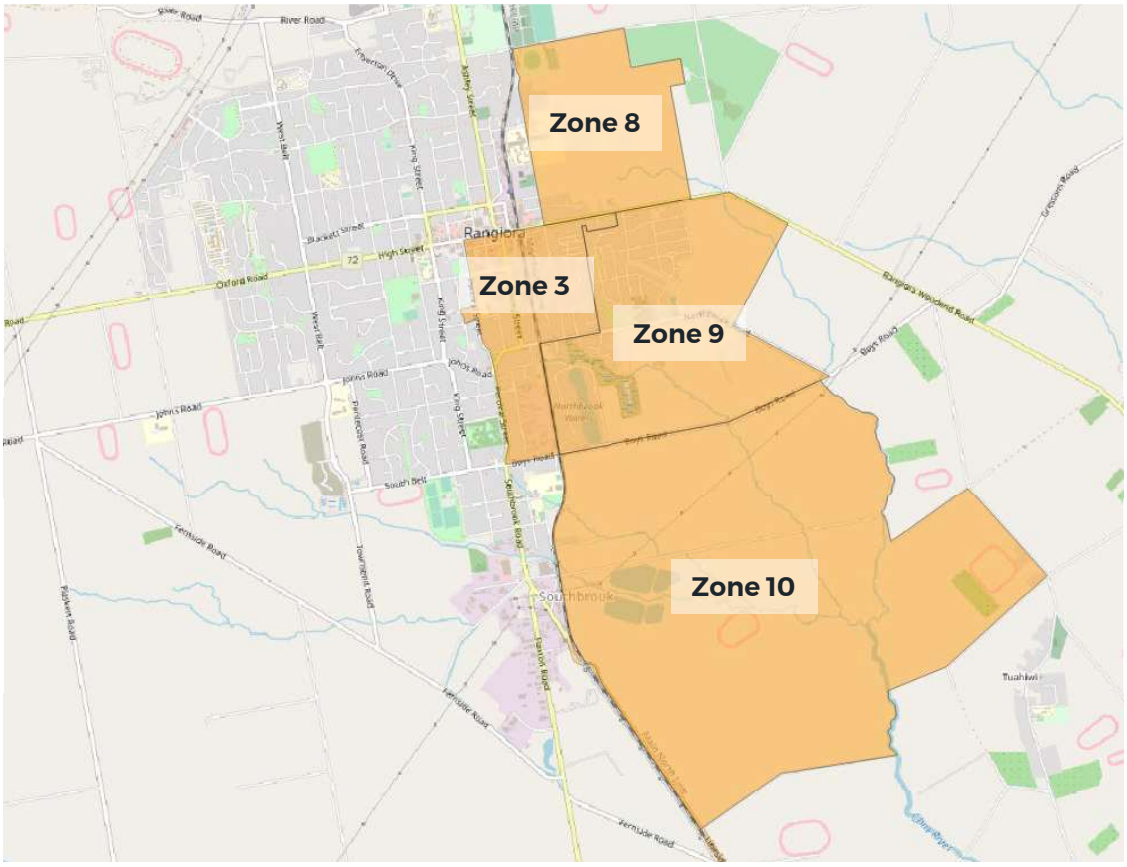


Figure 3-1. Model zones that border the Rangiora Eastern Link designation.

In these zones, the growth in residents, employment and households are shown in the graph below. This shows that the residential population is forecast to grow from approximately 3,200 currently to 7,500 by 2048. Employment is forecast to grow from approximately 700 currently to 3,600 by 2048.

In addition, the graphs below show the growth in residents, employment and households by each zone.

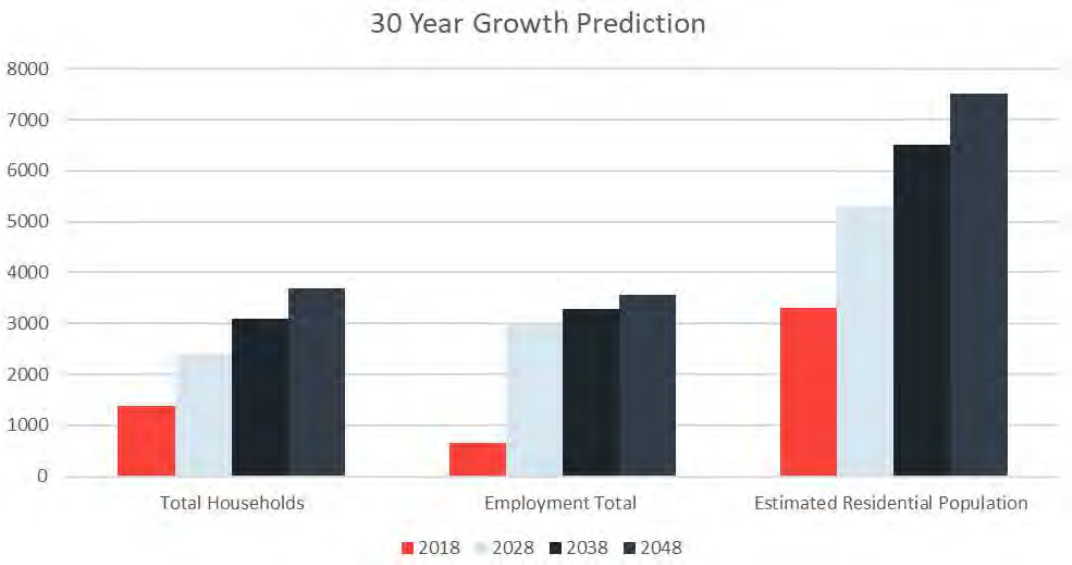


Figure 3-2. 30 year growth forecast – all four zones

Figure 3-3. Zone 3 – 30 year growth forecast

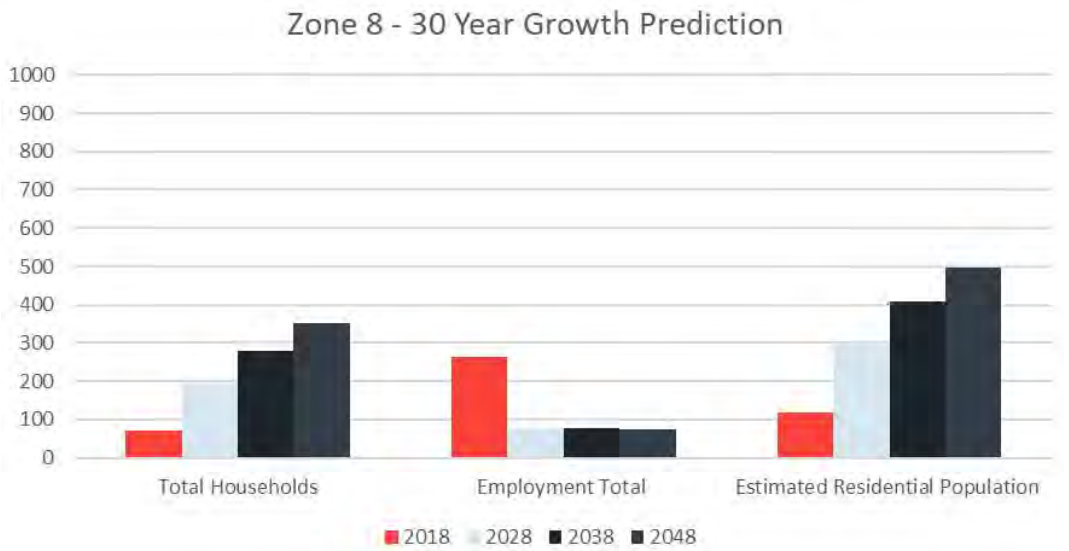


Figure 3-4. Zone 8 – 30 year growth forecast

Figure 3-5. Zone 9 – 30 year growth forecast

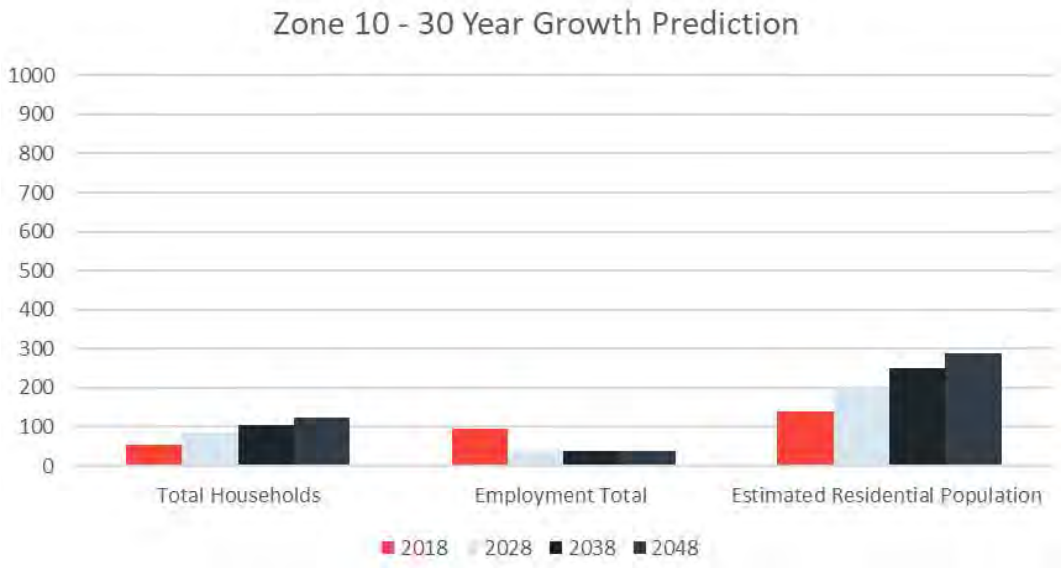


Figure 3-6. Zone 10 – 30 year growth forecast

3.1.2 Intersections

Table 3-1 displays the assumptions made for intersection types between the Rangiora Eastern Link and intersecting local roads. Any changes to these assumptions will be modelled as part of preliminary design.

Table 3-1. Intersection types between local roads and eastern link.

Intersection	Type
Lineside Road	Roundabout (two circulating lanes)
Marsh Road	Priority giveway (Marsh gives way)
Boys Road	Roundabout (one circulating lane)
Northbrook Road	Roundabout (one circulating lane)
Koura Drive	Priority giveway (Koura gives way)
Kippenberger Ave	Roundabout (one circulating lane)
Coldstream	Priority giveway (Eastern Link gives way)

3.2 Existing Transport System

The existing road hierarchy, as defined in the Waimakariri District Plan, is shown in Figure 3-7. Kippenberger Avenue is an arterial road, Boys Road is a collector road and Lineside Road is a strategic road. Other roads neighbouring the Rangiora Eastern Link designation are classified as local roads.

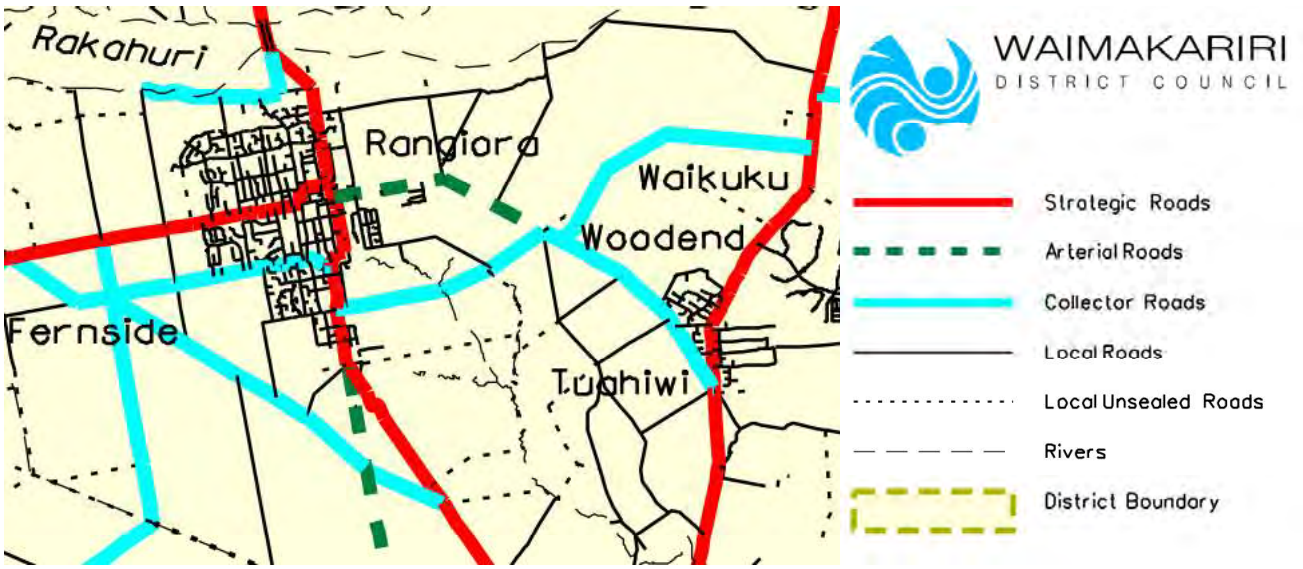


Figure 3-7. Waimakariri District Council road hierarchy.

Figure 3-8 show the walking and cycling strategy map for Waimakariri District Council[1]. This strategy identified priorities and direction going forward for walking and cycling in Waimakariri.

Figure 3-8. Walking and cycling strategy 2017 – 2022.

Three public transport services operate in Rangiora. These are:

[1] https://www.waimakariri.govt.nz/__data/assets/pdf_file/0007/31030/Walking-and-Cycling-Strategy-2017-2022.pdf

- Route 1 (Blue): run every 30 minutes from Rangiora to Kaiapoi, Christchurch city and onto Princess Margaret Hospital and Cashmere.
- Route 97: runs hourly from Pegasus Main Street via High Street to Acacia Avenue in Rangiora.
- Route 91: runs four direct services to Christchurch City in the AM and five PM. This service picks up and drops off at three Park & Ride locations and the route will vary depending on traffic conditions.

Figure 3-9 shows that the 97 Rangiora-Pegasus service operates along Kippenberger Road across the Rangiora Eastern Link.

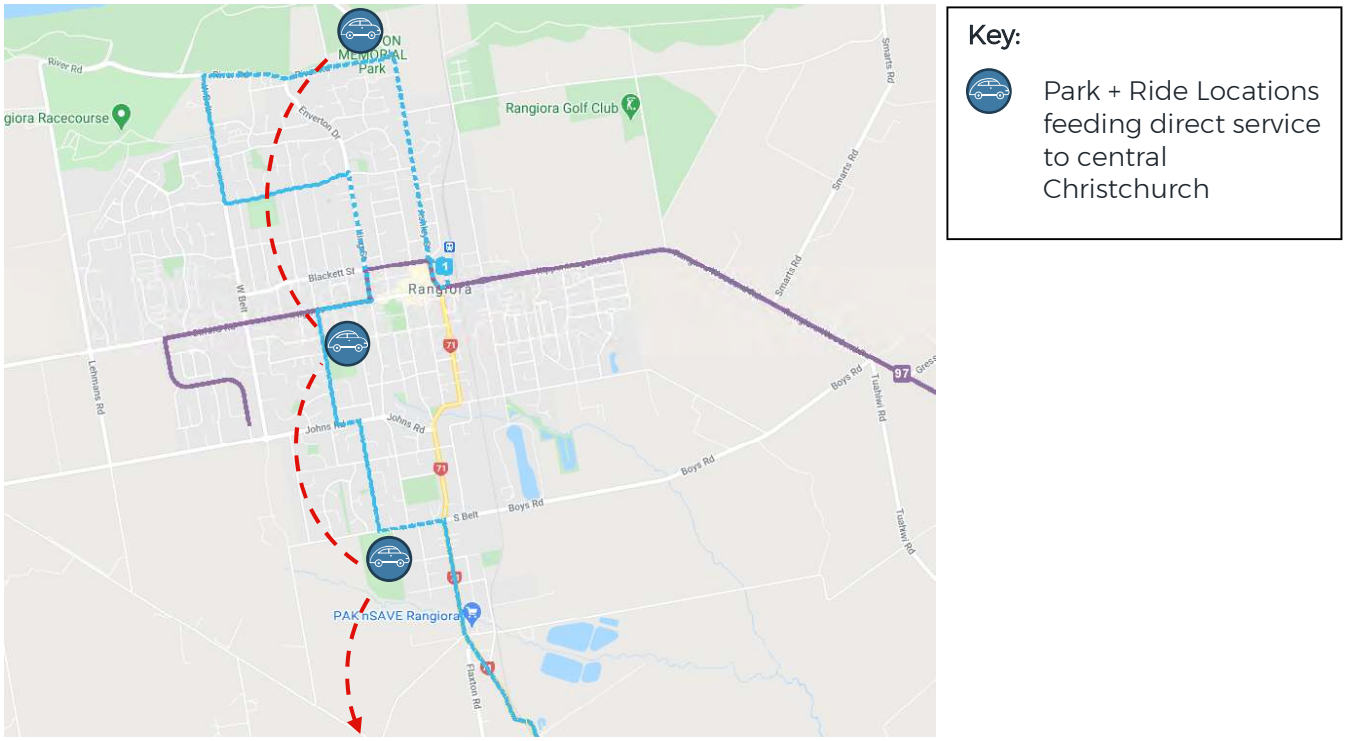


Figure 3-9. Public transport network

The recently endorsed PT Futures Business Case proposes changes to Route 97, which would turn off Kippenberger Avenue onto the Rangiora Eastern Link (MacPhail Avenue), as shown in Figure 3-10 below.

Figure 3-10. Proposed Waimakariri bus services

4 Traffic Effects - Operational

This section assesses the traffic and safety effects of the proposed designation against the existing network. It summarises key outputs from the traffic modelling which is included in Appendix C.

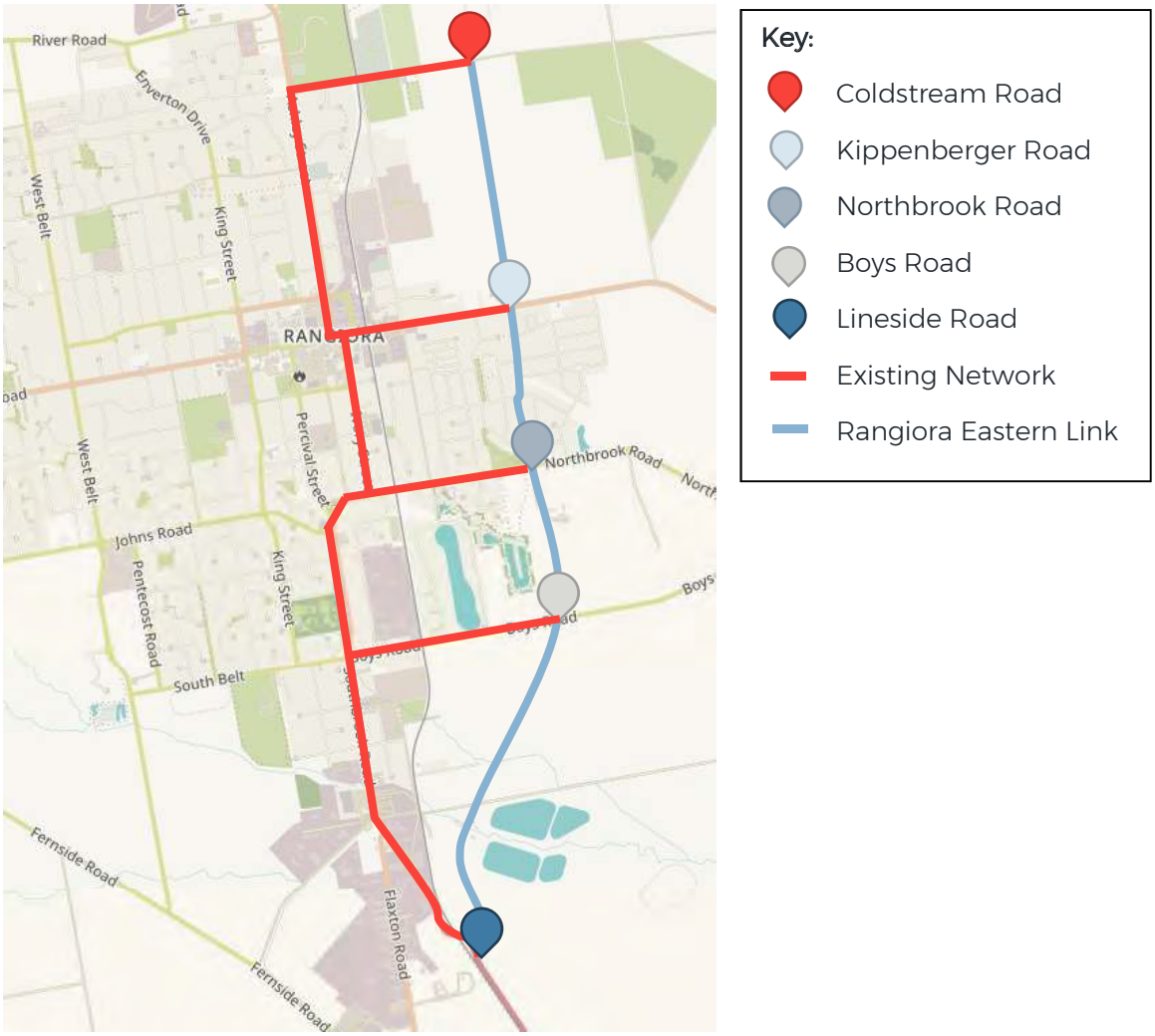
4.1 Route Efficiency

4.1.1 Rangiora Eastern Link Travel Time

Travel times between Lineside Road and key intersections along the Rangiora Eastern Link have been calculated from the CAST model.

The travel distances to Lineside Road are:

- Boys Road: 2.7km on the existing alignment and 1.8km on the proposed alignment
- Northbrook Road: 3.4km on the existing alignment and 2.6km on the proposed alignment
- Kippenberger Avenue: 4.3km on the existing alignment and 3.5km on the proposed alignment
- Coldstream Road: 5.7km on the existing alignment and 4.7km on the proposed alignment



The graphs in Figure 4-1 and Figure 4-2 show the southbound and northbound travel times in the 2038 morning peak period, with and without the Rangiora Eastern Link in place.

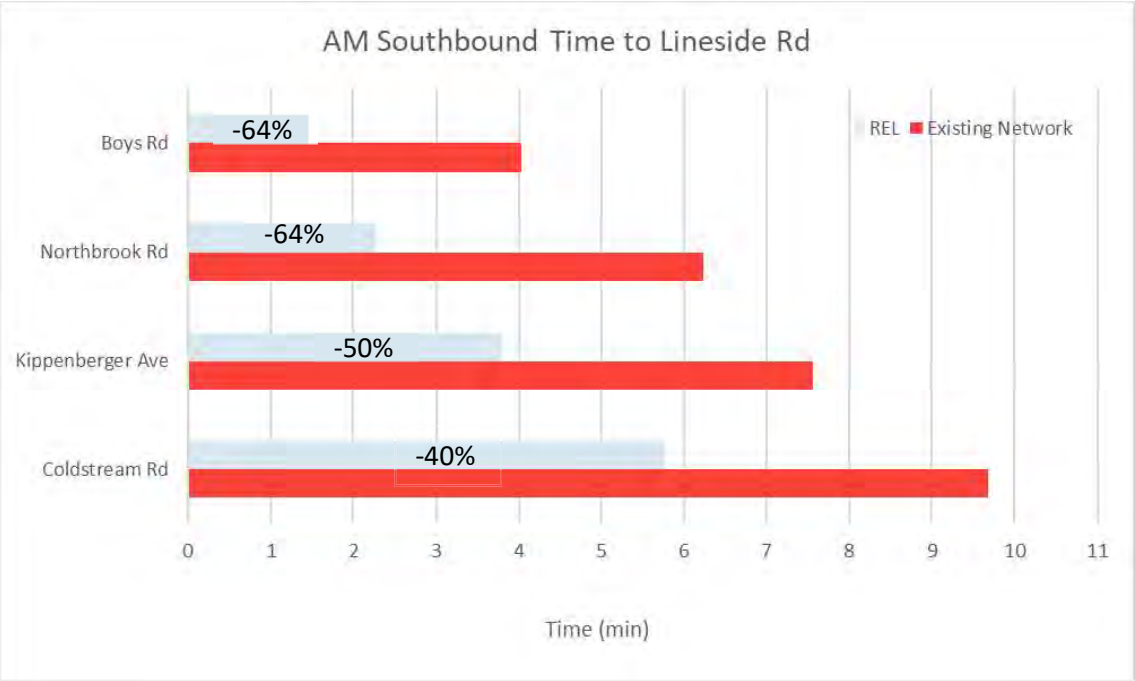


Figure 4-1. AM southbound time to Lineside Road.

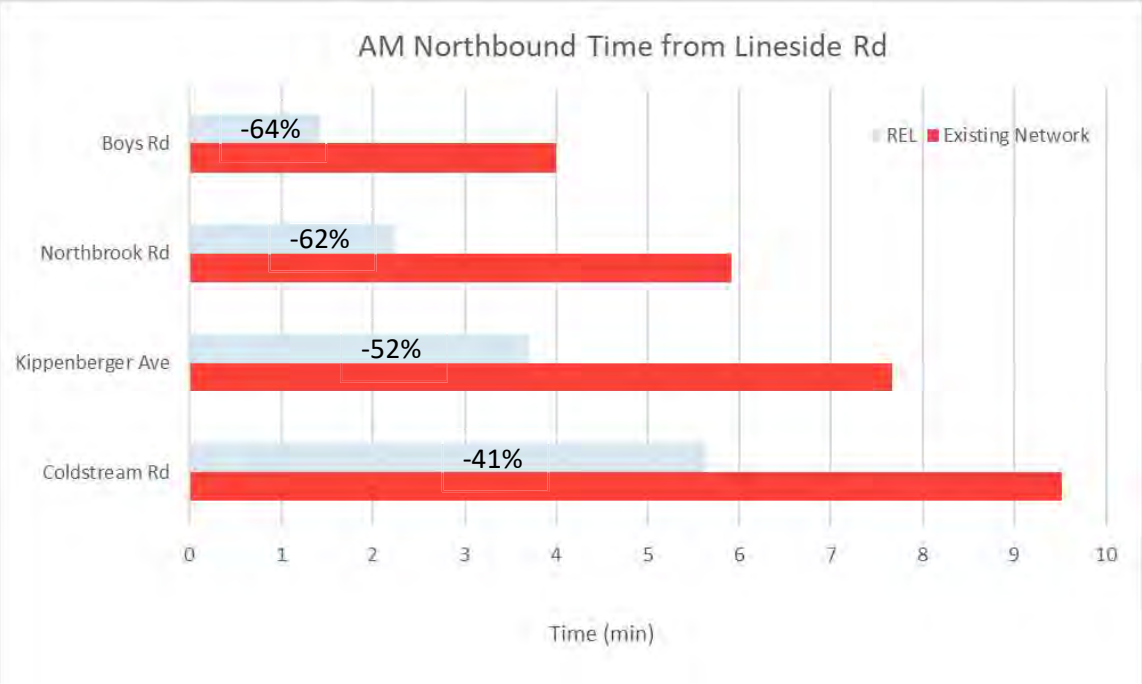


Figure 4-2. AM northbound travel time from Lineside Road.

It shows that the Rangiora Eastern Link will dramatically reduce travel times for people with origins or destinations along the route, by between 40 and 70%.

4.1.2 Rangiora Eastern Link Intersection Level of Service

The efficiency of the intersections at Coldstream, Koura, Kippenberger, Northbrook, Boy, Marsh, and Lineside Roads were assessed using the CAST model.

Level of Service (LOS) describes the quality of service provided by a section of road or intersection. Six grades of LOS are used ranging from Free Flow condition (LOS A) down to Forced Flow conditions (LOS F). In general, as the amount of traffic increases, the level of service decreases if no improvements are made to the network.

All local road intersections with the proposed alignment and designation would operate at LOS B or better in 2038.

The results of this modelling are tabulated below.

Table 4-1. 2038 Rangiora Eastern Link AM delays (average delay across all movements)

	Delays AM (s)	Delays IP (s)	Delays PM (s)	LOS
Coldstream Priority	3	2	4	A
Koura Priority	2	2	2	A
Kippenberger Roundabout	11	11	11	B
Northbrook Roundabout	11	10	11	B
Boys Roundabout	11	11	12	B
Marsh Priority	3	4	5	A
Lineside Roundabout	12	12	12	B

The new Rangiora Eastern Link intersections will add very little delay to local traffic. The diagram below shows intersection delays at key intersections in Rangiora. Green dots represent intersections where the average intersection delay is 0-30 seconds (LoS A, B & C), orange for LoS D and red for LoS E or higher.

Figure 4-3. Intersection Delays at 2038 AM peak period for do minimum.

Figure 4-4 Intersection Delays at 2038 AM peak period with Rangiora Eastern Link

The modelling forecasts all intersections in Rangiora operating with average delays less than 30 seconds, with the Rangiora Eastern Link in place. As detailed later in this report, the new road generally results in lower traffic volumes in the surrounding network. Although there are localised sections that will see an increase in traffic (for example on Coldstream Road), the magnitude is not enough to significantly impact on any existing intersections.

4.2 Area-wide Transport Effects of Project

Figure 4-5 and Figure 4-6 show the 2038 daily traffic volume for the do minimum network and when the Rangiora Eastern Link is in place, respectively. Table 4-2 summaries the forecasted 2038 traffic volumes on the new link.

Table 4-2. 2038 traffic volumes.

Screen line on Figure 4-6	2038 Rangiora Eastern Link	
	Daily Traffic Flow	% Heavy Vehicles
A-A (Coldstream – Kippenberger)	3,100	0.1%
B-B (Northbrook – Boys)	11,800	2.7%
C-C (Boys – Marsh)	14,700	2.8%

Figure 4-7 shows the 2038 daily change in vehicle volumes when the Rangiora Eastern Link is in place compared to the existing network. Green implies a decrease and red an increase in traffic flow. The new link will redistribute traffic around the network. Removing traffic from links that are approaching capacity. The project is predicted to result in a significant decrease in traffic on parallel routes.

These routes include:

Description	Direction	2038 Do min	2038 REL	Change	% Diff
		Daily	Daily		
Kippenberger (McPhails - Watkins)	eastbound	4600	4000	-600	-13%
	westbound	5000	4100	-900	-18%
	total	**9600**	**8100**	**-1500**	**-16%**
Kippenberger (Watkins - Eastbelt)	eastbound	4600	4000	-600	-13%
	westbound	4900	4100	-800	-16%
	total	**9500**	**8100**	**-1400**	**-15%**
Boys (Newnham - SH71)	eastbound	2200	1200	-1000	-45%
	westbound	2200	1000	-1200	-55%
	total	**4400**	**2200**	**-2200**	**-50%**
SH71 (High - Northbrook)	southbound	7400	5800	-1600	-22%
	northbound	4900	4800	-100	-2%
	total	**12300**	**10600**	**-1700**	**-14%**
SH71 (Northbrook - Southbelt)	southbound	8900	6200	-2700	-30%
	northbound	10000	8500	-1500	-15%
	total	**18900**	**14800**	**-4100**	**-22%**
SH71 (Southbelt - Station)	southbound	11800	8300	-3500	-30%
	northbound	11400	8800	-2600	-23%
	total	**23200**	**17000**	**-6200**	**-27%**

Conversely, traffic flows are predicted to increase on several arterial routes, particularly those that feed the Rangiora Eastern Link intersections. These routes include:

- Northbrook Road – between E Belt and MacPhail Ave (increases of up to 4,900 per day predicted, or 245%). This is one of the main feeders to the Rangiora Eastern Link.
- Koura Drive or nearby alternatives (increases of up to 800 per day predicted, or 320%)
- Coldstream Road (increases of up to 900 per day predicted, or 9%)

Description	Direction	2038 Do min	2038 REL	Change	% Diff
		Daily	Daily		
Northbrook (Goodwin - MacPhail)	eastbound	1300	1200	-100	-8%
	westbound	1100	1200	100	9%
	total	**2400**	**2400**	**0**	**0%**
Northbrook (Papawai - MacPhail)	eastbound	1400	3100	1700	121%
	westbound	1200	4300	3100	258%
	total	**2600**	**7500**	**4900**	**188%**
Northbrook (Papawai - Eastbelt)	eastbound	1200	2500	1300	108%
	westbound	1100	1800	700	64%
	total	**2200**	**4300**	**2100**	**95%**
Northbrook (Eastbelt - SH71)	eastbound	5800	4900	-900	-16%
	westbound	4100	3400	-700	-17%
	total	**9900**	**8200**	**-1700**	**-17%**

In general, the Project is modelled to result in a decrease in traffic flows on parallel routes such as the Lineside Road / and local streets, except for those closest to and that connect directly to the Project intersections. This will have corresponding effects on local property accesses. Access will, for example, be improved on local roads that experience reductions in traffic volumes.

The model predicts 'rat running' on local street, such as Northbrook Road, Watkins Drive, Koura Drive, Papawai Drive and Reeves Road. Based on the current road hierarchy, Figure 3-7, these are local roads whose primary function is property access, not thoroughfare. Unless mitigated, this increase in traffic on local roads would have a negative impact on the amenity and safety of residents.

It is recommended that Council investigate area-wide traffic calming treatments on local roads adjacent to the eastern link to reduce the likelihood of 'rat running'.

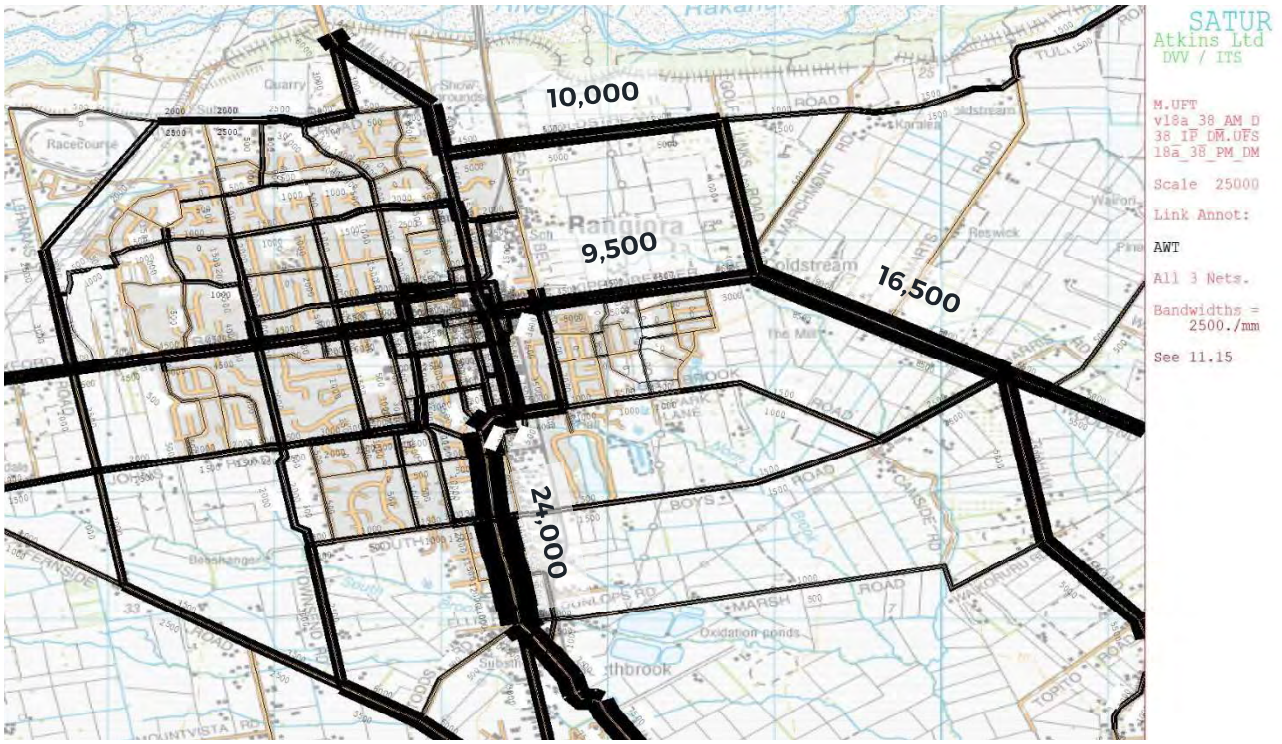


Figure 4-5 : 2038 do-minimum traffic volumes.

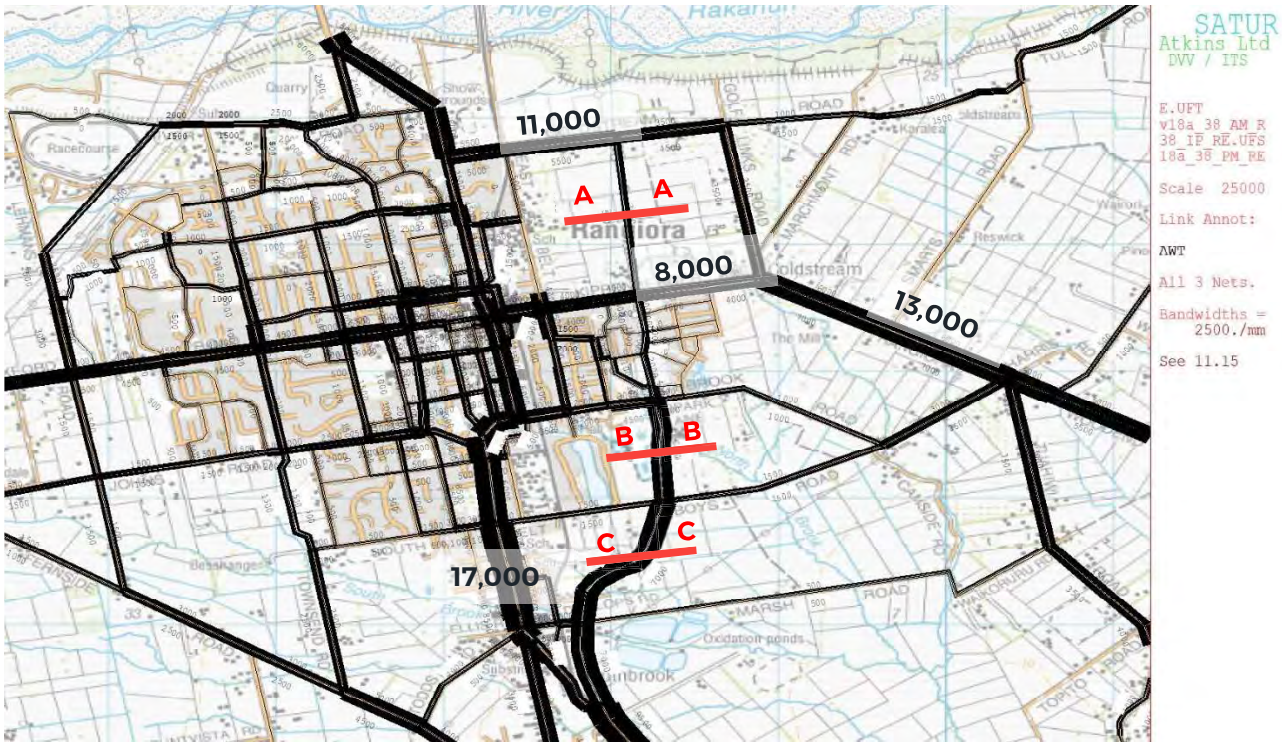


Figure 4-6 : 2038 traffic volumes with Rangiora Eastern Link.

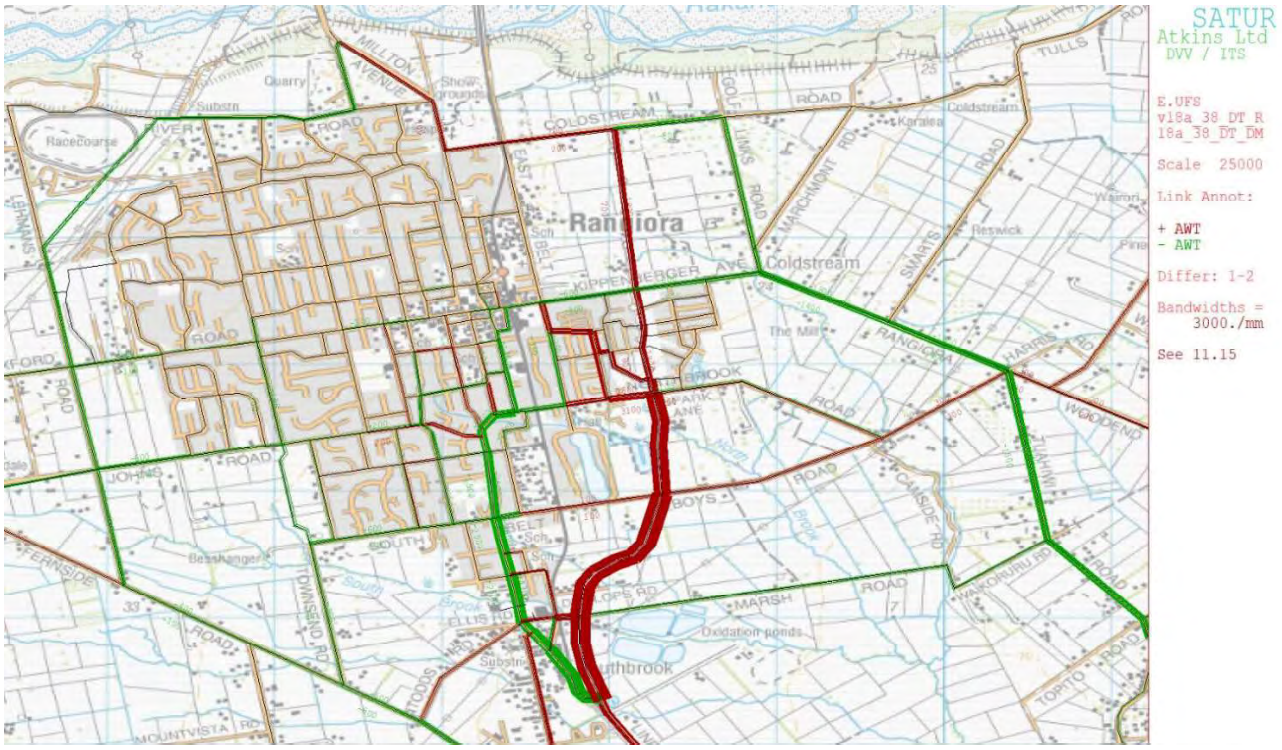


Figure 4-7. Daily difference plot.

The reduction in through traffic on the existing route results in improvements to the efficiency of the local roads intersections, namely:

- South Belt and Southbrook Road
- Ashley Street and High Street

Figure 4-8. Link delay for do minimum in 2038 AM peak period.

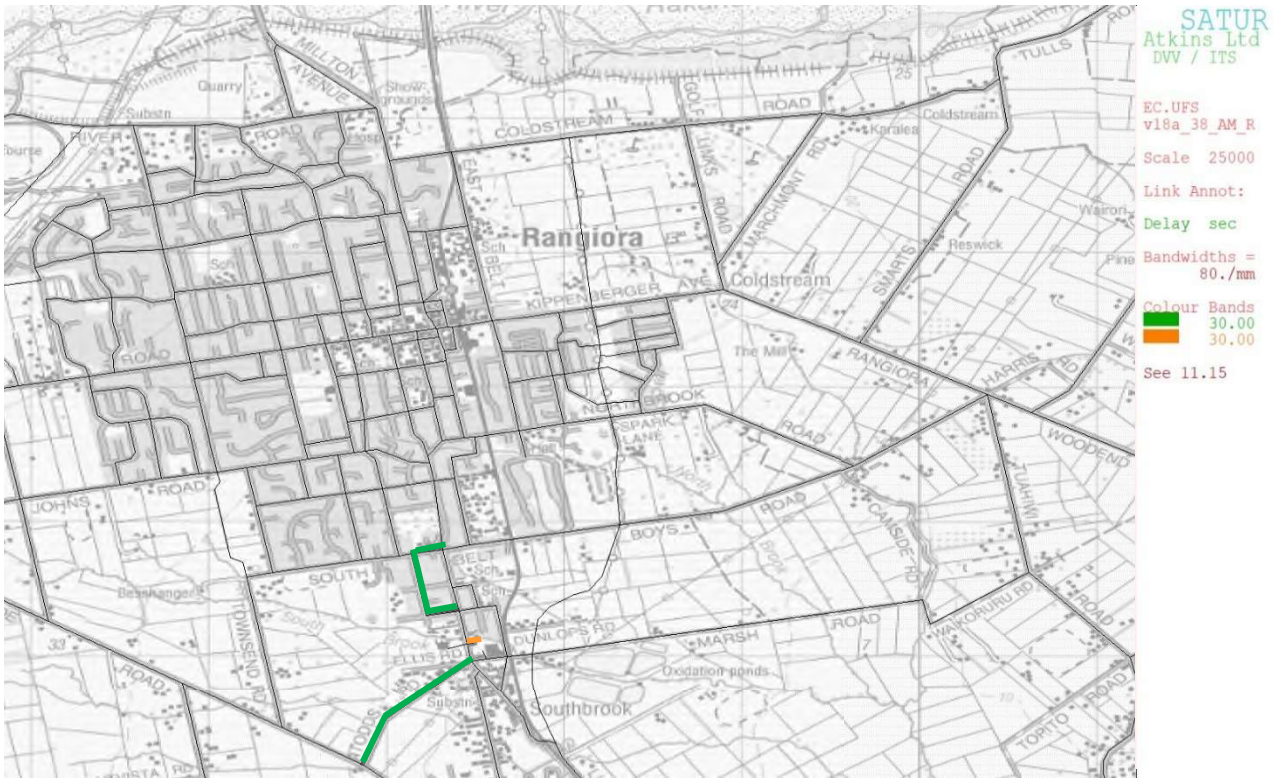


Figure 4-9. Link delay for Rangiora Eastern Link in 2038 AM peak period.

This identifies significant delays on the Percival – Southbrook corridor and some side streets feeding into it in the Do Minimum scenario. Figure 4-9 shows that Rangiora Eastern Link alleviates this bottleneck resulting in corridor delays disappearing, and side road delays reducing.

The total daily travel time and distance on the network decreases by 588hrs and 5,558km, respectively. The statistic is the cumulative travel time and distance savings of all vehicle travelling on the network per day. This is expected because the new road significantly shortens the distance needed to be travelled for many motorists, and reduces delays on existing roads. It is noted that the modelling is assumes fixed travel demands – i.e. the same total number of trips will be made to and from the same places in the Do Minimum and Option scenarios.

4.3 Safety

Safety has been assessed using Waka Kotahi's Monetised Benefit and Cost Manual (MBCM) crash analysis methodology, which utilises results of crash prediction models for Waka Kotahi's Crash Estimation Compendium and the recorded injury crash rates from the Crash Analysis System. Reported injury crashes in the 5 year period 2016-2020 have been assessed.

The crash estimates are based on:

- The predicted traffic volumes for the routes described in Section 4.2.
- The main alignment of REL being constructed to arterial standard
- Local roads based on Waimakariri District Council Road Hierarchy[2]

The Rangiora Eastern Link will reduce traffic volumes on the surrounding road network, resulting in a minor reduction in forecast crashes on the existing network. The existing network will see a reduction of approximately 1 injury crash per annum.

However, some of the crashes on the existing network will migrate to the new link. Therefore, the net number of crashes on the network will increase by approximately 1 injury crash per annum. This is due to the addition of four intersection on the Rangiora Eastern Link and a higher proposed

[2] https://www.waimakariri.govt.nz/__data/assets/pdf_file/0013/10354/sht135-dp2005.pdf

speed limit (assumed 60 km/hr). There are ways of mitigating safety that should be investigated during preliminary design. For example, limiting access ways and higher level of provisions for cyclists and pedestrians.

4.4 Resilience

The proposed Rangiora Eastern Link improves local road connectivity by providing an arterial road alternative to State Highway 71 between Lineside Road (north of the Rangiora Eastern Link) and Southbrook Road. This alternative road provides route resilience as there will be an alternative to the State Highway in the event of an incident closing one or both direction of the road.

4.5 Level Crossings

The proposed designation joins SH71 approximately 150m east of the level railway crossing. A SIDRA model, shown in Figure 4-10, was used to analyse the likelihood of traffic queues extending back to the railway crossing. The model uses 2038 forecast traffic volumes, and a 50 kmph approach speed.

The AM and PM peak periods were assessed. This predicts 95th percentile queues of 8m and 6m (1-2 vehicles) on the north-western Lineside Rd approach of the roundabout for the AM and PM peaks respectively. Further detail can be found Table 4-3 below.

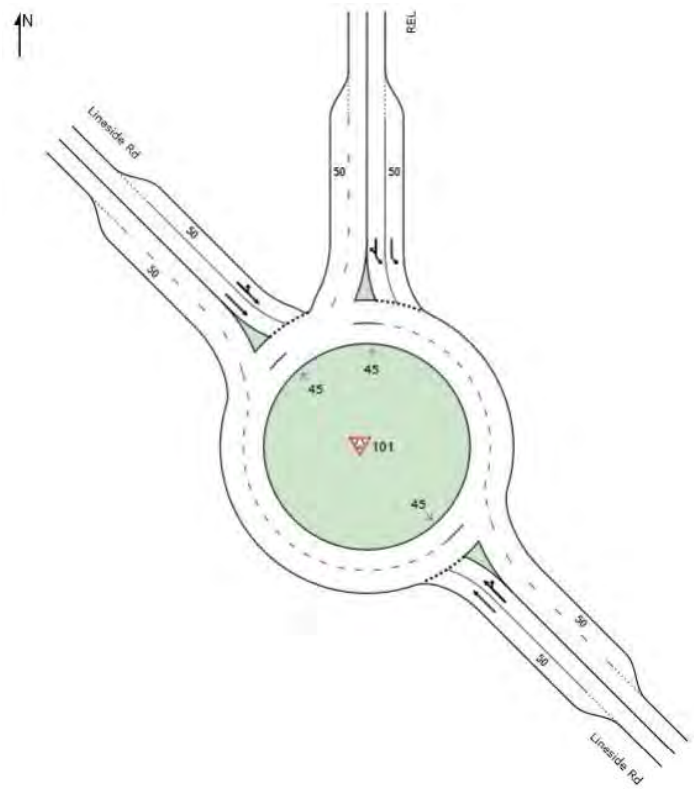


Figure 4-10. Lineside Rd and Rangiora Eastern Link Roundabout model.

Table 4-3. Modelling results.

	Approach	Degree of Saturation	95% Back of Queue (m)
AM	Lineside Rd S	27%	12
	REL N	29%	10
	Lineside Rd W	20%	8
PM	Lineside Rd S	41%	20
	REL N	30%	11
	Lineside Rd W	15%	6

These queues are low and there would be a very low chance of them extending back over the railway line. The reasons for them being low are:

- Traffic volumes southbound on Lineside Road are forecast to drop substantially. The transport model forecasts 660 vehicles per hour in the 2038 Do Minimum, reducing by 52% to 315 vehicles per hour with the Rangiora Eastern Link in place.
- The roundabout configuration means that southbound traffic does not have to give way very often. The only vehicles which they are required to give way to are those travelling from the south and turning right into the Rangiora Eastern Link, which is a relatively small number of vehicles in the AM peak period (283 vehicles per hour).
- The roundabout provides two lanes through it, where there is one lane currently.

5 Other Transport Effects

5.1 Effects on Pedestrians

The Rangiora Eastern Link will provide pedestrian access to the newly developed properties in the area. Current cross-section drawings anticipate footpaths on both sides. Some streets on the network will see an increase in traffic, and some will see a decrease in traffic next to pedestrians. These effects at a network level are considered negligible.

The designation is expected to result in positive effects for pedestrians.

5.2 Effects on Cyclists

The Rangiora Eastern Link will provide cycle access to the newly developed properties in the area. It would also provide a cross-town route which would be attractive for cyclists coming to and from the Passchendaele cycleway to the south. Current cross-section drawings anticipate on-road cycle lanes in both directions. The designation is expected to result in positive effects for cyclists.

5.3 Effects on Public Transport

A roundabout would be proposed at Kippenberger Road to replace the current priority control. This would introduce a delay to buses on Route 97 of 11 seconds.

Reductions in general traffic volumes on several roads in the areas surrounding the Project are expected with the implementation of the Project. These reductions will provide indirect benefits to public transport operators and users by reducing congestion on these routes and improving bus

travel times. This includes Lineside Road, Southbrook Road, Kippenberger Ave, and Rangiora-Woodend Road, each of which are expected to experience reduced traffic.

Single-lane roundabouts are proposed at each of these intersections, allowing all movements. Further design work will need to allow for tracking of buses. Delays at these intersections are all modelled to be LOS A.

Any delays to buses on Route 97 are expected to be less than minor.

The development of residential areas will result in more patronage on Route 97 and overall is considered to be a positive impact for the operation of public transport

6 Access

The proposed Rangiora Eastern Link designation will impact some access to residential properties. These impacts have been summarised below.

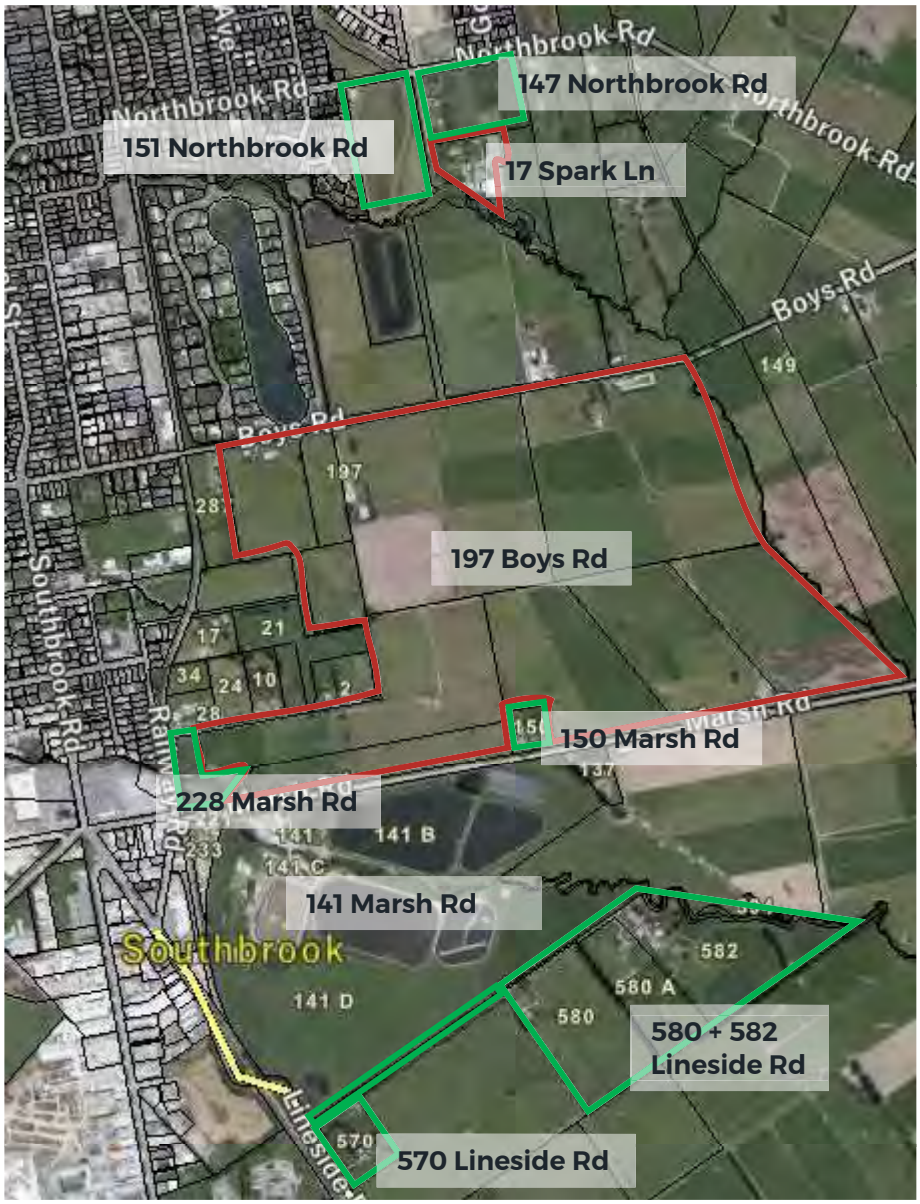


Figure 6-1. Approximate location of affected land parcels.

The effects to the following properties are considered to be less than minor as residents can still obtain access to their properties via side streets (Marsh Road and Boys Road etc.). These properties are:

- 570, 580, 580A, 582 Lineside Road
- 150 and 228 Marsh Rd
- 147 and 151 Northbrook Rd

The effects to the following properties are considered to be no more than minor. The properties would require newly formed vehicle crossings. These properties are:

- 141 Marsh Road
- 17 Spark Lane.

The effect on 197 Boys Road is considered to be significant.

6.1 580 & 582 Lineside Road

Access to 580, 580A, 582 Lineside Road will not be affected by the proposed Rangiora Eastern Link designation. However, the minimum separation distance between the vehicle crossing and the new intersection should comply with the District Plan.

Lineside Road is a strategic road with a posted speed limit greater than 50 km/hr. Rangiora Eastern Link is an arterial. The minimum separation distance between new vehicle crossings and intersection should be 180m. If the post speed limit is 50 km/hr or less, then the minimum separation distance between new vehicle crossings and intersection should be 60m.

6.2 Southbrook Sewer Farm

The existing access to the Council's Southbrook Sewer Farm will be affected by the proposed Rangiora Eastern Link designation. This is due to the newly formed intersection with Marsh Road and the Project at the existing access to this property. This property is owned by Waimakariri District Council.

Marsh Road is a local unsealed road. Rangiora Eastern Link is an arterial with an assumed posted speed limit of greater than 50 km/hr. The minimum separation distance between new vehicle crossings and intersection should be 75m. This assumes that the property vehicle crossing is on Marsh Road.

6.3 17 Spark Lane

The existing access to 17 Spark Lane will be affected by the proposed Rangiora Eastern Link designation. This is due to the newly formed intersection with Northbrook Road and the Project at the existing access to this property.

Northbrook Road is a local road with a posted speed limit of 50 km/hr. Rangiora Eastern Link is an arterial. The minimum separation distance between new vehicle crossings and intersection should be 35m. This assumes that the property vehicle crossing is on the Rangiora Eastern Link.

Council are in discussion with the property owner to mitigate road access.

6.4 197 Boys Road

197 Boys Road will be split in two by the Rangiora Eastern Link designation. The property is a rural land use. The severance could potentially affect the day-to-day operations of the farm.

Waimakariri District Council Stock Movement Bylaw 2020[3] restricts the movement of stock on roads lists in Schedule A. Roads in Schedule A are all the strategic and arterial roads in the District as well as all of the urban roads. The Rangiora Eastern Link will be an arterial road and therefore is expected to be included in Schedule A. Specific approval can be granted on any road named in

[3] https://www.waimakariri.govt.nz/__data/assets/pdf_file/0019/1792/200520059499-Stock-Movement-Bylaw-2020.pdf

Schedule A where the stock is being moved and no other reasonable route is available. However, extra traffic management conditions may be required.

This could have a significant effect on the movement of livestock between paddocks. This could be mitigated through a livestock underpass. Otherwise, any stock movement between the two halves of the property will require specific approval from council once the Project is constructed.

It is recommended that discussions with the landowner be initiated and an underpass be considered if appropriate.

7 Traffic Effects - Construction

The temporary effects of construction will be mitigated through the implementation a Construction Traffic Management Plan (CTMP).

8 Mitigation

From an operations perspective the Rangiora Eastern Link will improve the efficiency and effectiveness of travel north-south in Rangiora. This link will enhance the capacity and efficiency of movement for people travelling with Rangiora and between Rangiora and the south.

The Rangiora Eastern Link will increase the risk of 'rat running' through local roads whose primary function is property access, not thoroughfare. It is recommended that area-wide traffic calming treatment be installed on local roads between Northbrook Road and Kippenberger Ave adjacent to the eastern link to reduce the likelihood of 'rat running'.

It is recommended that a stock underpass be included as mitigation.

Temporary adverse effects may arise to transportation modes during the construction programme. These effects are able to be appropriately mitigated through the implementation of a CTMP.

9 Conclusions

Overall, it is considered that the operation of the Project will have a positive effect on the transport network. The Project will increase capacity within the network, reducing journey times, and improving consistency of journey times for traffic. It would improve route security by providing an alternative route.

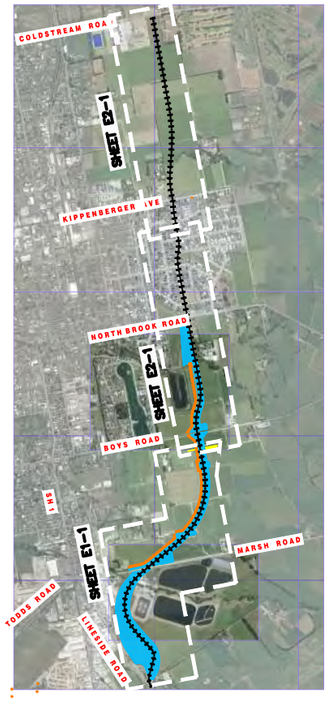
There are two potentially adverse effects identified as a result of the Rangiora Eastern Link. The additional traffic results in 'rat running' through local roads, such as Northbrook Road, Watkins Drive, Koura Drive, Papawai Drive and Reeves Road. Area wide traffic calming is considered an appropriate mitigation.

The eastern link will divide the farm at 197 Boys Road in two, potentially resulting in a need for stock to regularly cross the road. Stock underpass(es) is considered an appropriate mitigation.

Disclaimers and Limitations

This report ('**Report**') has been prepared by WSP exclusively for Waimakariri District Council ('**Client**') in relation to the proposed Rangiora Eastern Link. Its purpose is to assess the transportation related impacts of the Rangiora Eastern Link ('**Purpose**') and in accordance with the task request dated 18 December 2020 and letter of approval dated 20 December 2020. The findings in this Report are based on and are subject to the assumptions specified within. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.

Appendix A
Land Requirement Plans



LAYOUT PLAN
N.T.S

KEY

LAND REQUIRED FOR ROAD

LAND REQUIRED FOR CONSTRUCTION ACTIVITIES

1:2000 @ A1
1:4000 @ A3
0 20 40 60 80 100 120 140 160 180 200 m

REVISION	AMENDMENT	APPROVED	DATE
A	FOR INFORMATION	G.L	01-02-2021
B	ALIGNMENT REVISED BETWEEN BOYS RD AND NORTHBROOK RD	G.L	10-02-2021
C	AMENDED LAND REQD FOR ROAD AREA BETWEEN LINESIDE RD TO MARSH RD	G.L	25-02-2021
D	REMOVE STUB NTH OR KIPPENBERGER	G.L	12-04-2021
E	UPDATED AERIALS AND DESIGNATION	G.L	14-05-2021

WAIMAKARIRI DISTRICT COUNCIL

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SCALES: 1:2000
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
N.MALKOTI	G.LARCOMBE	G.LARCOMBE
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
SIMON O'DEA	G.LARCOMBE	2021-05-14

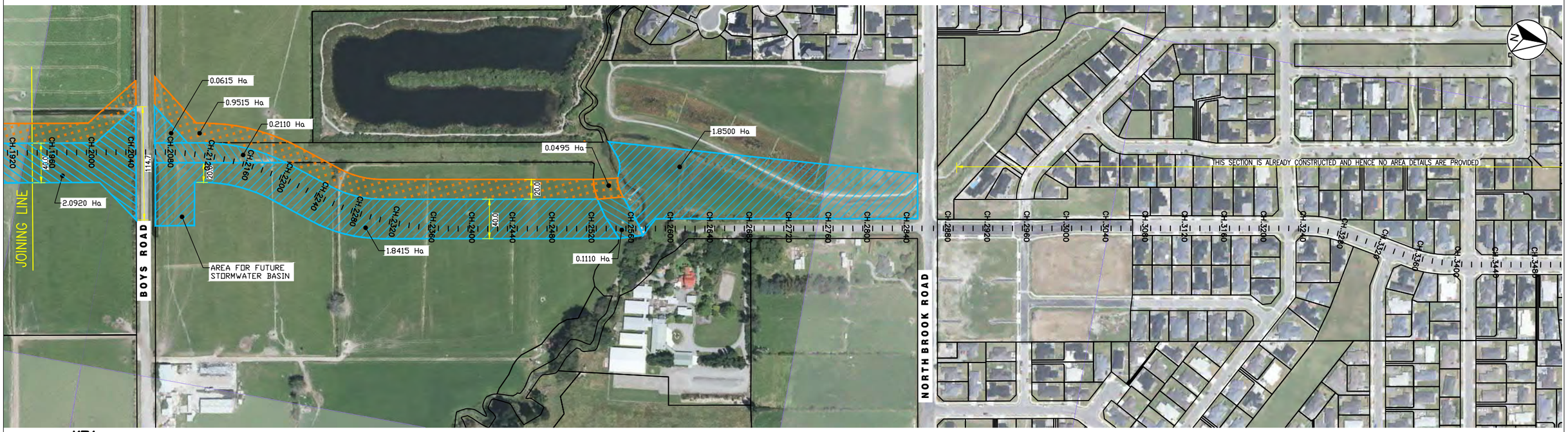
FOR CONSENT

PROJECT
WAIMAKARIRI DISTRICT COUNCIL
RANGIORA LINK ROADS
SOUTHERN, WESTERN & EASTERN LINKS

TITLE
OPTION P - EASTERN LINKS (LINESIDE TO COLDSTREAM)
LAND PLAN - SHEET 1

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
6-DHLHH.01	E1-1	E

Original sheet size A1 (841x594) Plot Date 2021-05-14 at 2:25:51 PM U:\ProjectsNZ\6d\6-DHLHH.01 WDC Roading Professional Services\Home\60000 - Additional Services\Complete\60011 - Rangiora eastern link - review\000 Data from Archive\OPTION P\LAND PLANS\LAND-PLAN-EAST-E1-1-E2-1_FEB 2021.dwg E1-1 (with 2018-2019 Aerials)



KEY

LAND REQUIRED FOR ROAD

LAND REQUIRED FOR CONSTRUCTION ACTIVITIES

1:2000 @ A1
1:4000 @ A3
0 20 40 60 80 100 120 140 160 180 200 m

REVISION	AMENDMENT	APPROVED	DATE
A	FOR INFORMATION	G.L	01-02-2021
B	ALIGNMENT REVISED BETWEEN BOYS RD AND NORTHBROOK RD	G.L	10-02-2021
C	AMENDED LAND REQD FOR ROAD AREA BETWEEN LINESIDE RD TO MARSH RD	G.L	25-02-2021
D	REMOVE STUB NTH OR KIPPENBERGER	G.L	12-04-2021
E	UPDATED AERIALS AND DESIGNATION	G.L	14-05-2021

WAIMAKARIRI DISTRICT COUNCIL

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DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
SIMON O' DEA	G.LARCOMBE	2021-05-14

FOR CONSENT

PROJECT
WAIMAKARIRI DISTRICT COUNCIL
RANGIORA LINK ROADS
SOUTHERN, WESTERN & EASTERN LINKS

TITLE
OPTION P - EASTERN LINKS (LINESIDE TO COLDSTREAM)
LAND PLAN - SHEET 2

WSP PROJECT NO. (SUB-PROJECT): 6-DHLHH.01
SHEET NO.: E2-1
REVISION: E

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Appendix B
Do Minimum Assumptions

Appendix B: Network Assumptions

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Network Schemes - NZTA

ID	Scheme Name	RCA	Opening Date	Model Year	CAST	CTM	Type	Location
740	Lineside Rd Interchange Signalisation	NZTA/WDC	2014	2018	Y	Y	Signalised Intersection	North
36	Western Corridor - Yaldhurst to Waterloo	NZTA	2014	2018	Y	Y	Widening 4 Laning	West
303	Yaldhurst Rd Speed Reduction to 70kph (Russley Rd to Pound Rd)	NZTA	2014	2018	Y	Y	Speed Change	West
408	Brougham/Collins/Simeon LILO Signals and Cycle Pedestrian Crossing	NZTA/CCC	2015	2018	Y	Y	Signals	West
801	Pegasus Rbt	NZTA	2015	2018	Y	Y	Roundabout	Waimakariri
1111	Traffic Signals Hoskyns/Jones Rd Intersection Upgrade	SDC/NZTA	2016	2018	Y	Y	Signalised Intersection	Selwyn
174	Pound Road Deviation to SH1 (Close Barters Rd)	NZTA	2017	2018	Y	Y	Deviation	West
79	Western Corridor - Groynes to Sawyers	NZTA	2017	2018	Y	Y	Widening	West
810	Agricultural Park Access (Templetons/Halswell/Augustine)	NZTA/CCC	2018	2018	Y	Y	Network Improvements	South-West
305	Airport Southern Access Interchange	NZTA	2018	2018	Y	Y	Network Improvements	West
304	Memorial Russley Interchange	NZTA	2018	2018	Y	Y	Network Improvements	West
1111	Norwich Quay, Lyttelton Ped signals.	NZTA	2018	2018	N	N	Ped signals (E Sutton Quay	Lyttelton
298	Western Belfast Bypass	NZTA	2018	2018	Y	Y	Network Improvements	North
35	Western Corridor - Sawyers to Memorial	NZTA	2018	2018	Y	Y	Widening	West
1111	Pineacres Intersection Upgrade	NZTA	2019	2028	N	N	Saftey Improvement	Waimakariri
1001	Perimeter Rd / Ron Guthrey Rd Signals	CIAL	2019	2028	Y	Y	Signalised Intersection	West
739	Broughs Rd Extension	NZTA	2019	2028	Y	Y	Deviation	West
94	Christchurch Southern Motorway (CSM1 and CSM2)	NZTA	2019	2028	Y	Y	Network Improvements	South-West
95	Main South Rd Four-Laning (MSRFL) inc Weedons Ross Interchange	NZTA	2019	2028	Y	Y	Network Improvements	South-West
527	Marshes Rd/Shands Rd Signals	NZTA	2019	2028	Y	Y	Signalised Intersection	South-West
602	SH1/Tennyson St/Brookside Rd Intersection Modifications	SDC/NZTA	2019	2028	Y	Y	Intersections (Left in, Left (	Selwyn
611	Halswell Road Speed Changes	NZTA	2021	2028	Y	Y	Speed Change	South-West
8	Northern Arterial Belfast South Facing Ramps	NZTA	2021	2028	Y	Y	Network Improvements	North
6	Northern Arterial with Extension (QEII Dr to Cranford St)	NZTA/CCC	2021	2028	Y	Y	Network Improvements	North
7	QE II 4 Laning - Main North Rd to Innes Rd	NZTA	2021	2028	Y	Y	Widening	North
403	Waimak Bridge 3N 2S + HOV	NZTA	2021	2028	Y	Y	Widening	Waimakariri
1002	Woodend Corridor Improvements (Ped Safety)	NZTA	2021	2028	Y	?	Network Improvements	Waimakariri
601	Rolleston Dr SH1 Overpass to Jones Rd	SDC/NZTA	2023	2028	Y	Y	Network Improvements	Selwyn
1004	SH1 Hoskyns Rd Slip Lane Izone Access	SDC/NZTA	2023	2028	Y	?	Slip Lane	Selwyn
29	Halswell Road 4 Laning - Curletts Rd to Dunbars Rd	NZTA	2028	2028	Y	Y	Widening	South-West
1005	West Melton SH73 signals	NZTA	2028	2028	Y	Y	To b eadvised by NZTA.	Selwyn
405	Yaldhust Signals (Steadman, Withells,Racecouse)	NZTA	2028	2028	Y	Y	Signals	West
718	Aidanfield / Halswell LiLo	NZTA/CCC	2031	2028	Y	Y	ban r turns	South-West
453	Woodend Bypass SEA	NZTA	2031	2028	Y	Y	Deviation	Waimakariri
1003	Brurnham Rbt.	NZTA	2035	2038	Y	?	Roundabout	
306	Orchard Road Extension	CIAL	2038	2038	Y	Y	Deviation	West
1006	SH1/Rolleston Dr South Roundabout	SDC/NZTA	2038	2038	Y	Y	Roundabout	Selwyn
307	Harewood Left In - Left Out (Johns Rd)	NZTA	2041	2038	N	N	Network Improvements	West
308	Sawyers Arms Interchange (Johns Rd)	NZTA	2041	2038	N	N	Network Improvements	West
1006	SH1/Rolleston Dr South Right Turn Prevention	SDC/NZTA	2041	2038	N	N	Intersections (Left in, Left (	Selwyn

Network Schemes - CCC

ID	Scheme Name	RCA	Opening Date	Model Year	CAST	CTM	Type	Location
401	Main South Rd/Chapppie Place	CCC	2013	2018	Y	Y	Signalised Intersection	West
511	Gardiners Rd/Sawyers Arms Rd Signals	CCC	2014	2018	Y	Y	Signalised Intersection	West
705	Glandovey/Idris	CCC	2014	2018	Y	Y	Signalised Intersection	Inner West
224	Ron Guthrey Rd/Peter Leeming Rd Signals	CCC	2014	2018	Y	Y	Signalised Intersection	West
43	Yaldhurst Village Development Network (Living G)	CCC	2014	2018	Y	Y	Local Network	West
810	Agricultural Park Access (Templetons/Halswell/Augustine)	NZTA/CCC	2015	2018	Y	Y	Network Improvements	South-West
809	Augusta/Main Road	CCC	2015	2018	Y	N	Signalised Intersection	East
609	Awatea Rd Speed Changes	CCC	2015	2018	Y	Y	Speed Change	South-West
808	Breezes/Pages	CCC	2015	2018	Y	Y	Signalised Intersection	East
806	Brougham/Burlington Intersection Signals Upgrade	CCC	2015	2018	Y	Y	Signalised Intersection	South
408	Brougham/Collins/Simeon LILO Signals and Cycle Pedestrian Crossing	NZTA/CCC	2015	2018	Y	Y	Signals	West
724	CB2 Network Changes including Edmonton / Shands	CCC	2015	2018	Y	Y	Local Network	South-West
409	Corsair/Springs Signals	CCC	2015	2018	Y	Y	Signals	South-West
803	Deans Ave South crossing	CCC	2015	2018	Y	Y	Signalised Intersection	Inner West
	Deans Ave/Matai St East Traffic Signals	CCC	2015	2018	Y	N	Signalised Intersection	Inner West
804	Deans/Fendalton/Harper Signals Upgrade	CCC	2015	2018	Y	Y	Signalised Intersection	Inner West
21	Ferrymead Bridge Widening & Main Road 3 Laning	CCC	2015	2018	Y	Y	Widening	East
805	Grahams/Memorial Signals Upgrade	CCC	2015	2018	Y	Y	Signalised Intersection	West
	Intersection Improvement: Blakes / Radcliffe	CCC	2015	2018	N	N	Local Network	North
	Main North Road Corridor Optimisation	CCC	2015	2018	N	N	Network Improvements	North
807	Main North/Northwood/Radcliffe Signals Upgrade	CCC	2015	2018	Y	Y	Signalised Intersection	North
505	Marshland Rd/Prestons Rd Signals	CCC	2015	2018	Y	Y	Signalised Intersection	North-East
802	Marshland/Mairehau	CCC	2015	2018	Y	Y	Signalised Intersection	North-East
181	Prestons Rd - extension of 50kph zone further west and	CCC	2015	2018	Y	Y	Speed Change	North
510	Travis/Bassett St Improvements	CCC	2015	2018	Y	Y	Priority Intersection	North-East
	Waimariri/Dovedale Signals	CCC	2015	2018	Y	N	Signalised Intersection	West
999	Accesible CBD Phase 1	CCC	2016	2018	Y	Y	AAC Improvements	CBD
301	Airport Southern Development Network	CCC	2016	2018	Y	Y	Local Network	West
524	Fulton Hogan Development Network (CSW4)	CCC	2016	2018	Y	Y	Local Network	South-West
2001	Intersection Improvement: Awatea /Wigram	CCC	2016	2018	Y	N	Signalised Intersection	South-West
162	Islington Park Drive Development	CCC	2016	2018	Y	Y	Local Network	West
154	Marshland Rd Speed Reduction to 70kph (Prestons Rd to Belfast Rd)	CCC	2016	2018	Y	Y	Speed Change	North-East
302	Pound Road (Resa) Deviation	CCC	2016	2018	Y	Y	Deviation	West
728	Prestons Rd Signals at NW and NE Entrances to Prestons	CCC	2016	2018	Y	Y	Signalised Intersection	North
2004	Disused Christchurch Red Zone Roads		2016	2018	Y	Y	Road Stopping	East
184	Wigram Development Network (CSW1)	CCC	2016	2018	Y	Y	Local Network	South-West
25	Wigram Magdala link (Overbridge)	CCC	2016	2018	Y	Y	Network Improvements	South-West
610	Wigram Rd Speed Changes	CCC	2016	2018	Y	Y	Speed Change	South-West
9999	CBD Speed Changes (AAC)	CCC	2016	2018	Y	?	Speed Change	CBD
612	Sparks Road Speed Changes	CCC	2017	2018	Y	Y	Speed Change	South-West
501	Deans Ave/Riccarton Rd Signals	CCC	2018	2018	Y	Y	Signalised Intersection	West
519	Frankleigh Ave/Lyttelton St/Sparks Rd Signals	CCC	2018	2018	Y	Y	Signalised Intersection	South-West
719	Halswell / Augustine 4-Way Signals	CCC	2018	2018	Y	Y	Signalised Intersection	South-West
520	Hoon Hay Rd/Sparks Rd Signals	CCC	2018	2018	Y	Y	Signalised Intersection	South-West
709	Belfast /Main North	CCC	2019	2028	Y	Y	Signalised Intersection	North
46	Belfast Village Development Network (CN1 Applefields)	CCC	2019	2028	Y	Y	Local Network	North
2002	CBD 30kph Speed Limit Extension	CCC	2019	2028	Y	?	Speed Change	CBD
715	Sparks / Hendersons Signalised 4-Way	CCC	2019	2028	Y	Y	Signalised Intersection	South-West
2222	Antigua Street (St Asaph-Moorhouse)	CCC	2020	2028	N	N	AAC Improvements	CBD
2222	Colombo Street (Bealey-Kilmore)	CCC	2020	2028	Y	Y	AAC Improvements	CBD
725	HJR Extension	CCC	2020	2028	Y	Y	Deviation	South-West
402	Intersection Improvement: Cashmere/ Hoon Hay/Worsleys	CCC	2020	2028	Y	Y		South
2222	Intersection Improvements: Wigram/Hayton	CCC	2020	2028	N	N	Growth - desirable	South-West
2222	Intersection Safety: Ilam/ Middleton/ Riccarton (7)	CCC	2020	2028	N	N	Intersection Improvement	South-West
525	Prestons Development Network	CCC	2020	2028	Y	Y	Local Network	North-East
169	Belfast Industrial Development Network (CB1)	CCC	2021	2028	Y	Y	Local Network	North
210	Cranford St 4 Laning - NAE to Innes	CCC	2021	2028	Y	Y	Widening	North
999	Ferry Road (St Asaph-Fitzgerald)	CCC	2021	2028	N	N	AAC Improvements	CBD
730	Grays / Ryans Priority Converted to Rbt	CCC	2021	2028	N	N	Roundabout	West
999	Hereford St (Manchester-Cambridge)	CCC	2021	2028	Y	Y	AAC Improvements	CBD
2222	Intersection Improvement: Awatea/Carrs	CCC	2021	2028	N	N	Intersection Improvement	South-West
410	Intersection Safety: Barrington/ Lincoln/ Whiteleigh	CCC	2021	2028	Y	Y	Signalised Intersection	South-West
999	Intersection Safety: Bealey/ Papanui/ Victoria (14)	CCC	2021	2028	N	N	Increased Levels of Service	CBD

Network Schemes - CCC

ID	Scheme Name	RCA	Opening Date	Model Year	CAST	CTM	Type	Location
503	Marshland Rd/Hawkins Rd/Lower Styx Rd Signals	CCC	2021	2028	Y	Y	Signalised Intersection	North-East
6	Northern Arterial with Extension (QEII Dr to Cranford St)	NZTA/CCC	2021	2028	Y	Y	Network Improvements	North
731	Orchard / Wairakei Priority Converted to Rbt	CCC	2021	2028	Y	Y	Roundabout	West
2222	Route Improvement: Mairehau Rd (Burwood to Marshland)	CCC	2021	2028	N	N	Growth - desirable	North-East
999	Victoria St	CCC	2021	2028	Y	Y	AAC Improvements	CBD
999	High Street (Hereford-Manchester)	CCC	2022	2028	Y	Y	AAC Improvements	CBD
999	High Street (Manchester-St Asaph)	CCC	2022	2028	Y	Y	AAC Improvements	CBD
2222	Intersection Safety: Clarence / Riccarton / Straven	CCC	2022	2028	N	N	LoS Recovery	Inner West
712	Main North/Marshland/Spencerville	CCC	2022	2028	Y	Y	Signalised Intersection	North-East
2003	Route Improvement: Stanleys Road	CCC	2022	2028	Y	?	Intersection Improvement	North-West
2222	Route Improvement: Worsley Rd (Dalweny to Holmcroft)	CCC	2022	2028	N	N	Increased Levels of Service	South-West
531	Grimseys Rd/Prestons Rd Signals	CCC	2023	2028	Y	Y	Signalised Intersection	North
2222	Intersection Improvement: Awatea/Owaka	CCC	2023	2028	N	N	Intersection Improvement	South-West
2222	Intersection Safety: Blenheim / Clarence	CCC	2023	2028	N	N	Increased Levels of Service	South-West
999	Lichfield Stg2	CCC	2023	2028	Y	Y	AAC Improvements	CBD
26	Lincoln Road 4 Laning - Curletts Rd to Wrights Rd	CCC	2023	2028	Y	Y	Widening	South-West
1111-E	New Brighton Improvements	CCC	2023	2028	Y	N	Network Improvements	East
2222	RONS Downstream Intersection Improvements : Cranford Street Downstr	CCC	2023	2028	N	N	Intersection Improvement	North
999	Tuam stg2	CCC	2023	2028	Y	Y	AAC Improvements	CBD
504	Belfast Rd/Marshland Rd Signals	CCC	2024	2028	Y	Y	Signalised Intersection	North-East
2222	Inner Harbour Road Improvement (Lyttelton to Diamond Harbour)	CCC	2024	2028	N	N	LoS Recovery	South
51	Northwood Blvd/Johns/Groynes Priority Intersection	CCC	2024	2028	Y	Y	Priority Intersection	North
999	Wayfinding	CCC	2024	2028	N	N	AAC Improvements	CBD
2222	Annex / Birmingham / Wrights Route Upgrade	CCC	2025	2028	N	N	Route Improvement	South-West
2222	Intersection Improvement: Hawkins / Radcliffe & Radcliffe Rd widening	CCC	2025	2028	N	N	LoS Recovery	North-East
999	Intersection Safety: Barbadoes / Bealey	CCC	2025	2028	N	N	Increased Levels of Service	CBD
999	Intersection Safety: Bealey/ Madras (6) 138 947 17115 Intersection Safety: Bealey / Manchester	CCC	2025	2028	N	N	Increased Levels of Service	CBD
2222	Intersection Safety: Kahu / Kilmarnock / Straven	CCC	2025	2028	N	N	Increased Levels of Service	Inner West
999	Salisbury Street and Kilmore Street	CCC	2025	2028	Y	Y	AAC Improvements	CBD
526	Harewood Cycle Project - Nunweek Blvd to Highstead Rd	CCC	2026	2028	Y	Y	Network Improvements	West
2222	Intersection Safety: Marshland/ New Brighton/ North Parade/ Shirley (8)	CCC	2026	2028	N	N	LoS Recovery	North-East
720	PC68 Local Road Network Changes	CCC	2026	2028	Y	Y	Local Network	South-West
732	Pound / Ryans Priority Converted to Rbt	CCC	2026	2028	Y	Y	Roundabout	West
4	Greers/Northcote/Sawyers Arms Signals	CCC	2027	2028	Y	Y	Signalised Intersection	North
733	Hawkins / Prestons Signals	CCC	2027	2028	Y	Y	Signalised Intersection	North
2222	Intersection Safety: Byron / Gasson	CCC	2027	2028	N	N	Increased Levels of Service	CBD
2222	Intersection Safety: Clyde / Creyke / Kotare	CCC	2027	2028	N	N	Increased Levels of Service	Inner West
3	Northcote Road 4 Laning - Sawyers Arms Rd to Main North Rd	CCC	2027	2028	Y	Y	Widening	North
530	Amyes/Springs Intersection	CCC	2028	2028	Y	Y	Signalised Intersection	South-West
517	Awatea Rd/Springs Rd Signals	CCC	2028	2028	Y	Y	Signalised Intersection	South-West
529	Burwood Rd/Mairehau Rd Signals	CCC	2028	2028	Y	Y	Signalised Intersection	North
722	CB7 Spine Rd Option 5	CCC	2028	2028	Y	Y	Local Network	South-West
741	Collector Rd Through CSW6 (Southerlands / Cashmere Rd area)	CCC	2028	2028	Y	Y	Local Network	South-West
999	Gloucester Street (Madras-Manchester)	CCC	2028	2028	Y	Y	AAC Improvements	CBD
2222	Intersection Improvements: Harewood / Stanleys	CCC	2028	2028	N	N		North
2222	Intersection Safety: Bealey / Manchester	CCC	2028	2028	N	N	Increased Levels of Service	CBD
2222	Intersection Safety: Cavendish / Styx Mill	CCC	2028	2028	N	N	LoS Recovery	North
721	Milns / Sparks / Sutherlands Signalised Ts	CCC	2028	2028	Y	Y	Signalised Intersection	South-West
187	Symes Rd Closure	CCC	2028	2028	Y	Y	Road Stopping	South-West
186	Symes Rd Extention to Havard Ave	CCC	2028	2028	Y	Y	Local Network	South-West
406	NWRA Area 2 Collector Road	CCC	2028	2028	Y	Y	Network Improvemenrs	West
2222	Intersection Improvement: Innes / Rutland	CCC	2029	2028	N	N	Intersection Improvement	North
710	Highstead/ Sawyers Arms	CCC	2030	2028	Y	Y	Signalised Intersection	North
2222	Route Improvement: Whiteleigh Ave (Barrington to Blenheim)	CCC	2030	2028	N	N	Intersection Improvement	South-West
723	CB7 Spine Rd Option 6 (incremental to Opt 5)	CCC	2031	2028	Y	Y	Local Network	South-West
738	Collector Road Through CSW7	CCC	2031	2028	Y	Y	Local Network	South-West
523	Highfield Park Development Network (CN5 & CN6)	CCC	2031	2028	Y	Y	Local Network	North

Network Schemes - CCC

ID	Scheme Name	RCA	Opening Date	Model Year	CAST	CTM	Type	Location
407	New Links : Candys to Quaifes	CCC	2031	2028	Y	?	Deviation	South-West
734	Revised Belfast Area Plan Spine Rd (CB1)	CCC	2031	2028	Y	Y	Local Network	North
716	Sparks / CAP Extension Signalised T	CCC	2031	2028	Y	Y	Signalised Intersection	South-West
22	Ferry Rd 4 Laning - Aldwins Rd to Fitzgerald Ave	CCC	2032	2028	Y	Y	Widening	East
726	Shands Rd 4-laning CSM2 - HJR	CCC	2031	**2038**	Y	Y	Network Improvements	West
704	Wairakei/Woolridge	CCC	2036	2038	Y	Y	Signalised Intersection	West
516	Cashmere Rd/Centaurus Ave/Colombo St/Dyers Pass Signals	CCC	2039	2038	Y	Y	Signalised Intersection	South
999	Durham St (Tuam-St Asaph)	CCC	2039	2038	N	N	AAC Improvements	CBD
999	Lichfield Street (Madras-Manchester)	CCC	2040	2038	N	N	AAC Improvements	CBD
404	Intersection Improvements: Memorial / Roydvale	CCC	2045	2048	N	N	Signalised Intersection	West

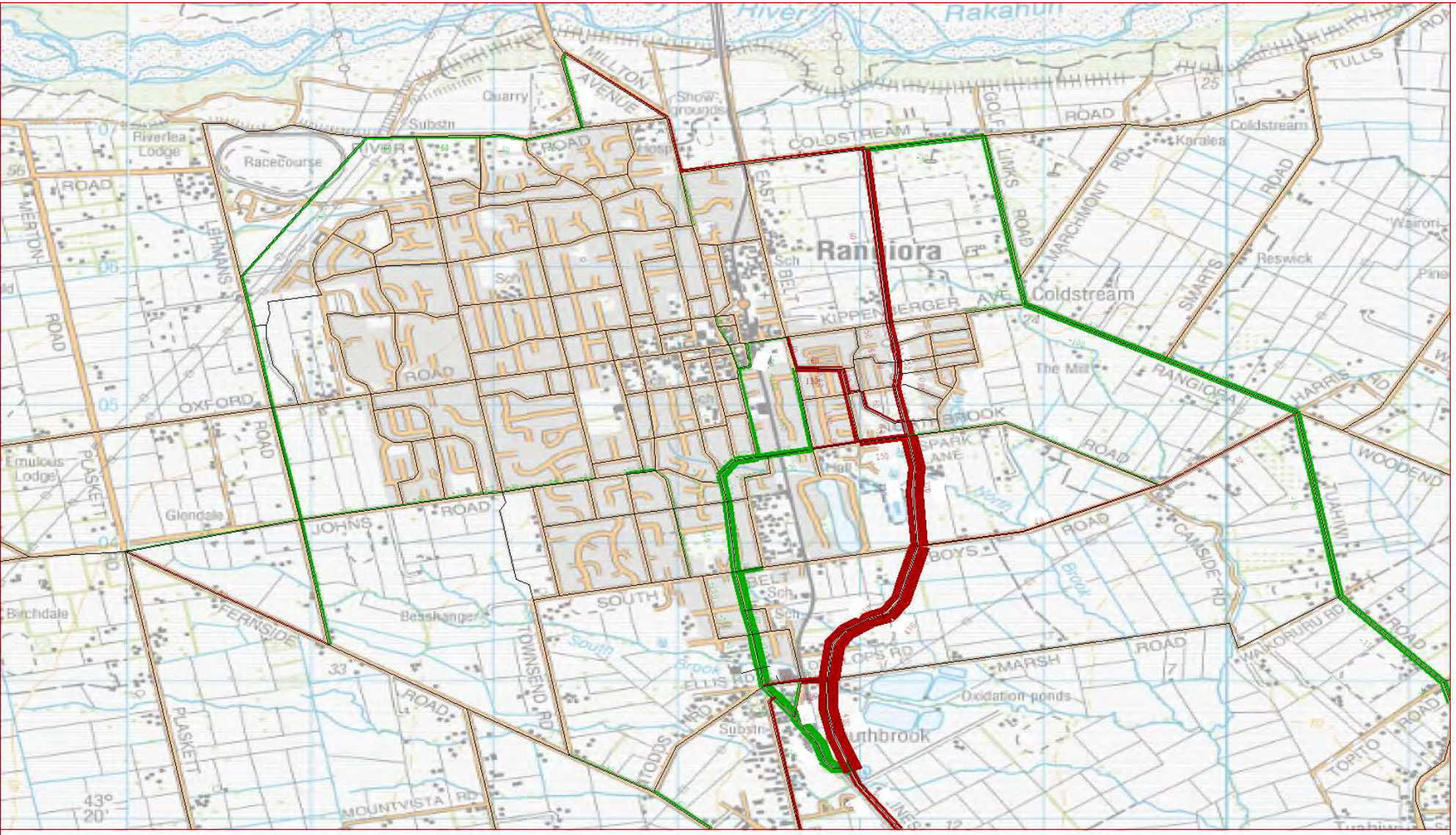
Network Schemes - WDC

ID	Scheme Name	RCA	Opening Date	Model Year	CAST	CTM	Type	Location
450	Ashley/High/Ivory Intersection (Red Lion corner)	WDC	2015	2018	Y	Y	Signalised Intersection	Waimakariri
3001	Flaxton / Lineside Intersection Realignment	WDC	2015	2018	Y	Y	Deviation	Waimakariri
450	High Street / Ashley Street Reconfiguration	WDC	2015	2018	Y	Y	Signalised Intersection	Waimakariri
451	High Street/Eastbelt Roundabout	WDC	2015	2018	Y	Y	Roundabout	Waimakariri
515	Ohoka Rd/Island Rd (W Ohoka offramp)	WDC	2015	2018	Y	Y	Network Improvement	Waimakariri
3333	Replacement of Ashley River Bridge	WDC/NZTA	2015	2018	N	N	Bridge Upgrade	Waimakariri
3002	Southbrook Road Traffic Signals (pak'n'save)	WDC	2016	2018	Y	N	Signalised Intersection	Waimakariri
452	Southbrook Road/South Belt Intersection Upgrade	WDC	2016	2018	Y	Y	Signalised Intersection	Waimakariri
3003	Bayliss Drive Extension to Lees Rd	WDC	2018	2018	Y	N	New Link	Waimakariri
3004	Beach / Smith / Williams Rbt	WDC	2018	2018	Y	Y	Roundabout	
3003	Rangiora NW Bypass (Silverstream)	WDC	2018	2018	Y	Y	New Link	
3014	Spark Lane (Kippenberger to Northbrook) and Connections	WDC	2019	2028	Y	N	New Link	
3005	Townsend Rd - West Belt Link Road	WDC	2019	2028	Y	Y	New Link	
3006	Silverstream Blvd Extension to Adderley Terrace	WDC	2020	2028	Y	Y	New Link	
3333	Skew Bridge alignment/replacement	WDC	2025	2028	N	N	Bridge Upgrade	Waimakariri
3014	Connecting road between River and Lehmans Roads	WDC	2026	2028	Y	N	New Link	Waimakariri
3333	Northern motorway congestion – park 'n' ride infrastructure (Rangiora, Kaiapoi)	WDC	2027	2028	N	N	PT	Waimakariri
3007	Boys / Harris / Rangiora Woodend / Tuahiwi Upgrade	WDC	2028	2028	Y	Y	Roundabout	
3008	Boys / Gressons / Northbrook Roads Speed Reduction	WDC	2028	2028	Y	Y	Speed Change	
3009	Rangiora Woodend Road Speed Reduction	WDC	2028	2028	Y	Y	Speed Change	
454	Ravenswood Spine Road	WDC	2028	2028	Y	Y	New Link	
3010	Smith St Signals East of Tunas Street	WDC	2028	2028	Y	Y	Signalised Intersection	
3011	Pegasus Road connecting to Gladstone Road	WDC	2031	2028	Y	Y	New Link	Waimakariri
3013	Tuahiwi Rd Speed Reduction	WDC	2028	2028	Y	Y	Speed Change	
3012	New eastern arterial in Rangiora	WDC	2041	2038	Y	Y	New Link	Waimakariri
3333k	Bradleys / McHughs / Tram	WDC	?	2048	N	N	?	

Network Schemes - SDC

ID	Scheme Name	RCA	Opening Date	Model Year	CAST	CTM	Type	Location
201	Rolleston Development Network (Dynes Rd and Rolleston Drive-SH1 connection)	SDC	2016	2018	Y	Y	Local Network	Selwyn
480	Tennyson/Kidman Roundabout	SDC	2016	2018	Y	Y	Roundabout	Selwyn
4002	Traffic Signals at Hoskyns/Jones Rd	SDC/NZTA	2018	2018	Y	Y	Signalised Intersection	Selwyn
482	Traffic Signals at Masefield Dr/Rolleston Dr	SDC	2018	2018	Y	Y	Signalised Intersections	Selwyn
483	Traffic Signals Lowes/Goulds/Spring Rolleston	SDC	2019	2028	Y	Y	Close Goulds Road & Signa	Selwyn
602	SH1/Tennyson St/Brookside Rd Intersection Upgrade	SDC/NZTA	2019	2028	Y	Y	Intersections (Left in, Left (	Selwyn
4003	Wordsworth St Extension	SDC	2019	2028	Y	N	Network Improvements	Selwyn
490	Shands/Blakes Rd Roundabout	SDC	2019	2028	Y	Y	Roundabout	Selwyn
4001	Rolleston LURP Business NE Zone Network	SDC	2019	2028	Y	?	Network Improvements	Selwyn
4004	Markham Way Extension	SDC	2020	2028	Y	N	Network Improvements	Selwyn
484	Traffic Signals at Rolleston Dr/Tennyson St	SDC	2020	2028	Y	Y	Signalised Intersections	Selwyn
4005	Markham Way Traffic Calming	SDC	2020	2028	Y	N	Traffic Calming	Selwyn
492	Springs/Marshs Rd Roundabout	SDC	2020	2028	Y	Y	Roundabout	Selwyn
4006	Moore St Extension	SDC	2021	2028	Y	N	Network Improvements	Selwyn
4007	Moore/Markham/Norman Kirk Intersection	SDC	2021	2028	Y	N	Realignment	Selwyn
4008	Tennyson/Moore Roundabout	SDC	2021	2028	Y	N	Roundabout	Selwyn
488	Shands/Hamptons Rd Roundabout	SDC	2021	2028	Y	Y	Roundabout	Selwyn
487	Springs/Hamptons Rd Roundabout	SDC	2021	2028	Y	Y	Roundabout	Selwyn
603	Weedons (Ross) / Jones and Levi intersections upgrades	SDC	2021	2028	Y	Y	intersection	Selwyn
489	Shands/Trents Rd Roundabout	SDC	2022	2028	Y	Y	Roundabout	Selwyn
601	SH1 Flyover Rolleston Dr to Hoskyns Rd (remove signals)	SDC/NZTA	2023	2028	Y	Y	Network Improvements	Selwyn
4009	Traffic Signals Gerald St/West Belt	SDC	2023	2028	Y	N	Signalised Intersection	Selwyn
1004	SH1 Hoskyns Rd Slip Lane Izone Access	SDC/NZTA	2023	2028	Y	Y	Slip Lane	Selwyn
4444	Gerald Street Upgrade (Eastern End)	SDC	2023	2028	N	N		Selwyn
481	Lowes/Levi/Masefield Roundabout Upgrade	SDC	2024	2028	Y	Y	Roundabout	Selwyn
486	Gerald/James/Edward St Roundabout	SDC	2025	2028	Y	Y	Roundabout	Selwyn
493	Ellesmere Road Upgrade (Trices-Sabeys)	SDC	2025	2028	Y	Y	Network Improvements	Selwyn
4010	Gerald Street/Vernon Drive Signals	SDC	2025	2028	Y	N	Signalised Intersection	Selwyn
4444	Gerald Street Upgrade (Transitional Zone)	SDC	2025	2028	N	N		Selwyn
485	Traffic Signals Springs/Gerald/Ellesmere Junction Rd	SDC	2027	2028	Y	Y	Signalised Intersection	Selwyn
4444	Gerald Street Upgrade (Western End)	SDC	2031	2028	N	N		Selwyn
1006	SH1/Rolleston Dr South Roundabout	SDC/NZTA	2038	2038	Y	Y	Roundabout	Selwyn
1006	SH1/Rolleston Dr South Right Turn Prevention	SDC/NZTA	2041	2038	Y	Y	Intersections (Left in, Left (	Selwyn

Appendix C
Detailed Modelling Outputs



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Atkins Ltd
DVV / ITS

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8a_28_AM_DMC

Scale 25000

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- Actual flo

Differ: 1-2

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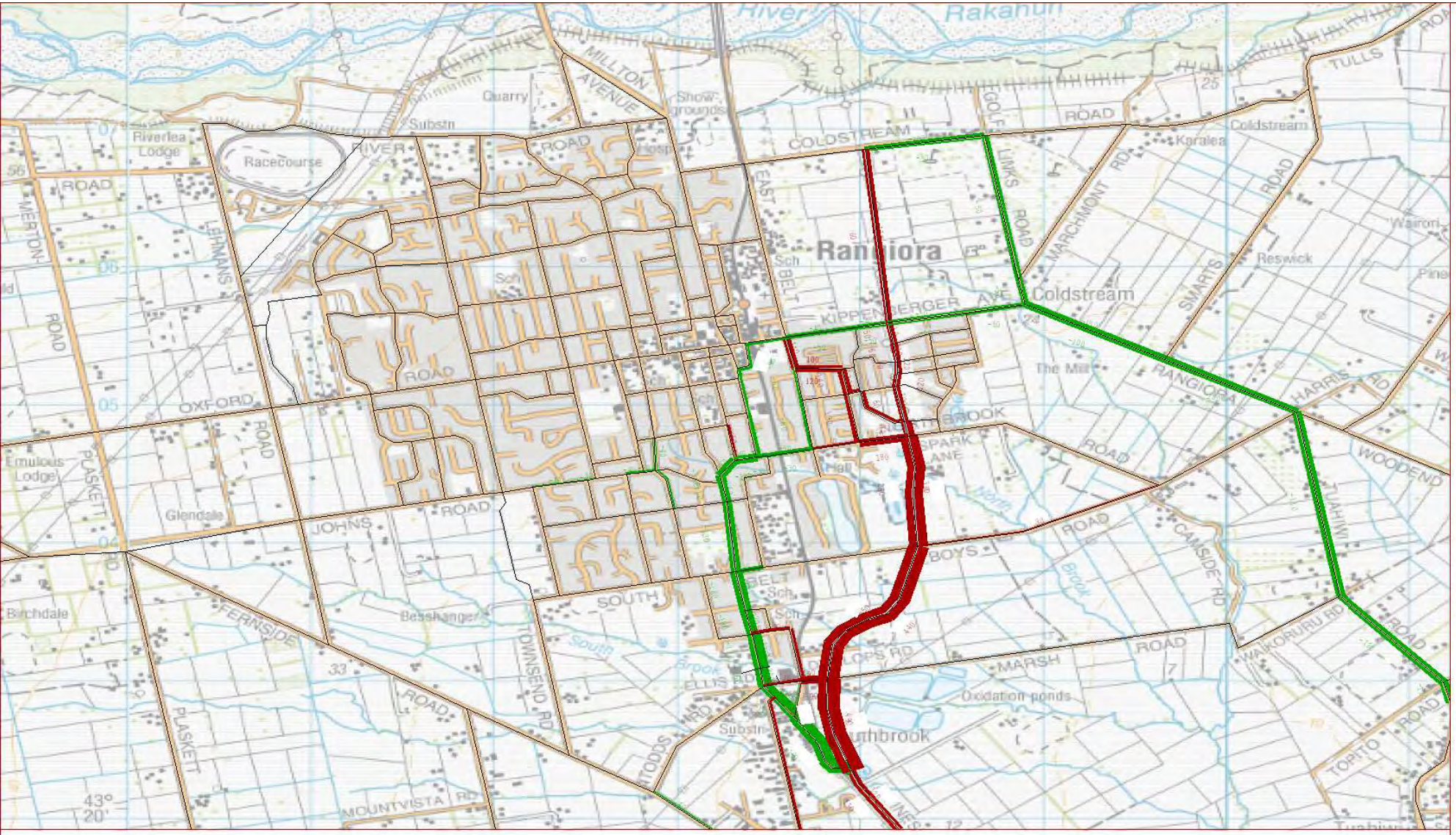
See 11.15

2028 AM With REL 20- 1-21

20- 1-21
QTP LIMITED



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Atkins Ltd
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See 11.15

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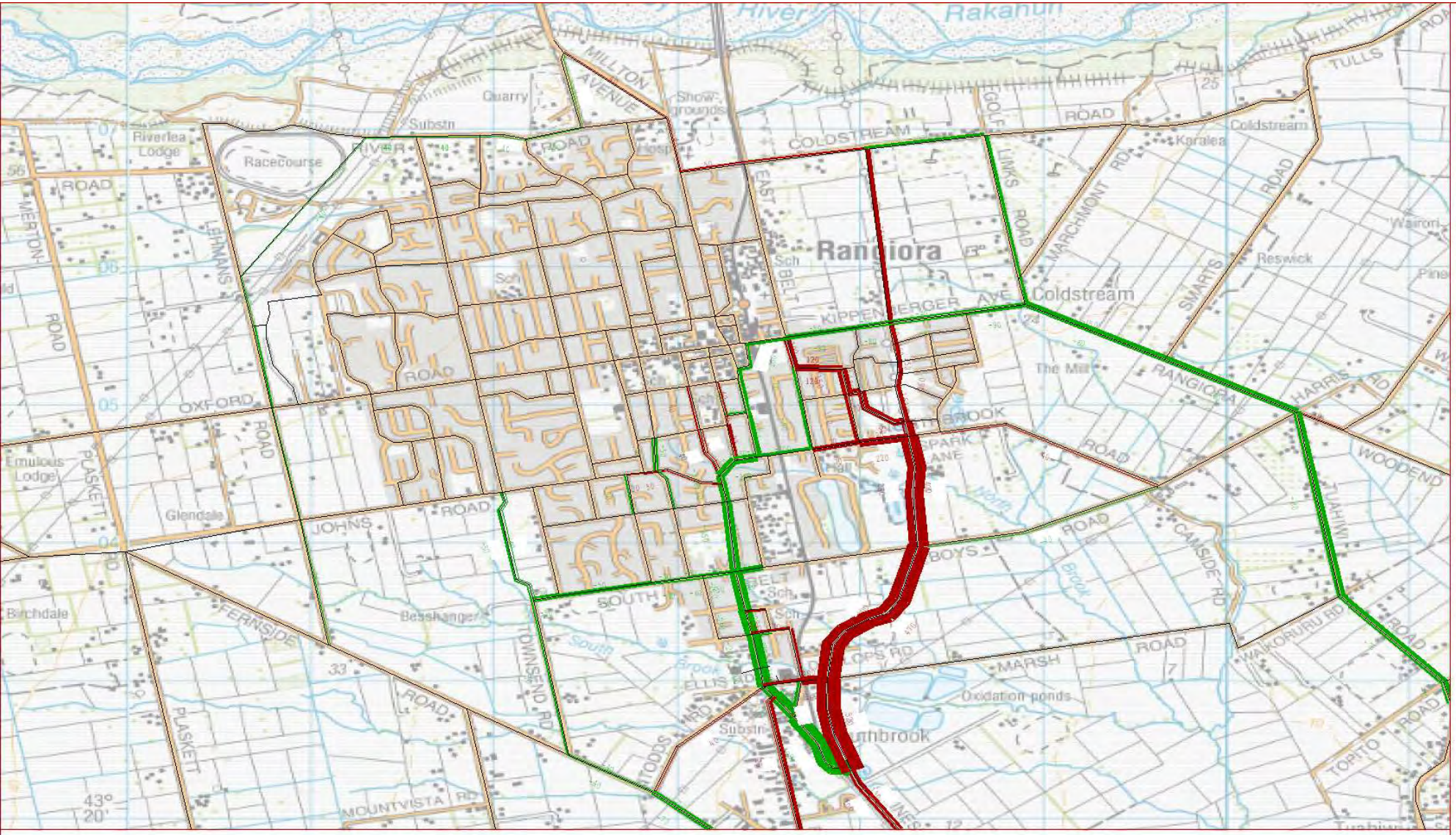

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Atkins Ltd
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See 11.15

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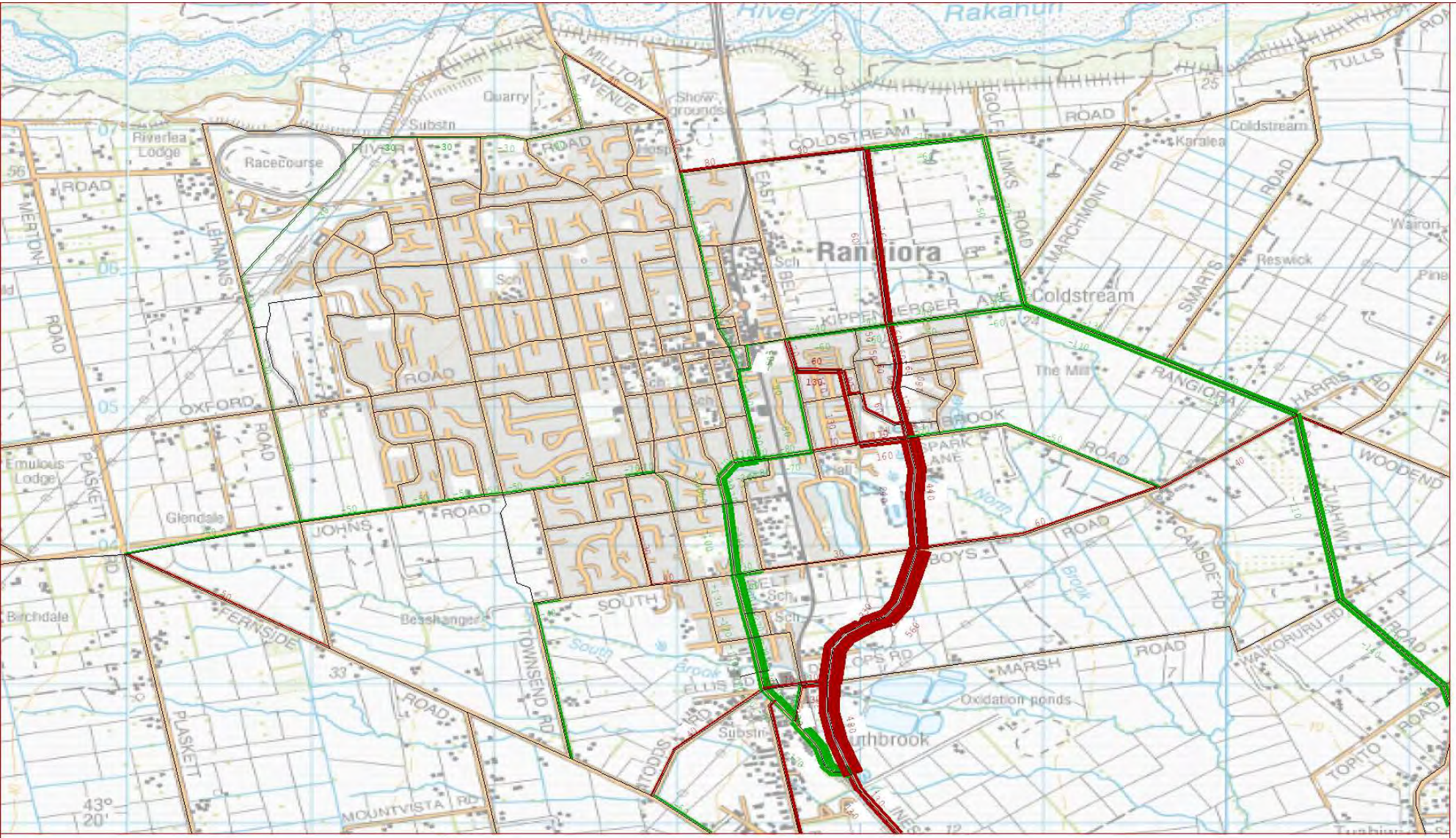
20- 1-21
QTP LIMITED



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Atkins Ltd
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See 11.15

14- 1-21
QTP LIMITED

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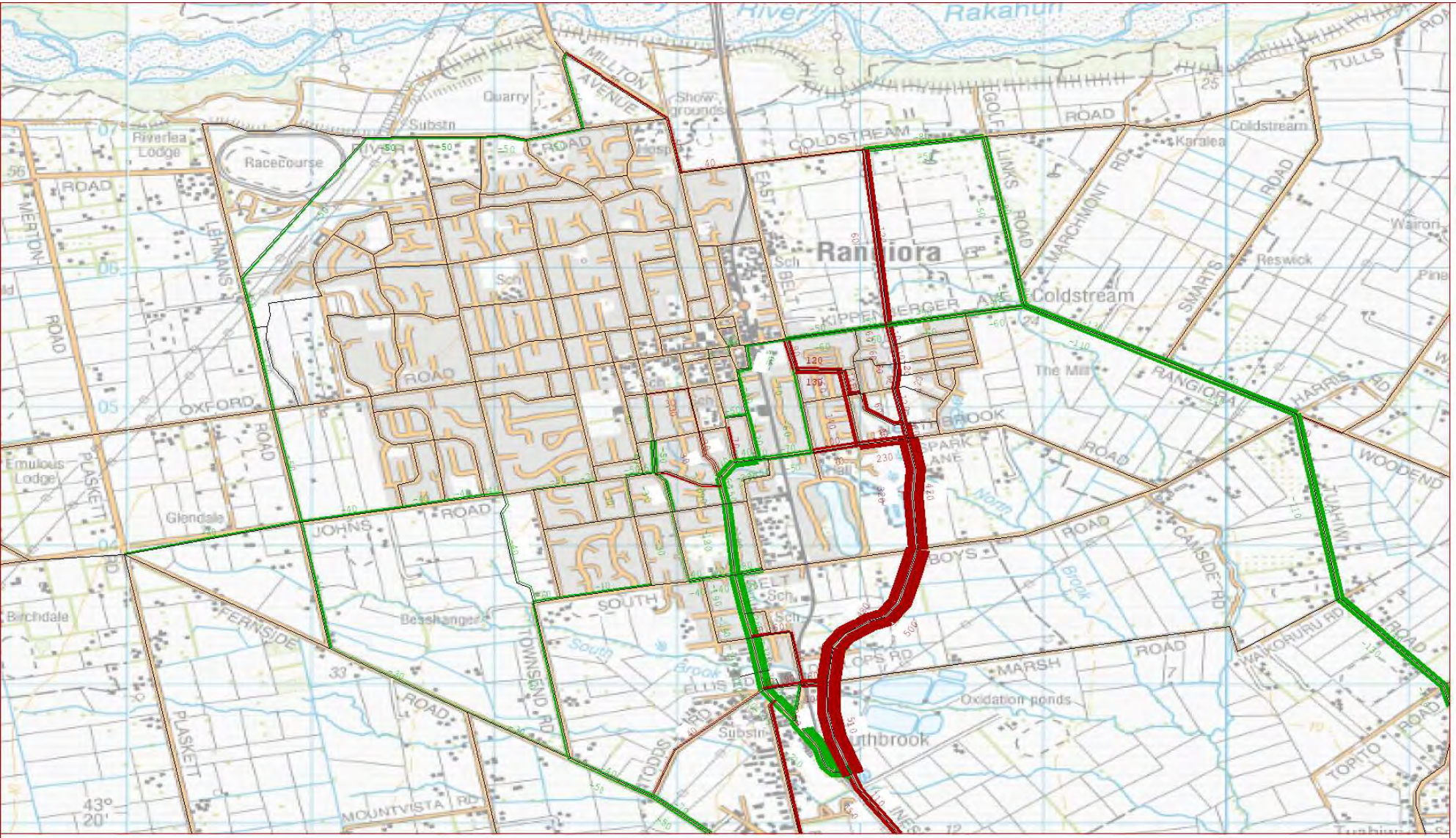

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See 11.15

14- 1-21
QTP LIMITED

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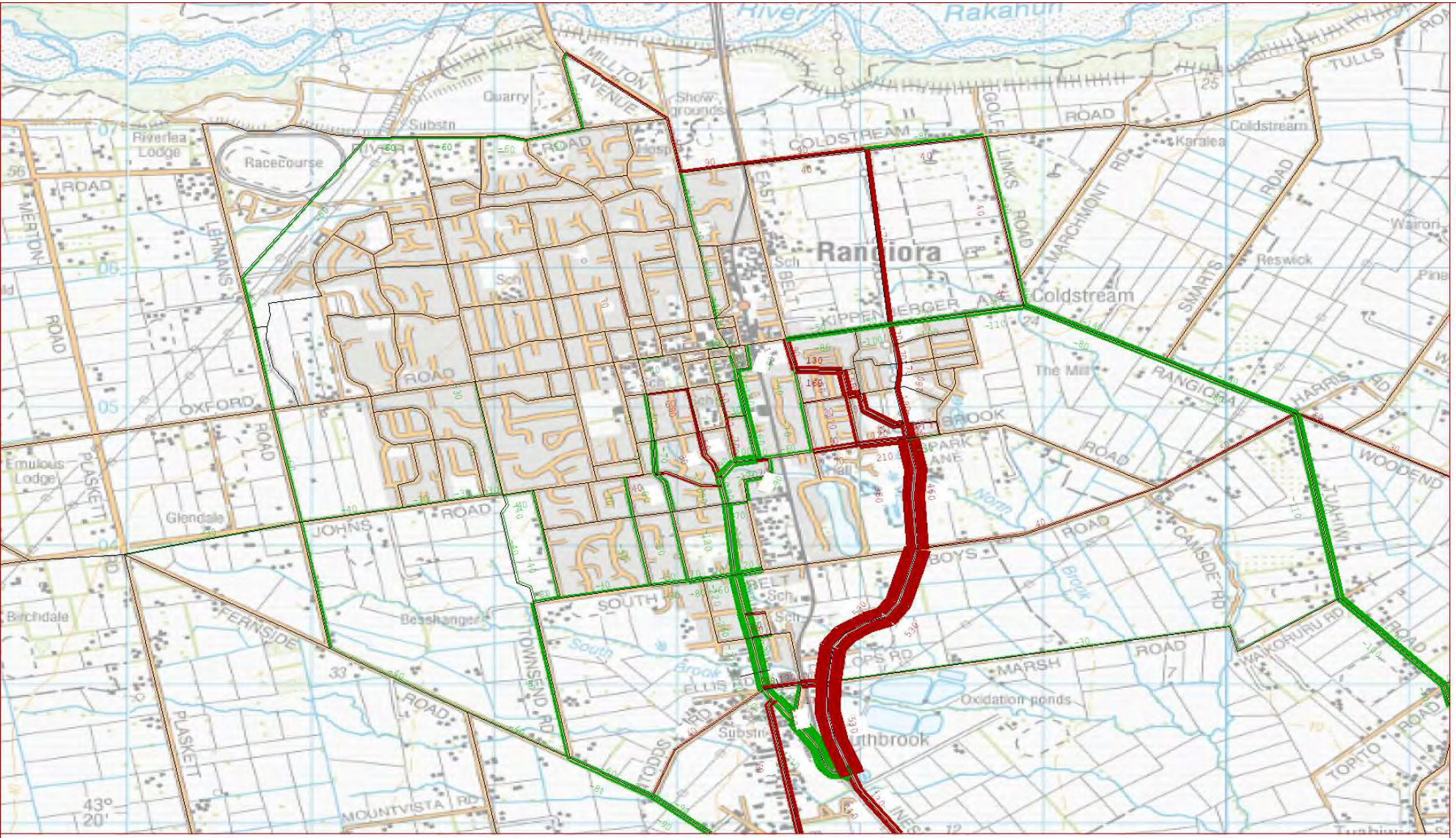

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DVV / ITS

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Bandwidths =
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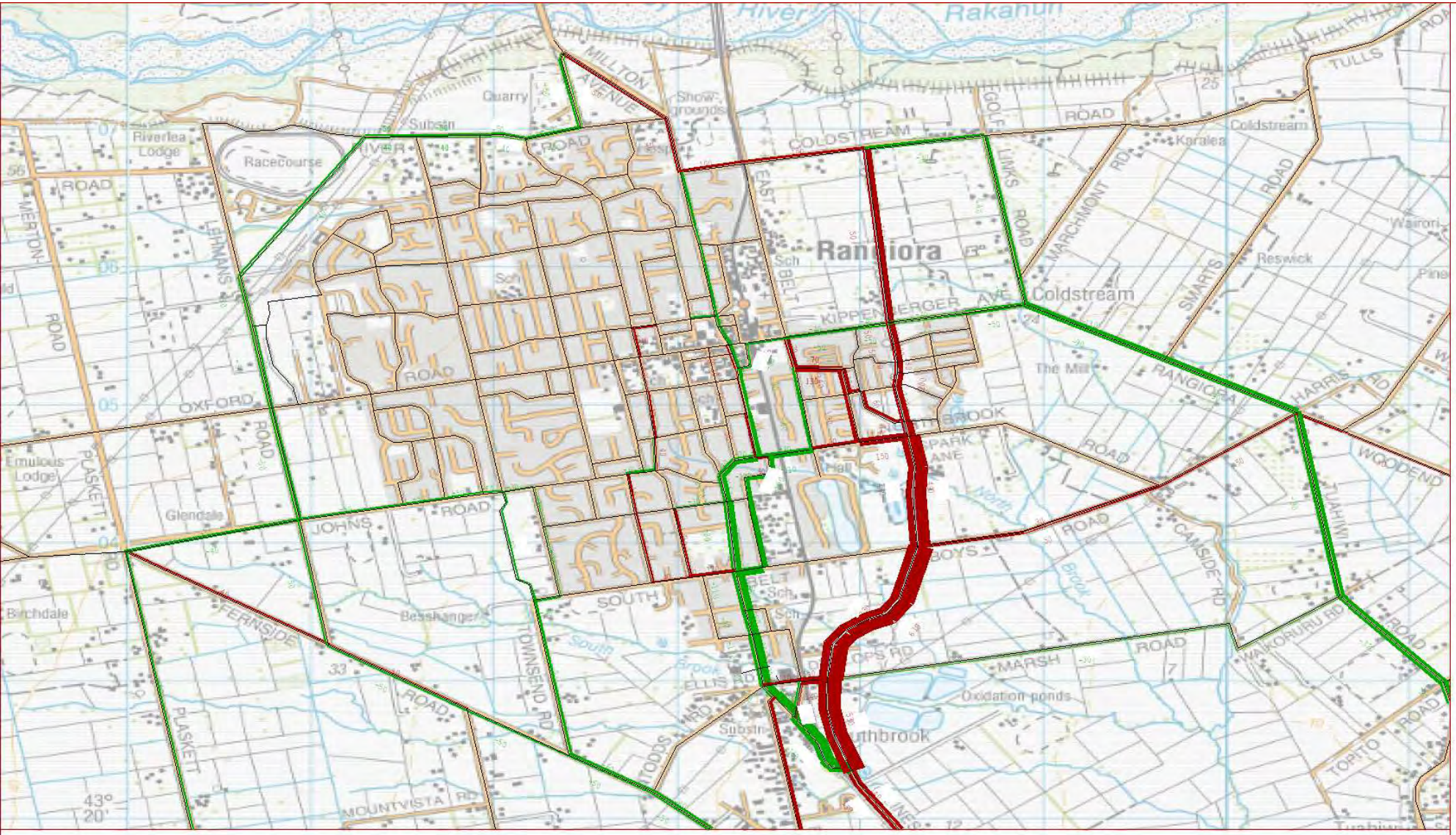
See 11.15

14- 1-21
QTP LIMITED

2038 PM With REL 14- 1-21



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DVV / ITS

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See 11.15

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QTP LIMITED

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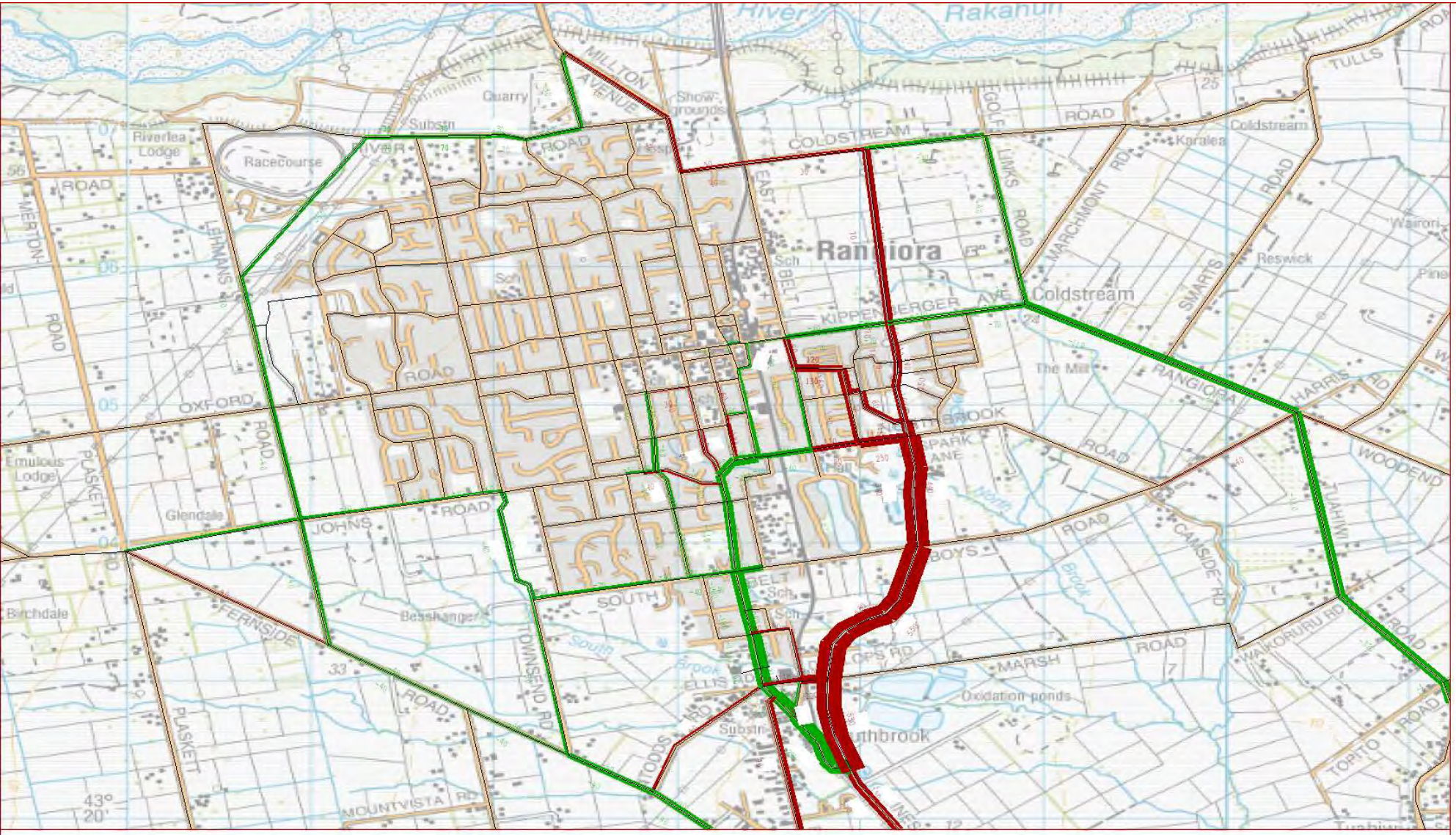

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DVV / ITS

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See 11.15

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QTP LIMITED

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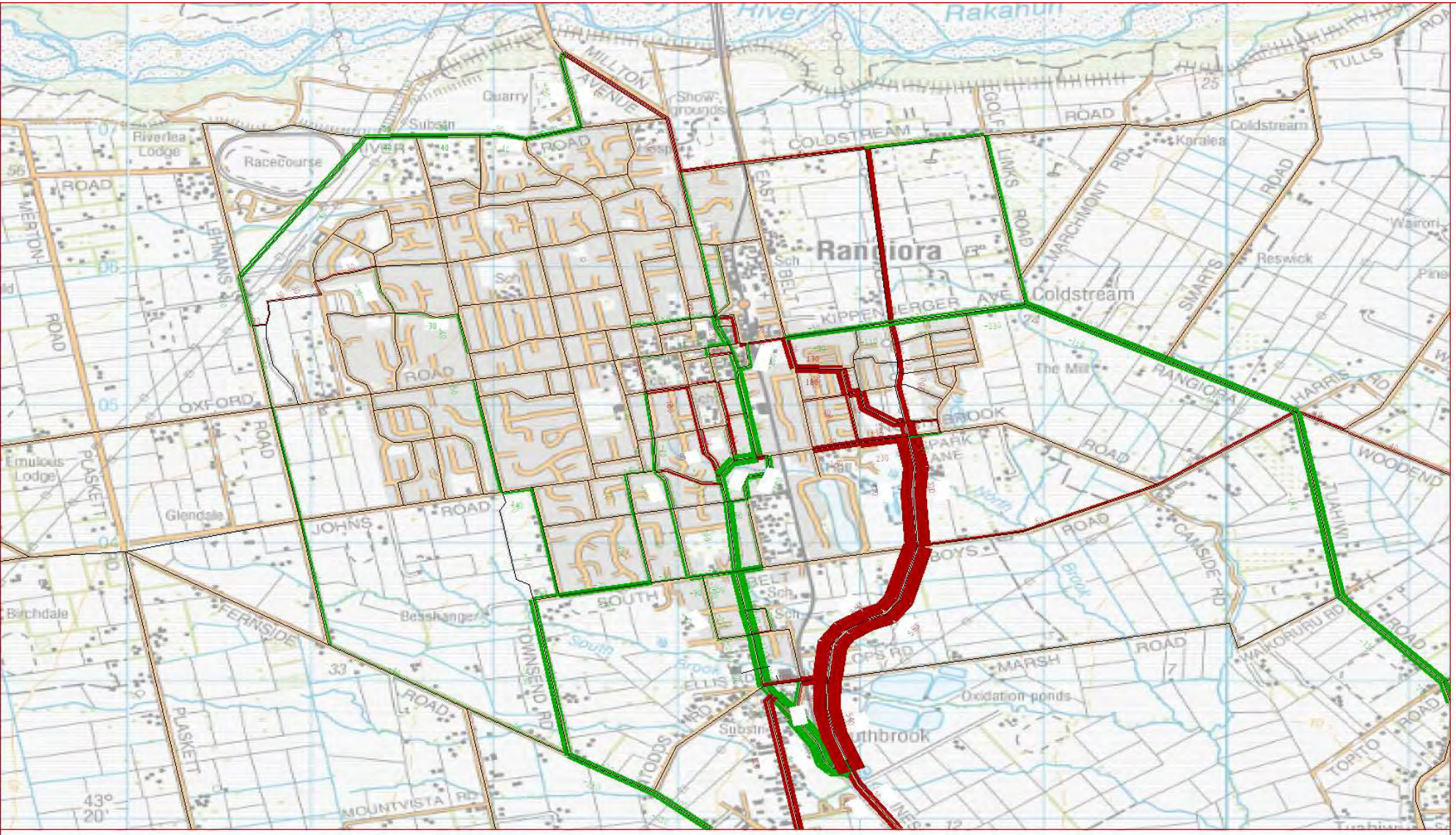

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Atkins Ltd
DVV / ITS

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See 11.15

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QTP LIMITED

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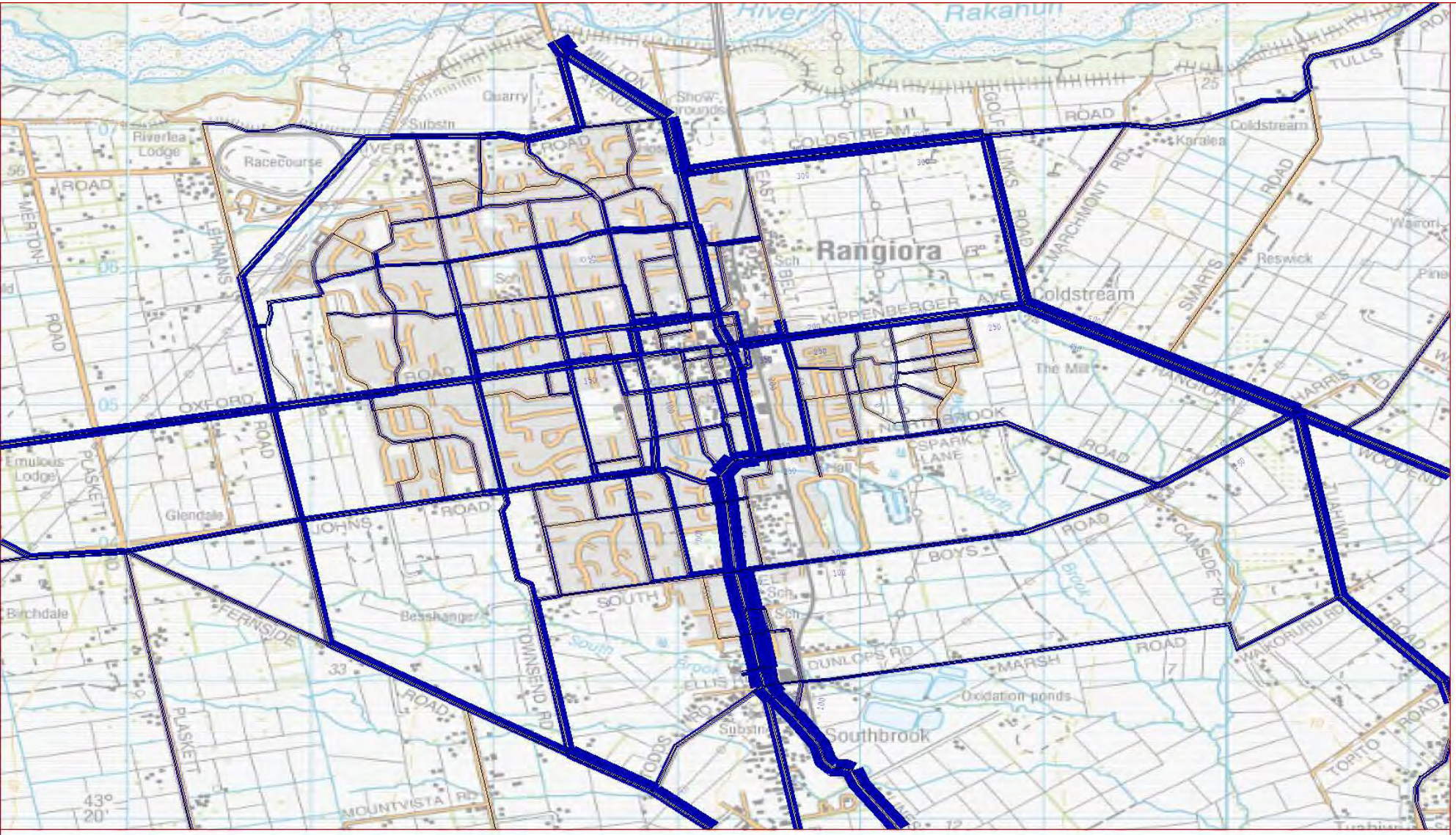

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Atkins Ltd
DVV / ITS

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See 11.15

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QTP LIMITED

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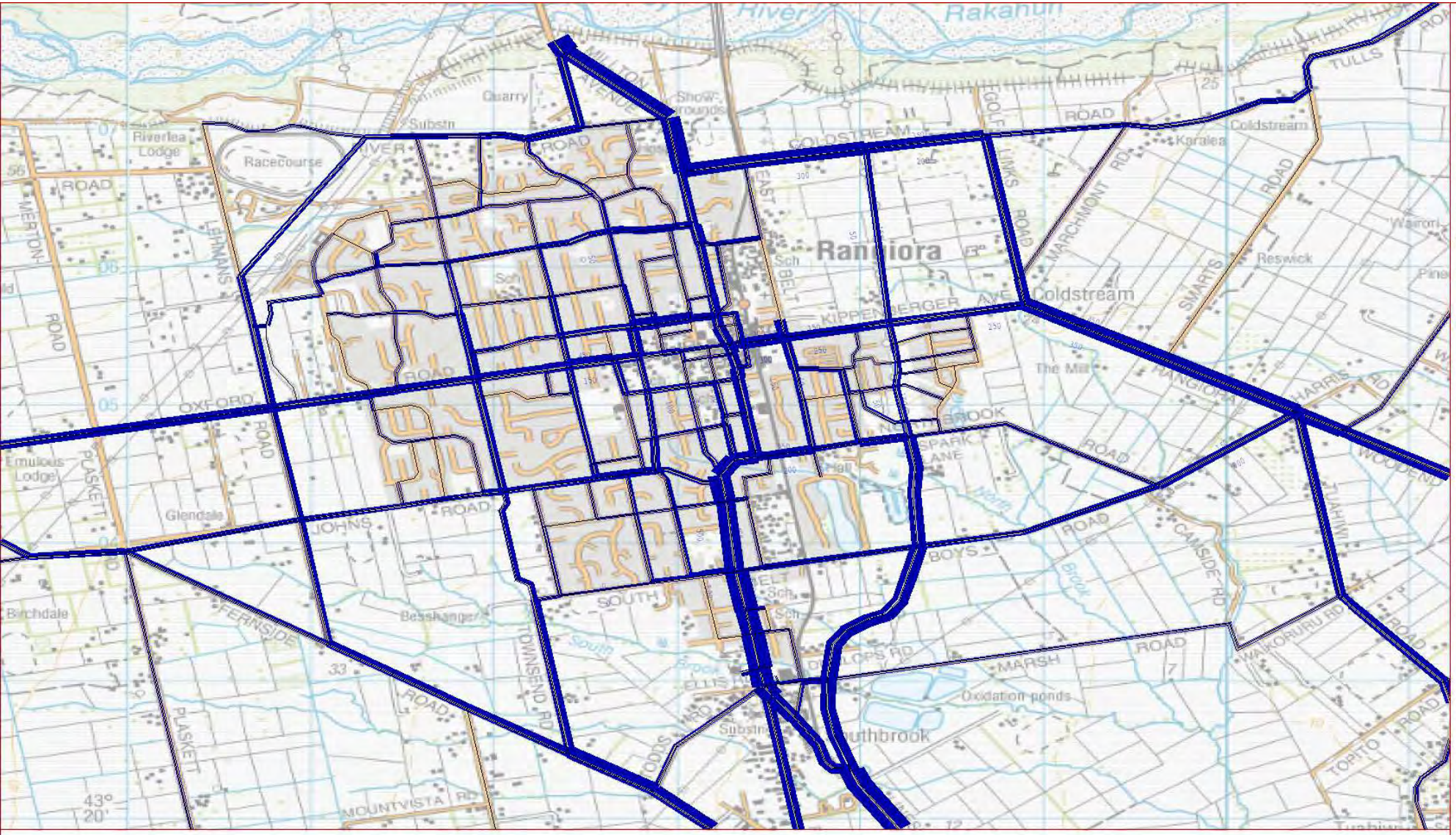

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Atkins Ltd
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QTP LIMITED

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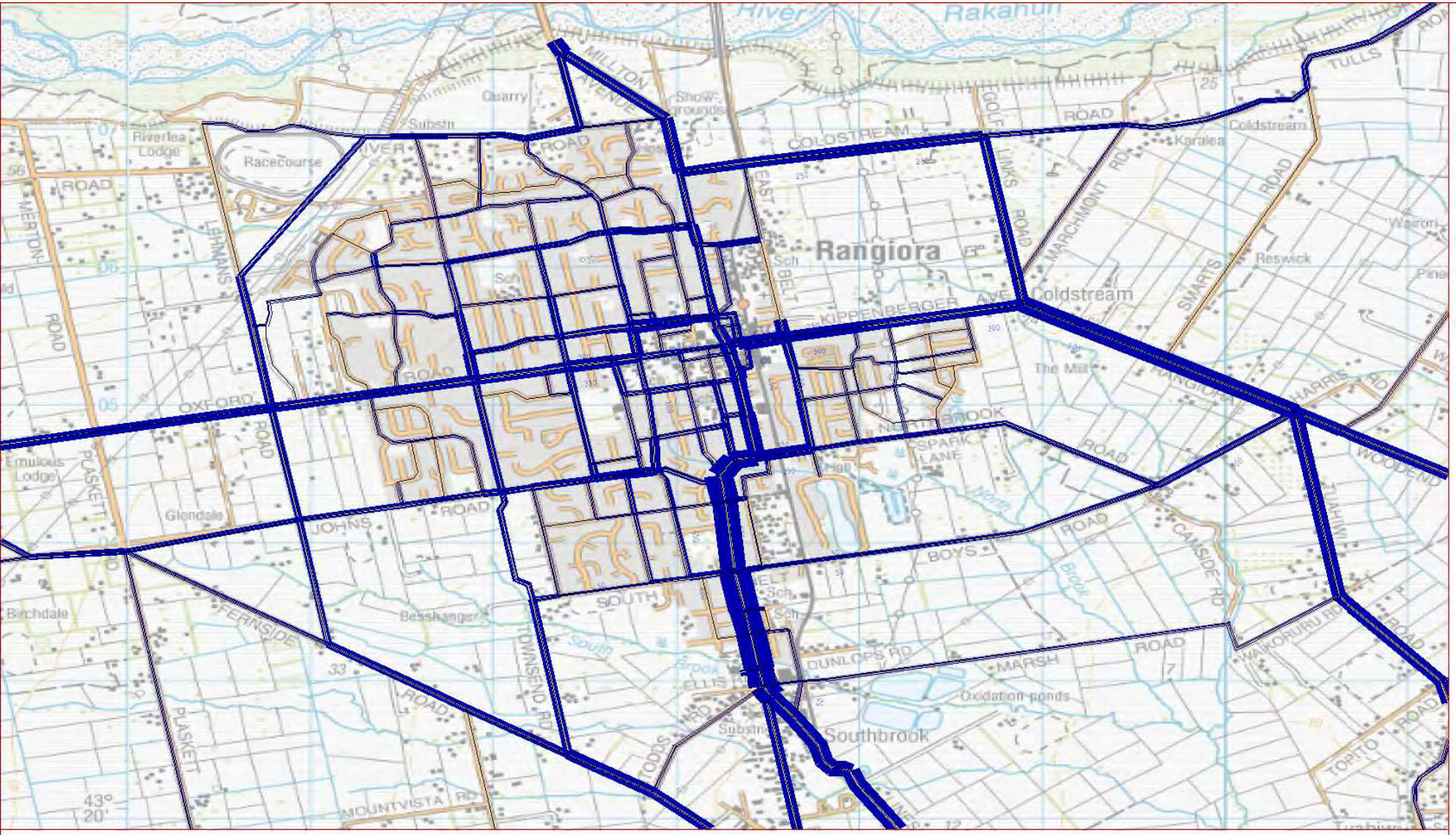

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Atkins Ltd
DVV / ITS

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See 11.15

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QTP LIMITED

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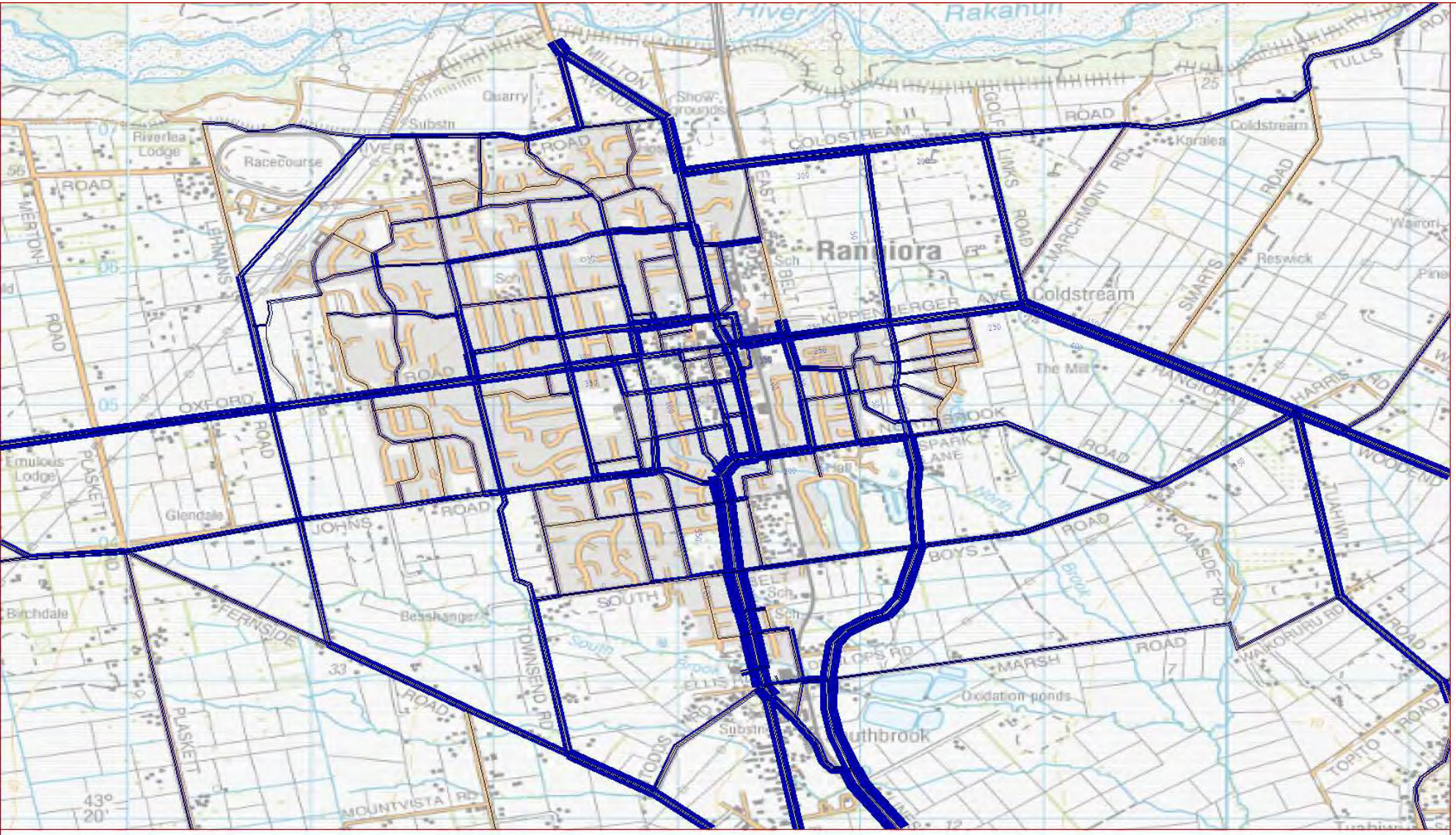

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See 11.15

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QTP LIMITED

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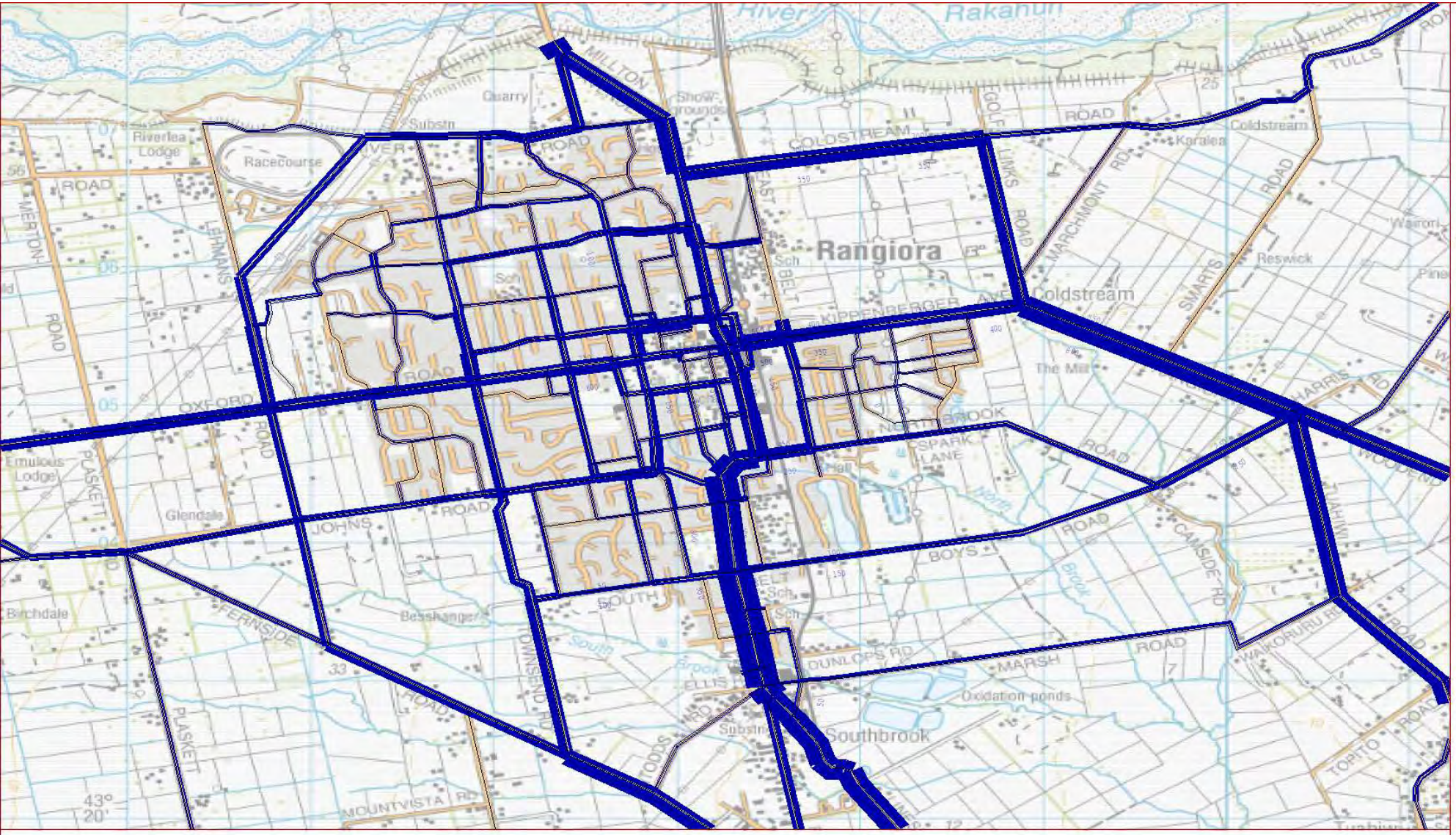

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DVV / ITS

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See 11.15

20- 1-21
QTP LIMITED

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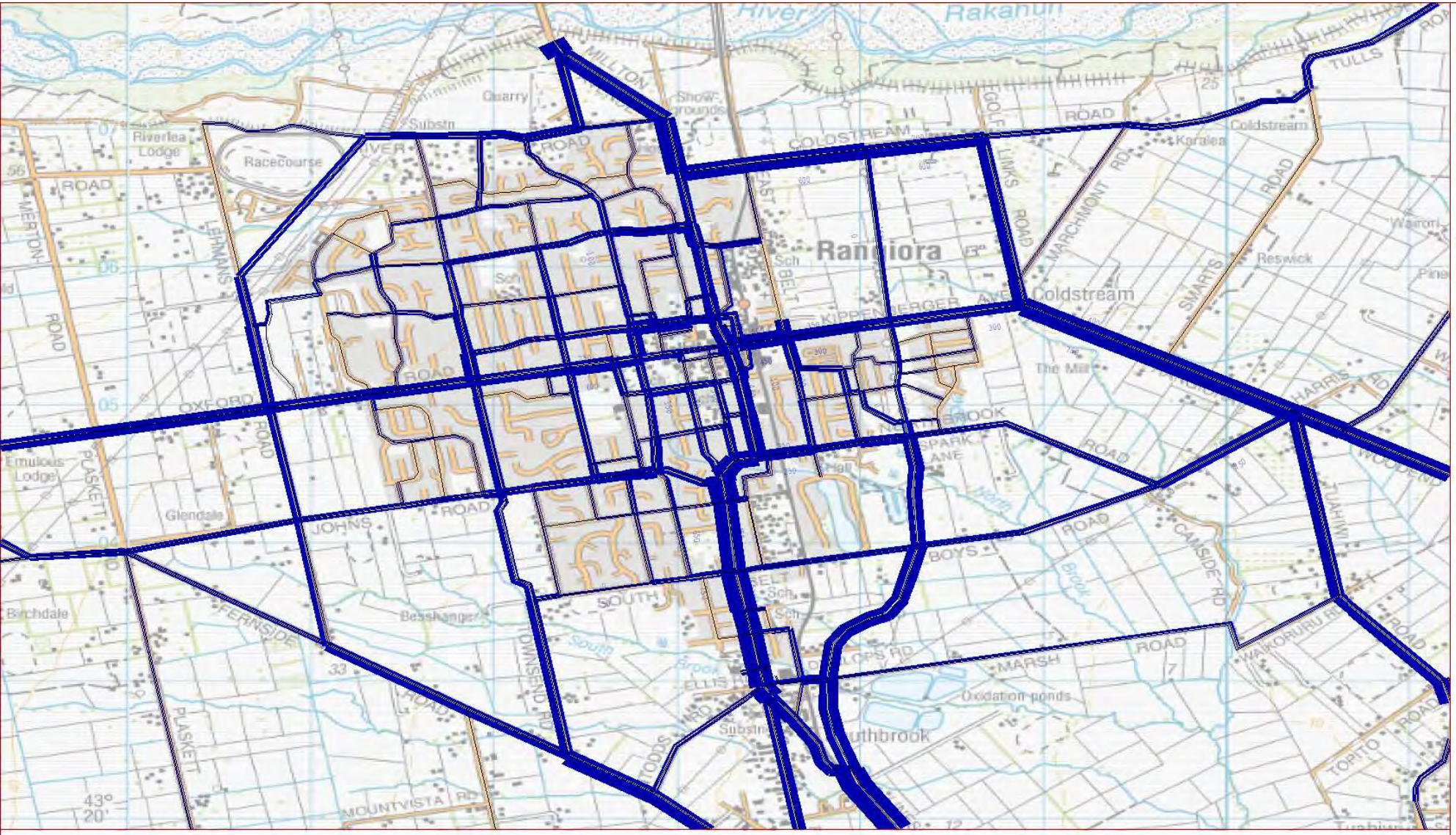

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See 11.15

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QTP LIMITED

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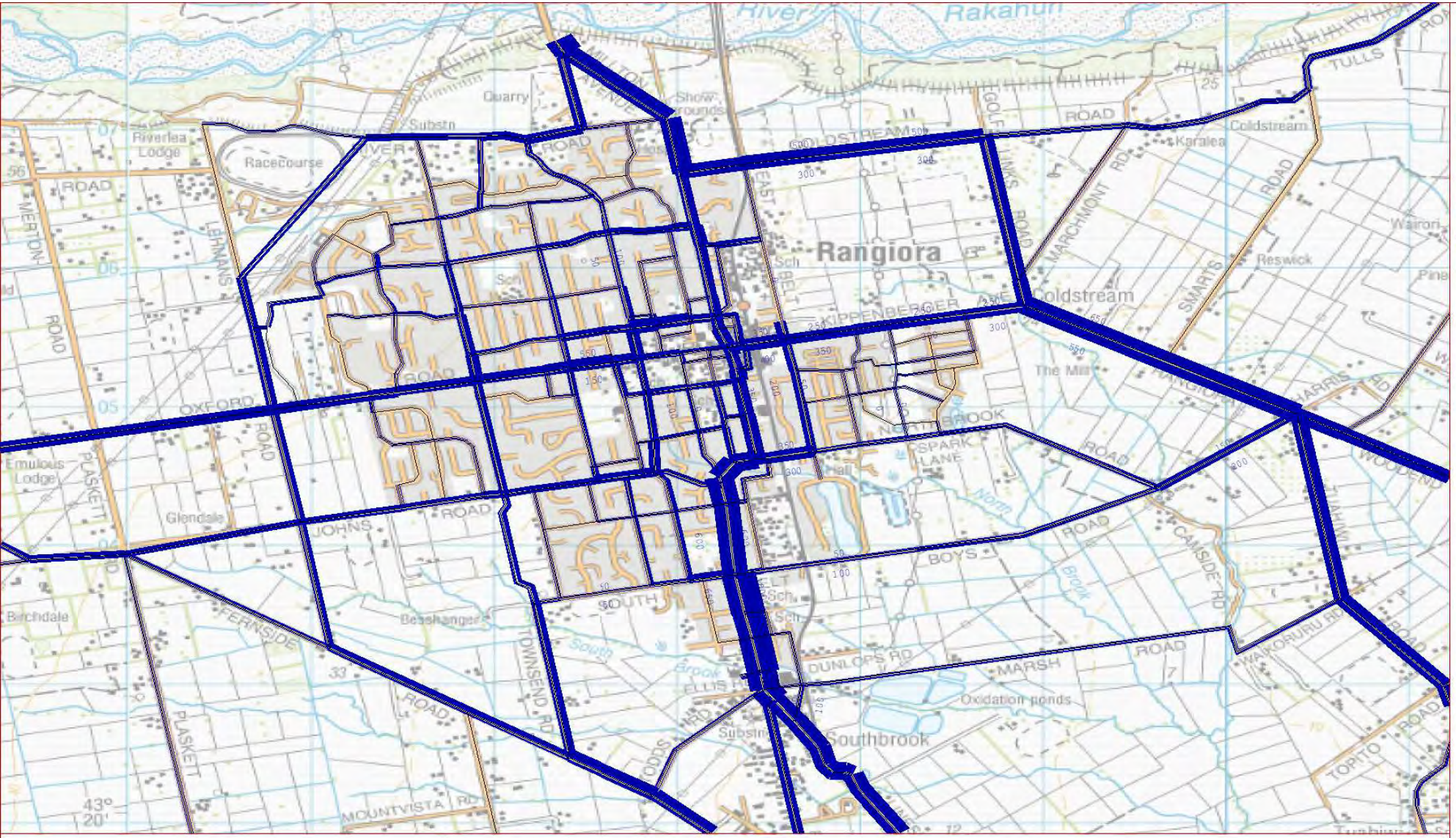

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Atkins Ltd
DVV / ITS

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See 11.15

14- 1-21
QTP LIMITED

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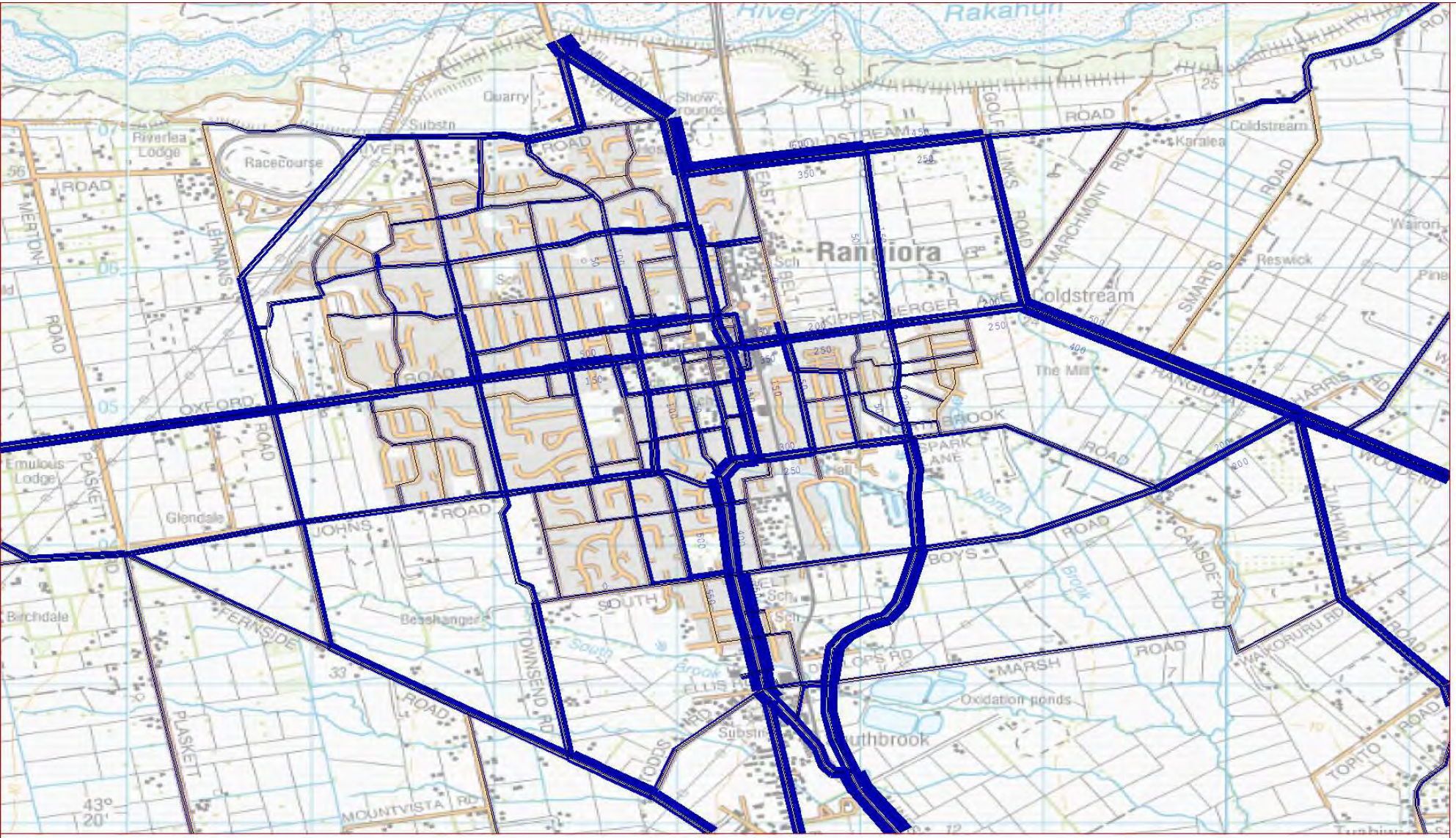

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DVV / ITS

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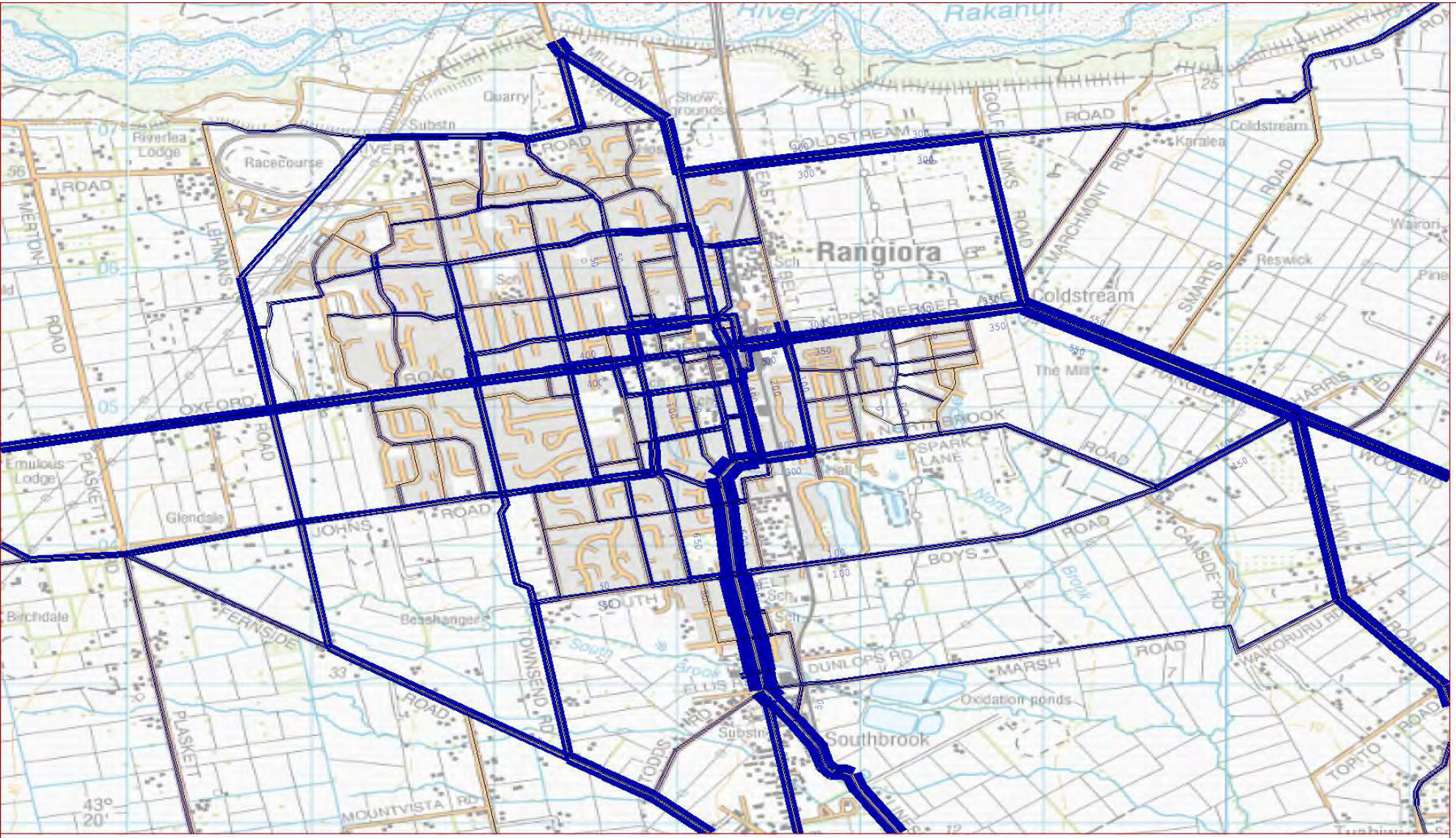

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Atkins Ltd
DVV / ITS

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QTP LIMITED

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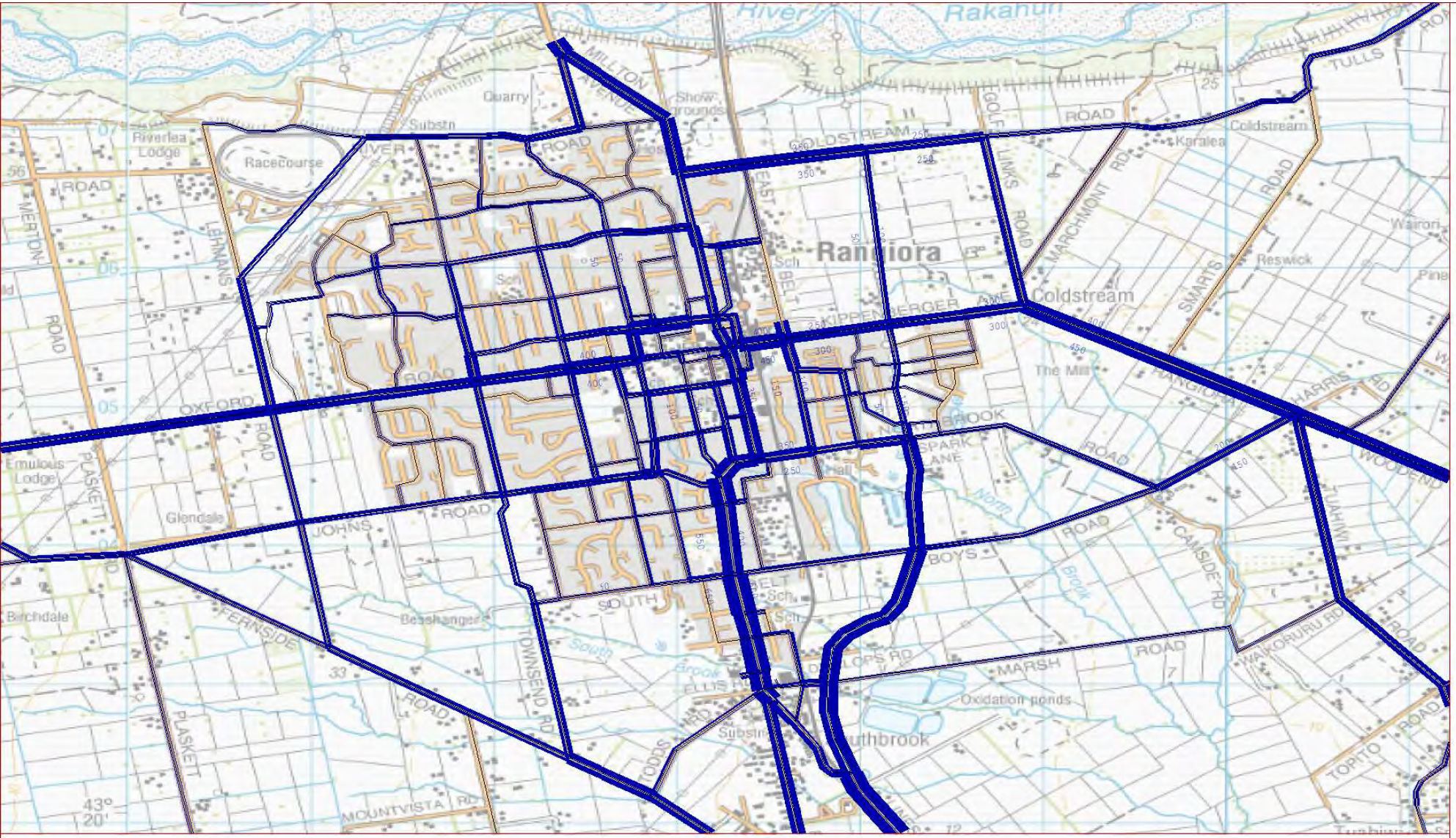

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DVV / ITS

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Bandwidths =
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See 11.15

14- 1-21
QTP LIMITED

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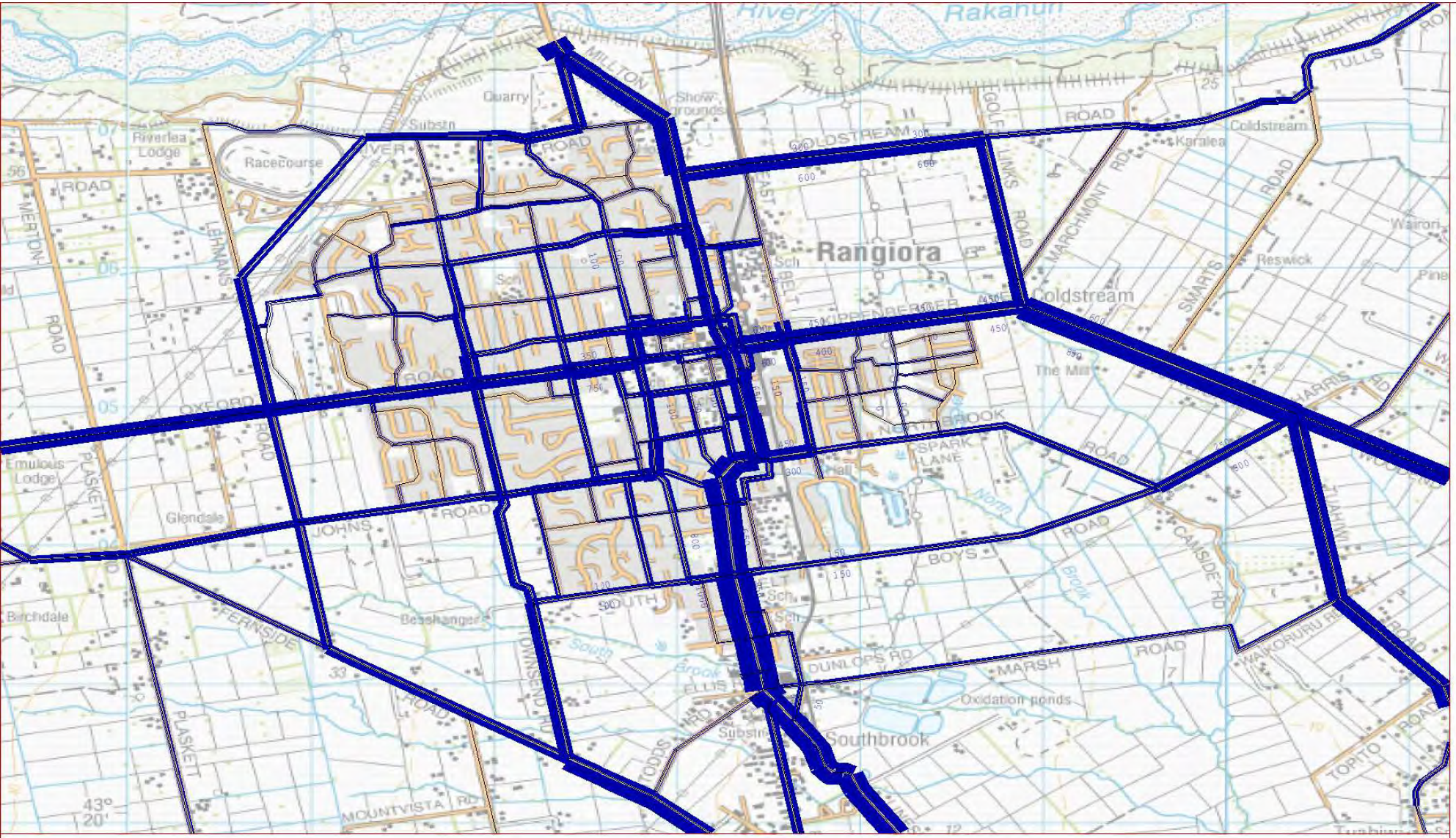

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DVV / ITS

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See 11.15

14- 1-21
QTP LIMITED

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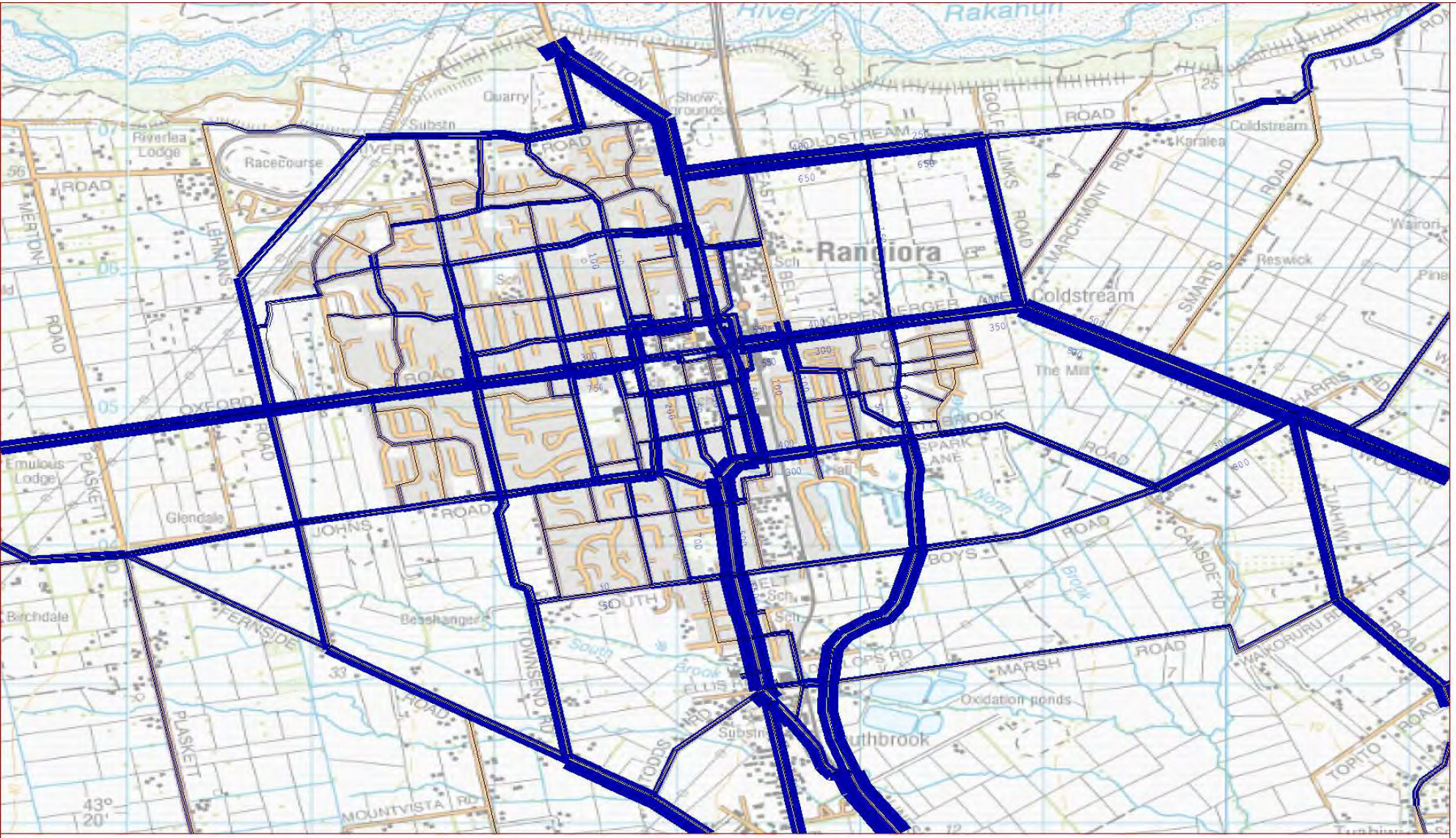

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DVV / ITS

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Scale 25000

Link Annot:

Veh

Bandwidths =
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See 11.15

14- 1-21
QTP LIMITED

2038 PM With REL 14- 1-21