

PRIVATE PLAN CHANGE 48 WAIRAU ESTATE



25 March 2019

Assessment of SH45 Access

Prepared for Oakura Farm Park by AMTANZ Ltd

Revision History

Revision N°	Prepared By	Description	Date
A	A Skerrett	Review of new access onto SH45	22-3-19
B	A Skerrett	Client comments incorporated	12-4-19

This report was prepared by AMTANZ Ltd solely for Oakura Farm Park Ltd. The scope of work and related responsibilities are defined in the Conditions of Engagement. The material in this report reflects industry standard judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. AMTANZ Ltd accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Document Acceptance

Action	Name	Signed	Date
Prepared by	Andy Skerrett		15-4-19
on behalf of	AMTANZ Ltd		

Table of Contents

1. INTRODUCTION.....	1
2. NEW ACCESS LOCATION.....	1
3. TRAFFIC VOLUMES.....	4
4. DISCUSSION.....	5
5. CONCLUSION	6

Appendices:

- APPENDIX A - TRAFFIC VOLUMES
 - APPENDIX B – SIDRA ANALYSIS OUTPUTS
 - APPENDIX C - DRAWINGS
-

1. INTRODUCTION.

Oakura Farm Park Ltd have requested Private Plan Change 48 from New Plymouth District Council to rezone land currently zoned as FUD and rural to residential to develop up to 399 lots at Oakura south west of New Plymouth.

The concept presented indicated an access from Wairau Rd to service the lots, with a potential to upgrade the State highway 45 and Wairau Rd intersection to a roundabout. In submissions on the plan change and at pre hearing meetings, it was suggested an alternative access directly onto State highway 45 would be beneficial. This report presents our investigations into a new access and the impacts on the likely traffic generation and their impacts on the Wairau Rd intersection.

2. NEW ACCESS LOCATION.

State highway 45 (South Rd) forms the western boundary of the bulk of the land proposed to be rezoned. For the purposes of this report we refer to the highway running north to south although in reality it runs more north east to south west. In this area the highway is a straight with a bend to the southern end and falls from the south to the north and has two small sag curves where culverts pass streams under the highway marked 1 and 2 on the aerial photograph below:



The location circled in red was selected as the new access as it meets the requirements of Austroads in terms of sight distance and provides a good link to the balance of the land under consideration.

State highway 45 consists of two sealed traffic lanes of 3.5m, there are sealed shoulders to each lane that vary in width but are typically 0.3m in width. Outside this there are grassed berms falling to water tables. There are three culverts passing under the highway two of which occur at the sag curves and the third taking the overflow from the pond immediately to the north of the proposed access location.

The sight distance to the south is limited by a left hand bend and has been measured at approximately 410m, a short sag curve occurs some 120m to the south of the intersection where a stream is culverted under the highway, as shown in the following photograph:



Whilst the road surface disappears past the crest curve following the culvert, vehicles remain visible for the full sight distance as demonstrated in the following photograph:

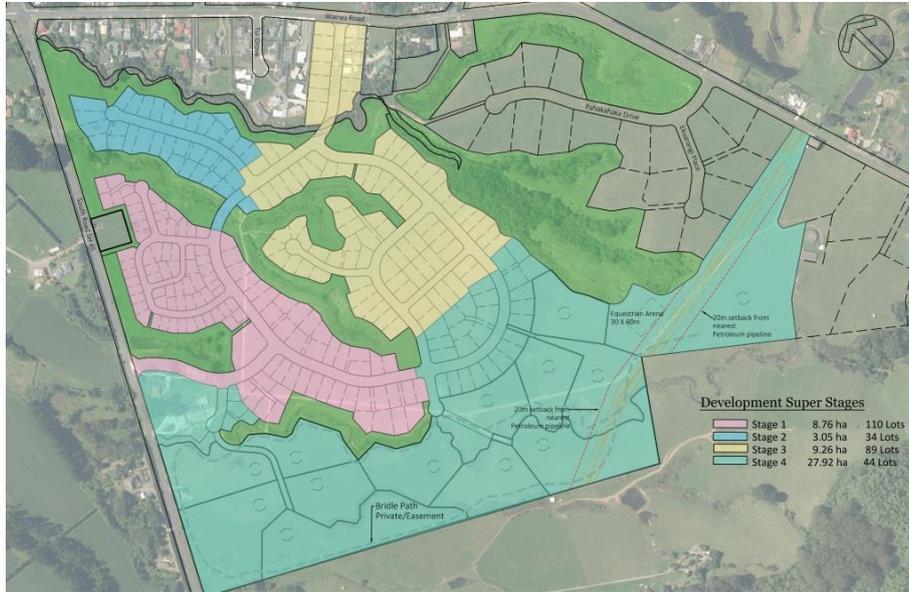


To the north a similar situation exists, with a crest curve at around 238m, but vehicles remain visible beyond this back to the Wairau Rd intersection as shown in the following photographs:



3. TRAFFIC VOLUMES.

The initial traffic impact assessment (TIA) was based on the maximum theoretical yield for the area at 399 lots. During the pre-hearing meetings a staging plan was tabled with a yield of 277 lots which was considered to be a more likely yield given the topography of the site as shown below.



In order to determine which access route traffic would utilise, the distance to the Wairau Rd intersection with SH45 was calculated for each lot via Upper Wairau Rd or the SH45 access. The result of this analysis indicated 65% of lots had a shorter route to the Wairau Rd intersection via Upper Wairau Rd. Given the number of intersections and longer potential delays to negotiate on the routes via Upper Wairau Rd the split was adjusted to 60:40 Upper Wairau Rd / SH45 access. To remain consistent with the TIA this split was then applied to the original 399 lots.

Traffic generation was treated in a similar manner to the original TIA with rates of 8.5 trips/lot/day, based on the rate calculated from the counts on Upper Wairau Rd, and the 10.4 trips/lot/day in the NZTA planning guide. Turning volumes match that recorded during the surveys. Below is the morning peak hour turning movements based on 8.5 trips/lot (see Appendix A).

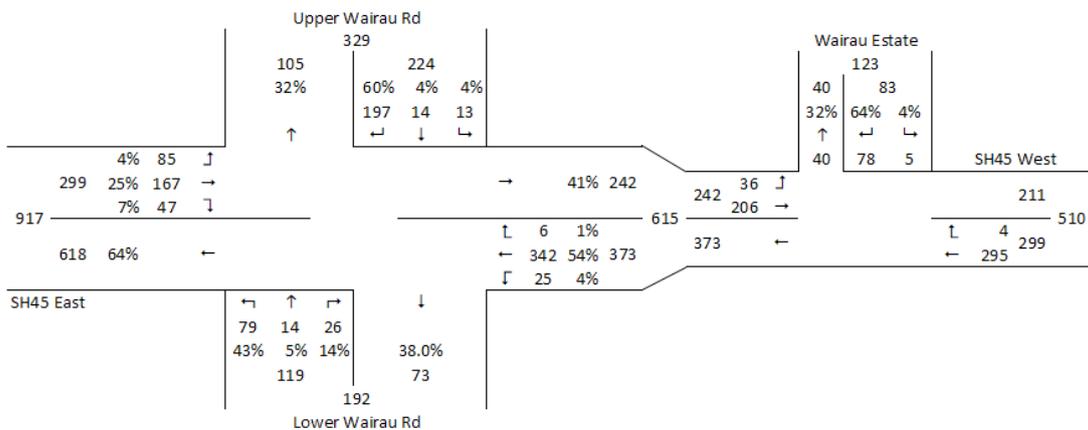


FIGURE 1 - A.M. PEAK HOUR MOVEMENTS @ 8.5 TRIPS/LOT

These turning movements were then used to model the Wairau Rd / State highway 45 intersection in Sidra 8 an industry standard lane based traffic modelling software.

The modelling indicates that the Wairau Rd intersection performs well with the crossing and right turning movements from Wairau Rd (both upper and lower) currently performing at Level of Service B. With the generation rate of 8.5 trips/lot the right turn out of Upper Wairau Rd drops to a LOS C with an increase average delay of 4.1 seconds to 16.2 seconds and the performance of that leg drops to LOS C with an increase in average delay for all movements of 3.8 seconds to 15.7 seconds. All other movements remain at LOS A or B.

With a trip generation rate of 10.4 trips / lot the performance of Upper Wairau Rd drops to LOS C for both the right turn out and straight through movements. The average delay for the right turn out increases by 5.7 seconds from the base case to 17.8 seconds. The straight through movement average delay increases by 5 seconds to 15.3 seconds, the performance of the leg drops from LOS B to C with an average delay of 17.2 seconds. All other movements remain at LOS A or B (see Appendix B for details).

4. DISCUSSION

The new access on State highway 45 would meet the requirements of Austroads in terms of design, the culvert to the west of the access which takes the form of a concrete box needs to be extended to cater for the widening of the shoulder in this vicinity. The intersection is shown in the concept drawings with a right turn bay (Appendix C), which whilst not necessary to cater for the right turning traffic is deemed necessary to assist the predominant right turn out manoeuvre.

Whilst the new intersection meets the requirements for a 100kph road it may be prudent for the road controlling authority to consider implementing an 80kph limit from just west of the intersection. This will reduce the speed of vehicles entering the Wairau Rd intersection and the township of Oakura addressing one of the purposes of the proposed roundabout.

The location of the new access has been chosen so that should the Oakura FUD Area West, north of the highway, be developed a simpler access can be achieved at the same location, lending itself to the installation of a roundabout at that time if necessary.

The second access also has other benefits as it improves circulation around the sub division reducing the overall km travelled. It provides better access to the equestrian blocks on the western boundary of the plan change area thus reducing the need for horse trucks and floats to go through the residential areas. It improves access for emergency response services who typically don't like dead end roads as it decreases their access options.

NZTA are concerned that intersections are where the majority of crashes occur and by introducing a new intersection provides an opportunity for crashes to occur. However, we believe that if an intersection is designed to meet the current standards and follows NZTA's safety in design and safety audit procedures then the potential risk is acceptable. The risk can be lowered still further if the speed limited was reduced to 80kph.

With the change in traffic flows a roundabout is now not necessary at the Wairau Rd intersection to cater for the maximum potential 399 lots and will perform better still if the concept plan with 277 lots is the final development.

In the original concept the traffic volume from the plan change area exceeded that on Wairau Rd and it was proposed to change the priority of the intersection to the new road. With the SH45 intersection the traffic flows are more balanced and consideration should be given to keeping the priority to Wairau Rd and installing a right turn bay into the plan change area.

5. CONCLUSION

The access onto State highway 45 has some positive effects as listed below;

- it addresses some of the submitters concerns around traffic volumes on Wairau Rd,
- it removes the concerns regarding the roundabout,
 - in terms of the impacts on heavy commercial vehicles,
 - neighbouring properties,
- it provides better access for emergency services,
- it reduces the overall travel distances , and
- provides easier access to the equestrian lots.

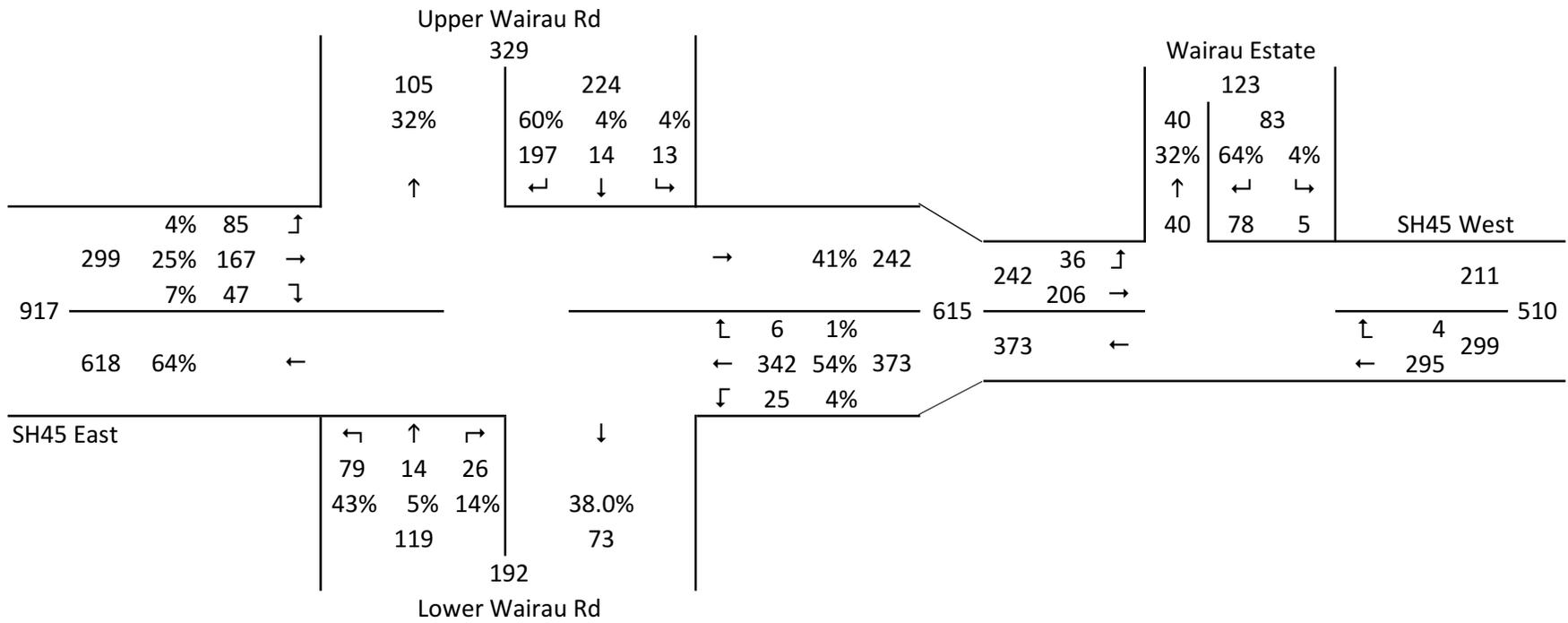
Removing the roundabout at Wairau Rd will not address NZTA's concerns regarding the speed of traffic entering Oakura, the implementation of an 80kph zone on the approach to Wairau Rd will go some way to achieving this. NZTA are also concerned about introducing a new potential conflict point on the highway. However, this risk can be minimised through the design process and by implementing an 80kph speed limit.

Overall we believe the benefits of implementing the second access outweigh the dis-benefits to the local road network.

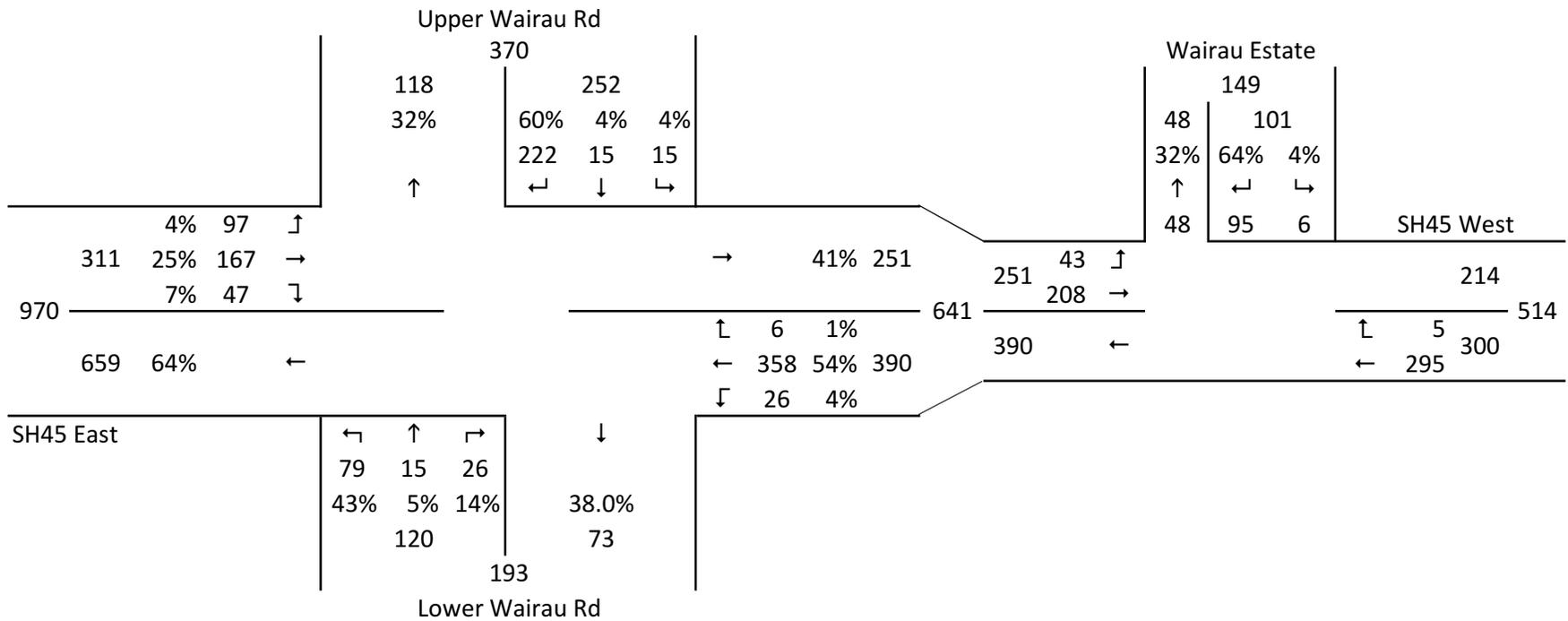
Appendix A

Traffic Volumes

	Base	Growth	Add dev.	10 Yr Vol	am peak	Wairau Estate	
Upper Wairau Rd	1150	115	355	1620	146	Lots	399
SH45 East	6250	1188	0	7438	669	Trips/lot	8.5
Lower Wairau Rd	1850	185	0	2035	183	Daily traffic	3392
SH45 West	4600	874	0	5474	493	AM peak	9%
						Pk hr	305
						Split 40:60	AM
						SH45 access	1357 122
						Wairau Rd	2035 183



	Base	Growth	Add dev.	10 Yr Vol	AM peak	Wairau Estate	
Upper Wairau Rd	1150	115	355	1620	146	Lots	399
SH45 East	6250	1188	0	7438	669	Trips/lot	10.4
Lower Wairau Rd	1850	185	0	2035	183	Daily traffic	4150
SH45 West	4600	874	0	5474	493	AM peak	9%
						Pk hr	373
						Split 40:60	
						SH45 access	1660 149
						Wairau Rd	2490 224



Appendix B

SIDRA Analysis

MOVEMENT SUMMARY

 Site: 101 [SH45 Access No dev]

Existing + 10 years growth on all legs
 Site Category: (None)
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Upper Wairau Rd												
1	L2	6	16.7	0.200	9.0	LOS A	0.6	4.6	0.53	1.00	0.53	43.0
2	T1	5	0.0	0.200	10.3	LOS B	0.6	4.6	0.53	1.00	0.53	43.0
3	R2	93	2.3	0.200	12.1	LOS B	0.6	4.6	0.53	1.00	0.53	41.5
Approach		104	3.0	0.200	11.9	LOS B	0.6	4.6	0.53	1.00	0.53	41.7
East: SH45 East												
4	L2	36	2.9	0.155	5.4	LOS A	0.5	3.5	0.21	0.17	0.21	47.3
5	T1	176	13.8	0.155	0.4	LOS A	0.5	3.5	0.21	0.17	0.21	48.0
6	R2	49	0.0	0.155	5.7	LOS A	0.5	3.5	0.21	0.17	0.21	47.0
Approach		261	9.7	0.155	2.1	NA	0.5	3.5	0.21	0.17	0.21	47.7
North: Lower Wairau Rd												
7	L2	83	1.3	0.147	8.9	LOS A	0.6	4.0	0.45	0.92	0.45	43.0
8	T1	8	0.0	0.147	11.5	LOS B	0.6	4.0	0.45	0.92	0.45	44.0
9	R2	27	0.0	0.147	12.1	LOS B	0.6	4.0	0.45	0.92	0.45	43.9
Approach		119	0.9	0.147	9.8	LOS A	0.6	4.0	0.45	0.92	0.45	43.3
West: SH45 West												
10	L2	5	0.0	0.165	5.3	LOS A	0.2	1.4	0.06	0.05	0.06	49.1
11	T1	284	2.6	0.165	0.1	LOS A	0.2	1.4	0.06	0.05	0.06	49.4
12	R2	21	5.0	0.165	5.5	LOS A	0.2	1.4	0.06	0.05	0.06	48.5
Approach		311	2.7	0.165	0.5	NA	0.2	1.4	0.06	0.05	0.06	49.4
All Vehicles		795	4.8	0.200	3.9	NA	0.6	4.6	0.23	0.34	0.23	46.7

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 (Akçelik M3D).

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

MOVEMENT SUMMARY

 Site: 101 [SH45 Access @8.5/lot Max lots]

Existing + 10 years growth on all legs + SH45 Access for 399 lots @ 8.5 trips/lot
 Site Category: (None)
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Upper Wairau Rd												
1	L2	14	7.7	0.505	10.5	LOS B	2.4	17.0	0.68	1.11	1.04	41.3
2	T1	15	0.0	0.505	13.9	LOS B	2.4	17.0	0.68	1.11	1.04	41.2
3	R2	207	1.0	0.505	16.2	LOS C	2.4	17.0	0.68	1.11	1.04	39.5
Approach		236	1.3	0.505	15.7	LOS C	2.4	17.0	0.68	1.11	1.04	39.7
East: SH45 East												
4	L2	89	1.2	0.189	5.4	LOS A	0.6	4.3	0.23	0.22	0.23	46.9
5	T1	176	13.8	0.189	0.5	LOS A	0.6	4.3	0.23	0.22	0.23	47.5
6	R2	49	0.0	0.189	6.3	LOS A	0.6	4.3	0.23	0.22	0.23	46.5
Approach		315	8.0	0.189	2.8	NA	0.6	4.3	0.23	0.22	0.23	47.2
North: Lower Wairau Rd												
7	L2	83	1.3	0.177	9.4	LOS A	0.7	4.8	0.51	0.94	0.51	42.5
8	T1	15	0.0	0.177	13.1	LOS B	0.7	4.8	0.51	0.94	0.51	43.6
9	R2	27	0.0	0.177	13.5	LOS B	0.7	4.8	0.51	0.94	0.51	43.5
Approach		125	0.8	0.177	10.7	LOS B	0.7	4.8	0.51	0.94	0.51	42.9
West: SH45 West												
10	L2	26	0.0	0.205	4.9	LOS A	0.1	0.6	0.02	0.04	0.02	49.2
11	T1	360	2.0	0.205	0.0	LOS A	0.1	0.6	0.02	0.04	0.02	49.6
12	R2	6	16.7	0.205	6.1	LOS A	0.1	0.6	0.02	0.04	0.02	48.2
Approach		393	2.1	0.205	0.5	NA	0.1	0.6	0.02	0.04	0.02	49.5
All Vehicles		1068	3.5	0.505	5.7	NA	2.4	17.0	0.29	0.44	0.37	45.5

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 (Akçelik M3D).

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

MOVEMENT SUMMARY

 Site: 101 [SH45 Access @10.4/lot Max lots]

Existing + 10 years growth on all legs + SH45 access for 399 lots @ 10.4 trips/lot
 Site Category: (None)
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Upper Wairau Rd												
1	L2	16	6.7	0.586	11.3	LOS B	3.1	21.7	0.72	1.16	1.22	40.7
2	T1	16	0.0	0.586	15.3	LOS C	3.1	21.7	0.72	1.16	1.22	40.6
3	R2	234	0.9	0.586	17.8	LOS C	3.1	21.7	0.72	1.16	1.22	38.7
Approach		265	1.2	0.586	17.2	LOS C	3.1	21.7	0.72	1.16	1.22	39.0
East: SH45 East												
4	L2	102	1.0	0.196	5.4	LOS A	0.6	4.5	0.24	0.22	0.24	46.8
5	T1	176	13.8	0.196	0.6	LOS A	0.6	4.5	0.24	0.22	0.24	47.4
6	R2	49	0.0	0.196	6.4	LOS A	0.6	4.5	0.24	0.22	0.24	46.5
Approach		327	7.7	0.196	2.9	NA	0.6	4.5	0.24	0.22	0.24	47.1
North: Lower Wairau Rd												
7	L2	83	1.3	0.185	9.5	LOS A	0.7	5.0	0.53	0.94	0.53	42.4
8	T1	16	0.0	0.185	13.6	LOS B	0.7	5.0	0.53	0.94	0.53	43.5
9	R2	27	0.0	0.185	13.8	LOS B	0.7	5.0	0.53	0.94	0.53	43.4
Approach		126	0.8	0.185	10.9	LOS B	0.7	5.0	0.53	0.94	0.53	42.8
West: SH45 West												
10	L2	27	0.0	0.214	4.9	LOS A	0.1	0.7	0.02	0.04	0.02	49.2
11	T1	377	2.0	0.214	0.0	LOS A	0.1	0.7	0.02	0.04	0.02	49.6
12	R2	6	16.7	0.214	6.2	LOS A	0.1	0.7	0.02	0.04	0.02	48.2
Approach		411	2.1	0.214	0.5	NA	0.1	0.7	0.02	0.04	0.02	49.5
All Vehicles		1129	3.4	0.586	6.3	NA	3.1	21.7	0.31	0.46	0.42	45.1

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 (Akçelik M3D).

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

Appendix C

Drawings



