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TRANSPORT MODELLERS ALLIANCE

Technical note

Project: St Leonards South
Note: Development sites A and BC
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1 Introduction

This technical note reports on the updated Future base model that includes development sites A and BC. The note then compares the performance of this future base model against that of the future model containing LEP growth and approved developments only

FIGURE 1 SITE A AND BC LOCATION

Source Open street map

The following changes were implemented in the future base model

- Berry Ln was removed
- A new connection between Park Rd and Berry Rd 100m south of Marshall Ave was implemented
- Lithgow Street was disconnected from River Rd

2 Traffic Generation

2.1 SITE A

The traffic generation for Site A was taken from the Colston Budd Hunt & Kafes PTY LTD report *Transport Aspects of Planning Proposal for Proposed Mixed Use Developments, Christie Street & Lithgow Street St Leonards*, issued December 2014 on behalf of Winston Property Group

In this report it is established that Site A will generate 210 and 350 vehicles per hour two way in the AM and PM peaks respectively

2.2 SITE B&C

Site B and Site C were previously treated as separate sites and have since been amalgamated into one site consisting of 472 - 486, 500 and 504 - 520 Pacific Highway

The traffic generation for Site B&C was taken from the Brown report *Traffic, Parking and Accessibility Report*, issued May 2014 on behalf of Leighton Properties and Charter Hall

In this report it was established that Site B&C will generate 236 and 177 vehicles per hour two way in the AM and PM peaks respectively

2.3 BERRY ST PARK RD DWELLIINGS

650 dwelling were added to the model just west of the rail line with 50% of the dwellings being accessed from Berry Rd and the other 50% being accessed from Park Rd.

As the dwelling will be high density dwelling at a distance of around 500m from the tram station the lowest trip generation rate will be used

The RMS *Guide to Traffic Generating Developments Updated traffic surveys* indicates that a trip generation rate of 0.07 trips per dwelling in the AM and 0.06 trips per dwelling in the PM can be used resulting in 46 trips in the AM peak and 39 trips the PM peak being generated.

TABLE 1 TRAFFIC GENERATION SUMMARY

		AM	PM
Site A	88 Christie Street	210	350
Site B Site C	472 - 486 and 504 - 520 Pacific Hwy 500 Pacific Hwy	236	177
	Berry St Park Rd dwellings	46	39
Total		492	566

3 Traffic Distribution

The traffic was broken up into three categories commercial (Office), retail and residential with the traffic generation volumes being broken up into these three categories and then assigned to the network

Previously established traffic patterns were used for commercial and residential distributions which were extracted from immediately surrounding sites while a new retail distribution pattern was established

The retail distribution pattern was established by assessing the size of the retail development and identifying all surrounding retail land uses. This established a catchment that was broken up into areas relating to the model zones and trips were assigned to the individual zones depending of the proportion of residential dwelling in a particular zone as it related to the entire catchment.

4 Results

4.1 NETWORK PERFORMANCE

TABLE 2NETWORK STATISTICS

	Model	Description	Mean Speed (kph)	VKT	VHT	Unreleased
AM	D02N02_AM_21 D13N20_AM_21	Background Growth Only	22.6	18273.0	809.9	7
		Future Base	20.3	18629.9	920.4	50
		% diff	-10.4%	2.0%	13.7%	
PM	D02N02_PM_21 D13N20_PM_21	Background Growth Only	21.6	18124.4	839.7	22
		Future Base	21.4	19147.8	896.1	22
		% diff	-0.9%	5.6%	6.7%	

Table 2 shows that the introduction of the developments has had some impact on the network statistics with the average speed reducing and the Vehicle Kilometres Travelled (VKT) and the Vehicle Hours Travelled (VHT) increasing.

Some of the increase in VKT and VHT will be a result of the increase in demand and not necessarily a deterioration of network performance such as in the PM. The AM however has had a smaller increase in trips and had a more adverse effect. The reason for this will be further explored in the preceding sections.

4.2 TRAVEL TIMES

Figure 2 and figure 3 show the impact that the increased demand has had on the Pacific highway.

The Future Base (FB) AM model has seen a 30 second increase in travel times between Greenwich Rd and Berry Rd and the FB PM has seen a 45 second increase in travel times between Rocklands Ave and Shirley Rd. These small increases in travel time are consistent with an increase in volume on the Pacific Hwy travelling towards the development sites.

As the rest of the curves are identical as such the increases are not consistently seen along the length of the curve this suggests that the increase in volume is placing pressure only as specific intersections.

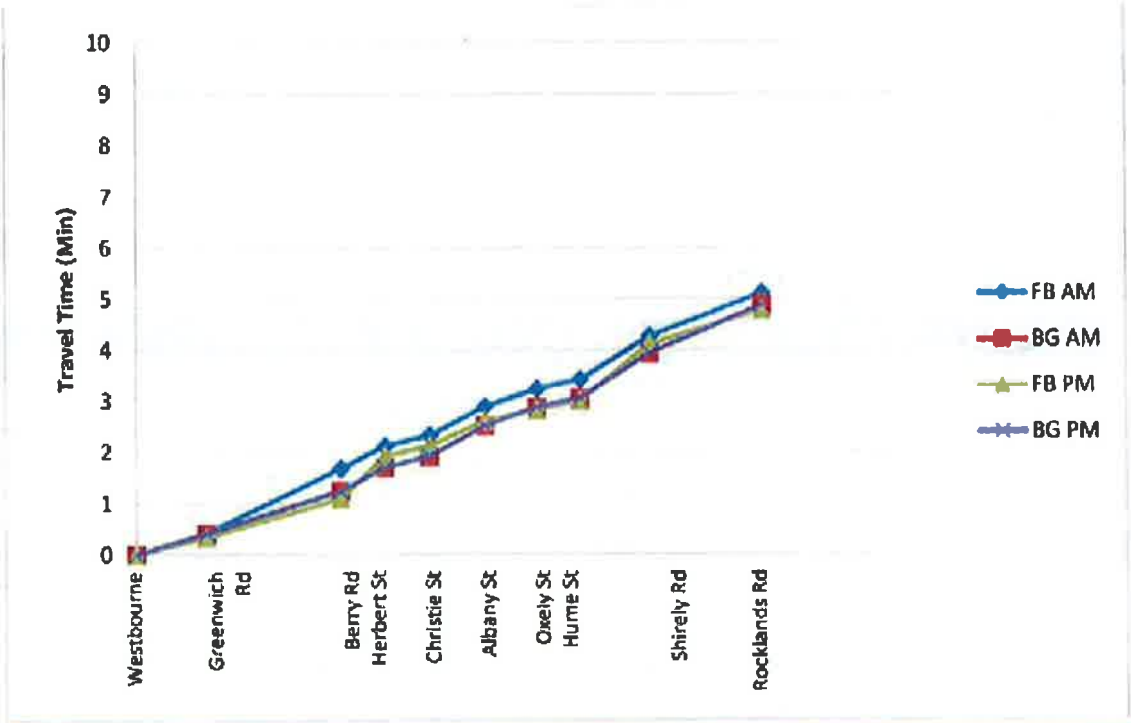

FIGURE 2 PACIFIC HWY EASTBOUND

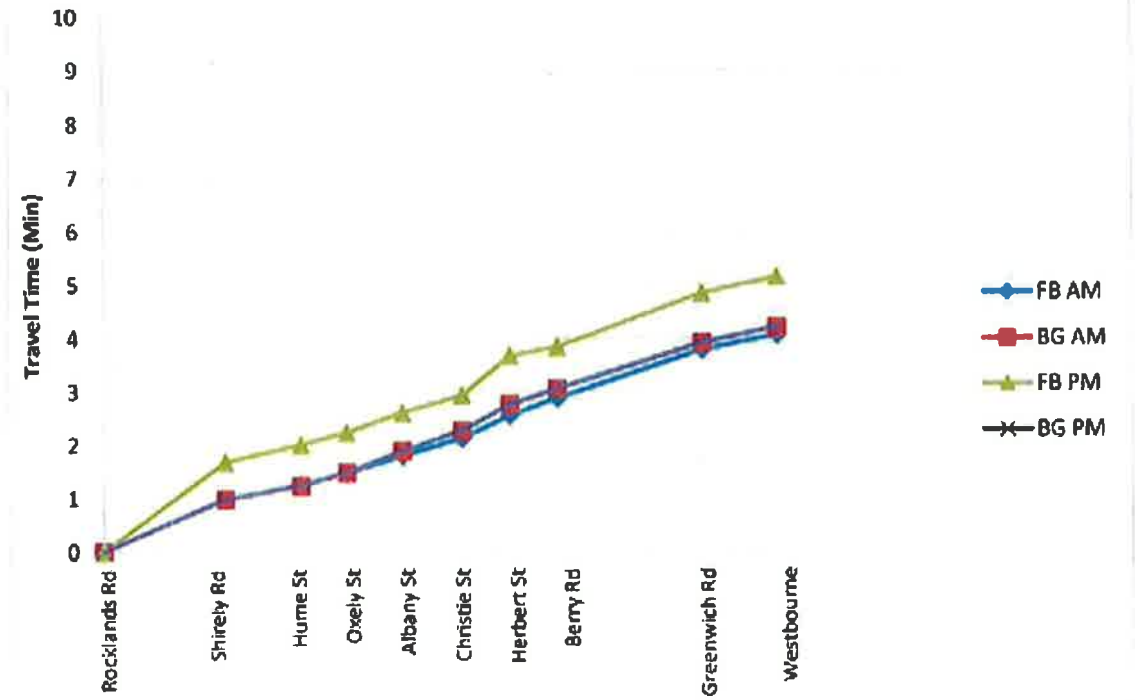

FIGURE 3 PACIFIC HWY WESTBOUND

4.3 LEVEL OF SERVICE

TABLE 3 AM LEVEL OF SERVICE

Intersection	Approach	Delay (s)	Vehicles	Level of Service	Delay (s)	Vehicles	Level of Service
		Background Growth Only			Future Base		
Pacific Hwy/Reserve Rd/Berry Rd	Reserve Rd	72.5	82	F	61.2	105	E
	Pacific Hwy (E)	97.2	1689	F	132.9	1661	F
	Berry Rd	60.6	125	E	53.3	113	D
	Pacific Hwy (W)	122.0	1965	F	133.4	1849	F
	Intersection	108.1	3861	F	128.7	3728	F
Pacific Hwy/Herbert St	Herbert St	54.1	618	D	124.9	686	F
	Pacific Hwy (E)	75.5	2112	F	57.7	1994	E
	Pacific Hwy (W)	44.5	1940	D	31.5	1801	C
	Intersection	59.8	4670	E	57.5	4481	E
Pacific Hwy/Christie St	Christie St (N)	71.9	499	F	104.3	532	F
	Pacific Hwy (E)	23.3	1995	B	13.9	1875	A
	Pacific Hwy (W)	20.8	2249	B	16.4	2181	B
	Intersection	27.2	4743	B	25.6	4588	B
Pacific Hwy/Albany St	Pacific Hwy (N)	29.2	1759	C	31.5	1710	C
	Albany St	110.3	610	F	68.0	608	E
	Pacific Hwy (S)	34.0	1593	C	22.3	1417	B
	Intersection	43.6	3962	D	34.0	3735	C
Pacific Hwy/Oxley St	Pacific Hwy (N)	12.2	1387	A	18.6	1317	B
	Oxley St (E)	54.4	114	D	37.8	120	C
	Pacific Hwy (S)	14.1	1373	B	20.2	1251	B
	Oxley St (W)	67.3	430	E	64.9	256	E
	Intersection	21.6	3304	B	24.1	2944	B
Pacific Hwy/Hume St	Pacific Hwy (N)	12.0	1446	A	12.9	1341	A
	Hume St (E)	56.7	188	D	52.4	137	D
	Pacific Hwy (S)	19.4	1257	B	19.2	1184	B
	Hume St (W)	55.6	142	D	56.3	146	D
	Intersection	19.9	3033	B	19.7	2808	B
Pacific Hwy/Falcon St/Shirley Rd	Pacific Hwy (N)	51.4	1413	D	48.6	1282	D
	Falcon St	114.8	879	F	135.7	813	F
	Pacific Hwy (S)	29.6	876	C	29.2	805	C
	Shirley Rd	119.4	457	F	106.2	512	F
	Intersection	70.1	3625	F	73.4	3412	F
Pacific Hwy/Alexander St	Pacific Hwy (N)	23.3	1253	B	20.1	1185	B
	Alexander St	43.7	356	D	44.8	326	D
	Pacific Hwy (S)	32.2	1124	C	33.7	1035	C
	Intersection	29.6	2733	C	28.8	2546	B
River Rd/Shirley Rd	Shirley Rd (N)	60.0	455	E	59.6	401	E
	Shirley Rd (S)	49.0	202	D	49.9	215	D
	River Rd	52.5	894	D	50.8	929	D
	Intersection	54.3	1551	D	52.9	1545	D

TABLE 4 PM LEVEL OF SERVICE

Intersection	Approach	Background Growth Only			Future Base		
		Delay (s)	Vehicles	Level of Service	Delay (s)	Vehicles	Level of Service
Pacific Hwy/Reserve Rd/Berry Rd	Reserve Rd	61.9	82	E	55.1	214	D
	Pacific Hwy [E]	92.2	1689	F	83.3	1803	F
	Berry Rd	65.6	125	E	67.7	116	E
	Pacific Hwy [W]	105.7	1965	F	114.6	1442	F
	Intersection	**97.6**	**3861**	**F**	**93.7**	**3575**	**F**
Pacific Hwy/Herbert St	Herbert St	50.9	618	D	50.3	850	D
	Pacific Hwy [E]	61.5	2112	E	59.4	1933	E
	Pacific Hwy [W]	27.2	1940	B	48.3	1515	D
	Intersection	**45.8**	**4670**	**D**	**53.7**	**4298**	**D**
Pacific Hwy/Christie St	Christie St [N]	168.5	499	F	52.4	391	D
	Pacific Hwy [E]	25.6	1995	B	17.3	1918	B
	Pacific Hwy [W]	16.3	2249	B	15.4	1943	B
	Intersection	**36.2**	**4743**	**C**	**19.7**	**4252**	**B**
Pacific Hwy/Albany St	Pacific Hwy [N]	23.4	1759	B	27.6	1480	B
	Albany St	74.8	610	F	66.4	611	E
	Pacific Hwy [S]	28.4	1593	B	24.6	1548	B
	Intersection	**33.4**	**3962**	**C**	**32.8**	**3639**	**C**
Pacific Hwy/Oxley St	Pacific Hwy [N]	13.4	1387	A	13.9	1178	A
	Oxley St [E]	45.7	114	D	40.0	132	C
	Pacific Hwy [S]	11.9	1373	A	15.5	1367	B
	Oxley St [W]	91.6	430	F	94.1	500	F
	Intersection	**24.1**	**3304**	**B**	**28.3**	**3177**	**B**
Pacific Hwy/Hume St	Pacific Hwy [N]	13.5	1446	A	14.8	1319	B
	Hume St [E]	46.5	188	D	51.3	163	D
	Pacific Hwy [S]	19.2	1257	B	19.7	1294	B
	Hume St [W]	54.6	142	D	51.7	173	D
	Intersection	**19.8**	**3033**	**B**	**21.1**	**2949**	**B**
Pacific Hwy/Falcon St/Shirley Rd	Pacific Hwy [N]	63.2	1413	E	63.6	1258	E
	Falcon St	85.8	879	F	93.0	954	F
	Pacific Hwy [S]	65.7	876	E	66.2	1072	E
	Shirley Rd	99.2	457	F	99.5	642	F
	Intersection	**73.8**	**3625**	**F**	**77.3**	**3926**	**F**
Pacific Hwy/Alexander St	Pacific Hwy [N]	15.2	1253	B	15.7	1080	B
	Alexander St	69.2	356	F	89.0	261	F
	Pacific Hwy [S]	47.6	1124	D	41.5	1305	C
	Intersection	**35.6**	**2733**	**C**	**35.7**	**2646**	**C**
River Rd/Shirley Rd	Shirley Rd [N]	27.1	455	B	27.4	775	B
	Shirley Rd [S]	38.8	202	C	50.8	398	D
	River Rd	34.4	894	C	32.6	644	C
	Intersection	**32.9**	**1551**	**C**	**34.3**	**1817**	**C**

The AM Level of service graph further reinforces what was discovered in the travel time results being that there has been an adverse effect to the Pacific Hwy at Berry St delay has also gone up at Herbert St and Christie St

The volumes at the Christie St intersection have dropped as a result of the increase in delay and as a result the volumes southbound along the Pacific Hwy are also lower indicating that the Berry St intersection is operating at capacity

There are no real increases in delay in the PM with most of the intersection Level of Service remaining similar with some of the intersection actually being improved upon as a result of signal optimisation along the Pacific Hwy

4.4 QUEUE DIAGRAMS

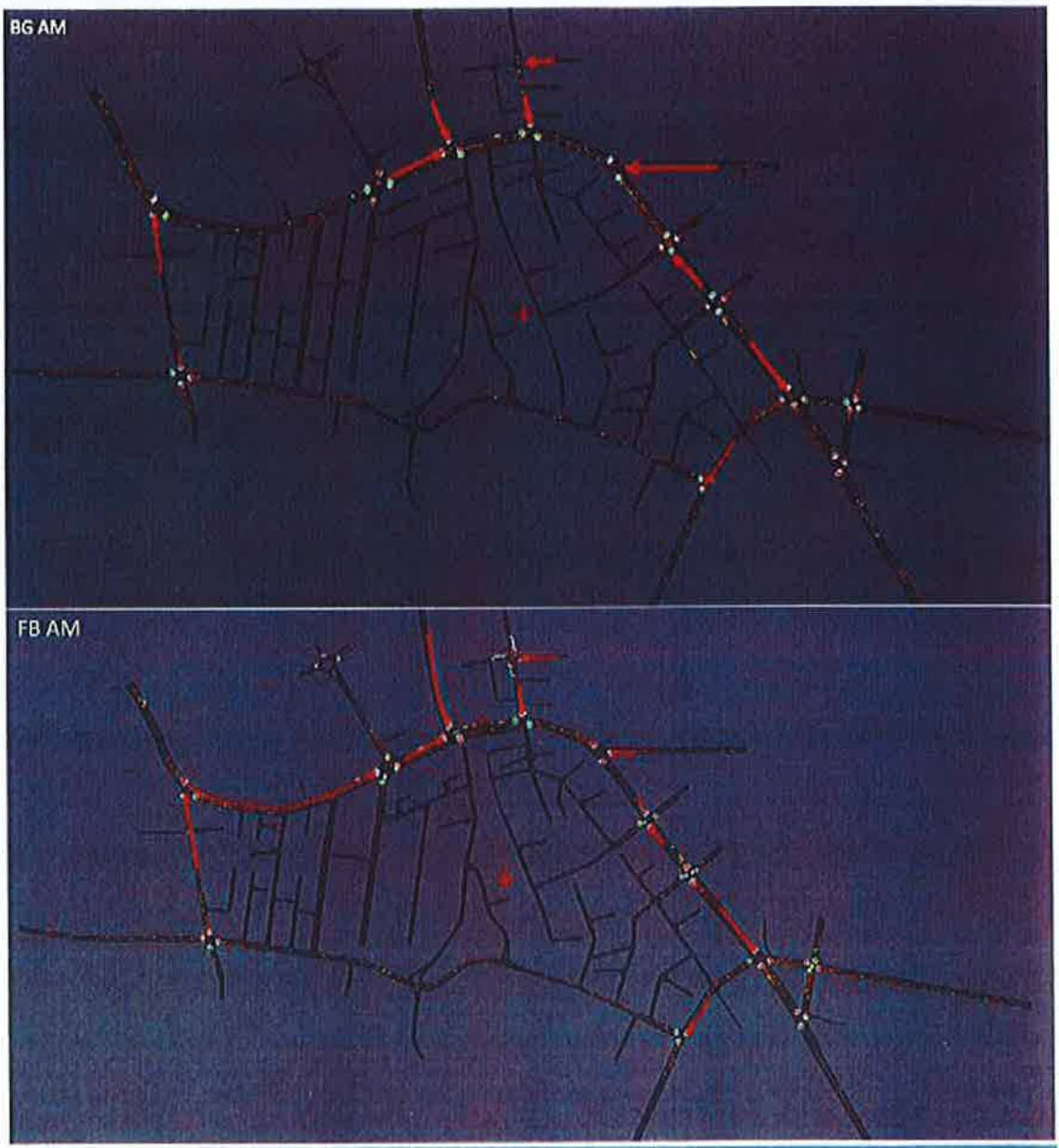

FIGURE 4 AM QUEUE DIAGRAMS

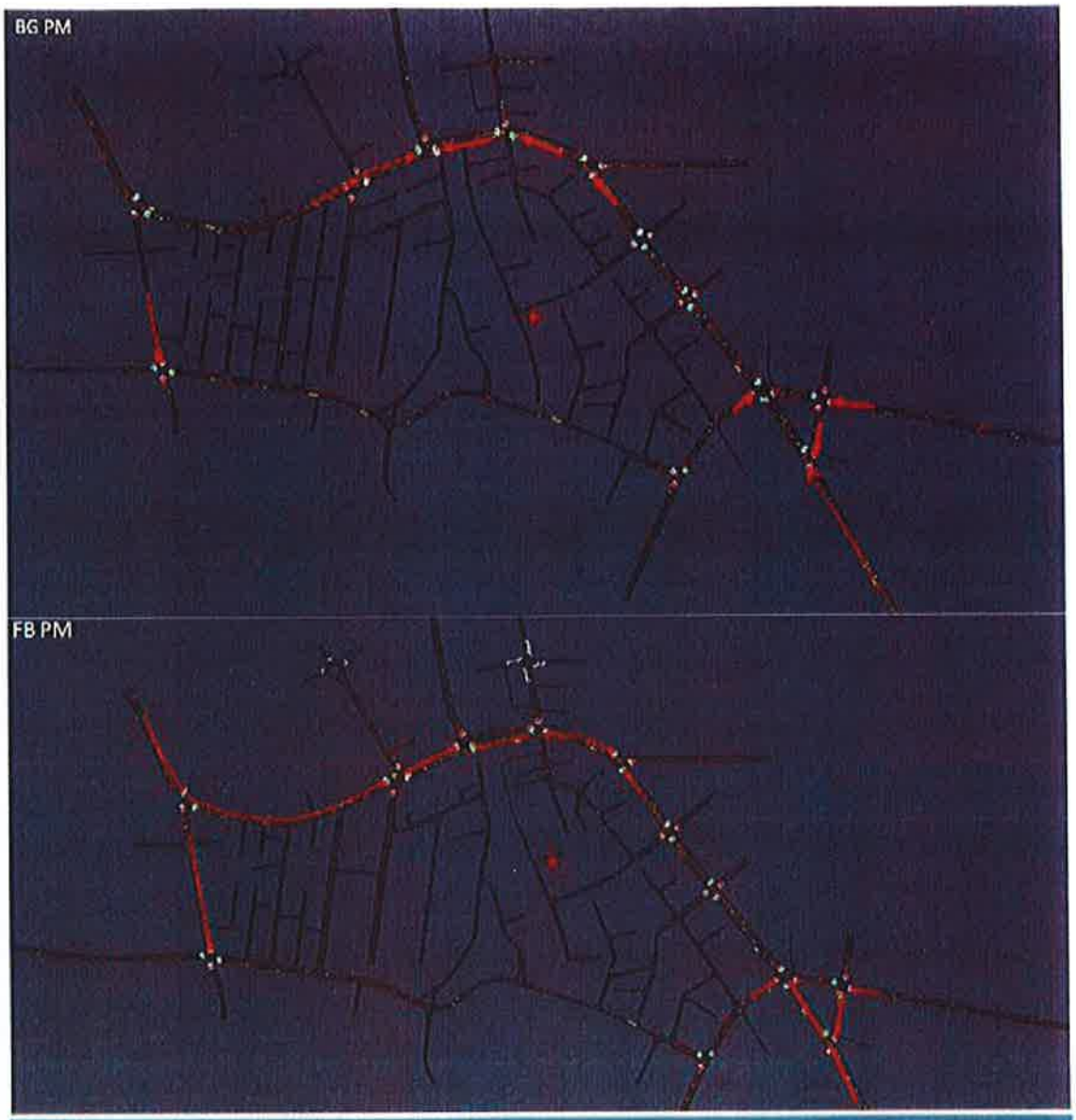

FIGURE 5 PM QUEUE DIAGRAMS

Figure 4 confirms that the increase in delay the AM had at the Berry Pacific Berry intersection is also accompanied by and increase in queueing

Figure 5 shows that previously the PM had a small rolling queue extending back from the Berry St intersection and even though the intersection performance hasn't deteriorated this rolling queue has grown indicating that the queue is dissipating quickly. A similar story can be told for the Pacific Falcon St intersection as there has been an increase in queueing without a substantial increase in delay

5 Conclusion

In summary the PM models does not experience any major network deterioration as a result of the introduction of the Site A and Site BC developments. There is the potential for an increase in queues however the models showed that the queues dissipate quickly and as such there has been no deterioration in intersection performance.

The improvement of some approaches at the PM intersections can be accounted for as a result of optimisation (in line with what is possible within SCATS) of signals along the Pacific Hwy

The results do however there indicate the potential for some network deterioration in the AM centred around the Pacific Berry St intersection (also potentially the PM if demands increase further) Previous modelling has indicated that it is the interaction between the Berry Herbert and Christie street intersections that causes the delay at Berry street and that this is a bottle neck on the network

The performance of the Berry St intersection is more sensitive in the AM due to the more directed nature of AM flows The increase in delay on the western approach is around 11 seconds and is manageable, as a result the network is able to cope with the increase in demand associated with the new developments but any further increase in development will need to be tested