

Before the Hearing Panel
Appointed by the Waimakariri District Council

Under the Resource Management Act 1991

In the matter of a hearing on submissions on the proposed Waimakariri District Plan

Hearing Stream 12: Rezoning

Rachel Claire Hobson and Bernard Whimp

Submission: 179 / Further submission: 90

Evidence of Andrew Francis Leckie

5 March 2024

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**anderson
lloyd.**

Introduction

- 1 My name is Andrew Francis Leckie.
- 2 I have a Bachelor of Engineering (Hons) in Civil Engineering and a Master of Engineering in Transportation, both from the University of Canterbury. I am a Chartered Professional Engineer, and I am a Chartered Member of Engineering New Zealand.
- 3 After graduating I carried out a civil engineering role for Fulton Hogan as part of the Christchurch Earthquake rebuild for two years, following which I have specialised as a transportation engineering consultant for the last nine years. In my current role as a Principal Transportation Engineer with Stantec New Zealand, I am involved in transportation engineering assessment and design for a broad range of landuse activities.
- 4 My relevant experience includes carrying out Integrated Transport Assessments for numerous residential rezonings, primarily through Private Plan Change requests. These have included Selwyn District Council Plan Changes 75 and 82 in Rolleston which involved traffic modelling assessments of large developments. I produced supporting transportation assessments for Selwyn District Council's proposed residential rezoning of deferred residential areas in Darfield and Leeston through the District Plan review process. I also carried out the Integrated Transport Assessment for the zoning of the Ravenswood Key Activity Centre.
- 5 I have prepared the Integrated Transport Assessment (**ITA, attached** as Appendix A) supporting the submission of Rachel Claire Hobson and Bernard Whimp (**the Submitters**), relating to the following land (**the Site**):
 - (a) 518 Rangiora-Woodend Road, Rangiora;¹ and
 - (b) 4 Golf Links Road, Rangiora.²
- 6 The Submitters seek an extension of the North East Rangiora or South East Rangiora Development Area overlay to include the Site within a Future Development Area (**FDA**); and the rezoning of the Site from Rural to General Residential.
- 7 This evidence provides a brief summary of my ITA.

¹ Legal description Part Rural Section 1054

² Legal description Lot 2 DP 16884

Code of Conduct for Expert Witnesses

8 While this is not a hearing before the Environment Court, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Summary

9 My Integrated Transport Assessment supports inclusion of the Site within a FDA and the rezoning of Site to General Residential.

10 In summary:

- (a) The proposed Outline Development Plan (**ODP**) will ensure development is appropriately connected to the surrounding road network, for a range of travel modes, and to potential future development to the north and east.
- (b) My assessment shows that 140 lots could generate approximately 1,250 vehicle movements per day (vpd) and 125 vehicle movements per hour (vph) during peak times.³ The resultant changes in traffic volume on nearby roads would be relatively small, with the largest increases forecast on Kippenberger Avenue towards Rangiora.⁴
- (c) The ODP proposes intersections on Rangiora Woodend Road and Golf Links Road. A T-intersection on Rangiora Woodend Road will be able to be located and designed to operate safely and efficiently in a future urban speed environment. The location of the intersection would allow for sightlines to the west of approximately 160m-180m to the curve in the road, which are in excess of the Austroads safe intersection sight distance requirement of 151m for a 70km/h design speed. An unrestricted sightline to the east will be available along the straight section of road.
- (d) The traffic modelling shows that a new intersection on Rangiora Woodend Road would be expected to operate efficiently, even during peak times. There would not be safety-related concerns arising from the operation of the intersection, i.e. from long delays and / or queuing. I recommend that boundaries at the intersection allow for an urban roundabout in the future in case access to the land to the south is sought. A roundabout would slow

³ Based on these rates: Daily traffic generation of 9vpd per lot; and Peak hour traffic generation rate of 0.9vph per lot.

⁴ Refer ITA Table 8-1 showing assessed traffic distribution and Table 8-2 showing traffic volume increases above 2038 CAST forecast traffic volumes.

through traffic and could act as a 'gateway' to Rangiora from the east, providing traffic calming benefits along the arterial route into the town.

- (e) A T-intersection on Golf Links Road, between Rangiora Woodend Road and Marchmont Road, will be able to be located and designed to operate safely and efficiently, having regard to forecast traffic volumes and vehicle speeds.
- (f) Residential development of the Site will have a negligible effect⁵ on the safety and efficiency of the Rangiora Woodend Road / Golf Links Road intersection (or the wider road network). However, I consider that this intersection should be upgraded to an urban standard, for the safety of all road users, prior to residential development along Golf Links Road (on either side of the road).
- (g) A safe crossing point for pedestrians and cyclists will be able to be incorporated into the design of a new intersection on Rangiora Woodend Road, providing connectivity to and from the existing shared path on the southern side of the road. This will support travel by active modes towards Rangiora to the west, as well as Ravenswood and Woodend to the east.
- (h) In my view, development of the Site will generate pedestrian and cyclist demand to cross Golf Links Road and connect to the shared path on the northern side of Kippenberger Avenue. I consider that there needs to be a safe and convenient connection in place between the new intersection on Golf Links Road and the shared path on the northern side of Kippenberger Avenue to support development of the site.
- (i) The 97 bus service, which connects Rangiora with Woodend and Pegasus, passes the Site, with the nearest bus stops on Kippenberger Avenue within a walkable distance (provided a suitable connection is in place). Bus stops could be provided on the Site frontage and / or bus frequencies could be increased by ECan to improve accessibility in the future in response to increased demand.
- (j) The Site is located approximately 1.8km east of the town centre, closer than existing and planned residential areas to the west of the town. I consider that walking and cycling will be viable travel modes to the town centre, and I note that there are key activities, including the high school and retail activities, located to the east of the town centre. Development of the Site will support a consolidated development pattern in Rangiora, which is a good outcome from a transportation perspective.

⁵ Refer ITA at 10.1

Conclusion

- 11 I am satisfied from a transportation perspective that the proposed rezoning is the most appropriate outcome for the Site. Alternatively, I support future residential development through an extension of the FDA to include the Site.

Dated 5 March 2024

Andrew Francis Leckie

518 Rangiora Woodend Road / 4 Golf Links Road Rezoning Submission

Integrated Transport Assessment



4 March 2024

Ref: 310205760

PREPARED FOR:

CVI Projects Limited

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Project Manager Final Approval
1	29/11/23	Final report	AL	AM	AL
2	04/03/24	Final report-minor updates	AL	AM	AL

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1. Introduction

CVI Projects has made a submission on the Proposed Waimakariri District Plan, seeking to have the land at 518 Rangiora Woodend Road and 4 Golf Links Road (approximately 11.3ha) zoned for residential use. The land sits outside of the proposed urban infrastructure boundary.

This integrated transport assessment has been prepared in support of the submission. It provides description of the existing and future transport environments in the vicinity of the site and provides consideration of key transport matters relevant to a potential residential development of the site, being vehicle access and pedestrian / cycle access to the site.

2. Site Location

The site is located north-east of Rangiora, on the northern side of Rangiora Woodend Road and east of Golf Links Road. Figure 2-1 shows the site location within the context of the Proposed District Plan urban development zoning, and the proposed road hierarchy. The site is approximately 1.3km east of the Rangiora Town Centre Zone.



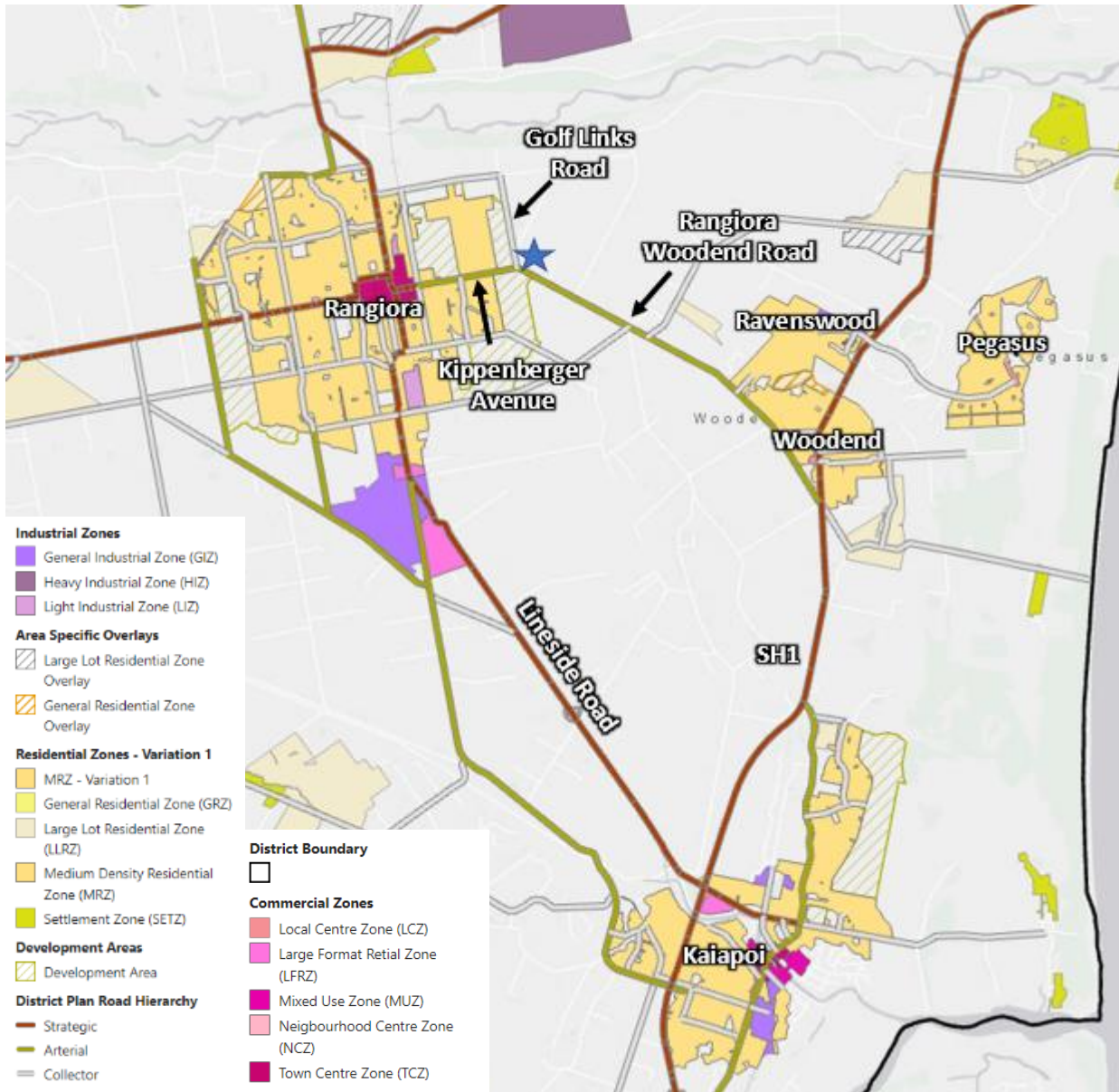


Figure 2-1: Site Location (Blue Star) in Context of Proposed District Plan Urban Development Zoning

Figure 2-2 shows the outline of the site to the north-east of the Rangiora Woodend Road / Golf Links Road intersection. The site has an approximately 250m long frontage to Rangiora Woodend Road and an approximately 150m frontage to Golf Links Road. Marchmont Road is separated from the site by a strip of properties approximately 110m deep.

Figure 2-3 shows the outline of the site in the context of the proposed District Plan (PDP) zoning in the nearby surrounding area. Under the PDP, the site would retain its rural zoning, while there is 'Development Area' indicated by the stripe hatching west of Golf Links Road and south of Rangiora Woodend Road opposite the site.





Figure 2-2: Site Outline in Local Context

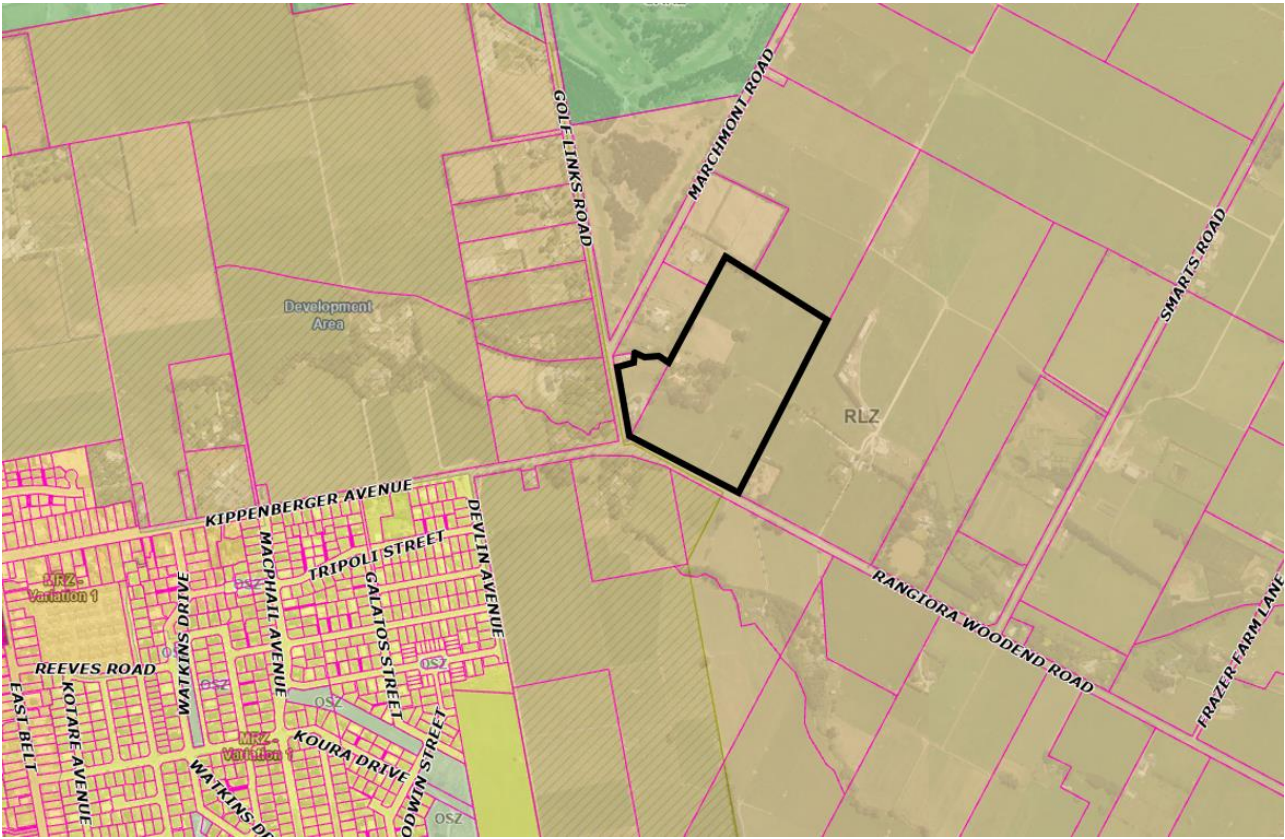


Figure 2-3: Proposed District Plan Zoning, Site Outlined in Black

3. Existing Transport Network

3.1 Rangiora Woodend Road

Rangiora Woodend Road is an arterial road which runs from the eastern edge of Rangiora to SH1 south of Woodend. Within Rangiora, it continues as Kippenberger Avenue and then High Street.

Past the site, Rangiora Woodend Road (Photograph 3-1) has a rural formation. There is a sealed carriageway width of approximately 7m, with two marked traffic lanes and minimal sealed shoulder widths. The posted speed limit in this location is 80km/h.



Photograph 3-1: Rangiora Woodend Road, Looking East Along Site Frontage

There is a curve in the road at the western edge of the site, shown in Photographs 3-2 and 3-3. Golf Links Road meets Rangiora Woodend Road on the outside of the curve and Rangiora Woodend Road crosses the Cam River immediately west of the intersection.



Photograph 3-2: Rangiora Woodend Road Curve, Looking West





Photograph 3-3: Rangiora Woodend Road Curve, Looking East

West of the curve, the posted speed limit reduces to 50km/h and Kippenberger Avenue continues into Rangiora (Photograph 3-4). There is established residential development on the southern side of the road, while a residential subdivision (Bellgrove) is under construction on the northern side of the road.



Photograph 3-4: Kippenberger Avenue, Looking West Towards Rangiora

3.2 Golf Links Road

Golf Links Road is part of a collector road route (along with Coldstream Road) which runs between Ashley Street and Rangiora Woodend Road, in the north-eastern part of Rangiora. This route provides access to a number of recreational activities including the golf course, sports fields, the indoor sports centre and the show grounds.

The road is formed with an approximately 6m wide sealed carriageway and a marked centreline, as shown in Photograph 3-5. There is a posted speed limit of 80km/h.





Photograph 3-5: Golf Links Road Looking North (Site on Right)

3.3 Rangiora Woodend Road / Golf Links Road Intersection

Golf Links Road meets Rangiora Woodend Road at a Give Way controlled T-intersection with a right turn bay on Rangiora Woodend Road (Photograph 3-6).



Photograph 3-6: Golf Links Road Approach to Rangiora Woodend Road

There are unrestricted sightlines in each direction from Golf Links Road, as shown below. The vegetation on the inside of the curve needs to be maintained to ensure westbound traffic on Rangiora Woodend Road has forward visibility to the intersection and this would be a responsibility of WDC as the road controlling authority.





Photograph 3-7: Sightline to Left at Rangiora Woodend Road / Golf Links Road Intersection



Photograph 3-8: Sightline to Right at Rangiora Woodend Road / Golf Links Road Intersection

The curve on Rangiora Woodend Road is cambered, typical of a rural road curve, with Golf Links Road meeting Rangiora Woodend Road on the top of the superelevation. The intersection has large corner radii and a large size, capable of accommodating large heavy vehicle movements.

Figure 3-1 shows an aerial image of the existing intersection with property boundaries and local constraints highlighted.



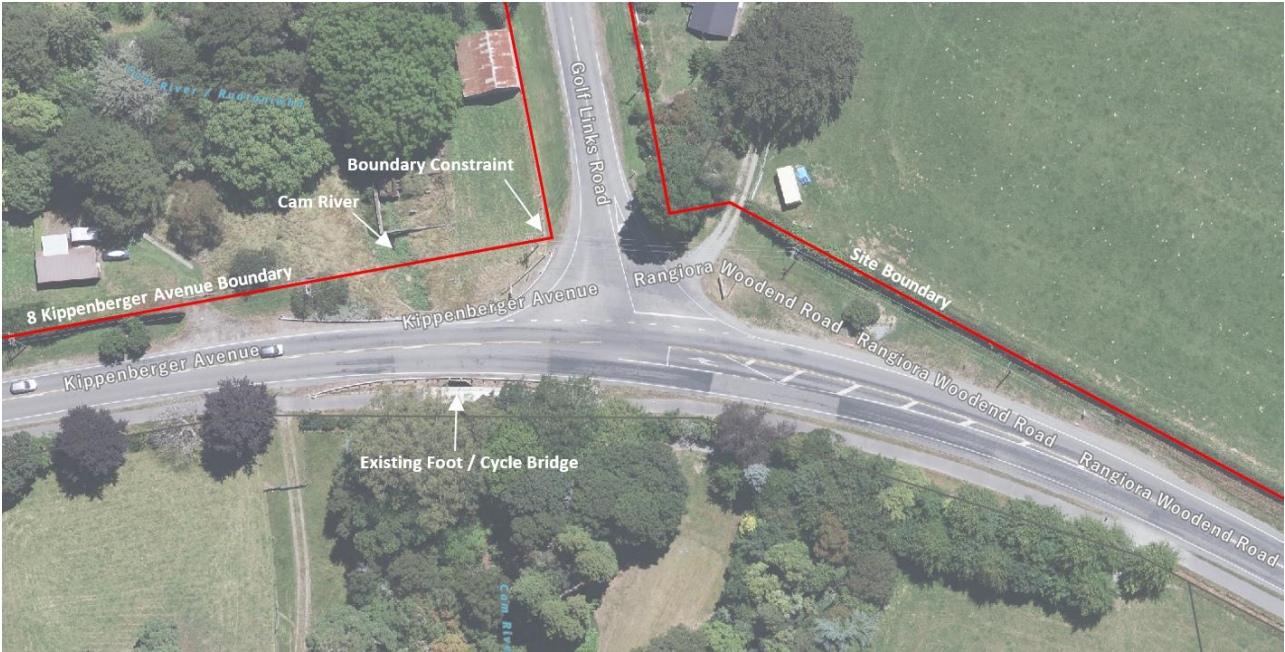


Figure 3-1: Existing Rangiora Woodend Road / Golf Links Road Intersection

3.4 Marchmont Road

Marchmont Road (Photograph 3-9) is a rural local road which runs along the south-eastern edge of the golf course. It has a 6m wide sealed carriageway and an 80km/h speed limit.



Photograph 3-9: Marchmont Road Looking North-East

Marchmont Road meets Golf Links Road at a skewed T-intersection, with an approximately 40-degree angle between the two roads. The intersection has Give Way controls as shown in Photograph 3-10.





Photograph 3-10: Golf Links Road / Marchmont Road Intersection

The acute angle between the two roads makes the observation to the right from Marchmont Road more difficult than it would be ideally. Unrestricted sightlines are available in both directions, as shown in Photographs 3-11 and 3-12.



Photograph 3-11: Marchmont Road Sightline to Right at Golf Links Road





Photograph 3-12: Marchmont Road Sightline to Left at Golf Links Road

3.5 Pedestrian / Cycle Infrastructure

The Rangiora Woodend Path is an off-road shared path which runs along the southern side of Rangiora Woodend Road between the two towns (approximately 6.5km in distance). Photograph 3-13 shows the path opposite the site. There is approximately 1.5m separation from the white edgeline to the path, and there is a small drainage ditch between the path and the boundary.



Photograph 3-13: Rangiora Woodend Path, Looking East

The path crosses the Cam River on a bridge separate from the road bridge (Photograph 3-14).





Photograph 3-14: Rangiora Woodend Path Bridge at Cam River

To the west, the off-road shared path ends within the urban speed limit area (Photograph 3-15). There are on-road cycle lanes marked and there is a footpath on the southern side of the road.



Photograph 3-15: Off-Road Path Transition to On-Road Cycle Lanes

3.6 Public Transport

Figure 3-2 shows the public bus routes serving the Waimakariri District. The 97 Rangiora / Pegasus service runs past the site along Rangiora Woodend Road, once an hour in each direction. The nearest bus stops are on Kippenberger Avenue approximately 250m west of Golf Links Road.



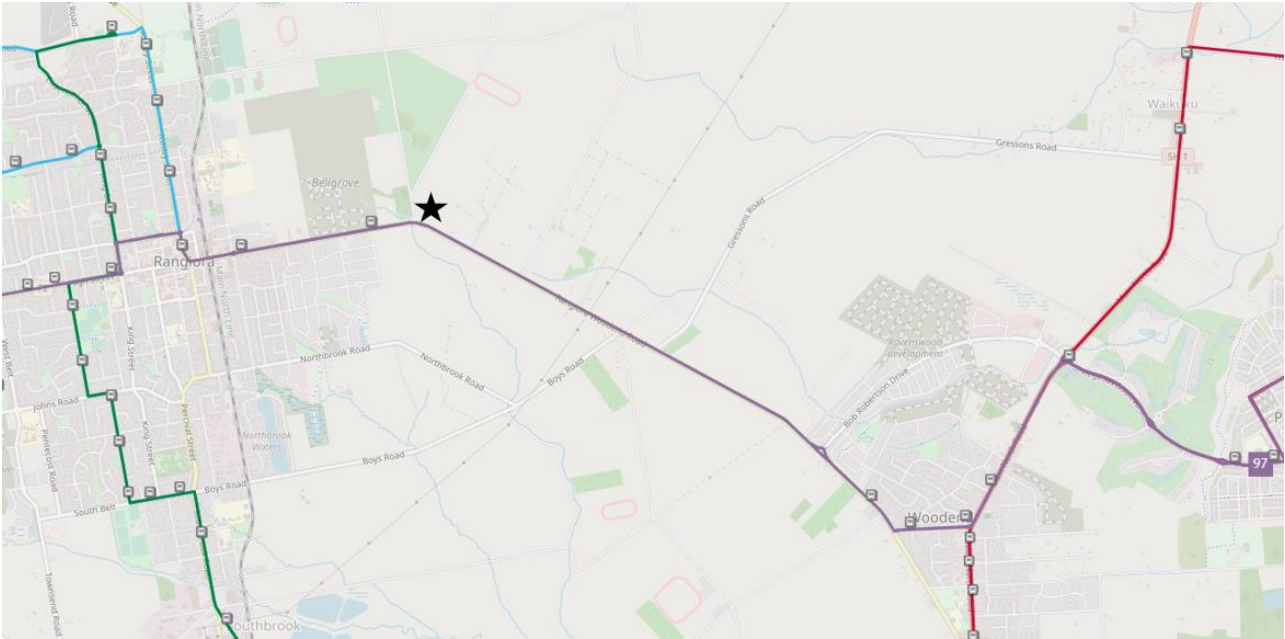


Figure 3-2: Existing Bus Routes (Metroinfo), Black Star = Site

4. Existing Transport Environment

4.1 Peak Hour Traffic Volumes

Peak hour traffic counts were carried out at the Rangiora Woodend Road / Golf Links Road intersection on Thursday 18 May 2023. The following figures summarise the morning and evening peak hour volumes recorded.

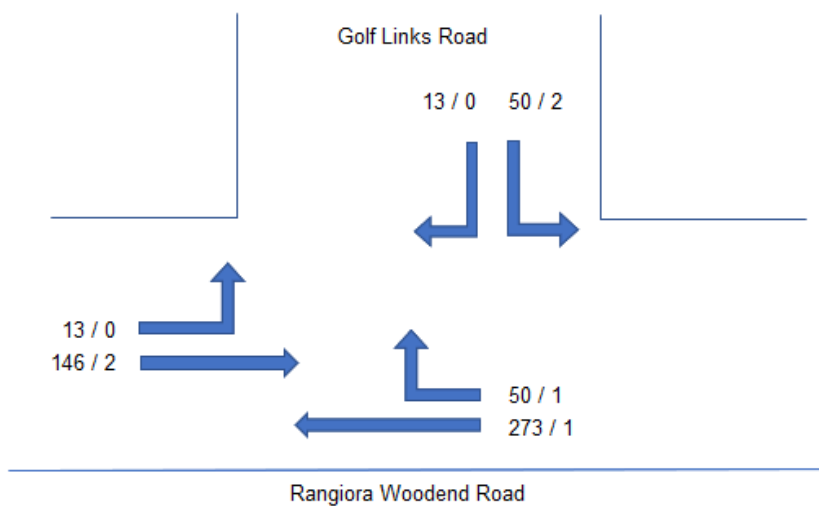


Figure 4-1: AM Peak Hour (8:00am-9:00am) Traffic Volumes (Total Volume / Heavy Volume), 18 May 2023



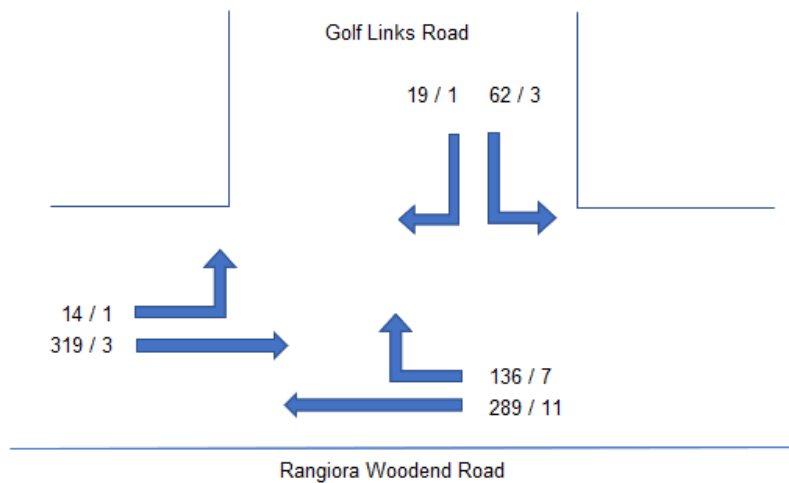


Figure 4-2: PM Peak Hour (4:00pm-5:00pm) Traffic Volumes (Total Volume / Heavy Volume), 18 May 2023

Rangiora Woodend Road carries moderate peak hour through volumes of approximately 400-600 vehicles per hour at the intersection. The traffic volumes are lower during the morning peak hour and there is tidality towards Rangiora associated with commuter patterns. Traffic volumes are higher during the evening and they are relatively balanced by direction.

There is clear demand for travel between Golf Links Road and Rangiora Woodend Road to the east (right in and left out movements) and particularly during the evening peak when approximately one third of traffic approaching from the east turns right into Golf Links Road.

There are currently low volumes of vehicles turning left in and right out at the intersection (less than 20 vehicle movements per hour for each movement).

The traffic surveys covered the shared path on the southern side of Rangiora Woodend Road. 17 cyclists were recorded across the four hours surveyed (7:00am-9:00am and 4:00pm-6:00pm).

4.2 Intersection Performance

The existing intersection has been modelled using SIDRA Intersection 9.0. The following default gap acceptance parameters reported in the SIDRA User Guide have been adopted:

- Left turn out: Critical gap 4.5s and follow-up headway 2.5s;
- Right turn out: Critical gap 5.5s and follow-up headway 3.5s; and
- Right turn in: Critical gap 4.0s and follow-up headway 2.0s.

The results are presented in Table 4-1.

Table 4-1: Existing Modelled Intersection Performance

Peak Period	Movement	Average Delay	95 th % Queue
AM Peak	Golf Links Road Left	6s	0.2veh
	Golf Links Road Right	9s	0.1veh
	Rangiora Woodend Road Right	6s	0.2veh
PM Peak	Golf Links Road Left	7s	0.3veh
	Golf Links Road Right	13s	0.2veh
	Rangiora Woodend Road Right	7s	0.5veh

This shows the intersection is operating with good levels of service to road users, and the low delays indicate that drivers have freedom to choose safe gaps.

5. Existing Road Safety

The Waka Kotahi Crash Analysis System has been used to review crash records in the vicinity of the site. During the full five-year period of 2018-2022, there was one non-injury crash reported at the Rangiora Woodend Road / Golf Links Road intersection, and there were no crashes recorded along the Rangiora Woodend Road or Golf Links Road frontages.

The crash at the intersection occurred when a driver mistakenly turned right out of Golf Links Road, having had their view to the right at least partially obstructed by a ute and trailer that has just turned right into Golf Links Road, and was hit by an eastbound vehicle.

One non-injury crash over a five-year period does not suggest there are any serious safety concerns with the existing intersection. As described earlier, the Rangiora Woodend Road / Golf Links Road intersection currently has a right turn bay and good sight distance. The speed limit of 80km/h presents some additional potential severity risk associated with turning crashes, although that has not been indicated by the crash reports.

Waka Kotahi Mega Maps records Rangiora Woodend Road past Golf Links Road as having the following road safety risk ratings¹:

- Infrastructure Risk: Medium-High
- Collective Risk: Medium
- Personal Risk: Low-Medium

¹ Collective safety risk is risk density measured as the number of fatal and serious casualties over a distance. Personal safety risk is risk to the individual of a fatal or serious casualty measured as casualties per million vehicle kilometres travelled. Infrastructure risk rating is a proactive measure of risk that aligns with personal risk but does not rely on crash history.



6. Future Environment

6.1 Future Development and Bellgrove Subdivision

As shown earlier and highlighted below, the planned Rangiora urban boundary is Golf Links Road on the northern side of Rangiora Woodend Road, while on the southern side the urban boundary would be close to opposite the eastern edge of the site. Bellgrove Subdivision on the northern side of Kippenberger Avenue, the initial stages of which are under construction, is outlined.

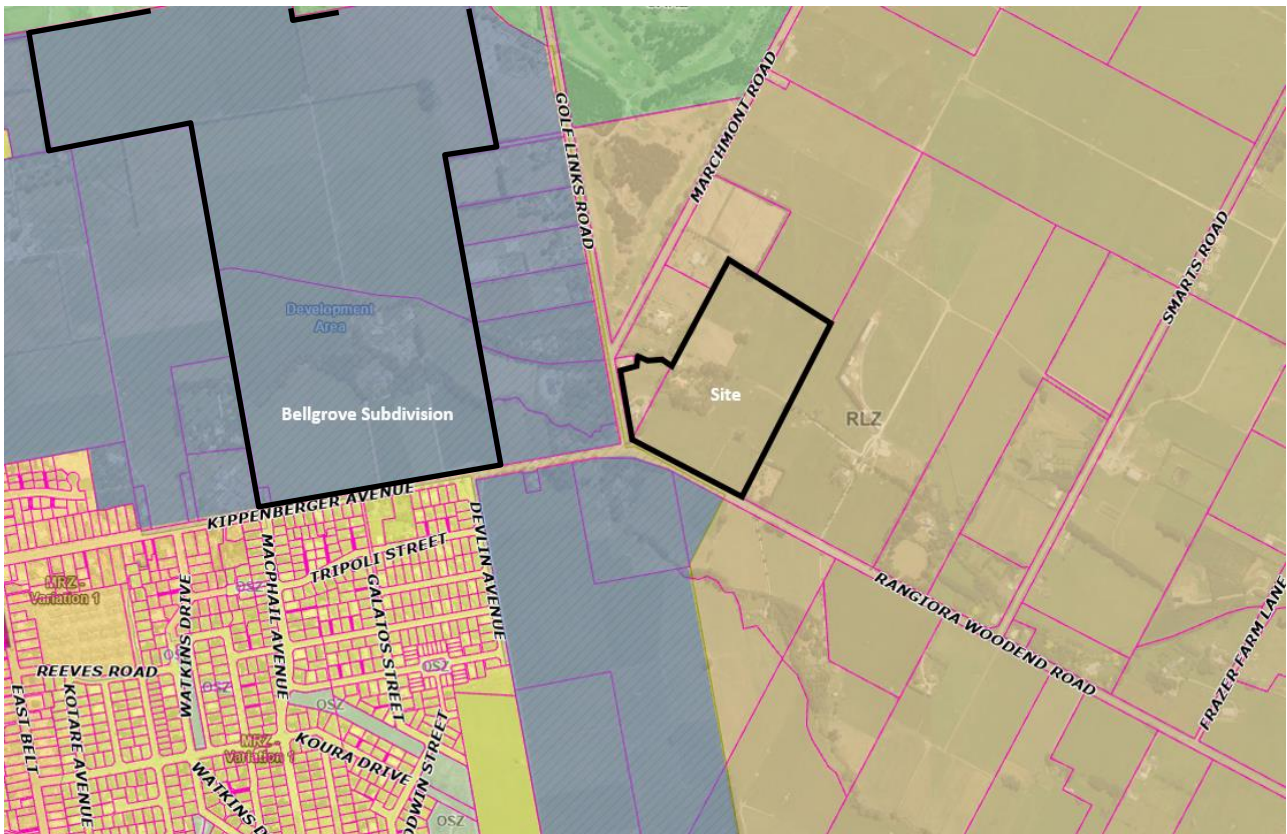


Figure 6-1: Proposed District Plan 'Development Areas' in Blue

Figure 6-2 shows the plan for the initial stages of the Bellgrove Subdivision. Access to Kippenberger Avenue is proposed via two intersections; one a roundabout at the existing MacPhail Avenue intersection and one a T-intersection between MacPhail Avenue and Devlin Avenue.



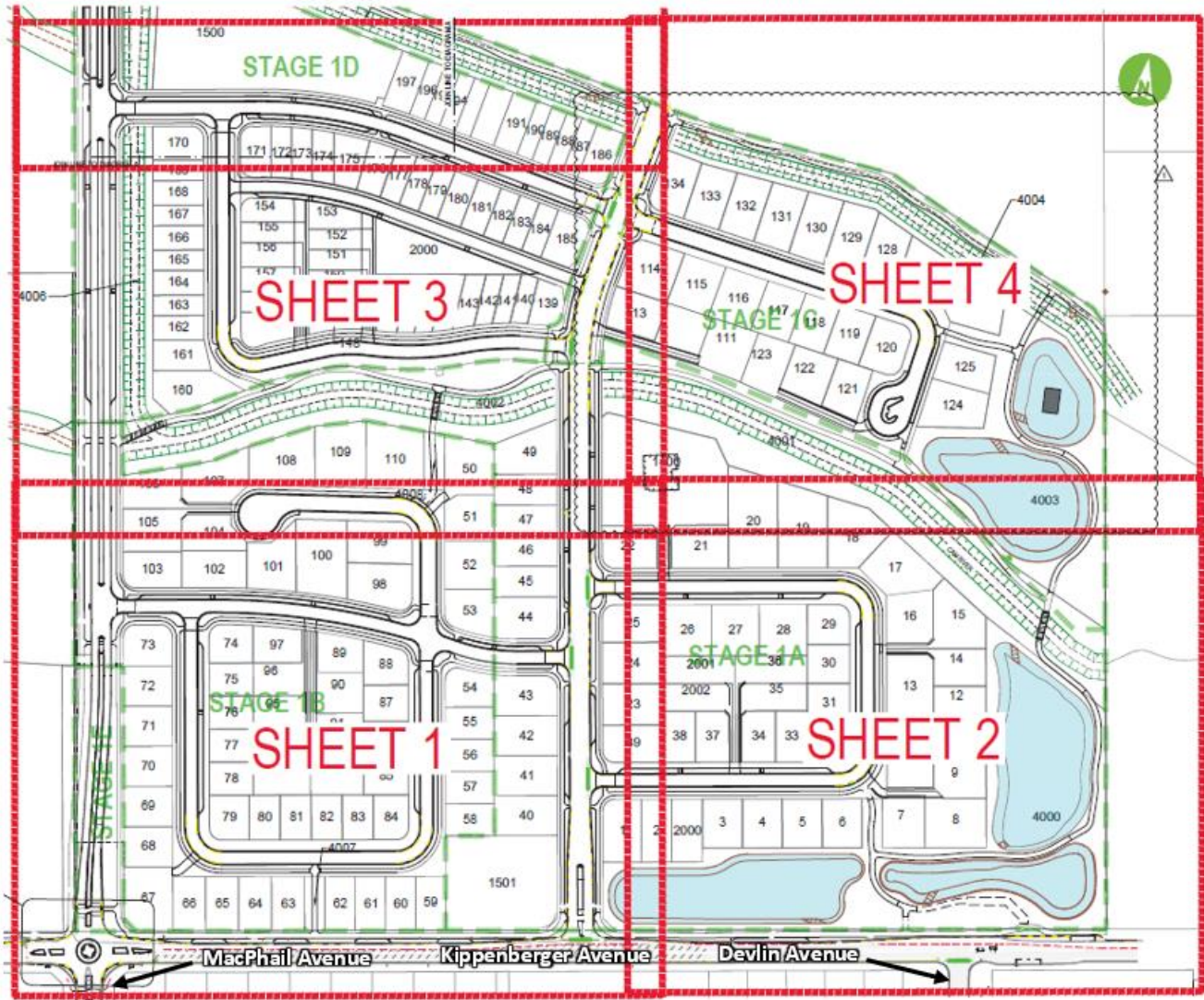


Figure 6-2: Bellgrove Subdivision Layout (Aurecon 'For Construction' Plan)

The plans for the Kippenberger Avenue frontage (Figure 6-3) include a shared path on the northern side of the road running to the eastern boundary of the subdivision. There are a crossing point with refuge island and a pair of bus stops just east of the Devlin Avenue intersection.

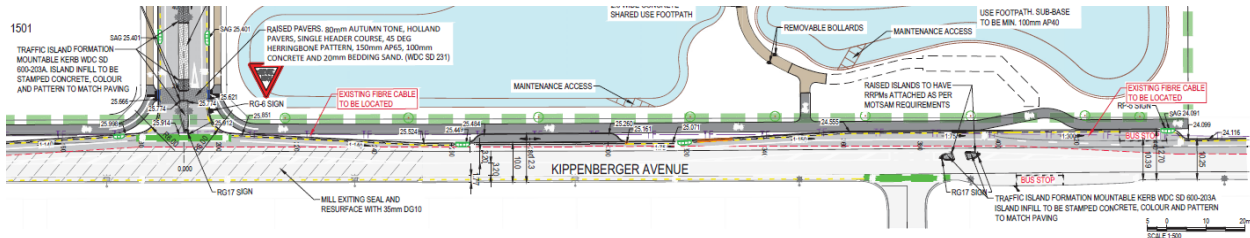


Figure 6-3: Bellgrove Subdivision Kippenberger Avenue Frontage (Aurecon 'For Construction' Plan)

6.2 Changes to Transport Network

The WDC Long Term Plan 2021-2031 has been reviewed. Two relevant projects in the Infrastructure Strategy have been identified.

A 'New eastern arterial in Rangiora' is listed as a project to manage impacts of growth and to reduce traffic congestion on Southbrook Road, with a timing of 2035/36. It is understood it is envisaged to run from Coldstream Road in the north to Lineside Road in south, potentially along the MacPhail Avenue route either side of Kippenberger Avenue.

'Rangiora / Woodend Road improvements' is listed as a road safety improvement project. It is understood to include a roundabout at the Rangiora Woodend Road / Boys Road intersection.

No future plans for changes to public transport provision in the area have been identified.

The Draft Waimakariri Integrated Transport Strategy has also been reviewed. It provides strategic direction and presents the following five responses to meet the transport challenges facing the district.



Figure 6-4: Draft Integrated Transport Strategy Responses

6.3 Nearby Landuse Changes

The recently approved Plan Change 30 to the District Plan makes provision for a Key Activity Centre in Ravenswood, which will only be approximately 5km east of the site via Rangiora Woodend Road and Bob Robertson Drive.

6.4 CAST Model Future Traffic Forecasts

Christchurch Assignment and Simulation Traffic (CAST) Model 2038 traffic forecasts for the Rangiora Woodend Road / Golf Links Road intersection are presented below.

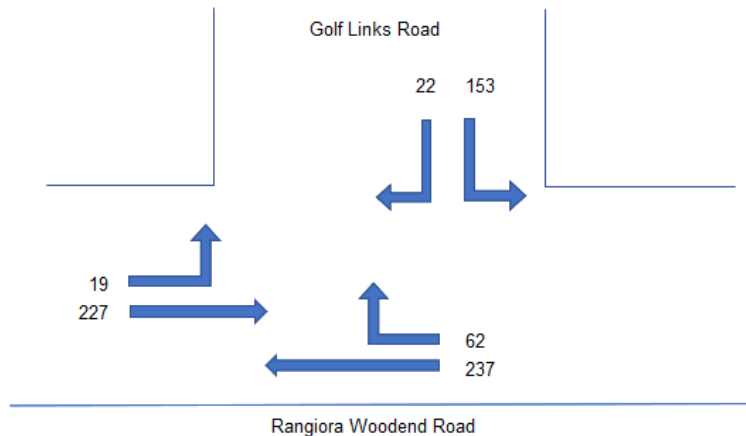


Figure 6-5: Rangiora Woodend Road / Golf Links Road 2038 CAST Model AM Peak Forecasts



Figure 6-6: Rangiora Woodend Road / Golf Links Road 2038 CAST Model PM Peak Forecasts

The through volumes on Rangiora Woodend Road are only approximately 10% higher than the existing volumes recorded recently. The volumes between Golf Links Road and Rangiora Woodend Road to the east are more than double the existing volumes. The result is that two-way volumes forecast on Rangiora Woodend Road east of the intersection and past the site are 30%-37% higher than they are currently.

The intersection has been modelled again in SIDRA with these future traffic forecasts. As summarised below, the intersection would still operate efficiently. The right turn out of Golf Links Road in the evening would face a 17s average delay which remains acceptable and this is a low volume movement. The relatively high volume right turn into Golf Links Road would continue to operate with low delays and limited queuing forecast.

Table 6-1: Forecast Future Intersection Performance (without Rezoning)

Peak Period	Movement	Average Delay	95 th % Queue
AM Peak	Golf Links Road Left	7s	0.6veh
	Golf Links Road Right	10s	0.2veh
	Rangiora Woodend Road Right	7s	0.2veh
PM Peak	Golf Links Road Left	8s	0.8veh
	Golf Links Road Right	17s	0.3veh
	Rangiora Woodend Road Right	7s	1.0veh

The traffic distribution of the zone opposite the site on the southern side of Rangiora Woodend Road (Zone 93 which includes some existing residential development) has been reviewed to inform the assessment that follows. The following table summarises the directional traffic distribution of the zone.

Table 6-2: CAST Traffic Distribution

Origin / Destination	AM Inbound	AM Outbound	PM Inbound	PM Outbound
Rangiora / Southbrook / Oxford	64%	53%	63%	66%
Christchurch	16%	32%	16%	15%
Woodend / Pegasus	8%	9%	8%	7%
Local Trips North	12%	6%	12%	12%

Trips to Rangiora / Southbrook / Oxford have been grouped together since they will all involve travel to the west along Kippenberger Avenue. Trips to Christchurch appear to be via the Eastern Arterial and Lineside Road in the 2038 CAST Model however there are options for travel to be via Rangiora Woodend Road to the east, as discussed later. Trips to



Woodend / Pegasus would be via Rangiora Woodend Road to the east, while the local trips north are assumed to be via Golf Links Road (and not adding to traffic volumes on Rangiora Woodend Road).

7. Proposed Rezoning

It is proposed to rezone the approximately 11.3ha site for residential use. The site could accommodate approximately 140 residential lots based on the proposed zoning.

An outline development plan (ODP) is proposed to guide development of the site and is shown in Figure 7-1. The ODP proposes intersections on Rangiora Woodend Road and Golf Links Road, as well as potential future connectivity to adjacent land to the west, north and east.

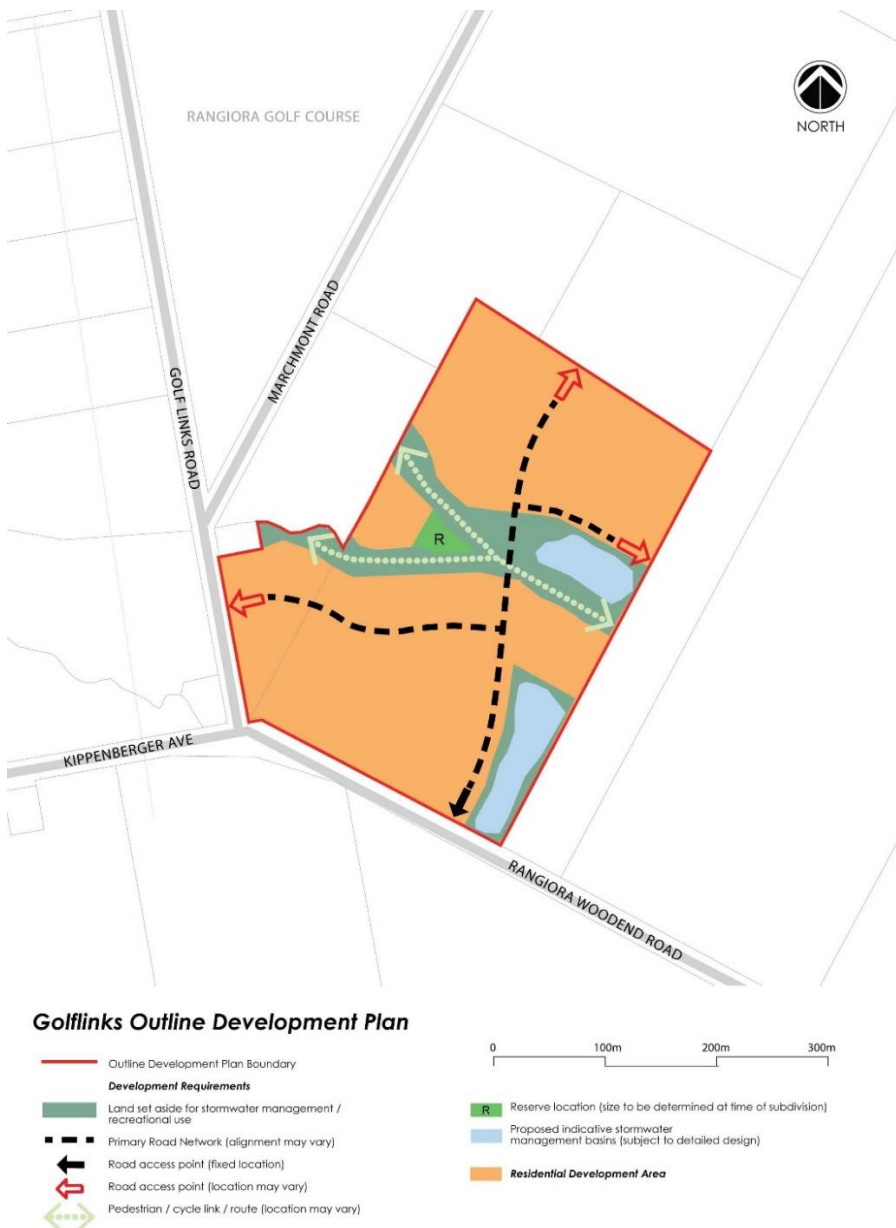


Figure 7-1: Proposed ODP



8. Traffic Generation

The following typical traffic generation rates have been adopted for this assessment:

- Daily traffic generation of 9 vehicle movements per day (vpd) per lot; and
- Peak hour traffic generation rate of 0.9 vehicle movements per hour (vpd) per lot.

Based on these rates, 140 lots could generate approximately 1,250vpd and 125vph.

During the morning, approximately 80% of traffic generation could be out of the site, while in the evening approximately 65% could be into the site.

The traffic distribution presented below, which is based on the CAST model distribution outlined earlier, has been adopted for this assessment. This is based on approximately 80% of movements being to and from the west (i.e. those to / from Rangiora and Christchurch) and 10% being to and from the east (Pegasus and Woodend). The remaining 10% of movements would be to / from the north on Golf Links Road and are therefore not included in this distribution which is focussed on the Rangiora Woodend Road / Kippenberger Avenue route for the analysis that follows.

Table 8-1: Traffic Distribution on Kippenberger Avenue / Rangiora Woodend Road for Analysis

Period	West Out	East Out	West In	East In
AM	80vph	10vph	20vph	3vph
PM	35vph	4vph	65vph	8vph

The resultant changes in traffic volume on nearby roads is set out in Table 8-2, based on the forecast 2038 CAST traffic volumes. Traffic volume increases are relatively small, with the largest increases being on Kippenberger Avenue towards Rangiora.

Table 8-2: Forecast Traffic Volumes (vph)

Road	AM Peak		PM Peak	
	Base (CAST)	With Rezoning	Base (CAST)	With Rezoning
Kippenberger Avenue west of site	505	605 (+100)	721	821 (+100)
Rangiora Woodend Road east of site	679	692 (+13)	1,101	1,113 (+12)
Golf Links Road north of site	256	268 (+12)	470	482 (+12)

9. Vehicle Access Assessment

9.1 Rangiora Woodend Road Intersection

9.1.1 T-Intersection Location / Formation

The new intersection on Rangiora Woodend Road is indicated on the ODP towards the eastern end of the site frontage, approximately 110m east of the curve in the road alignment and 200m east of Golf Links Road. The exact location and form of the intersection would be confirmed at the subdivision stage, however the ability to provide a safe and convenient T-intersection is assessed below.

Typically, at a T-intersection on an arterial road, there would at least be road widening opposite the intersection so that there is room for through traffic to pass a vehicle waiting to turn right from the main road. There is limited scope to widen Rangiora Woodend Road to the south in this location given there is the shared path on that side of the road, with limited separation between it and both the boundary and the carriageway.



A concept sketch has been prepared showing the space required to provide a right turn bay entirely on the northern side of the existing centreline and this is presented in Figure 9-1. Taper lengths are based a 60km/h design speed for eastbound traffic, which is considered appropriate given an urban speed limit would be expected if residential development is carried out adjacent to the road.



Figure 9-1: Intersection Concept with Right Turn Bay

This concept sketch confirms that the diverge taper could start after the curve for eastbound traffic, and a full right turn bay could be provided if necessary for an intersection in the indicated location.

With the road widening on the site side of the road to accommodate the right turn bay, the carriageway would move closer to the boundary. Power poles and the drainage channel along the front of the site could be impacted, and it may be preferable to remove these as part of an upgrade to the road frontage in any case.

9.1.2 T-Intersection Operation

The performance of the potential T-intersection on Rangiora Woodend Road has been modelled using SIDRA, while adopting the forecast 2038 through volumes from the CAST model, and the traffic generation outlined above. Based on an indicative subdivision layout, it has been assumed that 20% of traffic to / from the west would use Golf Links Road, while all traffic to / from the east would use the new intersection on Rangiora Woodend Road.

The following table summarises the forecast intersection performance.



Table 9-1: Forecast Performance of New Rangiora Woodend Road Intersection

Peak Period	Movement	Traffic Volume	Average Delay	95 th % Queue
AM Peak	New Road Left	10vph	7s	0.6veh
	New Road Right	64vph	12s	
	Rangiora Woodend Road Right	3vph	7s	0.0veh
PM Peak	New Road Left	4vph	8s	0.5veh
	New Road Right	28vph	25s	
	Rangiora Woodend Road Right	8vph	8s	0.0veh

The traffic modelling confirms that a T-intersection could operate well from a delay / efficiency perspective.

In the morning peak, the critical right turn out would face a low delay representing a good level of service B and there would be minimal associated queuing. The through volumes forecast during the morning peak are significantly lower than those during the evening peak, however this is consistent with current observations.

During the evening peak when through volumes are higher, delays for the right turn out of the site would be higher, however still forecast with an acceptable average delay of 25s which is the borderline between level of service C and D. It is noted that the right turn out would be a lower volume movement during the evening compared with during the morning. The right turn into the site would face low delays and there would be minimal queuing associated with this movement.

9.1.3 T-Intersection Safety

The location of the intersection would allow for sightlines to the west of approximately 160m-180m to the curve in the road, which are in excess of the Austroads safe intersection sight distance requirement of 151m for a 70km/h design speed. Based on an anticipated urban speed limit to support residential development, as well as the fact that eastbound traffic is approaching from an urban area, a 60km/h design speed is considered appropriate and the sightline to westbound traffic will be more than adequate. An unrestricted sightline to the east will be available along the straight section of road.

The traffic modelling shows that a new intersection on Rangiora Woodend Road would be expected to operate efficiently, even during peak times. There would not be safety-related concerns arising from the operation of the intersection, i.e. from long delays and / or queuing.

The design of the intersection could be considered further at a later stage, however the earlier sketch shows that a full right turn bay generated east of the curve in the road will be feasible and at this stage, this would be considered an appropriate intersection form in an urban setting with an urban speed limit in place.

9.1.4 Access to Land Opposite- Potential Roundabout

The land on the southern side of Rangiora Woodend Road is within the planned urban boundary of Rangiora, as presented earlier. An intersection to serve the land opposite the site would have similar constraints to those already outlined, with the need to be separated from the Golf Links Road right turn bay and provide widening for right turns into the site. This would mean that potentially the developers opposite could seek an intersection in a similar location to that already assessed.

A new crossroad intersection on the arterial road would not be appropriate from a road safety perspective. There could also potentially be safety-related concerns with two off-set priority intersections in close proximity on the arterial road, although it may be possible to provide staggered intersections with back to back right turn bays. The preference would be for a right-left stagger so that the right turns into the two side roads do not overlap. This would likely require the intersection for the land on the northern side of the road to be east of where it is indicated on the ODP (on the basis that the intersection on the southern side of the road could not be closer to the curve than where the northern intersection is indicated on the proposed ODP).

If access to both sides of Rangiora Woodend Road is sought at some stage, providing both with access to a roundabout could provide multiple benefits. A roundabout would slow through traffic and could act as a 'gateway' to Rangiora from the east, providing traffic calming benefits along the arterial route into the town. The roundabout is a "primary" Safe System



intersection treatment and would also provide safe and convenient access for development on both sides of the road, addressing any potential safety concerns with staggered T-intersections. It is considered that a roundabout could be designed for a 60km/h design speed in this location (rather than for a higher design speed) based on an expected urban speed environment. It is recommended that the boundaries at any new T-intersection on Rangiora Woodend Road allow for an urban roundabout to be constructed in the future (boundaries to be confirmed at the subdivision stage) in case access to the land opposite is sought and a roundabout is deemed the most appropriate intersection form.

9.2 Access to Golf Links Road

The ODP indicates a new intersection on Golf Links Road approximately 100m north of Rangiora Woodend Road and 70m south of Marchmont Road.

Providing an intersection on Marchmont Road is a good outcome from a connectivity perspective, meaning that local trips to the north via Golf Links Road can be made without adding to the number of movements to and from Rangiora Woodend Road.

Golf Links Road is forecast to carry peak hour two-way traffic volumes in the order of 260vph-470vph in 2038. At these levels of traffic, there are no concerns with a local road T-intersection being able to operate efficiently. The design of the intersection would be considered at the land-use consent stage, with it expected to tie into an urbanised frontage.

The intersection location does not have a long separation to either the Rangiora Woodend Road or the Marchmont Road intersections with Golf Links Road. However, vehicle speeds are relatively slow on Golf Links Road close to Rangiora Woodend Road since drivers are either slowing for the intersection or have just turned into Golf Links Road at a slow speed. The 70m separation between Marchmont Road and the proposed intersection represents a 5s travel distance at 50km/h, which is considered to be adequate to ensure there turning movements do not conflict and there is no driver confusion. The 100m separation from Rangiora Woodend Road to the proposed intersection is more than adequate to ensure that traffic turning to and from the new road does not impact the arterial road.

10. Assessment of Rangiora Woodend Road / Golf Links Road Intersection

10.1 Intersection Operation

The Rangiora Woodend Road / Golf Links Road intersection has been modelled with the additional traffic that could be generated by development of the site. 80% of traffic to / from the west is added to through volumes at the intersection while 20% of traffic to / from the west is added to turning volumes at the intersection (right turns out and left turns in). The following table summarises the modelling outputs.

Table 10-1: Rangiora Woodend Road / Golf Links Road Intersection Performance with Development

Peak Period	Movement	Traffic Volume	Average Delay	95 th % Queue
AM Peak	Golf Links Road Left	153vph	7s	0.6veh
	Golf Links Road Right	38vph (+16)	12s	0.3veh
	Rangiora Woodend Road Right	62vph	7s	0.2veh
PM Peak	Golf Links Road Left	181vph	8s	0.9veh
	Golf Links Road Right	29vph (+7)	20s	0.4veh
	Rangiora Woodend Road Right	244vph	8s	1.1veh



There is minimal difference between these results and those presented in Table 6-1, suggesting that the additional volume of traffic that could be generated by development of the site would not have a noticeable effect on the performance of this intersection.

10.2 Intersection Formation / Safety

The intersection has a high-speed, rural formation. As highlighted earlier, the intersection is large, with large radii, and a steep camber on the main road around the curve. The only pedestrian / cycle provision in the vicinity of the intersection is the off-road path on the southern side of the road. Non-car travel modes are addressed in the following section of the report, however the intersection is not pedestrian or cycle friendly.

It is considered that if residential development is to occur on Golf Links Road, regardless of whether it is on the western side as already anticipated, or on the eastern side of the road as would be enabled through the proposed rezoning, this intersection should be upgraded to an urban standard. It is expected that an upgrade would aim to achieve slower vehicle speeds by both turning and through traffic, a reduced intersection size if possible while still accommodating large vehicles, and safe pedestrian provision (discussed further below).

It is considered that this upgrade would be warranted to accommodate residential development on the western side of Golf Links Road, regardless of whether the site is developed. Accordingly, it is considered that a developer of the site could contribute to an intersection upgrade but should not be wholly responsible for it.

11. Non-Car Travel Modes Assessment

11.1 Pedestrian / Cycle Crossing on Rangiora Woodend Road

Currently there is only the shared path on the southern side of Rangiora Woodend Road within the vicinity of the site. There would be demand for pedestrians and cyclists to cross to this path from the site, for travel towards Rangiora as well as towards the likes of Ravenswood to the east.

Providing a safe pedestrian / cycle crossing point on Rangiora Woodend Road in conjunction with a new intersection will be achievable. If a T-intersection is provided, a refuge island could be built in opposite the right turn bay. With a refuge island, pedestrians would only need to cross the road one half at a time and desirable pedestrian crossing sightlines would be achievable. Having the speed limit reduced to an urban speed will also contribute to pedestrian / cyclist safety as well as the safety of the new intersection.

A roundabout would provide the opportunity to provide a pedestrian and cyclist crossing point in a slower speed environment.

11.2 Pedestrian / Cycle Demand Towards Kippenberger Avenue

A crossing point at the new intersection would serve the desire line of pedestrians and cyclists wanting to cross to the shared path on the southern side of the road to travel to the east towards Ravenswood, as well as that of most pedestrians and cyclists wanting to travel towards Rangiora. However, the desire line towards Rangiora for some people within the site would potentially be across Golf Links Road and along the northern side of Kippenberger Avenue, or across Rangiora Woodend Road in the vicinity of the Golf Links Road intersection.

Figure 3-1 presented earlier summarises the constraints in the vicinity of the Rangiora Woodend Road / Golf Links Road intersection. Having pedestrians cross Rangiora Woodend Road in the vicinity of the intersection is undesirable given the road alignment limits visibility to approaching vehicles and the road is wide with the right turn bay. On the northern side of Rangiora Woodend Road, the 8 Kippenberger Avenue property boundary appears to limit the ability to provide a path on the western side of Golf Links Road, while the Cam River is another constraint for a path in this location.



It is considered it will be necessary to ensure there is a route for pedestrians and cyclists from the new Golf Links Road intersection to cross Golf Links Road and connect to the path on the northern side of Kippenberger Avenue outside the Bellgrove subdivision. It may be that this cannot be provided until the 8 Kippenberger Avenue site is developed for residential use.

11.3 Pedestrian Demand North

Once there is development on the western side of Golf Links Road, connecting through to Bellgrove Subdivision and potentially into the northern part of Rangiora, there could be pedestrian demand between development within the site and these areas. It will be necessary to urbanise Golf Links Road as development of the site occurs and this would include providing a footpath or shared path and crossing points to the western side of the road.

11.4 Public Transport Accessibility

Regarding public transport accessibility, the site has a bus route going past it as highlighted earlier. Existing bus stops on Kippenberger Avenue, east of Devlin Avenue, are within walking distance to the west (approximately 300m west of Golf Links Road), but a safe pedestrian connection to the west will need to be provided as outlined above. A pair of bus stops could be provided on the site frontage in the future to provide improved accessibility for the site (and the land on the southern side of the road) but this would be done by ECan in response to demand.

12. District Plan Policy Assessment

12.1 Proposed District Plan

The transport related objectives and policies of the Proposed Waimakariri District Plan have been reviewed. The following four policies are considered to be the most relevant for a residential rezoning and consistency with these policies is commented on below.

TRAN-P2 Environmentally sustainable outcomes

Seek more environmentally sustainable outcomes associated with transport, including by promoting:

1. the use of public transport, [active transport](#) and sustainable forms of transport;
2. the use of [green infrastructure](#);
3. the increased utilisation of renewable resources;
4. the use of low impact approaches (such as in [site](#), [route](#) or [structure](#) selection or construction methodology);
5. using low carbon materials in construction;
6. changing the way activities that generate high greenhouse gas emissions are delivered;
7. offsetting greenhouse gas emissions through activities such as planting carbon sequestering trees or the establishment and restoration of [wetlands](#); and
8. energy efficiency and conservation practices.

TRAN-P4 New activities

New activities:

1. locate on or establish primary access to the classification of [road](#) within the [District Plan road hierarchy](#) best able to accommodate the level and type of traffic generated;
2. provide safe entry and exit for vehicles to and from a [site](#) to a [road](#) without compromising the safety or efficiency of the [road corridor](#) or [rail corridor](#);
3. where a [site](#) has two or more [road frontages](#), provide access from the classification of [road](#) within the [District Plan road hierarchy](#) best able to accommodate the level and type of traffic generated;
4. provide safe and efficient access, including ease of access by service and [emergency service](#) vehicles; and
5. provide facilities for safe [active transport](#), including through marked [on-road cycle lanes](#), [separated cycle lane](#), [sealed road](#) shoulders with sufficient width to safely accommodate cyclists, [off-road](#) formed cycle paths, cycling end-of-journey facilities for staff, [shared use path](#) and footpaths.



TRAN-P7 Connections between new development and public transport

Achieve connections between public transport and new developments in major settlements by requiring:

1. new residential neighbourhoods to be designed to ensure convenient and safe walking distances from proposed residential allotments to public transport and other amenities; and
2. roading design that facilitates the provision of an efficient and convenient public transport system into, out of, and around the development.

TRAN-P15 Effects of activities on the transport system

Ensure, to the extent considered reasonably practicable, that other activities do not compromise the safe and efficient operation, maintenance, repair, upgrading or development of the transport system, including through:

1. managing access to the road corridor, and activities and development adjacent to road/rail level crossings, particularly where it is necessary to achieve protection of the safe and efficient functioning of the transport system, including those parts of the transport system that form part of critical infrastructure, strategic infrastructure and regionally significant infrastructure;
2. avoiding, remedying or mitigating adverse reverse sensitivity effects on the transport system; and
3. providing for ease of access for service and emergency service vehicles.

Key relevant matters are accessibility by non-car travel modes, the appropriateness of vehicle access to / from the frontage roads and effects of additional traffic on the transport system.

12.1.1 Non-Car Travel Assessment

Accessibility by non-car travel modes is addressed in Section 11. It is considered essential for a safe crossing point over Golf Links Road and a connection to the shared path on the northern side of Kippenberger Avenue to be provided to allow safe and convenient travel by walking and cycling towards Rangiora.

As shown below in Figure 12-1, the site is located approximately 1.8km east of the town centre, closer than existing and planned residential areas to the west of the town. This distance would take approximately 25 minutes to walk and would be a short cycle ride. It is considered that walking or cycling will be viable travel modes to the town centre, and it is noted that there are key activities, including the high school, located to the east of the town centre.





Figure 12-1: 1.8km Radius around Rangiora Town Centre (Google Earth)

A crossing point will be able to be provided in conjunction with the new intersection on Rangiora Woodend Road, and this will allow people to connect to the path on the southern side of the road, providing options for travel towards destinations to the east, including Ravenswood.

As outlined, there is a bus route currently running past the site on Rangiora Woodend Road. Stops are currently located on Kippenberger Avenue, east of Devlin Avenue, which is approximately 300m west of the site. Provided a crossing point on Golf Links Road and a connection to the Kippenberger Avenue shared path on the northern side of the road are provided, residents of the site will be able to safely access the bus stops. If development occurs on the site and on the land to the south of Rangiora Woodend Road, it is possible that an additional bus stop pair could be provided on the site frontage to better service the new residential land. Also, bus service frequencies could be improved in the future to better serve developing areas, such as Ravenswood.

It is concluded that a residential development of the site can be appropriately connected to the existing pedestrian / cycle network to ensure it is accessible by a range of non-car travel modes.

12.1.2 Vehicle Assessment

The new intersections on Rangiora Woodend Road and Golf Links Road were assessed in Section 9.

A new T-intersection on Rangiora Woodend Road will be able to function safely and efficiently with an urban speed limit in place. A right turn bay could be provided to ensure through traffic on the arterial road is not impacted by turning traffic.

Having new intersections on both Rangiora Woodend Road and Golf Links Road is considered a good outcome for connectivity and providing route options to spread traffic. Having a new intersection on Rangiora Woodend Road means



that the whole development will not be reliant on Golf Links Road, with the new intersection able to be designed to an appropriate standard (whereas the existing Golf Links Road intersection is constrained due to its location).

If the land on the southern side of Rangiora Woodend Road is to be developed, it will be preferable to provide access to both sides of the road from a new roundabout and it has been recommended that boundaries at the new intersection allow for an urban roundabout (to be confirmed at subdivision stage).

In the wider area, the traffic volumes that could be generated by an approximately 140 lot subdivision will be relatively low and would be dispersed across multiple routes, likely including the new Rangiora eastern arterial route. Accordingly, no traffic analysis beyond the new intersection on Rangiora Woodend Road and the Rangiora Woodend Road / Golf Links Road intersection has been carried out at this stage.

12.2 Operative District Plan

The transport-related policies of Chapter 11 Utilities and Traffic Management of the Operative District Plan have also been reviewed. The following Policy 11.1.1.5 is considered the relevant one related to land use and transport planning.

Policy 11.1.1.5

New developments and activities in relation to their traffic generation characteristics should:

- a. locate on or establish primary access to an appropriate level of road within the road hierarchy;
- b. not have vehicular access to an inappropriate level of road in the hierarchy; and
- c. provide cycleways along arterial, strategic and collector roads where:
 - i. necessary to provide an identified transport or recreation function; and
 - ii. alternative opportunities do not exist within the road hierarchy.

Points a and b are related to providing access on an appropriate road in the road hierarchy. As already assessed above, it is considered a good outcome to provide intersections on the arterial Rangiora Woodend Road as well as the collector Golf Links Road. A new T-intersection on Rangiora Woodend Road will be able to operate safely and efficiently in an urban speed environment, with negligible effects on the safety and efficiency of the arterial road network.

Point c is related to providing cycleways along arterial and collector roads. There is already a cycleway along the southern side of Rangiora Woodend Road. The designs of the Rangiora Woodend Road and Golf Links Road frontages, including path provision, will be matters to be confirmed at a later stage. As highlighted, there will need to be a connection from the site to the existing shared path on the northern side of Kippenberger Avenue to support residential activity on the site.

Policy 11.1.1.6 is related to vehicle access to individual sites. This would be considered at the subdivision stage and is not considered relevant for this proposed rezoning.

13. Conclusion

The proposed rezoning represents a relatively small extension of the planned Rangiora urban area, with approximately 140 lots anticipated. The proposed ODP will ensure that a development of the site will be appropriately connected the surrounding areas for a range of travel modes. The proposed intersections on Rangiora Woodend Road and Golf Links Road will be appropriately located and will be able to be designed to ensure they operate safely and efficiently. Possible future roading connections to the land north and east of the site are indicated.

It will be necessary to provide a safe crossing point over Golf Links Road and a connection to the existing shared path on the northern side of Kippenberger Avenue to allow pedestrians and cyclists a safe and convenient route towards Rangiora. This will also ensure pedestrians can access the existing bus stops to the west of the site, while new bus stops could be provided on the site frontage in the future given there is a bus route running past the site on Rangiora Woodend Road.



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