BEFORE THE HEARINGS PANEL FOR THE QUEENSTOWN LAKES PROPOSED DISTRICT PLAN

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Hearing Stream 13 – Queenstown Mapping

AND

IN THE MATTER Submission 715, Jardine Family Trust and Remarkables Station Limited

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SUMMARY AND SUPPLEMANTARY EVIDENCE OF JASON BARTLETT
8 August 2017

INTRODUCTION

1 I have been engaged by the land owners and Submitters, Jardine Family Trust and Remarkables Station Limited (715) to provide traffic engineering advice in relation to the zone change requested in their Submission, 715.

2 In preparing this summary and supplementary evidence I have reviewed:

(a) The rebuttal evidence of Ms Wendy Banks for QLDC, Section 6;

(b) The rebuttal evidence of Mr Anthony MacColl (NZTA), Sections 14 to 23;

(c) The rebuttal evidence of Mr Antony Sizemore for NZTA, Sections 28 to 31; and

(d) The rebuttal evidence of Mr Andrew Carr for JPROA.

3 In this evidence I have provided supplementary information with respect to a possible access intersection from Kingston Road (SH6) and traffic modelling for access to the zone change either via Maori Jack Road or direct access via a new intersection from SH6.

REBUTTAL EVIDENCE

4 The primary concern raised by Ms Banks appears to be the lack of traffic modelling to confirm that a direct SH6 access to the additional 541 residential lots within Homestead bay is possible. This is driven by the number of dwellings within the overall Jacks Point Zone being significantly greater than provided for in the current QLDC/NZTA traffic model. It appears from this concern that Ms Banks does not support the overall network traffic modelling undertaken by QLDC and NZTA in 2016. Within this evidence I will provide further modelling for the proposed access to the extension of the Homestead Bay portion of the Jacks Point Zone.

5 The rebuttal evidence of Mr MacColl and Mr Sizemore both for NZTA raise concerns that they have not been provided with any details of a possible direct access from SH6 to serve the extended Homestead Bay residential area. In addition, Mr MacColl and Mr Sizemore would both expect that increased traffic from the Homestead Bay would ideally use

the existing Jacks Point Zone accesses if this is possible. Both consider that provision a further SH6 access, if required, would be outside of this District Plan process.

6 The rebuttal evidence of Mr Carr for JPROA was primarily concerned with the potential traffic effects of the Homestead Bay extension on the residence of Jacks Point. This included effects of traffic; on Maori Jack Road which is a privately owned road operated by JPROA, and at the existing intersection with SH6. Mr Carr considers that operational effects at the intersection of Maori Jack Road and SH6 would be a direct downstream traffic effect that should be assessed.

SUPPLENTARY EVIDENCE

7 I have undertaken traffic modelling in order to consider the concerns raised within the rebuttal evidence. To undertake this I have had to establish both a design year base line without the additional 541 residential lots at Homestead Bay. To complete this I have relied on the following:

(a) The base traffic flow on SH6 is from the QLDC/NZTA traffic model. For SH6 traffic I have used the 2045 am and pm peak period traffic flows. 2045 is likely to be well beyond the anticipated design year for this zone change and a robust basis for assessment;

(b) Base traffic flow for the Jacks Point portion of the Jacks Point Zone is based on development of 800 residential dwellings. This considered to be a realist base traffic flow for Maori Jack Road;

(c) The portion of Homestead Bay development enabled under the Operative QLDC District Plan, 244 residential dwellings will use Maori Jack Road for access. This portion of homestead Bay traffic is considered to use Maori Jack Road regardless of alternative access options; and

(d) That traffic generation and distribution rates are based on the evidence of Mr Carr[1]. It is noted that this is identical to the

[1] Refer Rebuttal Evidence of Mr Carr, paragraphs 17 & 18.

generation and distribution rates assumed in the QLDC/NZTA traffic model for the Jacks Point Zone.

8 The traffic distributions and modelling results are provided in Attachment A.

9 For the allowable development of Jacks Point and Homestead Bay (244 dwellings) the Maori Jack Road intersection with SH6 will generally operate efficiently with queuing (delay 10 seconds am and 25 seconds pm) at the right turn from Maori Jack Road to SH6. The maximum queue length for this manoeuvre would be less one vehicle.

10 For modelling I have considered a scenario 1 where all development of Jacks Point and Homestead Bay (785 dwellings) use the existing intersection of Maori Jack Road with SH6. This scenario showed; that in the am peak period the left turn from Maori Jack to SH6 would fail, and in the pm peak period the right turn from SH6 to Maori Jack Road would have an increased queue length. The delays right turn from Maori Jack Road to SH6 will also increase although maximum queue lengths will still be less than one vehicle.

11 To manage the additional traffic for this modelled scenario the following improvements will be required:

(a) Create a left turn lane from Maori Jack Road and merge to SH6 northbound to reduce delay and queuing;

(b) Extend the existing right turn bay to accommodate longer right turn queue without affecting southbound through traffic; and

(c) Increase capacity of Maori Jack Road link for vehicular traffic and pedestrians[2]. In particularly increasing the footpath provision on Marori Jack Road and widening at the existing side road intersection within Jacks Point. This would be required to increase the capacity of the existing road and side road intersections.

12 It is expected that any improvements necessary such as those noted above would be part of any agreement with JPROA. Based on the modelled scenario 1 both NZTA and JPROA approvals will be required

[2] Refer Rebuttal Evidence of Mr Carr, paragraphs 30 to 31.

to improve the capacity of the Maori Jack Road and the intersection with SH6. Without the approval of JPROA a new state highway intersection will be required to facilitate the extension of Homestead Bay residential area.

13 I have considered a scenario 2 where Jacks Point and a portion of Homestead Bay (244 residential dwellings) would use the existing Maori Jack Road intersection with SH6. In this scenario a new SH6 intersection would be provided to access the additional 541 residential dwellings at Homestead Bay. This scenario allows for increased through traffic at the existing Maori Jack Road intersection which is a concern raised by Mr Carr in his rebuttal evidence[3].

14 Scenario 2 is reliant on a new access intersection to be located at the existing registered crossing place CP48. This intersection would be similar to the existing Maori Jack Road intersection and can be designed in accordance with current Austroads Guidance. Attachment B provides a possible intersection layout. At the location the available visibility sight distance is in excess of 300m in each direction which is the desirable safe intersection sight distance for a 110km/hr operating speed. I acknowledge the concerns of Mr MacColl and Mr Sizemore regarding a lack of detailed site information, for the avoidance of doubt the visibility sight distances at the site are approximately 400m to the south and 500m to the north.

15 Scenario 2 would be the only viable access to the proposed Homestead Bay extension if JPROA do not approve access via Maori Jack Road.

16 The Scenario 2 modelling suggests that the new T-intersection with the SH6 would generally operate efficiently with minimal queuing. With this scenario the downstream effects at the Maori Jack Road intersection would be:

(a) Significantly increased left turn queuing in the am peak period. This can be relieved by the provision of a left turn lane from Maori Jack Road and merge to SH6 northbound;

[3] Refer Rebuttal Evidence of Mr Carr, paragraphs 23 to 29.

(b) Slight increase in the queue length for right turning from SH6 to Maori Jack Road. This may require the extension of the existing right turn bay. The delay for this manoeuvre will be minimal, approximately 12 seconds; and

(c) Increased queuing for right turning traffic from Maori Jack Road in both the am and pm peak periods although the maximum queue lengths will still be less than one vehicle.

17 This scenario 2 traffic modelling suggests that if a new state highway intersection is provided then there will be a need for improvements at the existing intersection of Maori Jack Road. These improvements are of a similar nature identified the scenario 1 modelling.

18 I have not transferred this modelling to other proposed state highway intersections that serve the Jacks Point Zone. It is expected that any additional improvement works at these intersections would be at the discretion of NZTA. Should NZTA wish to retain or improve the operational efficiency or safety of the state highway network beyond the immediate site this is likely to form part of any approvals from NZTA. At this stage it is noted that the SH6 intersection with Woolshed Road is limited to construction traffic only.

19 The modelling that I have undertaken is relatively detailed in nature. It is likely that this modelling will need to be repeated for any NZTA approvals at the time of development. As the order of development within the Jacks Point Zone progresses it is likely that additional modelling will be required by NZTA based on the extent of development committed and a realistic expectation of future design traffic. This has been the case with other intersection on the state highway network regardless of details discussed and agreed at a previous planning stages. It is possible that other development within, or beyond, the Jacks Point Zone may change the anticipated intersection layout or the method of control.

20 The modelling undertaken demonstrates that it is possible to provide an access to the proposed Homestead Bay extension facilitated by the Submission. The access to the extension may be either a new access intersection on SH6, or via Maori Jack Road. These options both require approvals from third parties.

SUMMARY

21 The Jardine Family Trust and Remarkables Station Limited Submission (715) seeks to rezone an area of rural land at Homestead Bay. It is possible that this zone change could provide up to 541 additional residential lots.

22 Following comments made in rebuttal evidence I have undertaken more robust traffic modelling which shows that:

(a) Access to the proposed zone change can be provided via Maori Jack Road. This will require a number of improvements. If this access methodology is progressed approvals from both JPROA and NZTA will be required to allow for road upgrades; or

(b) Access to the proposed zone change can be provided from a new intersection onto SH6. This intersection can be constructed to meet the requirements of current Austroads guidance. Improvements will also be required at the existing Maori Jack Road intersection with SH6 and potentially other intersections serving the Jacks Point Zone. These improvements all require works within the state highway corridor. If this access methodology is progressed NZTA approval will be required.

23 The additional traffic modelling undertaken does not change my opinions expressed in my Evidence. The additional modelling does provide a more robust assessment in order to review potential transport effects and ascertain how these can be minimised. It is acknowledge that although effects can be minimised approvals of adjacent road controlling authorities will be required if the level of development at Homestead Bay exceeds the provisions of the Operative District Plan.

Jason Bartlett

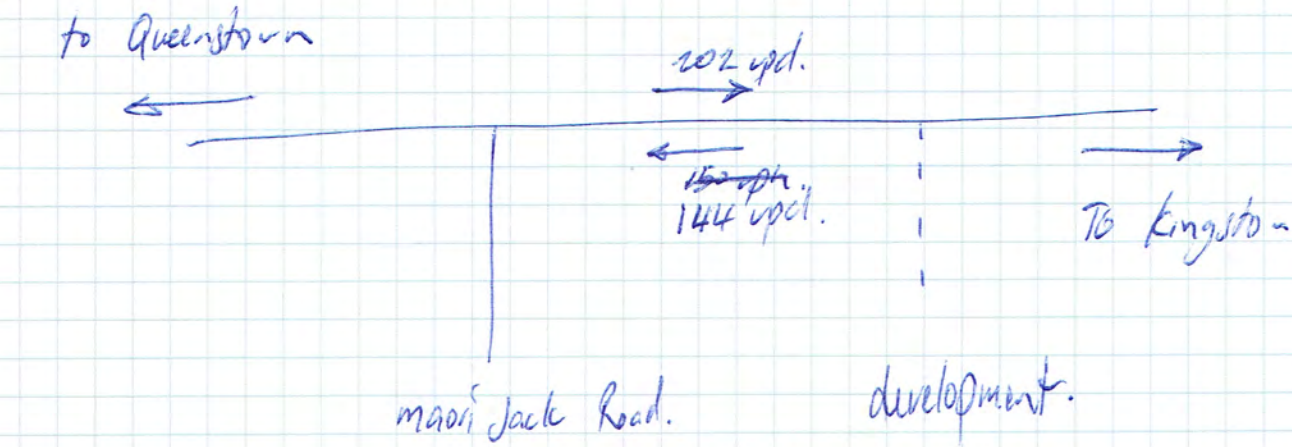
8 August 2017

Attachment A – Traffic Distribution and Modelling

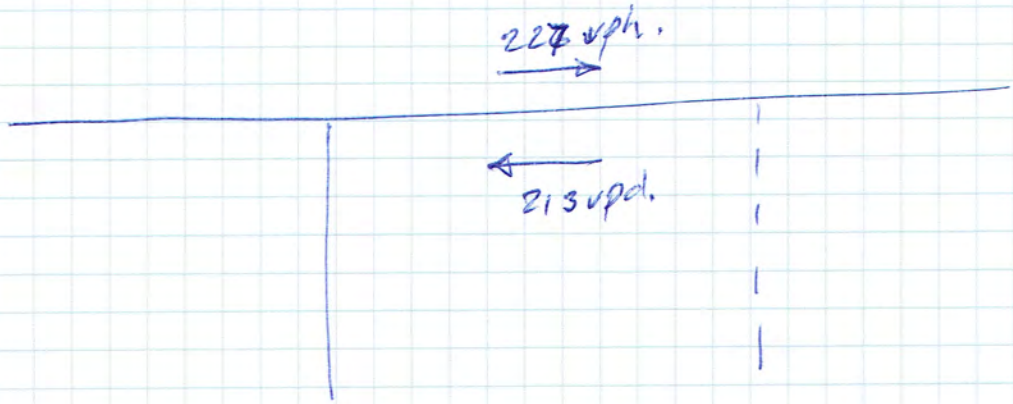
Jardine traffic flows.

- base traffic 2045 based on the QLDC / NZTA traffic model.

am.



Pm.



from QLDC / NZTA through traffic at Woolshed Road Intersection.

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Client Jardine

Description

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Date

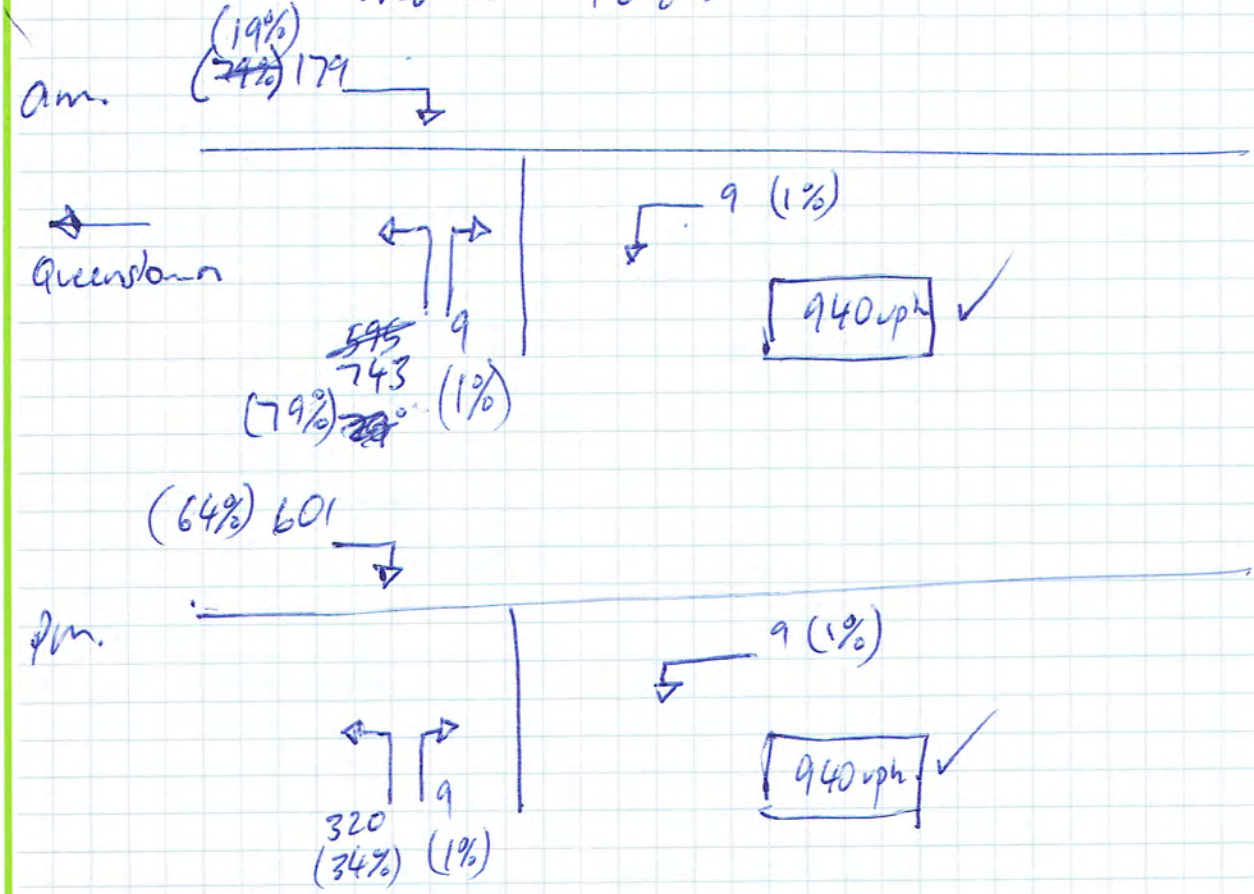
Sheet

ODP Development Distribution

Jacks Point Traffic plus allowable Jardine

- based on full capacity of Jacks point 800 residential dwellings + Jardine 244 residential dwellings ⇒ 1044 total residential ≈ 940 vph.
- traffic flows based on evidence of Mr Andrew Carr for JPROA 0.9 vph, 80% exit am 20% entry am. or 35% exit pm 65% entry pm.

  note - this distribution is similar to the NZTA/QLDC Traffic model proportions for Woolshed Road.



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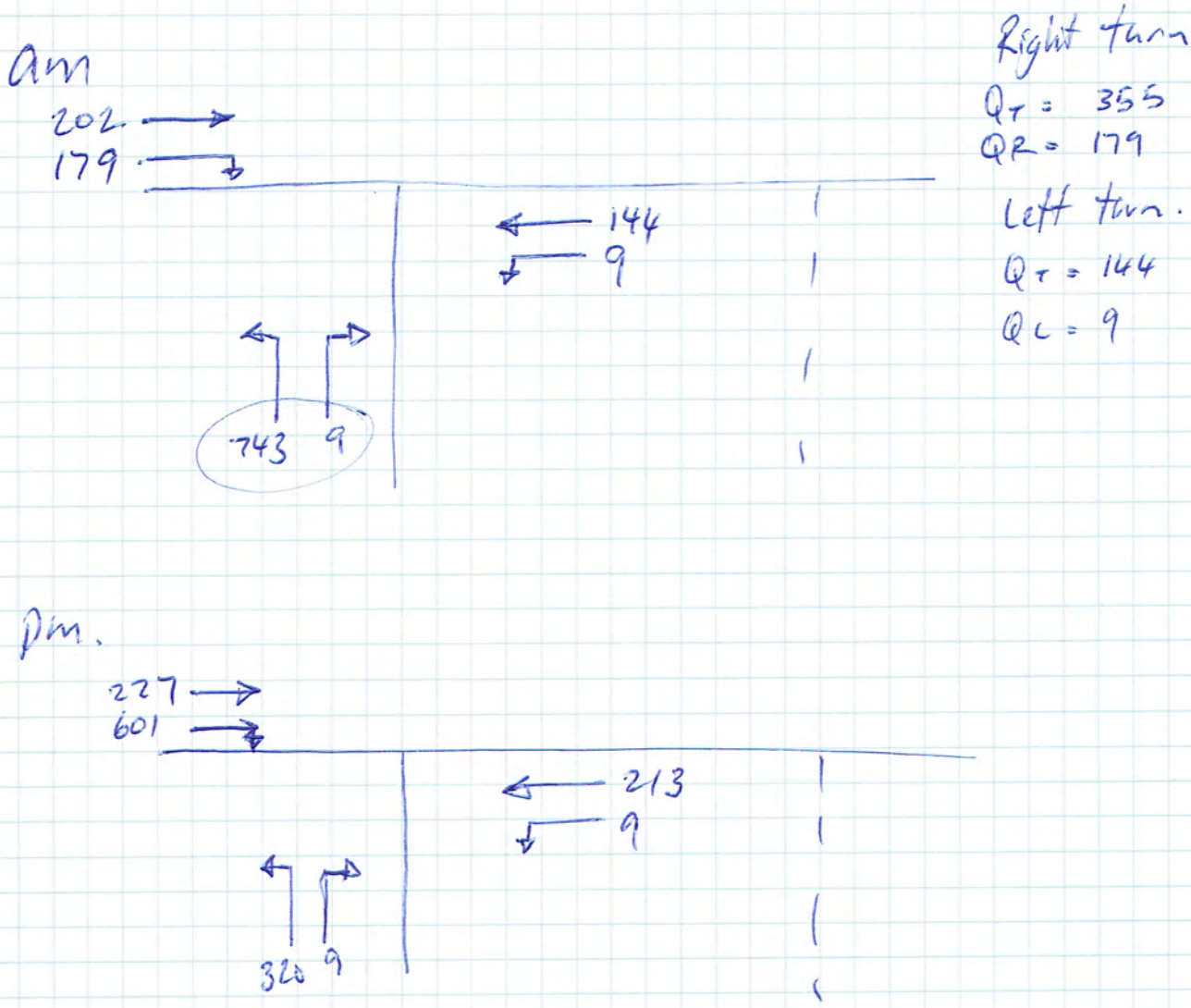
Base + development distribution.

- SH6 2045 from QLDC/NZTA traffic model.
- Full development of Jacks Point 800 residential + ODP Homestead Bay (Jardine) 244 residential.



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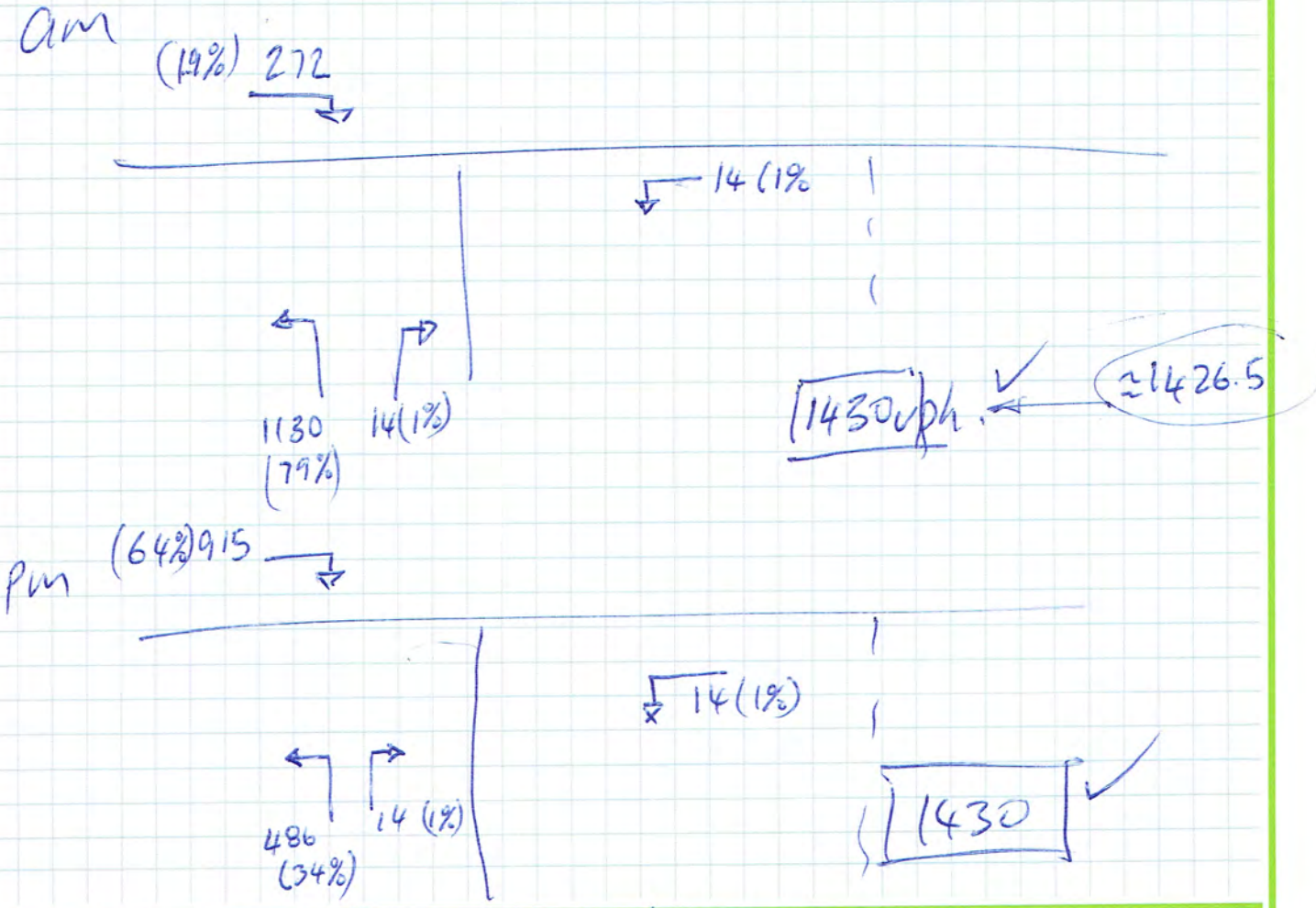
Scenario 1. - development Distribution

all proposed Jardine use Maori Jack Rd.

- based on full development of
  - Jacks Point 800 residential dwellings
  - Homestead Bay 785 residential dwellings
- Distribution based on Andrew Carr Evidence & QLDC/NZTA traffic model.



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Client Jardine

Description

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Date

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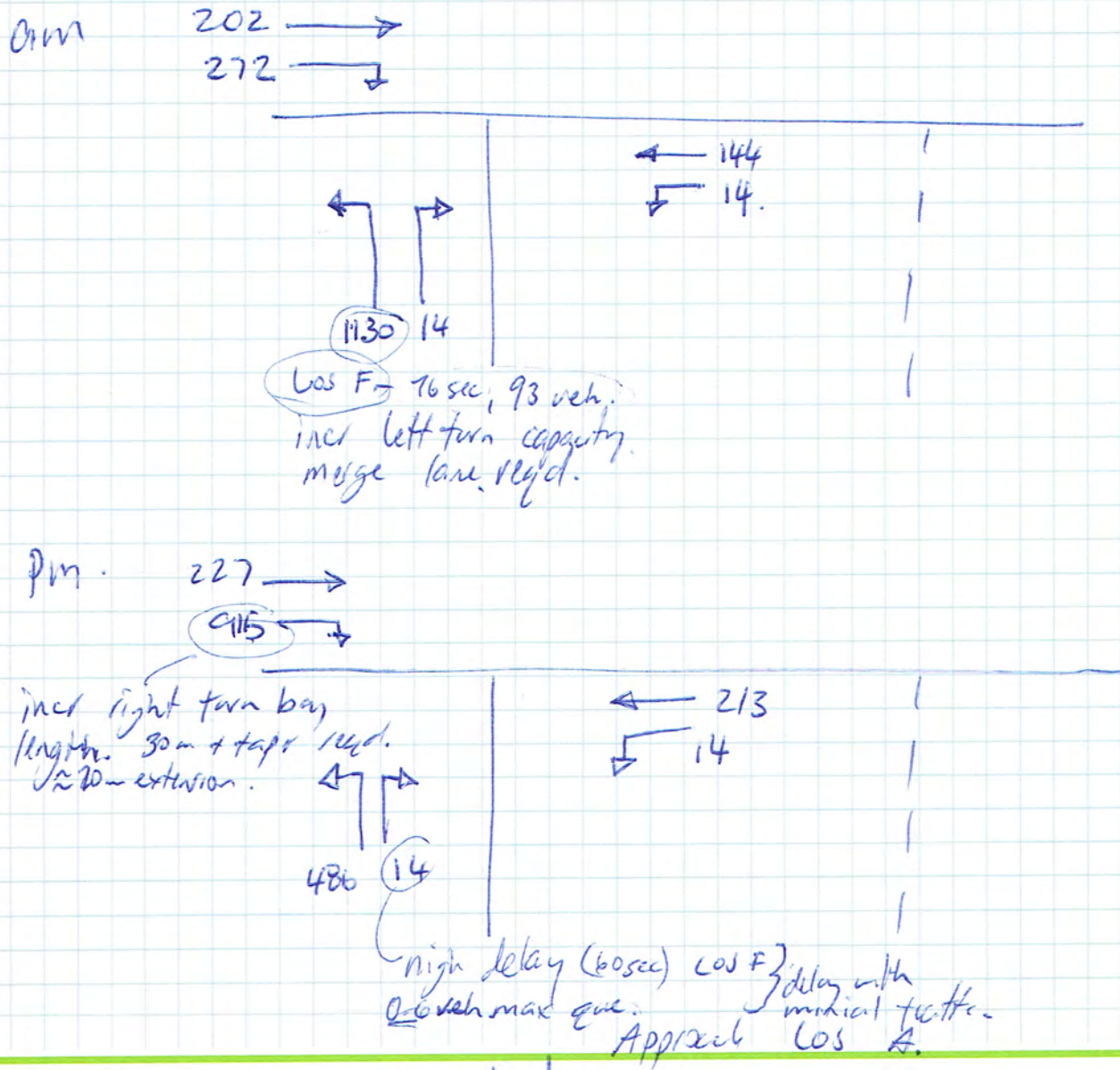
2045 Base + Scenario 1 development Dst



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Client Jordan

Description

Prepared by

Date

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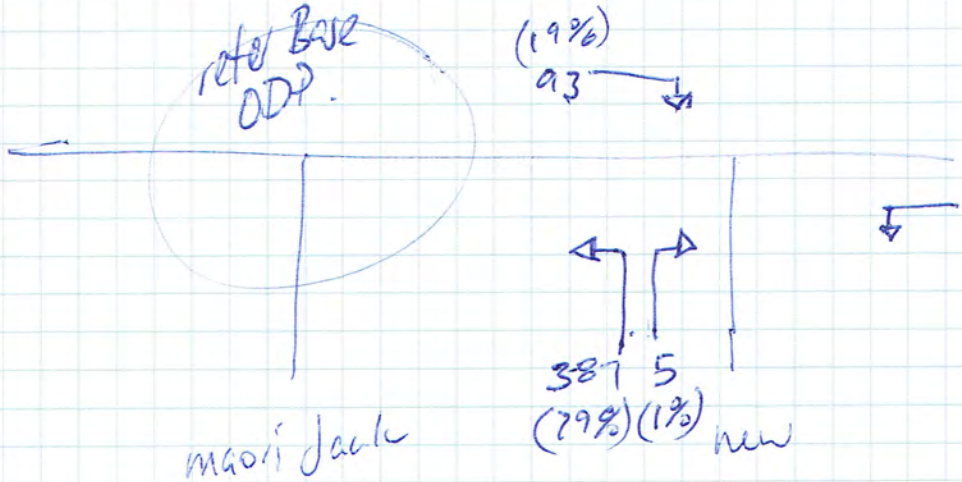
Scenario 2 - development distribution

- existing ~~SH~~ Maori Jack intersection serves
  - Jacks Point, 800 residential dwellings.
  - 244 Homestead Bay dwellings. (ODP)
- new SH6 access to accommodate additional Homestead Bay of 541 residential dwellings.

am.



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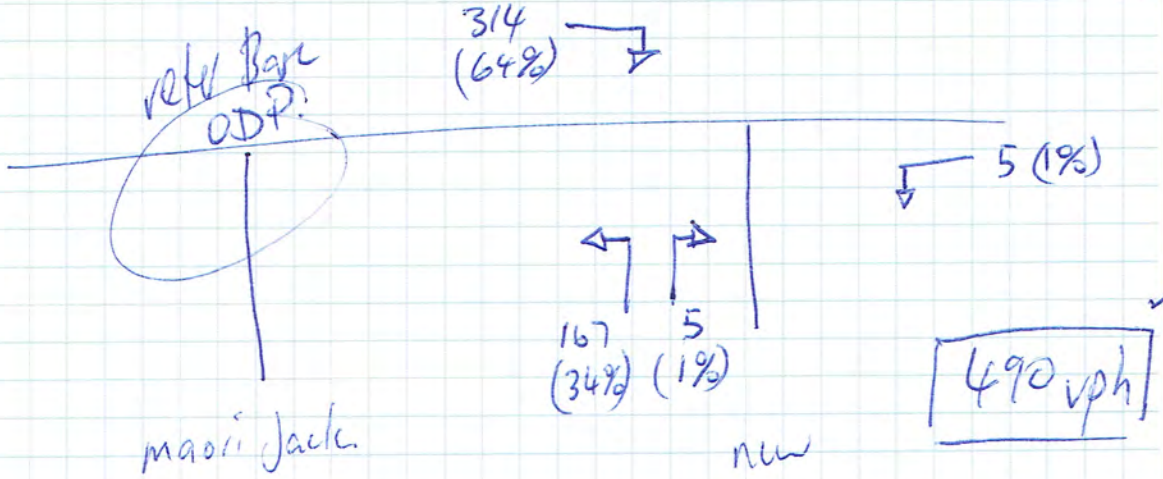

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Client Jardine.

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Date

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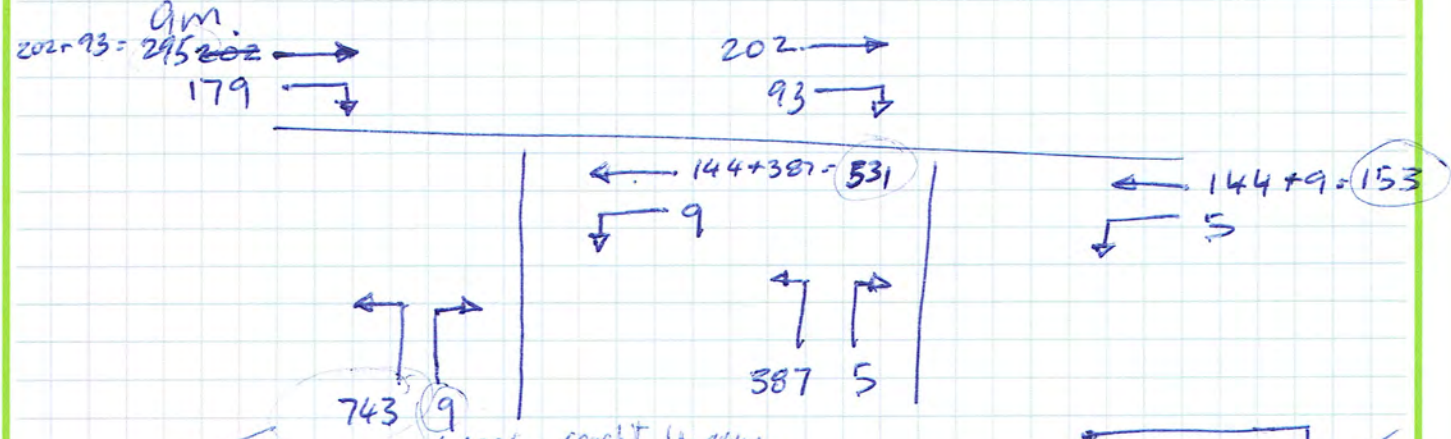
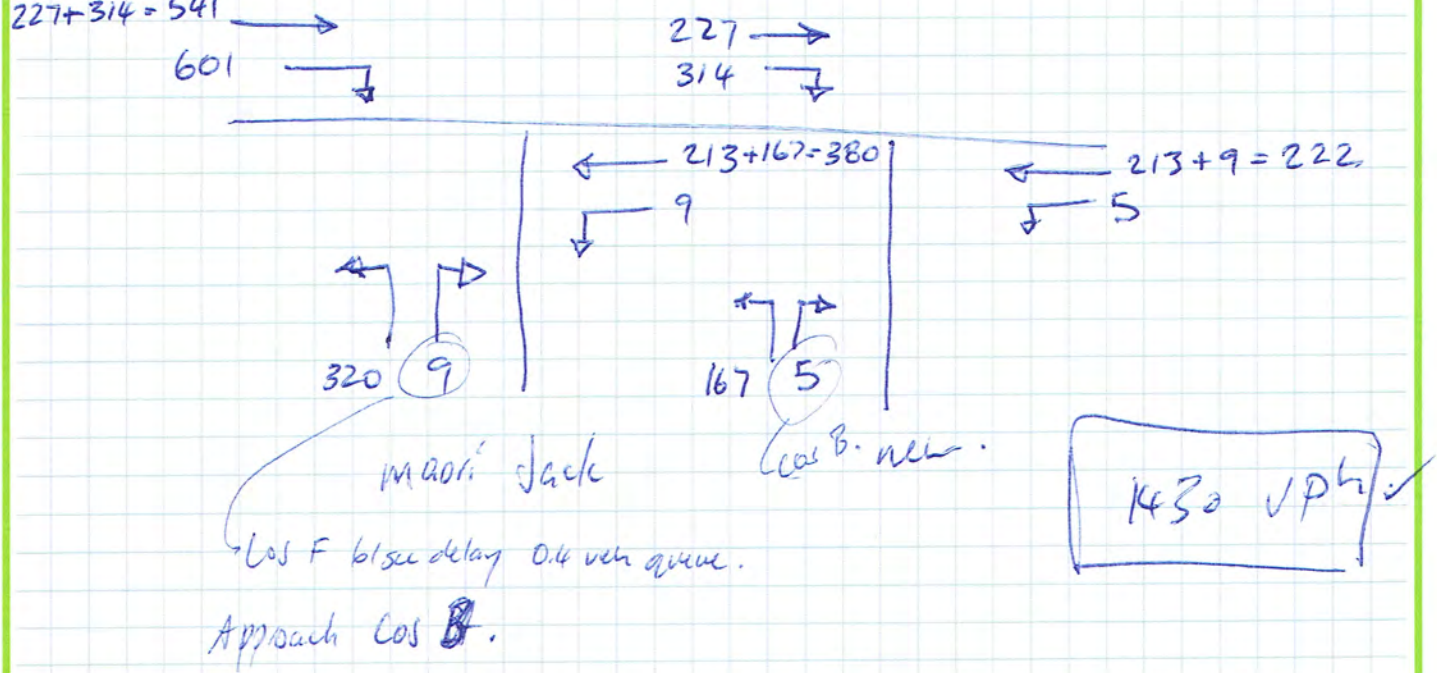
2045 Base + Scenario 2 development Dist.



PM.



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Client

Description

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Date

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MOVEMENT SUMMARY

Site: 101v [Maori Jack Road/SH6 2045 AM Full ODP]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	9	3.0	0.005	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	152	7.0	0.080	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		161	6.8	0.080	0.3	NA	0.0	0.0	0.00	0.03	59.6
North: SH6 (Qtn)											
8	T1	213	7.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	188	3.0	0.156	6.3	LOS A	0.7	4.8	0.30	0.58	52.4
Approach		401	5.1	0.156	3.0	NA	0.7	4.8	0.14	0.27	56.2
West: Maori Jack Road											
10	L2	782	3.0	0.691	8.6	LOS A	9.0	64.5	0.53	0.70	51.2
12	R2	9	7.0	0.019	10.6	LOS B	0.1	0.5	0.56	0.71	49.5
Approach		792	3.0	0.691	8.6	LOS A	9.0	64.5	0.53	0.70	51.2
All Vehicles		1354	4.1	0.691	6.0	NA	9.0	64.5	0.35	0.49	53.5

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: 101v [Maori Jack Road/SH6 2045 PM Full ODP]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	9	3.0	0.005	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	224	7.0	0.119	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		234	6.8	0.119	0.2	NA	0.0	0.0	0.00	0.02	59.7
North: SH6 (Qtn)											
8	T1	239	7.0	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	633	3.0	0.568	8.4	LOS A	5.4	38.5	0.54	0.75	51.2
Approach		872	4.1	0.568	6.1	NA	5.4	38.5	0.39	0.54	53.3
West: Maori Jack Road											
10	L2	337	3.0	0.322	6.9	LOS A	1.4	10.3	0.39	0.64	52.3
12	R2	9	7.0	0.055	25.4	LOS D	0.2	1.3	0.84	0.94	41.2
Approach		346	3.1	0.322	7.4	LOS A	1.4	10.3	0.41	0.65	51.9
All Vehicles		1452	4.3	0.568	5.5	NA	5.4	38.5	0.33	0.48	53.9

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: 101v [Maori Jack Road/SH6 2045 AM Scenario 1]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SH6 (Kingston)											
1	L2	15	3.0	0.008	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	152	7.0	0.080	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		166	6.6	0.080	0.5	NA	0.0	0.0	0.00	0.05	59.3
North: SH6 (Qtn)											
8	T1	213	7.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	286	3.0	0.239	6.4	LOS A	1.1	8.0	0.33	0.59	52.3
Approach		499	4.7	0.239	3.7	NA	1.1	8.0	0.19	0.34	55.3
West: Maori Jack Road											
10	L2	1189	3.0	1.061	76.5	LOS F	93.4	670.9	1.00	1.92	26.2
12	R2	15	7.0	0.036	12.3	LOS B	0.1	0.9	0.62	0.79	48.4
Approach		1204	3.0	1.061	75.7	LOS F	93.4	670.9	1.00	1.90	26.3
All Vehicles		1869	3.8	1.061	49.8	NA	93.4	670.9	0.69	1.32	32.5

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: 101v [Maori Jack Road/SH6 2045 AM Scenario 1 Improvements]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	15	3.0	0.008	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	152	7.0	0.080	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		166	6.6	0.080	0.5	NA	0.0	0.0	0.00	0.05	59.3
North: SH6 (Qtn)											
8	T1	213	7.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	286	3.0	0.239	6.4	LOS A	1.1	8.0	0.33	0.59	52.5
Approach		499	4.7	0.239	3.7	NA	1.1	8.0	0.19	0.34	55.4
West: Maori Jack Road											
10	L2	1189	3.0	0.119	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
12	R2	15	7.0	0.036	12.3	LOS B	0.1	0.9	0.62	0.79	48.4
Approach		1204	3.0	0.119	5.7	LOS A	0.1	0.9	0.01	0.58	53.4
All Vehicles		1869	3.8	0.239	4.7	NA	1.1	8.0	0.05	0.47	54.4

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: 101v [Maori Jack Road/SH6 2045 PM Scenario 1]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	15	3.0	0.008	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	224	7.0	0.119	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		239	6.8	0.119	0.4	NA	0.0	0.0	0.00	0.04	59.5
North: SH6 (Qtn)											
8	T1	239	7.0	0.157	0.7	LOS A	3.6	27.0	1.00	0.00	55.7
9	R2	963	3.0	0.869	15.1	LOS C	22.9	164.2	0.87	1.14	46.8
Approach		1202	3.8	0.869	12.2	NA	22.9	164.2	0.90	0.92	48.4
West: Maori Jack Road											
10	L2	512	3.0	0.489	7.7	LOS A	3.4	24.2	0.47	0.70	51.9
12	R2	15	7.0	0.213	60.7	LOS F	0.6	4.6	0.95	0.99	29.5
Approach		526	3.1	0.489	9.2	LOS A	3.4	24.2	0.48	0.71	50.8
All Vehicles		1967	4.0	0.869	10.0	NA	22.9	164.2	0.68	0.75	50.1

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.

MOVEMENT SUMMARY

Site: 101v [Maori Jack Road/SH6 2045 AM Sceanrio 2]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	9	3.0	0.005	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	559	7.0	0.297	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		568	6.9	0.297	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: SH6 (Qtn)											
8	T1	311	7.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	188	3.0	0.264	9.6	LOS A	1.1	8.1	0.60	0.85	50.3
Approach		499	5.5	0.264	3.6	NA	1.1	8.1	0.23	0.32	55.9
West: Maori Jack Road											
10	L2	782	3.0	1.161	166.0	LOS F	83.4	598.7	1.00	5.00	15.9
12	R2	9	7.0	0.051	23.7	LOS C	0.2	1.2	0.83	0.93	42.0
Approach		792	3.0	1.161	164.3	LOS F	83.4	598.7	1.00	4.95	16.0
All Vehicles		1859	4.9	1.161	71.0	NA	83.4	598.7	0.49	2.20	27.4

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: 101v [New/SH6 2045 AM Seenario 2]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	5	3.0	0.003	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	161	7.0	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		166	6.9	0.085	0.2	NA	0.0	0.0	0.00	0.02	59.8
North: SH6 (Qtn)											
8	T1	213	7.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	98	3.0	0.082	6.3	LOS A	0.3	2.4	0.29	0.58	52.5
Approach		311	5.7	0.113	2.0	NA	0.3	2.4	0.09	0.18	57.4
West: Jardine Road											
10	L2	407	3.0	0.363	6.6	LOS A	1.7	12.5	0.35	0.60	52.4
12	R2	5	7.0	0.010	9.6	LOS A	0.0	0.3	0.52	0.65	50.2
Approach		413	3.1	0.363	6.6	LOS A	1.7	12.5	0.35	0.60	52.4
All Vehicles		889	4.7	0.363	3.8	NA	1.7	12.5	0.19	0.35	55.3

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: 101v [Maori Jack Road/SH6 2045 AM Sceanrio 2 Improvements]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	9	3.0	0.005	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	559	7.0	0.297	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		568	6.9	0.297	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: SH6 (Qtn)											
8	T1	311	7.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	188	3.0	0.264	9.7	LOS A	1.1	8.1	0.60	0.84	50.5
Approach		499	5.5	0.264	3.7	NA	1.1	8.1	0.23	0.32	56.0
West: Maori Jack Road											
10	L2	782	3.0	0.078	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
12	R2	9	7.0	0.051	23.7	LOS C	0.2	1.2	0.83	0.93	42.0
Approach		792	3.0	0.078	5.8	LOS A	0.2	1.2	0.01	0.58	53.3
All Vehicles		1859	4.9	0.297	3.5	NA	1.1	8.1	0.06	0.34	55.9

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: 101v [Maori Jack Road/SH6 2045 PM Scenario 2]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SH6 (Kingston)											
1	L2	9	3.0	0.005	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	400	7.0	0.212	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		409	6.9	0.212	0.2	NA	0.0	0.0	0.00	0.01	59.8
North: SH6 (Qtn)											
8	T1	569	7.0	0.407	0.6	LOS A	6.0	44.2	1.00	0.00	55.7
9	R2	633	3.0	0.705	12.3	LOS B	7.9	56.7	0.74	1.13	48.5
Approach		1202	4.9	0.705	6.8	NA	7.9	56.7	0.86	0.60	51.7
West: Maori Jack Road											
10	L2	337	3.0	0.398	8.9	LOS A	2.1	15.3	0.55	0.83	51.0
12	R2	9	7.0	0.149	61.3	LOS F	0.4	3.1	0.95	0.98	29.3
Approach		346	3.1	0.398	10.3	LOS B	2.1	15.3	0.56	0.84	50.0
All Vehicles		1958	5.0	0.705	6.0	NA	7.9	56.7	0.63	0.52	52.9

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

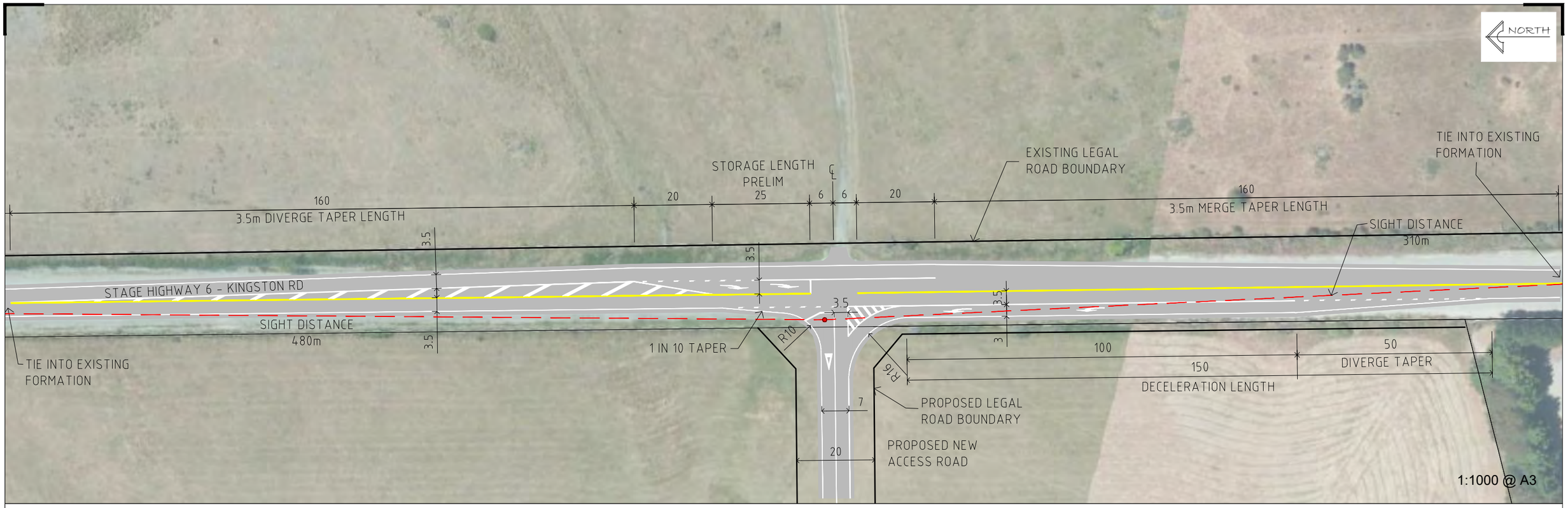
Site: 101v [New/SH6 2045 PM Scenario 2]

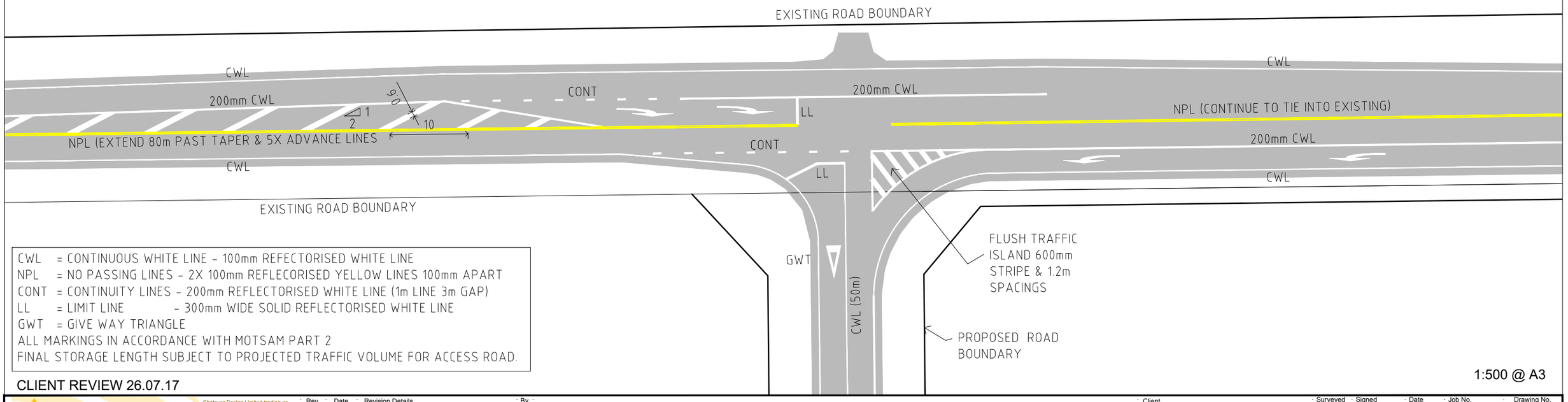
New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: SH6 (Kingston)											
1	L2	5	3.0	0.003	5.6	LOS A	0.0	0.0	0.00	0.58	53.5
2	T1	234	7.0	0.124	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		239	6.9	0.124	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: SH6 (Qtn)											
8	T1	239	7.0	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	331	3.0	0.299	6.9	LOS A	1.4	10.2	0.42	0.64	52.1
Approach		569	4.7	0.299	4.0	NA	1.4	10.2	0.24	0.37	55.1
West: Jardine Road											
10	L2	176	3.0	0.170	6.7	LOS A	0.7	4.7	0.35	0.62	52.4
12	R2	5	7.0	0.016	14.8	LOS B	0.1	0.4	0.70	0.80	46.9
Approach		181	3.1	0.170	7.0	LOS A	0.7	4.7	0.36	0.63	52.2
All Vehicles		989	4.9	0.299	3.6	NA	1.4	10.2	0.21	0.33	55.6

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.

Attachment B – Proposed State Highway Intersection Layout





CWL = CONTINUOUS WHITE LINE - 100mm REFECTORISED WHITE LINE
NPL = NO PASSING LINES - 2X 100mm REFLECORISED YELLOW LINES 100mm APART
CONT = CONTINUITY LINES - 200mm REFLECTORISED WHITE LINE (1m LINE 3m GAP)
LL = LIMIT LINE - 300mm WIDE SOLID REFLECTORISED WHITE LINE
GWT = GIVE WAY TRIANGLE
ALL MARKINGS IN ACCORDANCE WITH MOTSAM PART 2
FINAL STORAGE LENGTH SUBJECT TO PROJECTED TRAFFIC VOLUME FOR ACCESS ROAD.

CLIENT REVIEW 26.07.17

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Rev.	Date	Revision Details	By
-	-	-	-

HOMESTEAD BAY
PROPOSED SH6 INTERSECTION LAYOUT

Client: Jardine	Surveyed: -	Signed:	Date: -	Job No.: 12471	Drawing No.: 01 Sheet 001
Notes: All dimensions shown are in meters unless shown otherwise. Any person using Clark Fortune McDonald drawings and other data accepts the risk of: - Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions. - Ensuring the information is the most recent issue. - Copyright on this drawing is reserved.	Drawn: RWB	Signed:	Date: 01.01.14	Scale: AS ABOVE	
	Designed: -	Signed:	Date: -	Datum & Level: Mt Nic 2000 & MSL	Rev.: -

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