

Integrated Transport Assessment Tamahere Village Hub

Waikato District Council

ISSUE 1, 23 FEBRUARY 2017

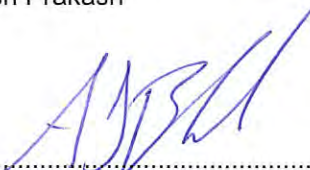


Integrated Transport Assessment Tamahere Village Hub

Waikato District Council

Prepared by: 

Vinish Prakash

Approved by: 

Alastair Black/Alasdair Gray

ISSUE 1, 23 FEBRUARY 2017

2 Alfred Street
PO Box 14178
Hamilton, 3214
Tel: 07 853 8997



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EXECUTIVE SUMMARY

Foster Developments Ltd have applied for land use consent for a development in Tamahere. Waikato DC asked Gray Matter to review the traffic assessment in the application and extend it to consider how best to treat the Birchwood Lane/Devine Road intersection.

Proposal

The site is located on the corner of Devine Road and Wiremu Tamihana Drive within the Tamahere Village Business Zone.

The proposal is for a mixed-use commercial development. The development comprises of four buildings with a total area of 2,929m². The development will include boutique style shops, healthcare facilities, a café, restaurant/bar and grocer.

The plans indicate two vehicle crossings, one on Devine Road and one on Wiremu Tamihana Drive. The vehicle crossing on Devine Road forms a crossroads intersection with Birchwood Lane and Devine Road. The southern end of the carpark will connect to the parking area adjacent to the proposed sports pavilion with additional access to Wiremu Tamihana Drive

Summary

The commercial hub is estimated to generate 2,600 veh/day and 560 veh/hr during the peak hour. There do not appear to be any issues likely relating to traffic efficiency at the intersection following the changes to the roading network and full development of the site. Generally, crossroads intersections are undesirable. A more appropriate option would be to form a roundabout at the intersection with the access into the Village Hub forming a fourth leg. The alternative of relocating the entranceway to between Birchwood Lane and Wiremu Tamihana Drive has operational and safety disadvantages.

There is shortfall of parking onsite. The adverse effects are likely to be less than minor. They could be reduced by encouraging alternative modes of transport and allowing overflow of parking to the recreation reserve car park adjacent to the commercial Village Hub.

With appropriate modifications, the transportation effects of the proposal could be managed to be minor or less.

Suggested Options for Mitigation

We understand that WDC is working with the developer and have therefore presented options for mitigation rather than conditions. We suggest the following options for mitigation:

- = WDC to review the detailed car park design before works commence onsite;
- = That the Devine Road vehicle crossing be designed and constructed to allow the Devine Road/Birchwood Lane intersection to be formed as a roundabout with the Village Hub vehicle crossing forming a fourth leg;
- = Four courier/service vehicle spaces are provided onsite plus a loading bay for large vehicles. The loading bay should be designed to accommodate a 90%ile truck (at least 8.3m x 2.44m + clearance + manoeuvring) ;
- = Review number of accessible spaces; and
- = Provide additional parking spaces, potentially located:
 - o In the landscaped area shown between spaces 61 and 62;
 - o Next to space 10; and
 - o Next to space 6.

1. BACKGROUND

1.1. Introduction

Foster Developments Ltd have applied for land use consent for a development in Tamahere. Waikato District Council asked Gray Matter to review the traffic assessment in the application and extend it to consider how best to treat the Birchwood Lane/Devine Road intersection. Traffic Design Group (TDG) had previously prepared a "Transport Statement" (letter dated 22 December 2016) for the development. The Transport Statement assessed the internal site layout and access points.

1.2. Purpose and Basis of this Report

The purpose of this report is to assess the potential adverse effects of traffic and parking related to the proposed commercial development and the traffic effects on the surrounding road network, in particular at the Devine Road/Birchwood Lane intersection.

This Integrated Traffic Assessment (ITA) considers the following:

- = Existing environment;
- = Committed environmental changes;
- = Existing travel characteristics;
- = Proposal details;
- = Appraisal of transportation effects;
- = Options for mitigation;
- = Compliance with policy and other frameworks;
- = Discussion and conclusions; and
- = Recommendations

2. EXISTING ENVIRONMENT

2.1. Locality and Transport Environment

The site is located on the corner of Devine Road and Wiremu Tamihana Drive within the Tamahere Village Business Zone. A concept layout for the mixed-use development is included in the District Plan schedule 23B Tamahere Village Business Zone rules. The site is mainly surrounded by properties within the Country Living Zone with a recreation reserve southeast of the site and the Tamahere Model School northeast of the site.

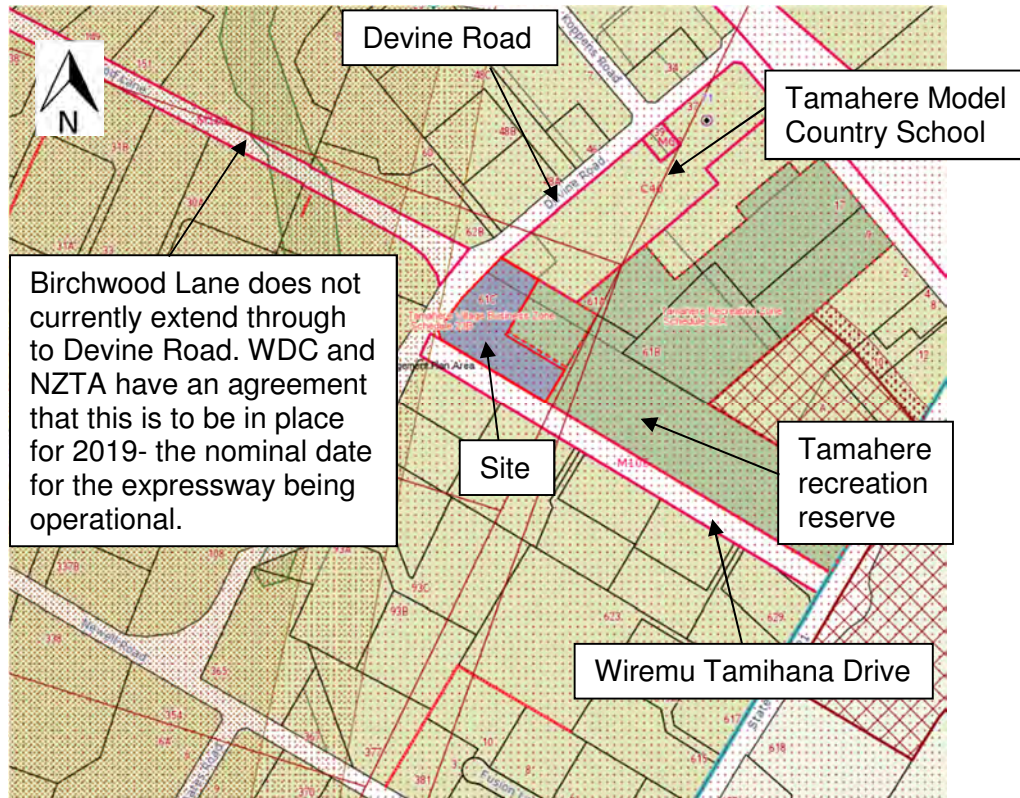


Figure 1: Site Locality (Waikato District Council – Intra Maps)

Table 1 summarises the roads surrounding the site.

Road	Description	Photo (Google streetview)
Devine Road	ONRC: Secondary Collector AADT 602 veh/day (north of Wiremu Tamihana Road) – 1480 veh/day (south of Wiremu Tamihana Road) 2-lane road, approximately 11.5m carriageway width to accommodate right turn bays and left turn lanes into Birchwood Lane and Wiremu Tamihana Drive there is footpath on both sides of the road	

Road	Description	Photo (Google streetview)
Birchwood Lane	This section of Birchwood Lane forms an intersection with Devine Road and only provides access to one rural residential property as it does not yet extend to the northern section of Birchwood Lane. This is likely to operate as a collector road once the east-west link is operational (see Figure 2).	
Newell Road	ONRC: Primary Collector AADT 4016 veh/day 2-lane road, approximately 5.8m carriageway with footpath located on one side of the road east of Aspenleigh Drive.	
Wiremu Tamihana Drive	ONRC: Secondary Collector AADT 1421 veh/day 2-lane road, approximately 7m wide carriageway. The road is marked with edge lines and a centreline. There is a shared path located on one side of the road.	

Table 1: Existing Road Environment

2.2. Crashes

We have completed a search of the NZ Transport Agency's Crash Analysis System (CAS) for the Birchwood Lane/Devine Road and Wiremu Tamihana Drive / Devine Road intersections. There have been no reported crashes for either of the intersections.

3. COMMITTED ENVIRONMENTAL CHANGES

3.1. Waikato Expressway – Hamilton Section

The Hamilton section of the Waikato Expressway is currently under construction with completion expected by 2020. Works include a new southern interchange and construction of a Tamahere east/west link. The Hamilton Section of the Expressway will tie into the existing Tamahere interchange.

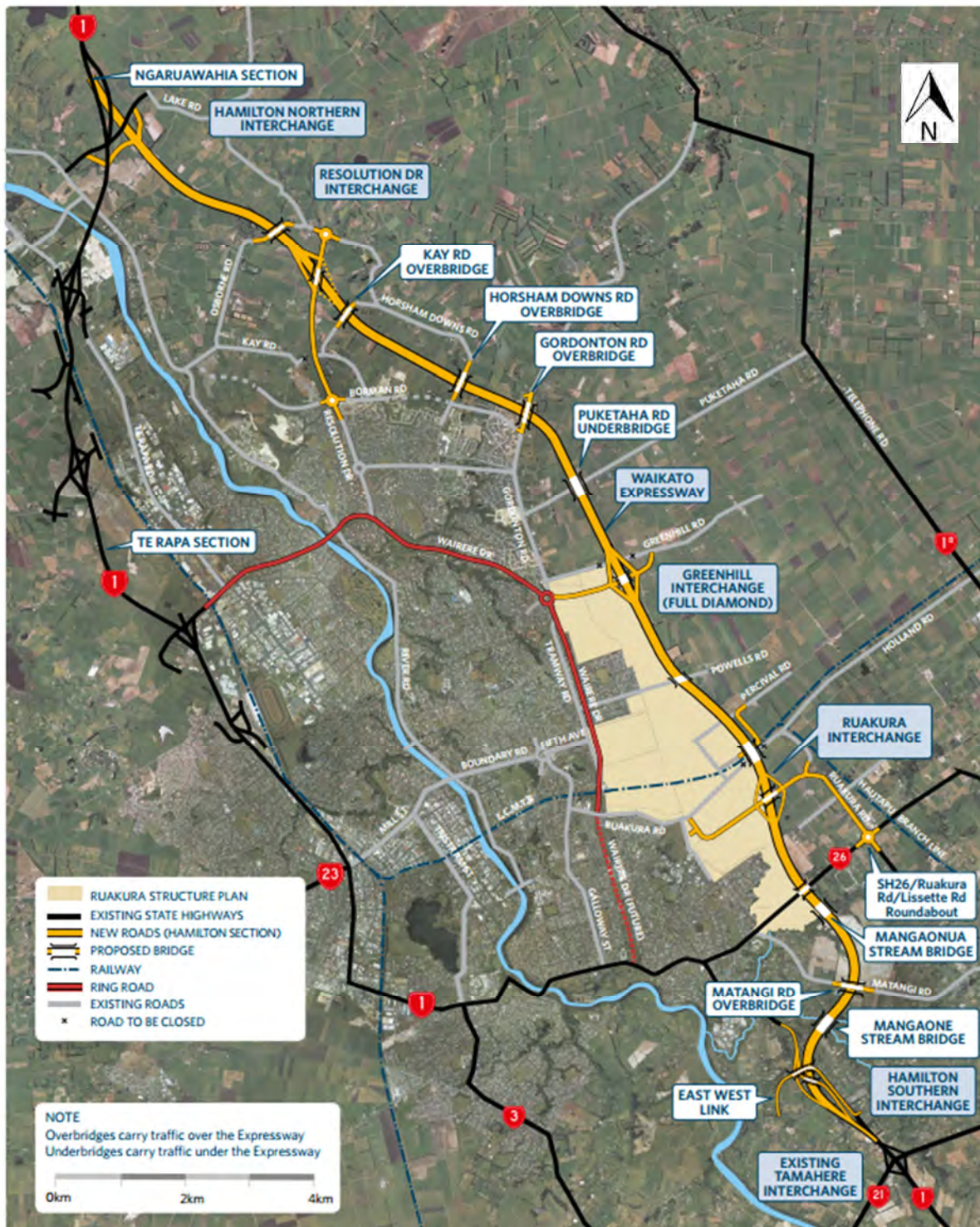


Figure 2: Waikato Expressway – Hamilton Section (NZTA)

3.2. Tamahere East/West Link

The new east/west link road will provide connectivity across the Expressway for Tamahere east residents on Cherry Lane and Bollard Road to areas such as the Tamahere Model School and the proposed Tamahere Village Hub. The link road will form a “T” intersection with Birchwood Lane approximately 600m south of the Newell Road/Birchwood Lane intersection. The east/west link is expected to be completed at the same time as the Hamilton Section of the Expressway.

3.3. Birchwood Lane Extension

The District Plan shows Birchwood Lane extending from Newell Road to Devine Road. Currently there is no through access from Newell Road to Devine Road via Birchwood Lane as a 330m long section is unformed. The section of Birchwood Lane with access to Devine Road only services one lot. A Memorandum of understanding between NZTA and Waikato District Council (2013) states that the extension of Birchwood Lane is to be completed by 2019 unless accelerated by NZTA. However, this project is currently not included in Waikato District Council’s Long Term Plan (2015-2025).

3.4. Cambridge Road/Newell Road Intersection

The NZ Transport Agency engaged Opus to complete an assessment of the Newell Road/Cambridge Road intersection to assess the safety and efficiency impacts because of the Expressway works on Cambridge Road (Opus report Cambridge Road/Newell Road Intersection Review (18/07/16)).

Opus completed traffic modelling based on three scenarios. The modelling took into account the changes to the network e.g. the Waikato Expressway, the east/west link, Birchwood Lane extension and the Tamahere Village Hub. Table 1 below shows the WRTM traffic volumes at the Devine Road/Birchwood Lane intersection for the following three scenarios:

- = A: Newell Road/Cambridge Road as per existing arrangement;
- = B: Newell Road/Cambridge Road left-in/left-out only; and
- = C: Newell Road/Cambridge Road closed.

Scenario	Total Vehicles at Devine Road/Birchwood Lane Intersection (veh/hr)					
	2021			2041		
	AM Peak	Mid Peak	PM	AM	Mid	PM
A	191	110	128	256	148	205
B	207	118	139	276	168	208
C	211	119	138	284	173	222

Table 1: Opus Modelling Extract from WRTM at Devine Road/Birchwood Lane Intersection

The Opus report concluded that NZTA should consider closing the Newell Road/Cambridge Road intersection as the overall effect of closing the intersection on Tamahere West residents is likely to be less than minor. Based on WRTM traffic volume extracts closing the intersection at Newell Road (Scenario C) is likely to increase demand at the Birchwood Lane/Devine Road intersection in 2021 and 2041.

3.5. Hamilton - Cambridge Cycle Connection

We understand that there is a cycleway planned to provide connection from Hamilton to Cambridge with connection to Tamahere as well. The current preferred alignment runs along Birchwood Lane.

4. EXISTING TRAVEL CHARACTERISTICS

The site is currently vacant. There is a school located next to the site. Most of the traffic on Devine Road is predominately for access onto local roads or rural residential property access. Access into Tamahere west from Tamahere east is via the Tamahere interchange or the Newell Road/Cambridge Road intersection.

5. PROPOSAL DETAILS AND PREDICTED TRAVEL DATA

5.1. District Plan Concept

Figure 3 shows the District plan concept for the Tamahere Village Hub and the recreation reserve. The plan shows a vehicle crossing on Devine Road and a vehicle crossing on Wiremu Tamihana Drive. The Devine Road vehicle crossing forms a fourth leg to a proposed roundabout on Devine Road. The concept layout shows a connection from the Village Hub car park to the adjacent car park for the sports fields.

Appendix 2 - Tamahere Village Concept Plan

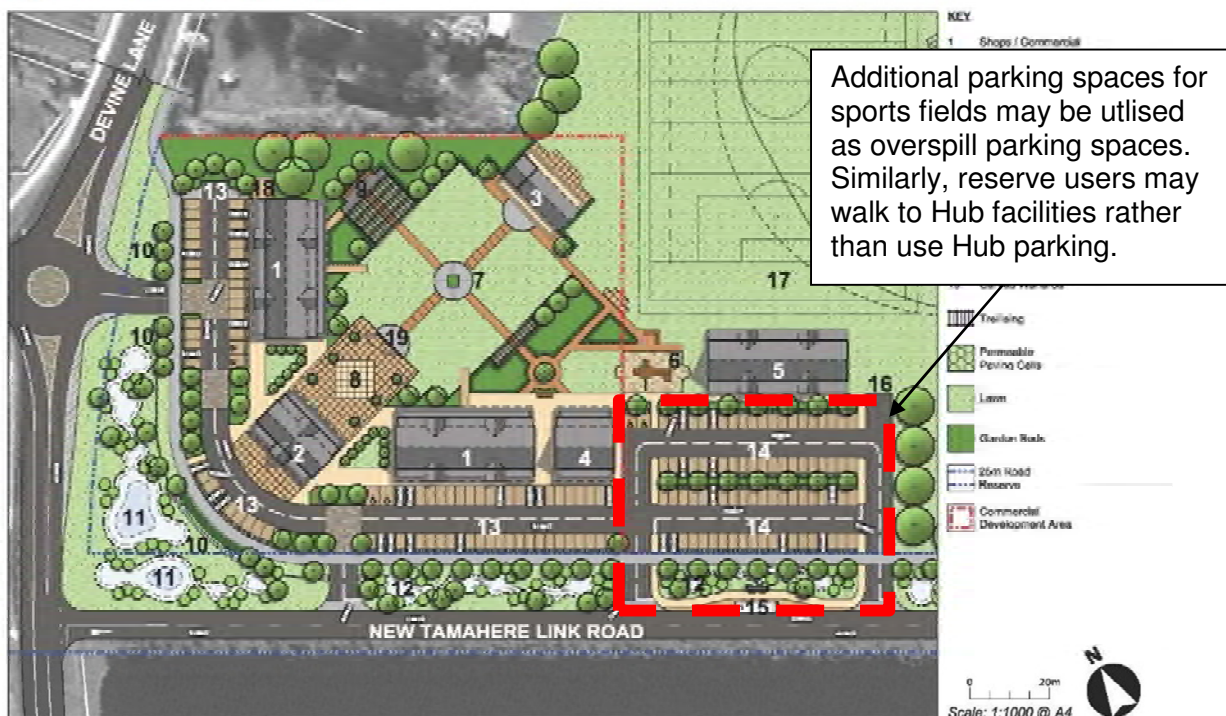


Figure 3: Waikato District Plan – 23B.4 Tamahere Village Concept Plan

5.2. Description of proposal

The proposal is for a mixed-use commercial development. The site is located within the Tamahere Village Business Zone. The development is comprised of four buildings, shown as Block A, B, C and D on the drawings. Blocks A and D are single storey with blocks B and C double storey. The proposal is broadly consistent with the District Plan concept.



Figure 4: Proposed Tamahere Village Hub Site Plan (refer larger Copy attached at Appendix B)

The development will include boutique style shops, healthcare facilities, a café, restaurant/bar and grocer. The associated activities and areas for each block are described in Table 2 below.

Activity	Block A (single storey) m²	Block B (double storey) m²	Block C (double storey) m²	Block D (single storey) m²	Total m²
Retail	252 (108+72+72)		335 (142+193)		587
Doctor	251				251
Grocer				350	350
Bistro		310			310
Café		200			200
Wine Cellar			200		200
Court yard		93			93
Kitchen		80			80
Venue		206			206
Office			545 (290 +255)		545
Ancillary areas (e.g. access, WC etc.)		45	62		107
Total Area					2929

Table 2: Proposed building activities and areas (m²)

5.3. Traffic

5.3.1. Trip Generation.

Table 3 assesses the trip generation based on published trip generation rates from Road Research Report 453 – trips and parking and the RTA Guide to Traffic Generating Developments. RR-453 trip generation rates for restaurants/cafes are based on seats. We are unaware of how many seats the restaurant/café development includes. For the purposes of this assessment, we have calculated the trip generation for the café and bistro activities using published trip generation rates from RTA, which assess the trip generation based on floor area.

Activity	Area Total	Daily Trip Rate	Daily Trips (veh/day)	Peak Hour Trip Rate	Peak Hour Trips (veh/hr)
Retail	587	128.6/100m ²	755	42.5/100m ²	249
Doctor	251 6 consultants + 6 staff)	79.4/prof staff	476	11.6/prof staff	70
Grocer	350	129/100m ²	451	17.9/100m ²	63
Bistro	310	60/100m ²	186	5/100m ²	9
Café	200	60/100m ²	120	5/100m ²	60
Wine Cellar (RR453)	200	128.6/100m	257	42.5/100m ²	85
Court yard (above bistro)	93	60/100m ²	56	5/100m ²	3
Venue (above bistro)	206	60/100m ²	124	5/100m ²	10
Office	545	26.1/100m ²	142	2.5/100m ²	14
			2,567		563

Table 3: Assessment of Trip Generation

Based on published trip generation rates we have assessed the trip generation as:

- = Daily 2,600 veh/day
- = Peak hour 560 veh/hr

The site is likely to generate multipurpose trips. RTA states that for multipurpose trips a discount factor of 20-25% can be applied for shopping centres with a gross leasable floor area (GLFA) of less than 10,000m². Based on a 20% reduction, daily trip generation is likely to be 2,100 veh/day and 450 veh/hr during the peak hour. Our assessment is based on a worst-case scenario of 2,600 veh/day and 560 veh/hr. Therefore, our assessment of trip generation is likely to be conservative.

Trip generation was not assessed in the TDG Transport Statement.

5.3.2. Trip Distribution

The trips generated to and from site are likely to be from residents within the Tamahere Community. We expect that there is likely to be an increase in movements between the Tamahere east and west catchments.

Most trips to and from site are likely to be from Devine Road as it provides the most direct form of access to Tamahere west and north. We have assumed a worst-case scenario of all trips

generated by vehicles entering and existing from the Devine Road vehicle crossing. Actual trip distribution is likely to be closer to 70% via Devine Road and 30% via Wiremu Tamihana Drive.

The modelling completed by Opus concluded that closing the Cambridge Road/Newell Road intersection would result in 222 veh/h (2041 pm peak) at the Devine Road/Birchwood Lane intersection. This modelling included some trips from the proposed development but the volume is unclear. For the purposes of our intersection assessment, we have conservatively assumed 560 veh/hr would use the Devine Road vehicle crossing.

5.4. Access

The plans indicate two vehicle crossings, one on Devine Road and one on Wiremu Tamihana Drive. The southern end of the carpark will connect to the parking area adjacent to the proposed sports pavilion with additional access to Wiremu Tamihana Drive.

5.4.1. Devine Road Vehicle Crossing

The vehicle crossing on Devine Road forms a crossroads intersection with Birchwood Lane and Devine Road. There is approximately 90m separation from the Devine Road/Wiremu Tamihana Drive intersection. The Tamahere Village Concept plans show a roundabout with a fourth leg for access into the Village. The proposed access arrangement does not currently show a roundabout.

5.4.2. Wiremu Tamihana Vehicle Crossing

The vehicle crossing on Wiremu Tamihana Drive is approximately 6m wide at the property boundary and located approximately 70m southeast of the Wiremu Tamihana/Devine Road intersection. We note that there is a vehicle crossing located approximately 30m southeast of the Village Hub vehicle crossing. The vehicle crossing appears to be servicing three lots. However, none appear to be developed.

5.5. Parking

There are 107 parking spaces proposed with eight spaces allocated as accessible parking spaces. Table 4 summarises the minimum District Plan parking requirements for the various activities onsite. For the purposes of this assessment, we have assumed that there will be six consultants and six staff at the proposed medical centre in Block A.

Activity	Area Total	District Plan Parking requirement	Parking spaces
Retail	587	1 space per 45m ² GFA including indoor and outdoor retail area	13
Doctor	251 6 consultants + 6 staff)	2.5 car spaces per professional consultant plus 1 car space per fulltime equivalent staff	15+6= 21
Grocer ¹	350	1 space per 25m ² GFA	14
Bistro	310	1 car space per 10m ² net public floor area	31
Café	200	1 car space per 10m ² net public floor area	20
Court yard (above bistro)	93	1 car space per 10m ² net public floor area	9
Venue (above bistro)	206	1 car space per 10m ² net public floor area	21

¹ Assessed as a supermarket

Activity	Area Total	District Plan Parking requirement	Parking spaces
Wine Cellar	200	1 space per 30m ² GFA	7
Office	545	1 car space per 35m ² GFA	16
Total Spaces			152

Table 4: District Plan Parking Requirements

There is a shortfall of approximately 45 parking spaces when compared to the District Plan parking requirements. No loading spaces are shown on the site plans, based on our assessment at least four spaces are required.

The TDG Transport Statement assessed the District Plan parking requirement as 126 spaces our assessment suggests that 152 parking spaces are required. The TDG assessment is based on the public space for the café and restaurant areas being 75% of GFA and the Grocer has been assessed as a retail activity. We have assessed the café and restaurant based on the total area of the activity excluding the kitchen and assessed the grocer as a supermarket.

The parking spaces are shown as 2.6-2.7m wide parking spaces and are wider than or consistent with the District Plan parking bay minimum dimensions. There are 16 bicycle parking spaces shown on the site plans. The District Plan requirement is for one bicycle space every 10 parking spaces. Based on our parking assessment the site only requires 15 bicycle parking spaces. There is a surplus of one bicycle parking space.

The District Plan requirement for accessible spaces is for at least one accessible park to be located within close access to every activity. We have assessed each building as one activity, which suggests four accessible spaces are required. The Building Code, Clause D1 Access routes, suggests that for 100 car parking spaces provided two accessible spaces are required. There are eight spaces proposed which is 4-6 spaces more than required. This reduces the spaces available for other users.

6. TRANSPORTATION EFFECTS

Our assessment of effects assumes the following changes to the roading environment as part of the expected environment:

- = Completion of the Waikato Expressway – Hamilton Section (expected 2019)
- = Completion of the Tamahere East/West Link (expected 2019)
- = Completion of the Birchwood Lane extension (unfunded but targeting 2019)
- = Closure of Newell Road/Cambridge Road intersection (to be decided but results in a slightly conservative assessment)

6.1. Traffic

Based on published trip generation rates we expect approximately 2600 veh/day and approximately 560 veh/hr. It is likely that the majority of turning movements will occur at the Devine Road vehicle crossing as it provides the most direct form of access onto site.

We have completed SIDRA traffic modelling for the Devine Road/Birchwood Lane intersection based on 2041 traffic volumes from WRTM (Opus report) and estimated development traffic for both a crossroads intersection and a roundabout. Summary of intersection performance is shown in Table 5, full SIDRA movement summary outputs are attached at Appendix C.

Intersection type	Worst Average delay (sec/veh)	Worst 95 th %ile queue distance (m)	Worst Level of Service (LOS)	Comment
Crossroads	10.4 seconds (right turn out of Birchwood Lane)	16.3m (Village Hub vehicle crossing)	LOS B (right turn out of Birchwood Lane)	Queues and delays appear to be manageable. Performs slightly poorer than the roundabout.
Roundabout	9 seconds (right turn from Devine Road into Village Hub)	11.9m (Village Hub vehicle crossing)	LOS A	Queues and delays appear to be manageable. Performs slightly better than the crossroads intersection.

Table 5: Summary of SIDRA modelling

In terms of efficiency, the roundabout performs slightly better. The additional traffic generated by the Village Hub is unlikely to have any significant adverse effects in terms of traffic efficiency.

6.2. Intersection and Vehicle Crossing Safety

6.2.1. Devine Road Access

There is no separation between the vehicle crossing and the Devine Road/Birchwood Lane intersection. The District Plan requires 30m separation. The vehicle crossing on Devine Road effectively forms a crossroads intersection with Birchwood Lane. We expect the site to generate approximately 2600 veh/day and 560 veh/hr. We expect this vehicle crossing to be the primary access point onto site. The volume of trips suggest that the vehicle crossing should be designed to intersection standards. The concept plans indicate a roundabout at the Devine Road access. However, the current proposed plans show a crossroads layout.

We have estimated the injury crash rates using the NZ Transport Agency's Crash Estimation Compendium for urban crossroads and an urban roundabout. The crash rates have been calculated using 2041 PM peak hour traffic volumes from the Opus report with 560 veh/hr from the development. We have assumed that 10% of AADT occurs during the peak hour.

Layout	Crash Rate	Comment
Predicted-crossroads	0.31 injury crashes/year or an injury crash every 3 years	Not preferred.
Predicted-roundabout	0.128 injury crashes/year or an injury crash every 8 years	Preferred

Table 6: predicted crash rates at Devine Road/Birchwood Lane intersection

In terms of vehicular safety, the preferred option at the Devine Road vehicle crossing would be a roundabout.

6.2.2. Wiremu Tamihana Drive Access

There is approximately 70m separation between the vehicle crossing and the Wiremu Tamihana Drive/Devine Road intersection. There is an entranceway located approximately 30m southeast of the vehicle crossing. It appears that it serves three lots that are likely to be rural residential dwellings.

Wiremu Tamihana Drive is straight and there appears to be sufficient visibility from the vehicle crossing. There may be some disruptions to through traffic as there is no flush median or right turn

bay on Wiremu Tamihana Drive for turning vehicles to wait for gaps. Austroads Guide to Geometric Design Part 3 desirable safe stopping distance for a 50km/h urban road is 55m. There is sufficient stopping distance between the intersection and the vehicle crossing. There does not appear to be any significant safety issues related to this vehicle crossing. We note that this is unlikely to be the primary access point onto site, except for residents of Tamahere south and pass by trips with people entering using one crossing and leaving via the other.

6.3. Parking, Loading and Manoeuvring

6.3.1. Parking

107 parking spaces are proposed. The District Plan requires 152 spaces, a shortfall of 45 parking spaces. Peak parking demand times are likely to vary between the activities. For example health care facility and the office parking spaces are unlikely to be occupied after 5pm during the weekdays, and we expect that peak parking demand at the restaurant to be after 5pm. The different timing for peak parking demand will assist in minimising the potential effects of the parking shortfall. There is likely to be an overspill of parking to the recreation reserve carpark, which is expected to be constructed immediately to the site with an internal road connection.

The site has eight accessible spaces, and only 2-4 spaces are required. Some of the accessible spaces could be reallocated for parking to reduce the shortfall. There may also be an opportunity to provide additional spaces:

- = In the landscaped area shown between spaces 61 and 62;
- = Next to space 10; and
- = Next to space 6.

6.3.2. Loading

There are no loading spaces shown on the site plans. The District Plan requirement is for at least four loading spaces. The TDG Transport Statement suggested including a condition that requires servicing for all activities to occur before 10am so service vehicles are able to utilise empty parking spaces. If spaces are unavailable then service vehicles are likely to park temporarily in the aisle blocking internal vehicle circulation.

We consider that it would be more appropriate to provide a courier/service vehicle space for each building as well as providing one large service vehicle space within site, to accommodate larger vehicles. We would expect that providing the loading spaces would result in a reduction of parking spaces by approximately 5-10 parking spaces.

It may be possible to reallocate space 19 as a loading space to accommodate rigid trucks making deliveries to the café and bistro. The grocer is likely to attract larger service vehicles and a larger space in close proximity is desirable to avoid trucks parking in the aisle. The loading bay should be designed to accommodate a 90%tile truck (at least 8.3m x 2.44m + clearance + manoeuvring). There is a risk that the loading bay may not provide sufficient space for larger delivery vehicles (e.g. semi-trailer)

6.3.3. Manoeuvring

The site layout has sufficient manoeuvring space to allow for two-way internal vehicle circulation. Manoeuvring space for larger vehicles in and out of the loading bays will need to be considered during detailed design of the parking layout.

6.3.4. Summary

The inclusion of four courier/service vehicle bays and one loading space for large vehicles may reduce the parking spaces provided by approximately 5-10 parking spaces. However, there are opportunities to provide some additional parking space and to reallocate accessible spaces. The shortfall in parking is likely to result in overspill of parking to the proposed carpark for the recreation reserve adjacent to the site and potentially on street parking in periods of high demand. Subject to normal road rules being followed this should result in no more than intermittent inconvenience for road users.

7. EVALUATION OF TRAFFIC IMPACTS AND MITIGATION OPTIONS

7.1. District Plan Compliance

The site is located within the Tamahere Village Business Zone. We have completed an assessment of District Plan compliance against Appendix A (traffic) of the Waikato District Plan. Table 6 discusses the departures from the relevant District Plan transportation requirements. A full District Plan compliance assessment is attached at Appendix A.

Rule	Requirements	Assessment
Access, vehicle entrance, parking, loading and manoeuvring		
21.16	Any activity is a permitted activity if: (a) access, vehicle entrance, parking, loading, queuing, and manoeuvring space is provided in accordance with Appendix A (Traffic), and (b) any carparks for non-residential activities are set back at least 3m from the road boundary of the site and screened by planting or fencing.	a) Does not comply – Parking shortfall, no loading spaces are provided b) Does not comply - some carparks only offset by 2m from road reserve boundary
Vehicle Movements		
21.17	Any activity is a permitted activity if: (a) it does not involve more than 30 vehicle movements per day, and (b) no more than 4 of these vehicle movements are heavy vehicle movements	a) Does not comply b) Does not Comply
Parking, loading bays, service lanes, and manoeuvring space		
A11	Any activity is a permitted activity if: (a) parking and loading bays are provided that complies with Table 1 and Figures 1, 2 and 3, and Appendix B (Engineering Standards), and (b) bicycle spaces are provided that comply with Table 2, and (c) parking, loading bays and manoeuvring spaces are sealed, drained and permanently marked if 5 or more parking spaces are required, excluding parking spaces required for a dwelling, and (d) parking spaces and loading bays are not located on a shared access or living court, and are not obstructed when not in use, and (e) parking, loading bays and manoeuvring spaces are located on the same site as the activity for which they are required, and (f) in Business Zones a service lane is provided that complies with Table 4 and Appendix B (Engineering Standards), and so that a vehicle is not required to reverse to or from a road, shared access or across a footpath.	a) Does not comply – no loading spaces b) Complies c) Appears to comply d) Complies e) Complies f) N/A

Access and vehicle entrances		
A14	Any activity is a permitted activity if: (a) the site has vehicle access to a formed road that is maintained by Council, and (b) no more than 3 activities share a private access, and (c) no access, access leg or right-of-way runs parallel to any road within 30m of the road, and (d) every access and road entrance is laid out and constructed to comply with the standards in: (i) Tables 4, 5 and 6, and (ii) Figures 4 to 10, and (iii) Appendix B (Engineering Standards), and (e) no new entrance is created from a limited access road, and (f) on a site with legal access to 2 roads, the activity only accesses the road with the lower classification in the road hierarchy in Table 8 (where the roads have the same classification, access is only to the road with the lower average daily traffic movements, unless it is considered unsafe), and (fb) no access or entrance within 10 metres of a road has a gradient steeper than 12 degrees. OR (g) if it is on land accessed solely via the Te Rapa Interchange, adjacent to the Te Rapa Dairy Factory.	a) Complies b) Complies c) Complies d) Does not comply – no separation between Devine Road/Birchwood Lane intersection and new vehicle crossing (30m required) e) Complies f) Does not comply – access from two roads fb) Complies g) N/A
Road Network – Safety and Functions		
A14.A	A14.A.1 Any activity is a permitted activity if: (a) no new entrance is created from a State highway; and (b) in relation to direct vehicle entrances onto a State highway no increase in Equivalent Car Movements/Day from or to an existing vehicle entrance resulting from any new activity, or expansion of existing activities requiring a resource consent under this Plan, is created; and (c) in relation to all other roads (except in the Industrial Zone) it is a new activity or expansion of an existing activity which: (i) does not generate any additional traffic movements; or (ii) does not require a resource consent under this plan (except for a Controlled Activity): or	a) N/A no access to State Highway b) N/A no access to State Highway c) Does not comply – expected to generate 2,600 veh/day daily

Table 7: District Plan Compliance Assessment

The non-compliances relate to relatively high trip generation, a parking shortfall, and location of the vehicle crossing on Devine Road. In Section 6 we have assessed the effects of the trip generation as less than minor and identified opportunities to increase parking supply.

The non-compliances appear unlikely to result in significant adverse transport effects.

7.2. Summary of Effects

Table 8 summaries and evaluates the effects related to efficiency, safety and parking as a result of the proposal.

Effect	Comment on Effect	Scale of effect	
		Comment	Action
Efficiency	The site is expected to generate 2600 veh/day and 560veh/hr. SIDRA traffic modelling based on 2041 traffic volumes shows that the approach delays and queues for both a crossroads intersection and a roundabout are manageable with all approaches performing at LOS A except for the right turn movement out of Birchwood Lane for the crossroads intersection which operates a LOS B. Potential adverse effects in terms of efficiency appear unlikely.	Low risk of delays, which are unlikely to be significant.	Disregard (refer Table 9)
Safety	Maintaining the Birchwood Lane/Devine Road/Village Hub intersection layout as per the plans is likely to have adverse safety effects. The injury crash prediction rates show higher crash rates for the crossroads intersection compared to other forms of intersection (e.g. roundabout).	Medium-high safety risk if crossroads intersection is constructed	Mitigate (refer Section 7.3 and Table 9)
Parking	a) Shortfall of 45-55 parking spaces compared to the District Plan requirements, potential for overspill of parking. b) No loading bays onsite may cause service vehicles to park in the aisles blocking two-way internal vehicle circulation.	a) Low - The effects of the parking shortfall are likely to be minimised by the construction of a carpark for the recreation reserve immediately to the Tamahere Village Hub. b) Scale depends on timing. Impact would be low at off-peak times (e.g. 8am -10am) or high if at peak times (e.g. 12pm – 1pm or 4pm-5pm).	a) Disregard b) Mitigate by providing loading spaces.

Table 8: Evaluation of impacts

7.3. Devine Road/Birchwood Lane intersection

Table 9 evaluates three options for forms of intersection along the Devine Road corridor.

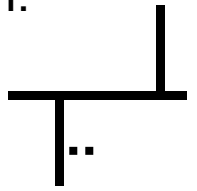
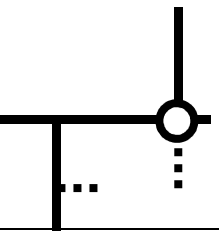
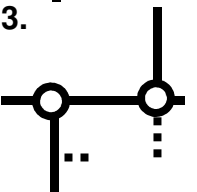
Layout	Description	Efficiency	Safety	Pedestrians and cyclists	Property Access	Land/process	Conclusion
1. 	Built to date Staggered T with right turn and left turn lanes at Birchwood Lane and Wiremu Tamihana Drive intersection	Satisfactory	Possibly too close to allow for right/left weave	Satisfactory	No safe access for commercial to Devine Road	Built to date but not consistent with structure plan	Not preferred In terms of safety effects crossroads intersection are generally undesirable.
2. 	Village concept Roundabout at Birchwood Lane/Devine Road/Development intersection, with Wiremu Tamihana Drive as is with some adjustments to line marking.	Satisfactory	Satisfactory	Roundabouts less safe for cyclists and pedestrians	High performance access for commercial development at Devine Road	As shown in structure plan but not built	Preferred
3. 	Roundabouts at both Birchwood Lane/Devine Road intersection and Wiremu Tamihana Intersection	Satisfactory	Satisfactory May assist in moderating speed	Roundabouts less safe for cyclists and pedestrians	High performance access for commercial development at Devine Road	Not built to date at Birchwood but consistent with structure plan. Not consistent with structure plan at Devine Road Link.	Desirable – however significant construction costs expected and not consistent with concept plan

Table 9: Devine Road Intersection Evaluation

Our preferred option is a roundabout at the Birchwood Lane/Devine Road intersection (Layout 2). The option is consistent with the concept plans and provides the safest form of intersection. Layout 3 would be desirable but the cost of construction is likely to be greater than Layout 2.

7.4. Options for Mitigation

With appropriate management, the potential adverse effects of the proposal could be mitigated to be less than minor. We understand that WDC is working with the developer and have therefore presented options for mitigation rather than conditions. Options to mitigate the above adverse effects related to safety at the Devine Road vehicle crossing and parking include:

- = WDC to review the detailed car park design before works commence onsite;
- = That the Devine Road vehicle crossing be designed and constructed to allow the Devine Road/Birchwood Lane intersection to be formed as a roundabout with the Village Hub vehicle crossing forming a fourth leg;
- = Four courier/service vehicle spaces are provided onsite plus a loading bay for large vehicles. The loading bay should be designed to accommodate a 90%ile truck (at least 8.3m x 2.44m + clearance + manoeuvring) ;
- = Review number of accessible spaces; and
- = Provide additional parking spaces, potentially located:
 - o In the landscaped area shown between spaces 61 and 62;
 - o Next to space 10; and
 - o Next to space 6.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1. Summary of Traffic Impact

The proposed mixed-use commercial hub in Tamahere is estimated to generate 2,600 veh/day and 560 veh/hr. There is likely to be an increase in traffic on Devine Road following the completion of the Waikato Expressway and closure of the Newell Road/Cambridge Road intersection. Based on SIDRA traffic modelling the additional traffic generated is unlikely to have any significant adverse effects in terms of traffic efficiency at the Devine Road/Birchwood Lane intersection.

The Devine Road vehicle crossing forms a crossroads intersection with Devine Road and Birchwood Lane. There will be a significant increase in turning movements at the intersection. To minimise the safety impacts we suggest forming a roundabout at the Devine Road/Birchwood Lane intersection with the access into the development forming a fourth leg. The roundabout at the Devine Road access is also consistent with the concept plans.

There is a parking shortfall of approximately 45 parking spaces and there are no loading bays provided onsite. The lack of loading bays could lead to service/courier vehicles parking in the car park aisles and adversely affecting two-way internal vehicle circulation. We suggest that a loading bay for each building is provided as well as a large loading space for large vehicle deliveries. The inclusion of the loading spaces is likely to decrease the amount of car parking spaces by approximately 5-10 spaces. The effects of the parking shortfall are offset by the proposed carpark for the recreation reserve adjacent to the site. There are also cycle parking facilities and paths connecting the rural residential areas of Tamahere to the Village Hub that provide options for alternative modes of transport.

8.2. Baseline Traffic

The Hub forms part of the structure plan and its traffic and access points could therefore be argued to be part of the expected environment. There would therefore be no net effects. Having convenience shopping available may reduce external trips and encourage walking and cycling.

8.3. Options for Mitigation

We suggest the following options for mitigation:

- = WDC to review the detailed car park design before works commence onsite;
- = That the Devine Road vehicle crossing be designed and constructed to allow the Devine Road/Birchwood Lane intersection to be formed as a roundabout with the Village Hub vehicle crossing forming a fourth leg;
- = Four courier/service vehicle spaces are provided onsite plus a loading bay for large vehicles. The large loading bay should be designed to accommodate a 90%ile truck (at least 8.3m x 2.44m + clearance + manoeuvring) ;
- = Review number of accessible spaces; and
- = Provide additional parking spaces, potentially located:
 - o In the landscaped area shown between spaces 61 and 62;
 - o Next to space 10; and
 - o Next to space 6.

8.4. Conclusions

The Village Hub is estimated to generate 2,600 veh/day and 560 veh/hr during the peak hour there does not appear to be any issues with traffic efficiency at the intersection following the changes to the roading network and full development of the site. Generally, crossroads intersections are undesirable; a more appropriate option would be to form a roundabout at the intersection with the access into the Village Hub forming a fourth leg. The alternative of relocating the entranceway to between Birchwood Lane and Wiremu Tamihana Drive has operational and safety disadvantages.

There is shortfall of parking onsite. The adverse effects are likely to be minimised by encouraging alternative modes of transport and allowing overflow of parking to the recreation reserve car park adjacent to the Village Hub.

The transportation effects of the proposal could be managed to be minor or less.

We suggest the following options for mitigation be considered:

- = WDC to review the detailed car park design before works commence onsite;
- = That the Devine Road vehicle crossing be designed and constructed to allow the Devine Road/Birchwood Lane intersection to be formed as a roundabout with the Village Hub vehicle crossing forming a fourth leg;
- = Four courier/service vehicle spaces are provided onsite plus a loading bay for large vehicles. The loading bay should be designed to accommodate a 90%ile truck (8.3m x 2.44m + clearance + manoeuvring) ;
- = Review number of accessible spaces; and
- = Provide additional parking spaces, potentially located:
 - o In the landscaped area shown between spaces 61 and 62;
 - o Next to space 10; and
 - o Next to space 6.

APPENDICES

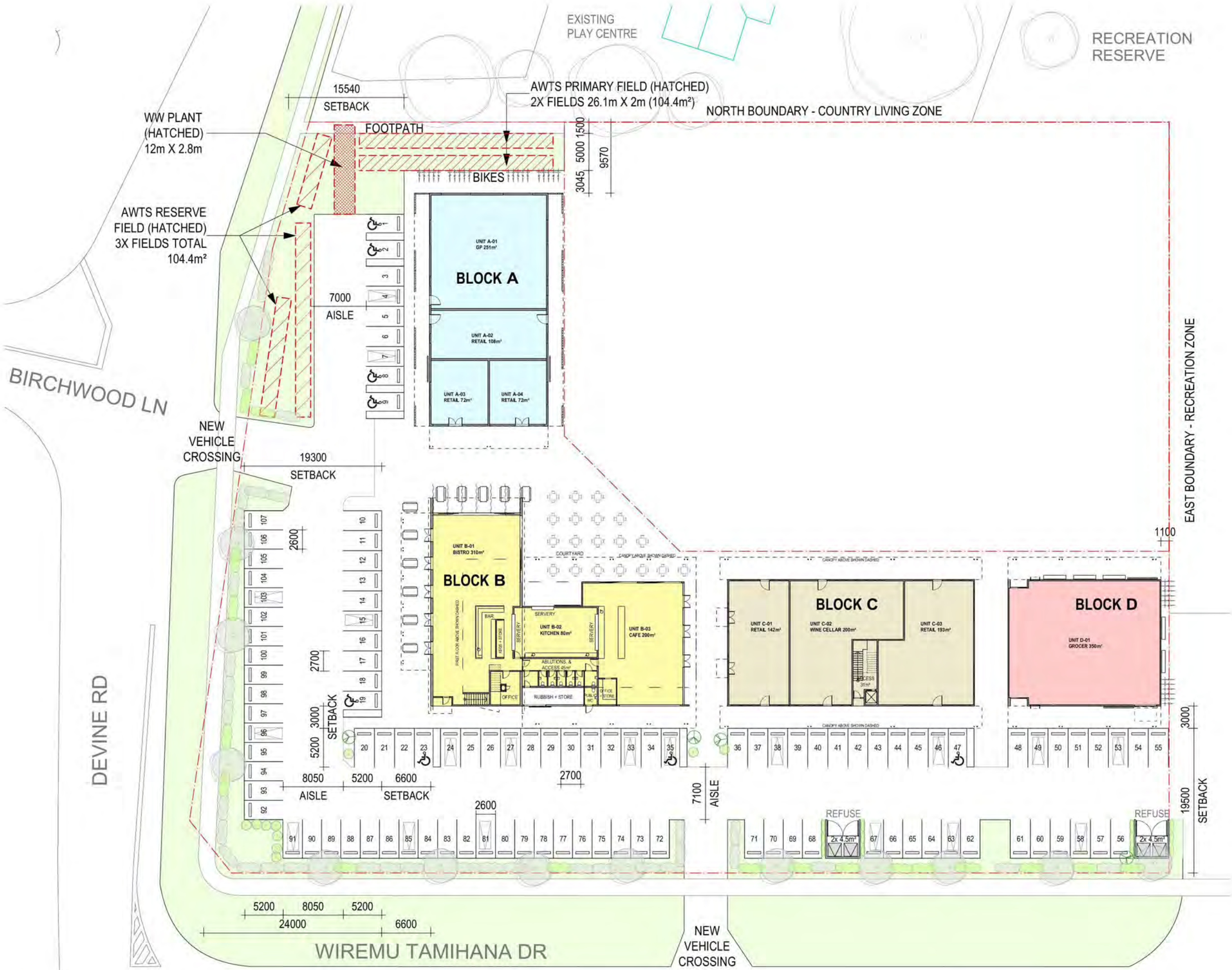
Appendix A: District Plan Compliance

Rule	Requirements	Assessment
Access, vehicle entrance, parking, loading and Manoeuvring		
21.16	Any activity is a permitted activity if: (a) access, vehicle entrance, parking, loading, queuing, and manoeuvring space is provided in accordance with Appendix A (Traffic), and (b) any carparks for non-residential activities are set back at least 3m from the road boundary of the site and screened by planting or fencing.	a) Does not comply – Parking shortfall, no loading spaces are provided b) Does not comply - some carparks only offset by 2m from road reserve boundary
Vehicle Movements		
21.17	Any activity is a permitted activity if: (a) it does not involve more than 30 vehicle movements per day, and (b) no more than 4 of these vehicle movements are heavy vehicle movements	a) Does not comply b) Does not Comply
Sign – effects on traffic		
21.39	Any activity is a permitted activity if an advertising sign directed at drivers: (a) does not imitate the content, colour or appearance of traffic control signs, and (b) contains no more than 40 characters or 6 symbols, and (c) has lettering that is at least 124mm high, and (d) is at least 150m from a site entrance, where the sign directs traffic to an entrance, and (e) does not obstruct sight lines of drivers turning into or out of entrances on any site	Will comply
Parking, loading bays, service lanes, and manoeuvring space		
A11	Any activity is a permitted activity if: (a) parking and loading bays are provided that complies with Table 1 and Figures 1, 2 and 3, and Appendix B (Engineering Standards), and (b) bicycle spaces are provided that comply with Table 2, and (c) parking, loading bays and manoeuvring spaces are sealed, drained and permanently marked if 5 or more parking spaces are required, excluding parking spaces required for a dwelling, and (d) parking spaces and loading bays are not located on a shared access or living court, and are not obstructed when not in use, and (e) parking, loading bays and manoeuvring spaces are located on the same site as the activity for which they are required, and (f) in Business Zones a service lane is provided that complies with Table 4 and Appendix B (Engineering Standards), and so that a vehicle is not required to reverse to or from a road, shared access or across a footpath.	a) Does not comply – no loading spaces b) Complies c) Appears to comply d) Complies e) Complies f) N/A
Manoeuvring space		
A12	Any activity is a permitted activity if on-site manoeuvring space is provided so that: (a) no vehicle is required to reverse to or from a road, or a shared	Will comply – to be confirmed during

	access, and (b) a 90 percentile car, as defined in Figure 2, can enter and exit all parking spaces without making more than one reverse movement, excluding spaces required for a dwelling, and (c) a 90 percentile car, as defined in Figure 2, can enter and exit one parking space per dwelling, without making more than one reverse movement, and (d) a 90 percentile truck, as defined in Figure 3, can enter and exit all loading spaces required under Table 1 without making more than one reverse movement. Note: (a) does not apply to Local Roads 'A' and 'B' in any of the Living Zones in the Te Kauwhata Structure Plan area.	detailed design
Queuing space		
A13	Any activity that provides on-site parking spaces, or is serviced by a drive-through facility, is a permitted activity if: (a) on-site queuing space is provided in accordance with Table 3 for vehicles entering or exiting the parking, loading, manoeuvring or service area.	Complies
Access and vehicle entrances		
A14	Any activity is a permitted activity if: (a) the site has vehicle access to a formed road that is maintained by Council, and (b) no more than 3 activities share a private access, and (c) no access, access leg or right-of-way runs parallel to any road within 30m of the road, and (d) every access and road entrance is laid out and constructed to comply with the standards in: (i) Tables 4, 5 and 6, and (ii) Figures 4 to 10, and (iii) Appendix B (Engineering Standards), and (e) no new entrance is created from a limited access road, and (f) on a site with legal access to 2 roads, the activity only accesses the road with the lower classification in the road hierarchy in Table 8 (where the roads have the same classification, access is only to the road with the lower average daily traffic movements, unless it is considered unsafe), and (fb) no access or entrance within 10 metres of a road has a gradient steeper than 12 degrees. OR (g) if it is on land accessed solely via the Te Rapa Interchange, adjacent to the Te Rapa Dairy Factory.	a) Complies b) Complies c) Complies d) Does not comply – no separation between Devine Road/Birchwood Lane intersection and new vehicle crossing e) Complies f) Does not comply – access from two roads fb) Complies g) N/A
Road Network – Safety and Functions		
A14.A	A14.A.1 Any activity is a permitted activity if: (a) no new entrance is created from a State highway; and (b) in relation to direct vehicle entrances onto a State highway no increase in Equivalent Car Movements/Day from or to an existing vehicle entrance resulting from any new activity, or expansion of	a) N/A no access to State Highway b) N/A no access to State Highway

	existing activities requiring a resource consent under this Plan, is created; and (c) in relation to all other roads (except in the Industrial Zone) it is a new activity or expansion of an existing activity which: (i) does not generate any additional traffic movements; or (ii) does not require a resource consent under this plan (except for a Controlled Activity): or Note: For A14.A.1(c) please refer to Explanation and Reason 29.35A	c) Does not comply – expected to generate 2,600 veh/day daily
Road Network – Safety and Functions – Te Rapa Interchange		
A14.B	Notwithstanding Rule A14.A.1, any activity is a permitted activity if it is from land accessed via the Te Rapa Interchange adjacent to the Te Rapa Dairy Factory and the peak hour traffic flows do not exceed the following limits: (a) AM Peak (7.30 – 9.30am) (i) All Ramps – 300 vehicles per hour (vph) (b) PM Peak (4.00 – 6.00pm) (i) North Bound On-Ramp – 150 vph (ii) All other Ramps – 300 vph If the site is also accessed via another route, traffic movements via that/those other route(s) shall remain subject to the vehicle movement limits contained in Rules 24.15.1(a) and Appendix A Rule A14.1 and A14.A.1(d)a.	Complies – Not applicable to the site.
Road construction and maintenance		
A15	Construction or maintenance of a road is a permitted activity if the work: (a) complies with Appendix B (Engineering Standards), and (b) does not create a new intersection with a limited access road, and (c) either (i) is undertaken by the council or other public road authority on a road that it owns or controls, or (ii) is required or authorised by a resource consent.	Complies

Appendix B: Site Plan



GFA SUMMARY		
UNIT	LEVEL	AREA
GROUND FLOOR:		
UNIT A-01	GF	251m ²
UNIT A-02	GF	108m ²
UNIT A-03	GF	72m ²
UNIT A-04	GF	72m ²
SUBTOTAL BLOCK A:		503 m ²
UNIT B-01	GF	310m ²
UNIT B-02	GF	80m ²
UNIT B-03	GF	200m ²
ABLUTIONS, ACCESS		45m ²
SUBTOTAL BLOCK B:		635m ²
UNIT C-01	GF	142m ²
UNIT C-02	GF	200m ²
UNIT C-03	GF	193m ²
ACCESS	GF	31m ²
SUBTOTAL BLOCK C:		566m ²
UNIT D-01	GF	350m ²
SUBTOTAL BLOCK D:		350m ²
TOTAL	GF	2054m²
FIRST FLOOR UNITS:		
UNIT B-11	FF	206m ²
UNIT B-12 (DECK)	FF	93m ²
SUBTOTAL BLOCK B:		299m ²
UNIT C-11	FF	290m ²
UNIT C-12	FF	255m ²
ACCESS	FF	31m ²
SUBTOTAL BLOCK C:		576m ²
TOTAL	FF	875m²
OVERALL TOTAL:		2929m²
CARPARKS PROVIDED = 107		
TYPICAL CARPARK DIMENSIONS:		
INNER ROWS 2.7m WIDE X 5.2m DEEP		
OUTER ROWS 2.6m WIDE X 5.2m DEEP		



Appendix C: SIDRA – Movement Summary Outputs

MOVEMENT SUMMARY

Roundabout

 Site: 101v [Birchwood Lane / Devine Road intersection + development 2041 (PM peak) - Conversion]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: DevineRoad (NB)											
1	L2	26	5.0	0.134	4.2	LOS A	0.8	5.9	0.49	0.60	45.4
2	T1	22	5.0	0.134	4.0	LOS A	0.8	5.9	0.49	0.60	46.5
3	R2	95	5.0	0.134	9.0	LOS A	0.8	5.9	0.49	0.60	41.0
Approach		143	5.0	0.134	7.4	LOS A	0.8	5.9	0.49	0.60	43.2
East: Tamhere Village Hub Access											
4	L2	95	5.0	0.242	2.6	LOS A	1.6	11.9	0.44	0.52	45.3
5	T1	95	5.0	0.242	2.8	LOS A	1.6	11.9	0.44	0.52	47.3
6	R2	95	5.0	0.242	7.1	LOS A	1.6	11.9	0.44	0.52	47.9
Approach		284	5.0	0.242	4.1	LOS A	1.6	11.9	0.44	0.52	46.8
North: Devine Road (SB)											
7	L2	95	5.0	0.207	4.1	LOS A	1.3	9.5	0.48	0.54	27.5
8	T1	67	5.0	0.207	4.0	LOS A	1.3	9.5	0.48	0.54	47.5
9	R2	65	5.0	0.207	8.9	LOS A	1.3	9.5	0.48	0.54	47.8
Approach		227	5.0	0.207	5.4	LOS A	1.3	9.5	0.48	0.54	39.5
West: Birchwood lane											
10	L2	8	5.0	0.123	3.9	LOS A	0.7	5.3	0.44	0.49	46.4
11	T1	95	5.0	0.123	3.8	LOS A	0.7	5.3	0.44	0.49	29.6
12	R2	34	5.0	0.123	8.7	LOS A	0.7	5.3	0.44	0.49	47.9
Approach		137	5.0	0.123	5.0	LOS A	0.7	5.3	0.44	0.49	35.6
All Vehicles		790	5.0	0.242	5.2	LOS A	1.6	11.9	0.46	0.53	41.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Crossroads
intersection

▽ Site: 101 [Birchwood Lane / Devine Road intersection + development 2041 (PM peak)]

New Site

Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: DevineRoad (NB)											
1	L2	26	5.0	0.019	5.0	LOS A	0.1	0.5	0.25	0.48	46.5
2	T1	22	5.0	0.075	0.5	LOS A	0.4	2.6	0.28	0.44	46.9
3	R2	95	5.0	0.075	5.2	LOS A	0.4	2.6	0.28	0.44	42.7
Approach		143	5.0	0.075	4.4	LOS A	0.4	2.6	0.28	0.45	44.6
East: Tamhere Village Hub Access											
4	L2	95	5.0	0.387	3.8	LOS A	2.2	16.3	0.35	0.60	42.3
5	T1	95	5.0	0.387	5.8	LOS A	2.2	16.3	0.35	0.60	42.6
6	R2	95	5.0	0.387	9.3	LOS A	2.2	16.3	0.35	0.60	42.0
Approach		284	5.0	0.387	6.3	LOS A	2.2	16.3	0.35	0.60	42.3
North: Devine Road (SB)											
7	L2	95	5.0	0.088	4.6	LOS A	0.0	0.0	0.00	0.31	24.7
8	T1	67	5.0	0.088	0.0	LOS A	0.0	0.0	0.00	0.31	48.2
9	R2	65	5.0	0.038	4.7	LOS A	0.2	1.3	0.08	0.51	46.2
Approach		227	5.0	0.088	3.3	NA	0.2	1.3	0.02	0.37	37.6
West: Birchwood lane											
10	L2	8	5.0	0.006	4.7	LOS A	0.0	0.2	0.08	0.50	46.4
11	T1	95	5.0	0.213	6.9	LOS A	0.9	6.6	0.55	0.71	26.8
12	R2	34	5.0	0.213	10.4	LOS B	0.9	6.6	0.55	0.71	44.5
Approach		137	5.0	0.213	7.7	LOS A	0.9	6.6	0.52	0.70	32.8
All Vehicles		790	5.0	0.387	5.3	NA	2.2	16.3	0.27	0.53	39.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.