

28. 7. 2011

**SHIRLEY/PAPANUI COMMUNITY BOARD
1 JUNE 2011**

**Report of a meeting of the Shirley/Papanui Community Board,
held on Wednesday 1 June 2011 at 4.10pm
in Garden Room, St Albans Baptist Church, 64 McFaddens Road St Albans.**

PRESENT: Chris Mene, (Chairperson), Anna Button, Ngaire Button,
Kathy Condon, Pauline Cotter, Chris English and Aaron Keown.

APOLOGIES: Nil.

The Board reports that:

PART A – MATTERS REQUIRING A COUNCIL DECISION



**1. SIGNALISED INTERSECTION – LANGDONS ROAD/MAIN NORTH ROAD/MARY STREET –
SAFETY AUDIT REPORT**

PURPOSE OF REPORT

1. The purpose of this report is to provide information requested by the Shirley/Papanui Community Board, and to seek a Council resolution to effect changes to the Langdons Road/Main North Road/Mary Street traffic signals, specifically around the installation of a right turn arrow turning from Main North Road onto Langdons Road.

EXECUTIVE SUMMARY

2. The board received a deputation from Helen Durelos at the meeting held on 21 May 2008, expressing that a safety audit be carried out at the intersection of Langdons Road/Main North Road/Mary Street. The purpose of this safety audit was borne from a concern that there is a danger to pedestrians crossing the signalised pedestrian crossing on the north leg of this intersection.
3. Following extensive site inspections and monitoring, staff submitted a report to the Board meeting held on 31 May 2010, recommending that the pedestrian crossing point on the north side of the intersection be removed immediately, and that the whole intersection be reviewed to look at options to further improve safety.
4. The Board supported this request, and passed it through to Council to endorse. The Board and Council then requested that consideration be made for the installation of a green turning arrow from Main North Road onto Langdons Road. Generally the installation of Right Turn Signals has a disadvantage to the general operation and efficiency of the intersection. However, in some cases, such as locations with a disproportionately heavy turning movement, or bad intersection geometry, some benefits may be achieved; this is generally still at the expense of efficiency on at least one approach.
5. Staff considered options for this intersection, and developed a brief for Aurecon consultants to investigate. The following factors and requirements were considered:
 - (a) No noticeable impact to traffic flows on Main North Road,
 - (b) Better pedestrian protection across each marked crossing (red arrow protection),
 - (c) A Right Turn Green Signal (green arrow) from Main North Road into Langdons Road,
 - (d) Reduced confusion of vehicles going straight through, mixed with right-turning vehicles on Langdons Road,

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- (e) Planned changes to the 'give way' rule.

Staff also permitted Aurecon to consider reducing the level of service for vehicles on Mary Street, as this is classified as a local road only, and does not justify the amount of green time it currently receives.

6. Aurecon considered all the aspects of the brief, and produced an 18 page report. The report from Aurecon is attached (**Attachment 1**) to this report.
7. The Aurecon report utilised the existing sParamics model which was developed for the bus priority project to allow full modelling of the impact to changes at this intersection, and other nearby intersections. Vehicle count and movement data was based on a count undertaken in September 2008. Baseline count data from elsewhere in the city before the February earthquake indicates this data is not likely to have changed significantly between September 2008 and January 2011.
8. The Aurecon report suggested three options. These are:
 - (a) Option 1 – Split approach phasing with an exclusive Right Turn lane and a shared through and left turn lane on Langdons Road.
 - (b) Option 2 – Option 1 with the addition of an exclusive Right Turn lane and a shared through and left turn lane on Mary Street.
 - (c) Option 3 – Option 2 with the addition of an exclusive right turn phase into Langdons Road, limiting the right turn phase and the Mary Street phase to a maximum of 11 seconds.
9. The report shows that it will be possible to change the lane configuration with no reduction to service for the vehicles on Main North Road. With the new lane configuration on Langdons Road, there will be almost no reduction in service to this traffic. In fact, it is likely there would be an improvement to the safety of pedestrians crossing Main North Road at the south side of the intersection as the Langdons Road traffic will be held with a red arrow. As these right turning vehicles do not have to give way to straight through traffic from Mary Street, they will be able to turn freely once the pedestrians have cleared, therefore increasing the level of service to this movement. Unfortunately, to implement this proposal, we would need to remove the final section of existing cycle lane on Langdons Road, as there would be no safe way to protect straight through cyclists while the left turn arrow is running on Langdons Road.
10. Due to the presence of the large tree on the south side of the Mary Street approach, we will not be able to increase the road width for an extra lane, as recommended in the Aurecon report. This means that it will only be possible for about half the number of vehicles to exit from Mary Street, compared to current levels. Implementing this recommendation will help discourage drivers from using Mary Street and the surrounding residential areas for rat-running. In the event that the Police need to make a quick exit from the Police Station, they can do this at any time with sirens sounding. Given the benefits to road users from other approaches, any disadvantages to drivers here would be compensated for in the improvements in pedestrian safety and wait times at other legs of the intersection.
11. The attached (**Attachment 2**) plan shows the proposed new layout for this intersection.
12. Since the February earthquake, there has been increased pressure on the right turn from Langdons Road, with short peak queuing reaching back through the Langdons Road roundabout. This new layout is likely to mitigate the effects of this queuing.

FINANCIAL IMPLICATIONS

13. The estimated cost of this proposal is approximately \$35,000.

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Do the Recommendations of this Report Align with 2009-19 LTCCP budgets?

14. The installation or removal of road markings, signs, and traffic signals is within the LTCCP Streets and Transport Operational Budgets, and could be programmed to be completed in the 2011/12 financial year.

LEGAL CONSIDERATIONS

15. Subject to the Local Government Act 1974 and 2002. Subject to the Land Transport Rule 54002, Traffic Control Devices.
16. The Community Boards do not have the delegated authority from the Council to make alterations to traffic control facilities on an arterial road. Therefore, the Community Board must make a recommendation to Council.

Have you considered the legal implications of the issue under consideration?

17. As above.

ALIGNMENT WITH LTCCP AND ACTIVITY MANAGEMENT PLANS

18. Aligns with the Streets and Transport activities by contributing to the Council's Community Outcomes - Safety and Community.

Do the recommendations of this report support a level of service or project in the 2009-19 LTCCP?

19. As above.

ALIGNMENT WITH STRATEGIES

20. The recommendations align with the Council Strategies including the Pedestrian Strategy 2001, Road Safety Strategy 2004 and the Safer Christchurch Strategy 2005.

Do the recommendations align with the Council's Strategies?

21. As above.

CONSULTATION FULFILMENT

22. As there are no proposed changes to the kerb-side parking layout, and the proposal will increase pedestrian safety, no consultation has been carried out on this proposal.

STAFF RECOMMENDATION

That the Council approve the following changes at the Langdons Road/ Main North Road/ Mary Street intersection:

- (a) Implementation of Option 3 and the recommendations of Aurecon report 213384-001-01,
- (b) That Mary Street remains as a single lane north-westbound,
- (c) That the new road marking layout is installed according to the **attached** proposed marking plan (TS102901.DGN 2010-11-22).

BOARD RECOMMENDATION

That the staff recommendation be adopted.

PART B - REPORTS FOR INFORMATION

2. DEPUTATIONS BY APPOINTMENT

2.1 WARREN HUDSON – PAPANUI HERITAGE GROUP

Warren Hudson, Murray Williams and Denis McMurtrie, from the Papanui Heritage Group, updated the Board on the activities the group which included a project to record the history of Papanui.

The group also expressed an interest in creating a small museum/learning centre on the Bridgestone site in Langdons Road and ask the Board for its assistance in identifying the exact location of the land that was gifted to the Council in 2010. Staff undertook to supply that information.

The Chairperson thanked Messrs Hudson, McMertrie and Williams for their deputation and invited the Papanui Heritage Group to attend a workshop with the Board later in the year.

2.2 LYNDA GOODRICK AND SIMON HILL – BELFAST COMMUNITY NETWORK

Lynda Goodrick and Simon Hill updated the Board on the work and activities of the Belfast Community Network.

The Chairperson thanked Ms Goodrick and Mr Hill for their presentation and members congratulated the group on the work they are doing in the community.

3.3 RHYS TAYLOR – GREENING THE RUBBLE

Rhys Taylor of Greening the Rubble, was in attendance and spoke to the Board of the work he is involved in.

The Chair thanked Mr Taylor for his deputation and asked that the Board be kept informed of any projects being undertaken by Greening the Rubble in the Shirley/Papanui community.

3.4 TONY MARSH – VISION CHURCH CHRISTCHURCH NORTH APOSTOLIC

Tony Marsh updated the Board on the work of the Vision Church Christchurch North Apostolic and requested the appointment of a Board representative on their Committee.

The Chairperson thanked Mr Marsh for his deputation and noted the intent of the Church to establish a residents' association. The Board **decided** to consider the appointment of a Board representative once the proposed resident's association has been established and incorporated.

3.5. ANNE KENNEDY AND GRAEME MITCHELL OF SHIRLEY COMMUNITY TRUST

Anne Kennedy and Graeme Mitchell, Shirley Community Trust, advised the Board of the Trust's desire to secure an alternative premise in the Shirley area to establish a new community centre and asked for the Board's support for their application.

The Board **decided**

- (a) To write a letter in support of the Shirley Community Trust's application for funding from the Canterbury Community Trust to purchase alternative premises.
- (b) That a Board representative would accompany the Shirley Community Trust members when they present their purchase proposal to the property owner.
- (c) To request staff to provide Shirley Community Trust with information on the funding and loans available within the Council which could assist with the purchasing of alternative premises.

3. PRESENTATION OF PETITIONS

Nil.

4. NOTICES OF MOTION

Nil.

5. BRIEFINGS

5.1 CENTRAL CITY PLAN

Mary Hay from Programme Engagement, briefed the Board on the community engagement plan for the Central City Plan including details of how elected members can contribute to the process.

Following questions from the members, the Chairperson thanked Ms Hay for her briefing.

6. CORRESPONDENCE

Correspondence was **received** from the following:

- (a) Ken Kinzett with concerns about 5 Vagues Road and Kruses Drain.

The Board considered the letter from Mr Kinzett, which was carried over from the 17 May 2011 Board meeting, and **decided** to request that staff attend a June 2011 meeting of the Board to explain available options and to verify the wording of the Board and the Council resolutions made in September 2010 with regard to Kruses Drain and the purchase of 5 Vagues Road.

- (b) Alison Allsop, Forfar Street resident, in relation to the earthquake damaged sites around St Albans and Papanui.

The Board considered the letter from Ms Allsop and **decided** to request that staff respond on behalf of the Board.

- (c) Ann Woods, Managing Director Skyway Body Corporate Services Ltd, regarding parking issues at 158-150 Cavendish Road.

The Board considered the correspondence of 30 May 2011 from Ms Woods and **decided** to refer the matter to staff for comment by way of memorandum on the reported parking issues at 150-158 Cavendish Road and on the resource consent car parking requirements for those properties.

- (d) Buzz Jones, Papanui TOCH Athletics Club regarding issues relating to the club's increased activity due to the facilities at Queen Elizabeth II being unavailable.

7. COMMUNITY BOARD ADVISER'S UPDATE

The Board **received** updates from the Community Board Adviser on Board related activities. Specific mention was made of the following matters:

7.1 WAIMAKARIRI RIVER STOPBANKS

The Board **received** requested information from Environment Canterbury regarding the damage and repairs on the southern bank of the Waimakariri River Stopbanks.

7 Cont'd

7.2 BELFAST COMMUNITY NETWORK – BELFAST FARMERS MARKET

The Board **received** requested information that the Belfast Community Network does require a resource consent to hold a regular Farmers Market and that the Network had employed a Planner to assist with their application.

7.2 IMPACT OF AGED CARE RESIDENTIAL DEVELOPMENTS ON ROADING NETWORK

The Board **received** a memorandum from staff in response to the Board's request for information on the impact of aged care residential developments on roading networks and the Council's ability to seek a contribution towards traffic works, such as pedestrian crossings, as a condition of granting resource consent.

8. ELECTED MEMBERS' INFORMATION EXCHANGE

- **New Zealand Local Boards and Community Boards Conference 2011** - New Zealand Community Board Conference attendees Anna Button, Kathy Condon and Pauline Cotter, updated the Board on their experiences at the May 2011 conference held in Rotorua.
- **Brooklands/Dredging of Styx River** - Concern was expressed regarding the risk of the Styx River flooding in Brooklands.

The Board **decided** that staff be requested to supply a memorandum on the risk of flooding of the Styx River at Spencerville and Brooklands and whether or not dredging would be taking place.

- **Brooklands and Spencerville Tsunami Alarms** - Local residents had approached members about the possibility of installing tsunami alarms in Brooklands and Spencerville and sought information about the risks of a tsunami in those localities.

The Board **decided** to request that staff brief the Board on 29 June 2011 on the risks of a Tsunami for the Brooklands and Spencerville areas, an appropriate evacuation plan and the possibility of tsunami alarms being installed at those locations.

- **Board Meeting of 29 June 2011**

The Board **decided** to hold the 29 June 2011 Community Board meeting at the Brooklands hall commencing at 4pm.

- **Garden Pride Awards** - The Board **decided** that if the certificates for the Garden Pride Awards have been printed, then they should be posted out. Otherwise, that a presentation ceremony be planned for 2012.
- **Graeme Condon Sports Facility Artwork** - Members were advised that the artwork for the Graeme Condon Sports Facility was planned to be ready for the first anniversary of the facility opening.

A presentation will be brought to the Board once the brief for the artwork has been sent out.

- **Community Board Objectives/Towards Recovery**

The Board **decided** to hold a Board workshop at 8am on 15 June 2011 to consider the Community Board Objectives including feedback from the Towards Recovery meetings, with the Board meeting on that day commencing at 9am.

Staff tabled a chart in preparation for the workshop, which summarised and commented on community feedback/requests from the Towards Recovery workshop held on 19 May 2011.

9. MEMBERS' QUESTION

Nil.

PART C - REPORT ON DELEGATED DECISIONS TAKEN BY THE BOARD

10. CONFIRMATION OF MEETING MINUTES – 18 MAY 2011

The Board **resolved** that the minutes of its ordinary meeting of 18 May 2011, be confirmed subject to the following amendment:

Page 2, paragraph 2 of clause 1.3 – sentence to read:

The group recently undertook several Edgeware Road street clean-ups, and are working with Gapfiller in planning several community events in the near future. The group is also working with the Greening the Rubble group to temporarily 'green' the site of the demolished supermarket site in Edgeware Road to enhance the area until a new supermarket is built.

The meeting concluded at 8.30pm

CONSIDERED THIS 15TH DAY OF JUNE 2011

**CHRIS MENE
CHAIRMAN**



**Langdons/Main North
Right Turn Signal Phasing
Christchurch City Council**

Report ref:
213384-001-01
28 September 2010
Revision 1

Document Control:
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Approver: BS

1. Introduction

Aurecon have been asked to investigate possible improvements to the operation of this intersection to provide improved safety for both drivers and pedestrians.

Consideration has been given to:

- Banning some movements if necessary.
- Providing additional lanes if possible.
- Longer pedestrian protection (eg Walk + ½ Clearance).
- Investigate the addition of a right turn phase for vehicles turning right into Langdons Road.

2. Technical Data

The pedestrian movement crossing Main North (Ped 1) has timings of:

WALK = 6sec

CL1 = 10sec

CL2 = 5sec

Ped protection should be provided for a minimum of $6 + 10/2 = 11$ sec.

The critical period is 16:00 – 17:00. The turn counts for September 2008 are summaries below:

| Approach | PM Volume |
|-----------------|-----------|
| Langdons LT | 170 |
| Langdons T | 39 |
| Langdons RT | 151 |
| | |
| Mary LT | 6 |
| Mary T | 76 |
| Mary RT | 77 |
| | |
| Main Nth Nbd LT | 114 |
| Main Nth Nbd T | 775 |
| Main Nth Nbd RT | 4 |
| | |
| Main Nth Sbd LT | 30 |
| Main Nth Sbd T | 490 |
| Main Nth Sbd RT | 65 |

Table 1 – 2008 Turncounts for Langdons/Main North/Mary

From the SCATS SM data (see Figure 1), the average B-Phase time over this period is 49sec with a cycle time of 131sec.

A cycle time of 131sec results in 27.5 cycles/hr

Allow for 3sec lost time per phase per cycle.



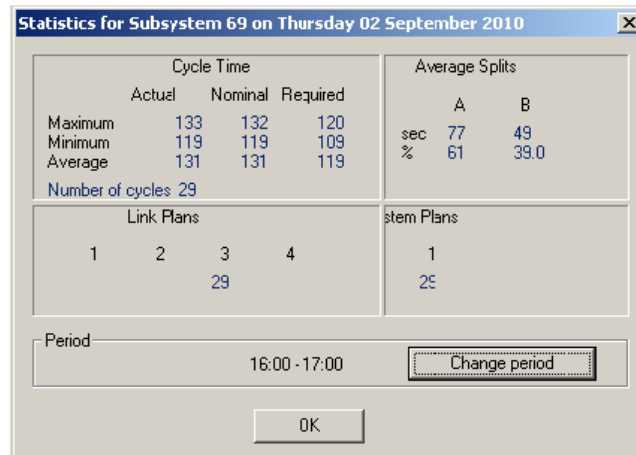


Figure 1 – Average PM Statistics from the SCATS SM

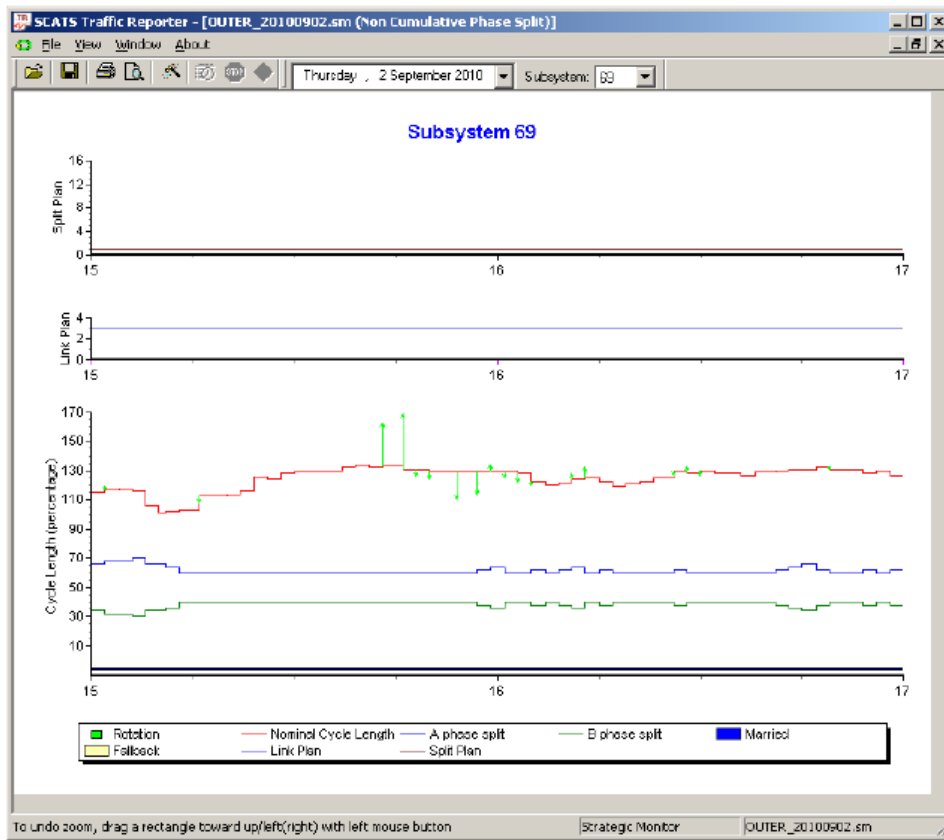


Figure 2 – SCATS SM for Langdons/Mary/Main North

3. Development of a Split Approach Phasing Option

Consider the possibility of split approach phasing where the Langdons approach operates in one phase and the Mary approach operates in a separate phase.

This results in less vehicle-vehicle conflicts and means that the right turn and left turn movements do not have to give way to other vehicles.

Assume a right turn (RT) sat flow of 1,400v/h = 2.57sec/veh

The RT volume out of Langdons of 150vehicles would therefore require:

$150 \times 2.57 = 385\text{sec}$ of green time for the hour.

With 27.5 cycles, 385sec of green results in 14sec of green/cycle.

If Ped1 runs each cycle, then the phase time required for the right turn movement is:

11sec Ped protection + 14sec green time + 3sec lost time = 28sec

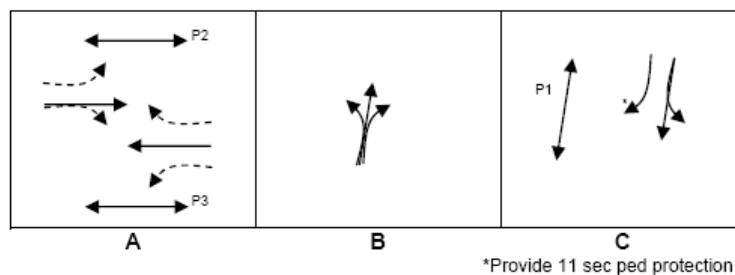
Note, the phase time required for the Left turn movement is:

$(170 \times 2.4 / 27.5) + 3 = 18\text{sec}$ and therefore the right turn movement governs.

If the same amount of green time is to be provided on Main North Road as is currently provided, then there is $49 - 28 = 21\text{sec}$ left for the new Mary St phase.

Currently there are 159 vehicles exiting out of Mary St which will require $159 \times 2.57 / 27.5 = 15\text{sec}$ green/cycle. A phase time of 21sec will therefore be adequate.

So in summary, the split approach option will require an exclusive right turn lanes on Langdons with the Langdons and Mary St approaches operating in separate phases. This will dramatically reduce the vehicle-vehicle conflicts, provide good pedestrian protection and keep the existing level of service on Main North Road.



Sequence: ABC

Figure 3 – Split Approach Phase Option

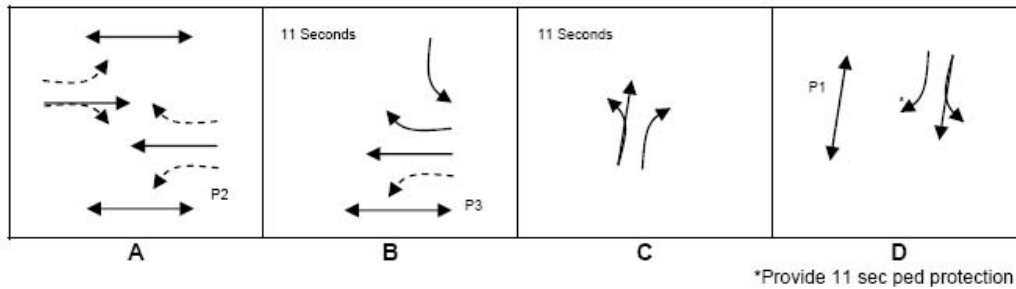
4. Development of a Right Turn Phase Option

Based on the above analysis, if a right turn phase is to be introduced, all the time for the right turn **must** come from the Main North Road phase, since the Langdons/Mary phases have no spare capacity. Alternatively, if the Mary St phase was to be introduced every second cycle, by providing an additional lane on Mary St, then the time saved could be allocated to the right turn phase.

The current volume of right turn vehicles is not high (65 – 77v/h).

The minimum phase time of 11sec (6sec green, 4sec yellow, 1sec all-red) will provide an equivalent of 8sec of green time per cycle. With 27 cycles, this means $27 \times 8 = 216\text{sec}$ of green/hr which can cater for a maximum of $216 / 2.57 = 84$ vehicles. Combined with the ability to still filter during A-Phase, sufficient time will be available for the right turn movement.

Alternatively, if both the right turn phase and the Mary St phase were to be limited to 11sec each, then both could be introduced each cycle with no effect on the level of service on Main North Road.



Sequence: ACDB

Figure 4 – Right Turn Phase Option

Based on the SCATS System Monitor (see Figure 3 below), there is also currently spare capacity at this site compared to the other coordinated sites along Main North Road.

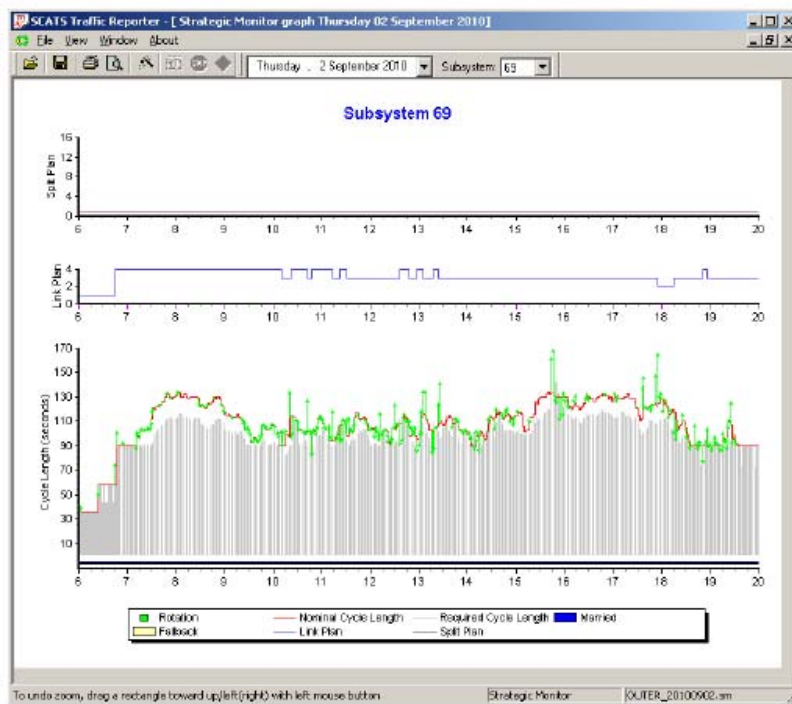


Figure 5 – SCATS SM for Langdons/Mary/Main North

Figure 6 below, shows the SCATS Average Degree of Saturation plots for the two Main North Road Strategic Approaches (SA's). The red line represents the Sbd SA and the black line represents the Nbd SA.

It can be seen from Figure 6 that the Average DS rarely goes above 95% and therefore some spare capacity may be available.

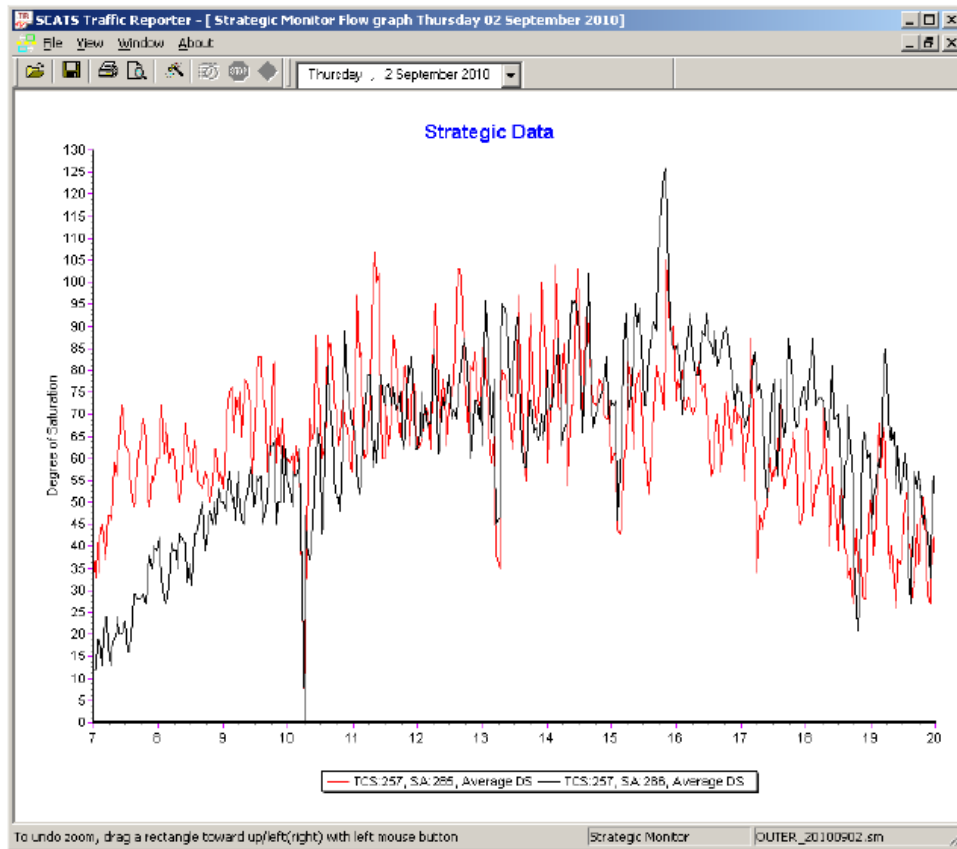


Figure 6 – SCATS Average DS for Main North Rd Approaches

In summary, it is likely that with the addition of an exclusive right turn lane on Mary St and the Mary St phase running a maximum of 11sec per cycle, a right turn phase of 11sec per cycle could be accommodated within the current average side road phase time of 49sec:

| | |
|-------------|-------|
| Langdons Rd | 28sec |
| Mary St | 11sec |
| Sbd RT | 11sec |
| TOTAL | 50sec |

5. Current Coordination along Main North Road

Although there may appear to be some spare capacity on Main North Road, often a longer main road green time is required to facilitate good two-way coordination. Often, the first part of the green phase is used for Nbd vehicle coordination and the second part of the green phase is used for Sbd vehicle coordination.

As seen in Figure 5, this site appears to operate in Link Plan 3 for nearly all of the afternoon. It is therefore important that there is good two-way coordination.

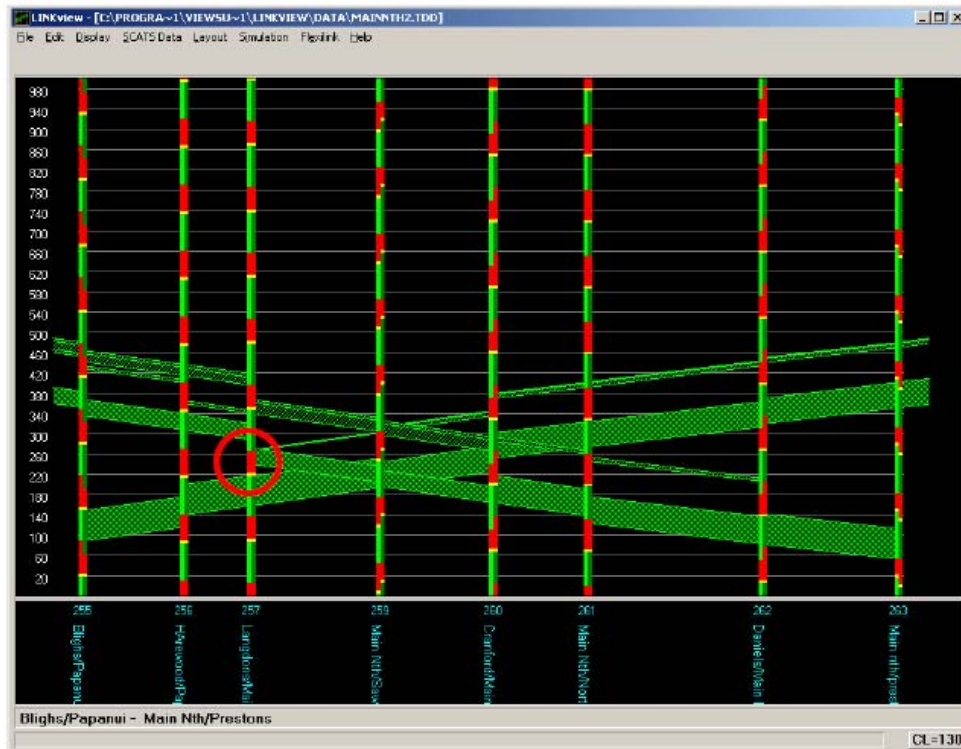


Figure 7 – Main North Road Time-Distance Diagram

Figure 7 shows that the start of the Main North Road phase at Langdons /Main North/Mary is required for the Sbd coordination and the end of the Main North Road green phase is required for the Nbd coordination. Coordination will therefore be made worse if the Main North Road phase time is reduced from its current 60%.

6. Traffic Modelling

The existing S-Paramics model of Main North-Papanui Road has been used to determine the effects of proposed signal phasing changes at Langdons/Main North/Mary.

Although the current model was calibrated for September 2006, Table 2 shows that the modelled turncounts are still appropriate compared to the latest 2008 counts. The modelled counts are in fact conservatively higher in all cases.

| Approach | MVMT | Sep-06 4pm - 5pm | | Sep-08 |
|------------|------|---------------------|----------|-------------------|
| | | Surveyed | Modelled | 4-5pm Surveyed |
| Langdons W | L | 190 | 189 | 170 |
| Langdons W | T | 51 | 41 | 39 |
| Langdons W | R | 178 | 187 | 151 |
| Main Nth N | L | 19 | 22 | 30 |
| Main Nth N | T | 577 | 635 | 490 |
| Main Nth N | R | 105 | 98 | 65 |
| Mary E | L | 19 | 25 | 6 |
| Mary E | T | 122 | 127 | 76 |
| Mary E | R | 118 | 132 | 77 |
| Main Nth S | L | 131 | 133 | 114 |
| Main Nth S | T | 778 | 846 | 775 |
| Main Nth S | R | 5 | 0 | 4 |

Table 2 – Modelled versus Surveyed Turncounts

The existing model will be cordoned off to exclude Papanui Road 100m south of Blighs Road. This will remove a lot of the “noise” created by the modelled variability along Papanui Road caused by Heaton/Innes, Merivale, and Bealey Avenue.

The following Options are to be modelled:

- Option 1 – Split approach phasing with an exclusive RT lane and a shared through and left turn lane on Langdons.
- Option 2 – Option 1 with the addition of an exclusive RT lane and a shared through and left turn lane on Mary Street.
- Option 3 – Option 2 with the addition of an exclusive right turn phase into Langdons Road, limiting the right turn phase and the Mary St. phase to a maximum of 11sec.

7. Traffic Modelling Results

7.1 Network Statistics

| Option | Mean Delay | Total Distance (km) | Total Number Vehicles | Mean Speed (kph) | Total network travel time (sec) | Total network travel time (hrs) |
|----------|------------|---------------------|-----------------------|------------------|---------------------------------|---------------------------------|
| Base | 146.4 | 9318.2 | 7450.2 | 30.8 | 545268.0 | 151.5 |
| Option 1 | 148.0 | 9303.2 | 7435.6 | 30.4 | 550339.4 | 152.9 |
| Option 2 | 149.5 | 9316.9 | 7445.6 | 30.2 | 556572.8 | 154.6 |
| Option 3 | 149.4 | 9293.7 | 7447.6 | 30.1 | 556240.5 | 154.5 |

Table 3 – AM Network Statistics Comparison

Table 1 shows that all models are producing very similar statistics, with the base model having the lowest mean delay by approximately 3 seconds. This represents 3 hours of delay per hour.

| Option | Mean Delay | Total Distance (km) | Total Number Vehicles | Mean Speed (kph) | Total network travel time (sec) | Total network travel time (hrs) |
|----------|------------|---------------------|-----------------------|------------------|---------------------------------|---------------------------------|
| Base | 284 | 40759.4 | 33265.2 | 15.6 | 4717163.2 | 1310.3 |
| Option 1 | 301 | 40739.4 | 33217.0 | 14.7 | 5003066.1 | 1389.7 |
| Option 2 | 289 | 40685.6 | 33235.6 | 15.3 | 4803113.4 | 1334.2 |
| Option 3 | 287 | 40664.7 | 33212.2 | 15.3 | 4773379.8 | 1325.9 |

Table 4 – PM Network Statistics Comparison

Table 2 shows some variation in the models with mean delay ranging from 284 seconds in the base through to 301 seconds in option 1. Note, an increase in Mean Delay of 5 seconds per vehicle over the 4 hour model is equivalent to approximately 11.5 hours of delay per hour.

7.2 Intersection Level of Service

| 7:00 - 8:00am | | Base | | Option 1 | | Option 2 | | Option 3 | |
|-------------------------|-------------------------|-------|------|----------|-------|----------|-------|----------|-------|
| Main North/Langdon/Mary | Main North (Southbound) | Left | 1 A | 2 A | 5 A | 3 A | 5 A | 3 A | 3 A |
| | | Thru | 3 A | 5 A | 7 A | 8 A | 7 A | 5 A | 5 A |
| | | Right | 8 A | 14 B | 17 B | 20 C | 17 B | 8 A | 8 A |
| | Mary | Left | 42 D | 20 C | 20 C | 2 A | 2 A | 32 C | 32 C |
| | | Thru | 48 D | 35 D | 35 D | 42 D | 40 D | 42 D | 42 D |
| | | Right | 56 E | 38 D | 38 D | 47 D | 43 D | 43 D | 43 D |
| | Main North (Northbound) | Left | 5 A | 3 A | 3 A | 3 A | 3 A | 11 B | 11 B |
| | | Thru | 5 A | 5 A | 5 A | 10 B | 10 B | 9 A | 9 A |
| | | Right | 2 A | 5 A | 5 A | 19 B | 17 B | 17 B | 17 B |
| | Langdon | Left | 39 D | 44 D | 44 D | 41 D | 44 D | 44 D | 44 D |
| | | Thru | 51 D | 53 D | 46 D | 46 D | 42 D | 27 C | 39 D |
| | | Right | 40 D | 46 D | 46 D | 40 D | 40 D | 40 D | 40 D |
| 8:00 - 9:00am | | Base | | Option 1 | | Option 2 | | Option 3 | |
| Main North/Langdon/Mary | Main North (Southbound) | Left | 3 A | 4 A | 10 B | 6 A | 6 A | 6 A | 6 A |
| | | Thru | 5 A | 11 B | 11 B | 11 B | 11 B | 11 B | 11 B |
| | | Right | 8 A | 19 B | 21 C | 19 B | 19 B | 19 B | 19 B |
| | Mary | Left | 32 C | 52 D | 52 D | 52 D | 46 D | 38 D | 38 D |
| | | Thru | 37 D | 52 D | 52 D | 46 D | 46 D | 44 D | 45 D |
| | | Right | 29 C | 51 D | 51 D | 44 D | 48 D | 48 D | 48 D |
| | Main North (Northbound) | Left | 7 A | 11 B | 14 B | 9 A | 9 A | 9 A | 9 A |
| | | Thru | 6 A | 12 B | 12 B | 13 B | 13 B | 12 B | 12 B |
| | | Right | 6 A | 19 B | 19 B | 19 B | 14 B | 14 B | 14 B |
| | Langdon | Left | 40 D | 42 D | 42 D | 43 D | 44 D | 34 C | 34 C |
| | | Thru | 41 D | 47 D | 47 D | 39 D | 44 D | 36 D | 39 D |
| | | Right | 44 D | 55 E | 48 D | 48 D | 46 D | 46 D | 46 D |
| 2:00 - 3:00pm | | Base | | Option 1 | | Option 2 | | Option 3 | |
| Main North/Langdon/Mary | Main North (Southbound) | Left | 5 A | 12 B | 7 A | 13 B | 13 B | 13 B | 13 B |
| | | Thru | 11 B | 14 B | 16 B | 17 B | 17 B | 12 B | 12 B |
| | | Right | 19 B | 17 B | 24 C | 15 B | 15 B | 15 B | 15 B |
| | Mary | Left | 31 C | 64 E | 44 D | 59 E | 51 D | 59 E | 51 D |
| | | Thru | 24 C | 62 E | 39 D | 52 D | 51 D | 52 D | 51 D |
| | | Right | 29 C | 63 E | 40 D | 50 D | 50 D | 50 D | 50 D |
| | Main North (Northbound) | Left | 11 B | 15 B | 13 B | 18 B | 18 B | 18 B | 18 B |
| | | Thru | 12 B | 16 B | 17 B | 16 B | 16 B | 16 B | 16 B |
| | | Right | 19 B | 19 B | 24 C | 20 C | 20 C | 20 C | 20 C |
| | Langdon | Left | 31 C | 109 F | 103 F | 90 F | 90 F | 90 F | 90 F |
| | | Thru | 34 D | 113 F | 103 F | 90 F | 90 F | 90 F | 90 F |
| | | Right | 45 D | 147 F | 127 F | 102 F | 102 F | 102 F | 102 F |
| 3:00 - 4:00pm | | Base | | Option 1 | | Option 2 | | Option 3 | |
| Main North/Langdon/Mary | Main North (Southbound) | Left | 9 A | 15 B | 11 B | 7 A | 7 A | 7 A | 7 A |
| | | Thru | 11 B | 16 B | 16 B | 10 B | 10 B | 10 B | 10 B |
| | | Right | 20 C | 22 C | 23 C | 18 B | 18 B | 18 B | 18 B |
| | Mary | Left | 37 D | 76 E | 38 D | 57 E | 51 D | 57 E | 51 D |
| | | Thru | 29 C | 70 E | 39 D | 51 D | 51 D | 51 D | 51 D |
| | | Right | 30 C | 67 E | 48 D | 59 E | 59 E | 59 E | 59 E |
| | Main North (Northbound) | Left | 16 B | 22 C | 20 C | 23 C | 23 C | 23 C | 23 C |
| | | Thru | 17 B | 19 B | 17 B | 23 C | 23 C | 23 C | 23 C |
| | | Right | 19 B | 20 C | 24 C | 15 B | 15 B | 15 B | 15 B |
| | Langdon | Left | 32 C | 98 F | 98 F | 49 D | 49 D | 49 D | 49 D |
| | | Thru | 39 D | 88 F | 96 F | 44 D | 44 D | 44 D | 44 D |
| | | Right | 40 D | 119 F | 138 F | 51 D | 51 D | 51 D | 51 D |
| 4:00 - 5:00pm | | Base | | Option 1 | | Option 2 | | Option 3 | |
| Main North/Langdon/Mary | Main North (Southbound) | Left | 9 A | 18 B | 18 B | 16 B | 16 B | 16 B | 16 B |
| | | Thru | 5 A | 14 B | 12 B | 12 B | 12 B | 12 B | 12 B |
| | | Right | 20 C | 44 D | 40 D | 25 C | 25 C | 25 C | 25 C |
| | Mary | Left | 79 E | 55 E | 76 E | 65 E | 65 E | 65 E | 65 E |
| | | Thru | 39 D | 63 E | 58 E | 86 F | 84 F | 86 F | 84 F |
| | | Right | 45 D | 64 E | 62 E | 85 F | 85 F | 85 F | 85 F |
| | Main North (Northbound) | Left | 17 B | 23 C | 25 C | 23 C | 23 C | 23 C | 23 C |
| | | Thru | 16 B | 24 C | 23 C | 23 C | 23 C | 23 C | 23 C |
| | | Right | 24 C | 22 C | 19 B | 31 C | 31 C | 31 C | 31 C |
| | Langdon | Left | 46 D | 113 F | 93 F | 45 D | 45 D | 45 D | 45 D |
| | | Thru | 46 D | 100 F | 94 F | 50 D | 50 D | 50 D | 50 D |
| | | Right | 59 E | 121 F | 104 F | 58 E | 58 E | 58 E | 58 E |
| 5:00 - 6:00pm | | Base | | Option 1 | | Option 2 | | Option 3 | |
| Main North/Langdon/Mary | Main North (Southbound) | Left | 6 A | 13 B | 10 B | 14 B | 14 B | 14 B | 14 B |
| | | Thru | 6 A | 7 A | 9 A | 7 A | 7 A | 7 A | 7 A |
| | | Right | 32 C | 23 C | 27 C | 25 C | 25 C | 25 C | 25 C |
| | Mary | Left | 64 E | 87 F | 61 E | 21 C | 21 C | 21 C | 21 C |
| | | Thru | 35 D | 65 E | 62 E | 107 F | 102 F | 107 F | 102 F |
| | | Right | 39 D | 68 E | 56 E | 105 F | 105 F | 105 F | 105 F |
| | Main North (Northbound) | Left | 14 B | 24 C | 19 B | 28 C | 28 C | 28 C | 28 C |
| | | Thru | 16 B | 23 C | 20 C | 27 C | 27 C | 27 C | 27 C |
| | | Right | 19 B | 10 B | 12 B | 29 C | 29 C | 29 C | 29 C |
| | Langdon | Left | 40 D | 58 E | 62 E | 41 D | 41 D | 41 D | 41 D |
| | | Thru | 51 D | 51 D | 48 D | 40 D | 40 D | 40 D | 40 D |
| | | Right | 51 D | 60 E | 72 E | 50 D | 50 D | 50 D | 50 D |

Table 5 – Langdons/Main North/Mary LOS Comparisons



Table 5 shows the following results:

AM Peak

There is very little difference between the Base and all Options in the AM peak hours. The delay on Main North Road, both Nbd and Sbd has doubled in the Options but resulting delay is still very low at approximately 10-12 sec/veh.

PM Peak

In the afternoon between 2pm and 4:30pm, the delays are excessive on Langdons Road for Options 1 and 2. Option 3 has acceptable delays on Langdons because of the introduction of the left turn green arrow in conjunction with the right turn phase.

Between 4:30pm and 6pm, the delays in Option 3 are very similar to the Base, except for the delays on Mary Street.

The delays for Mary Street in all three Options are a lot worse than the Base, but this will only encourage traffic to use alternative routes and so the delays and queues are not likely to occur on-street.

7.3 Network Travel Times

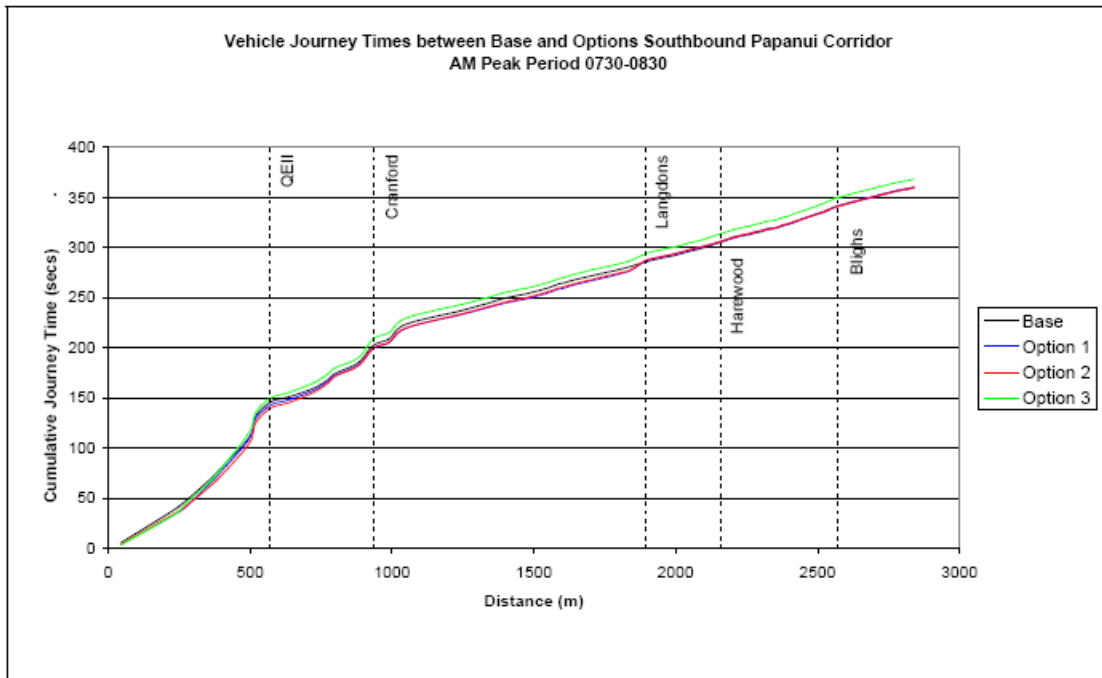


Figure 8– AM Southbound Average Journey Times

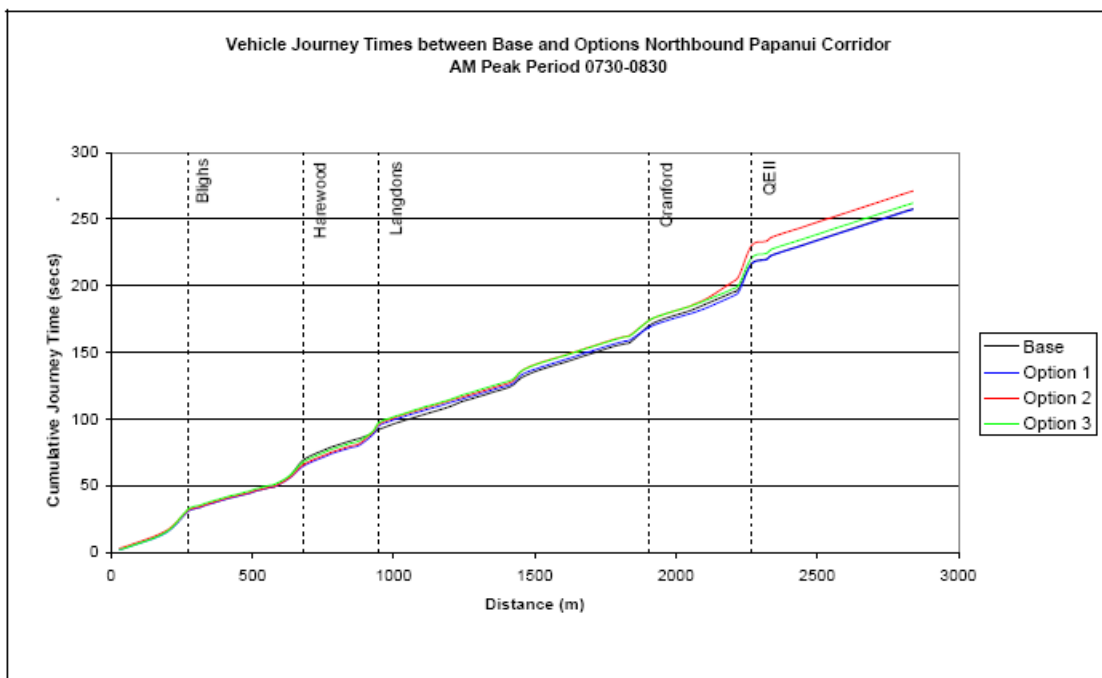


Figure 9 - AM Northbound Average Journey Times

Figures 8 and 9 above show that the base and all options produce similar journey times in the AM for both Northbound and Southbound trips.

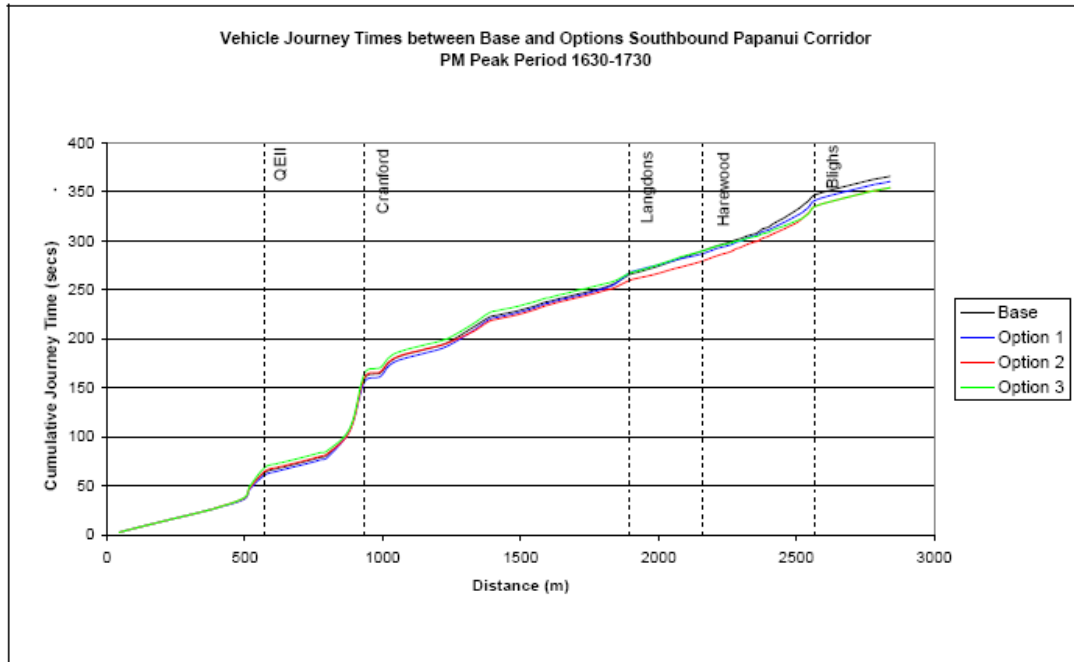


Figure 10 – PM Southbound Average Journey Times

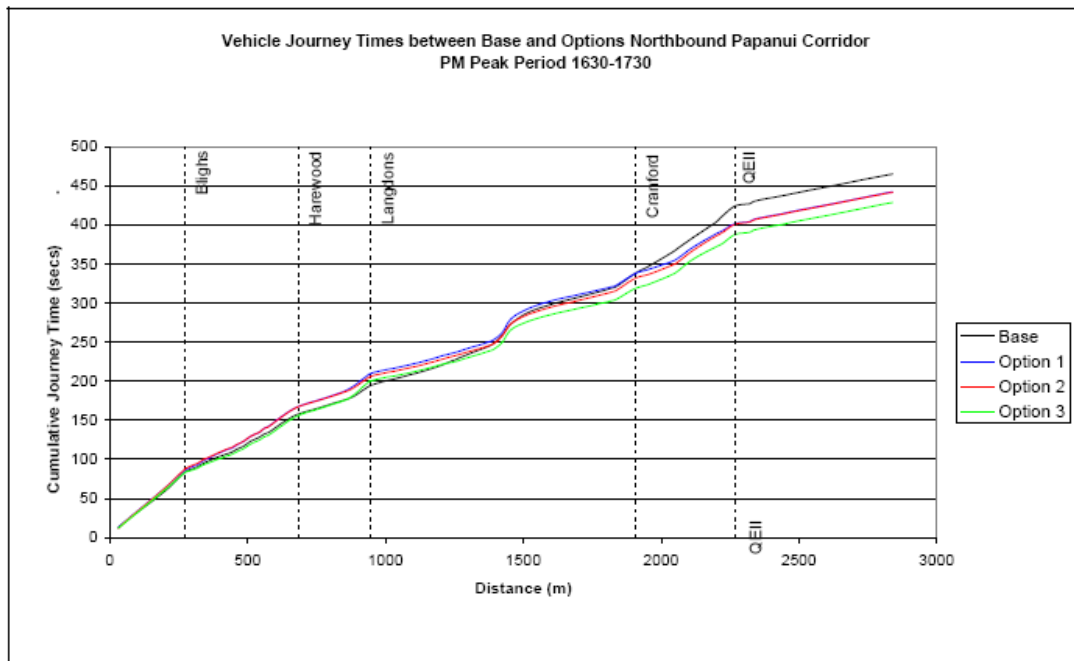
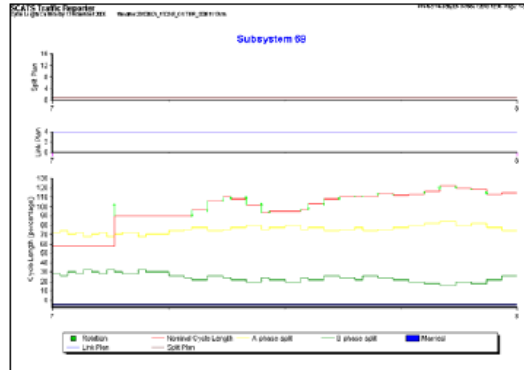
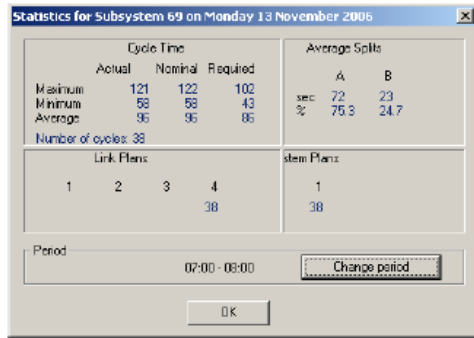


Figure 11 - PM Northbound Average Journey Times

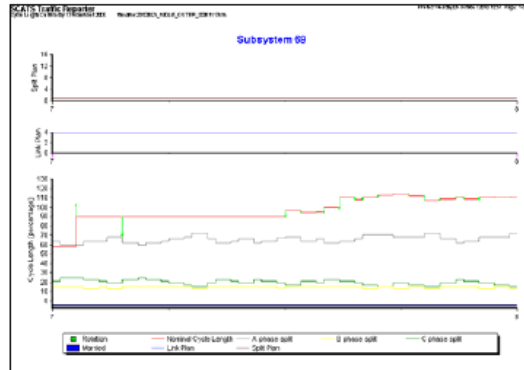
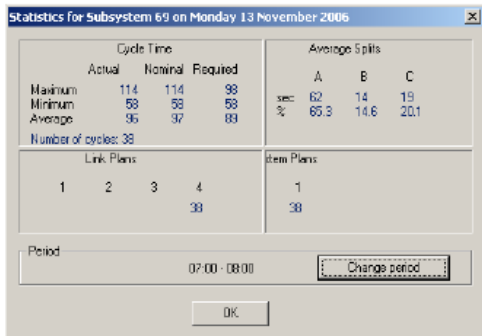
Figures 10 and 11 above show that the Base and all options produce similar journey times in the PM for both Northbound and Southbound trips. The additional delay at this intersection (as shown in Table 5) does therefore not have a noticeable effect on the overall vehicle journey times.

7.4 SCATS System Monitor Comparisons

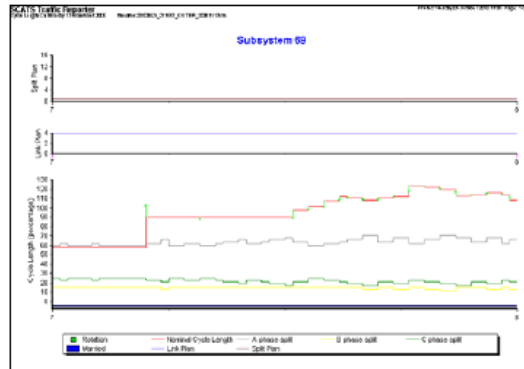
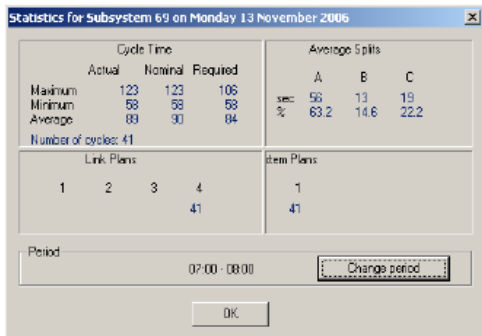
AM 7:00 – 8:00am



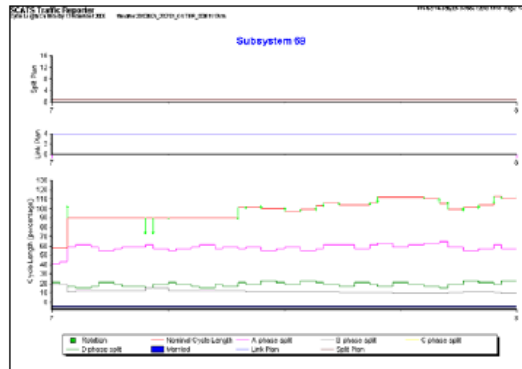
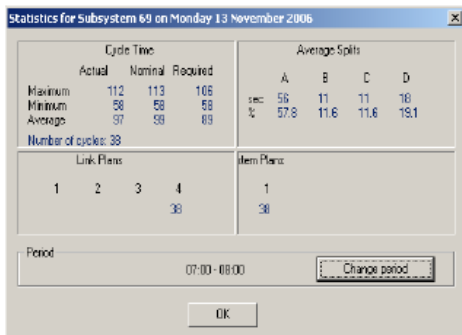
Base



Option 1



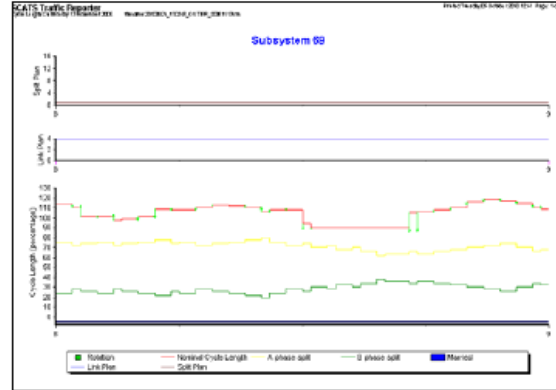
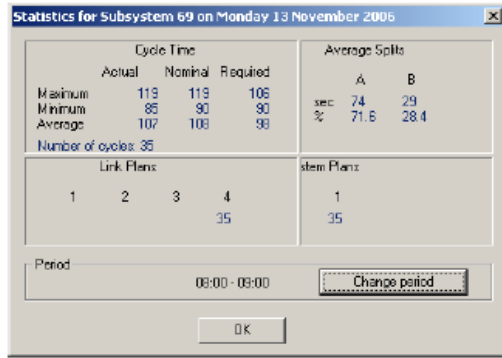
Option 2



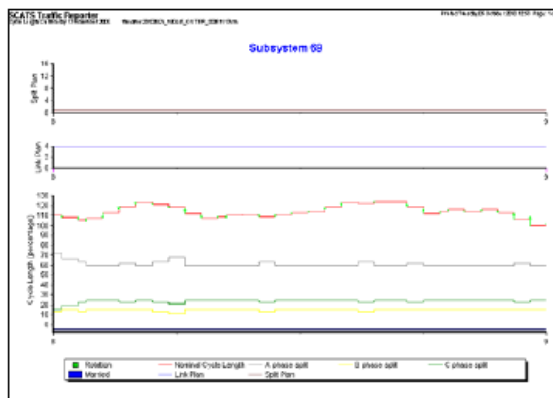
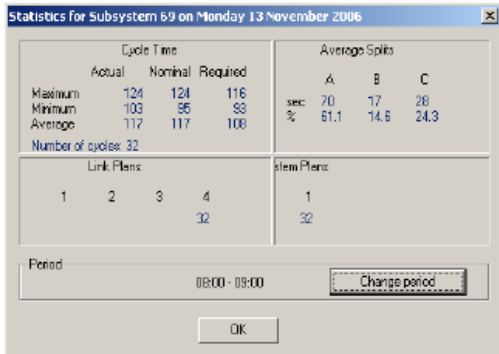
Option 3



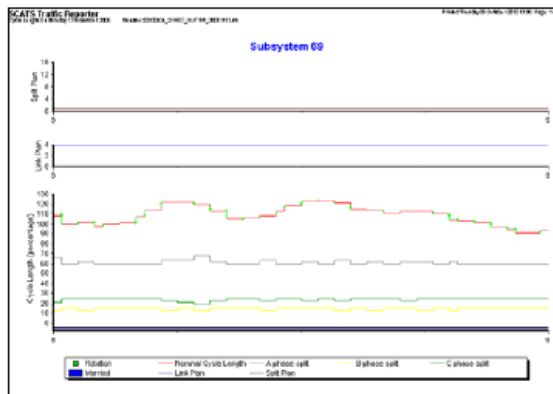
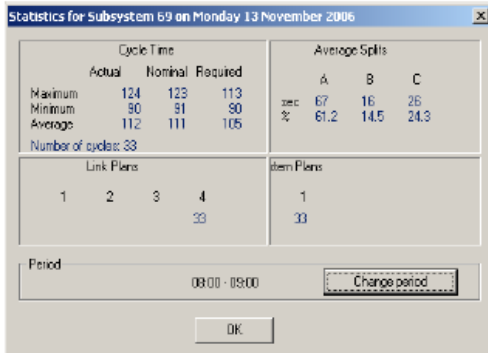
AM 8:00 – 9:00am



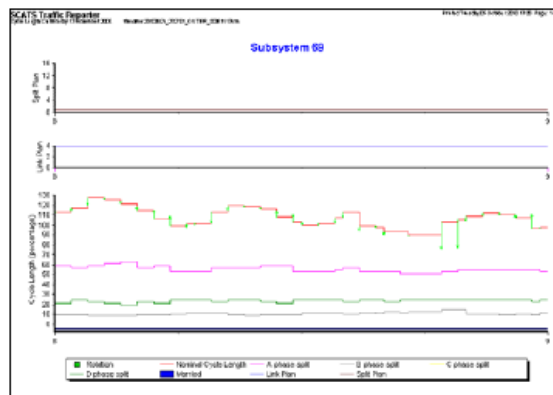
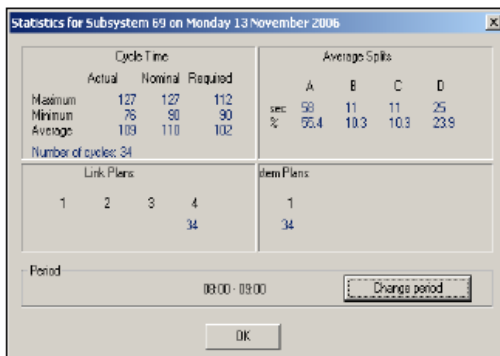
Base



Option 1



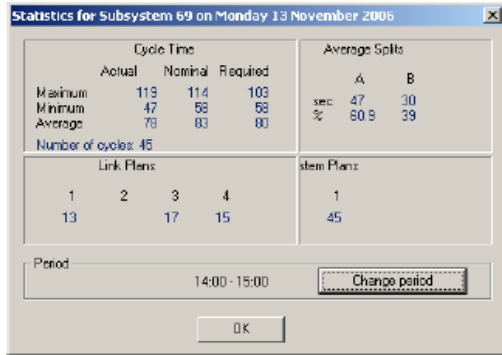
Option 2



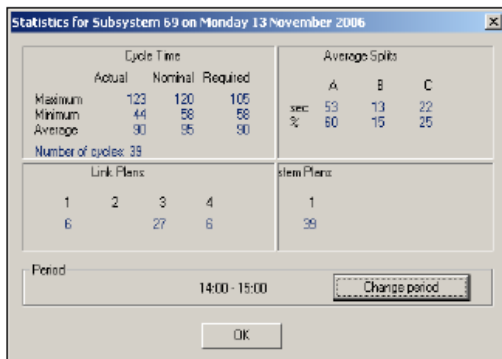
Option 3



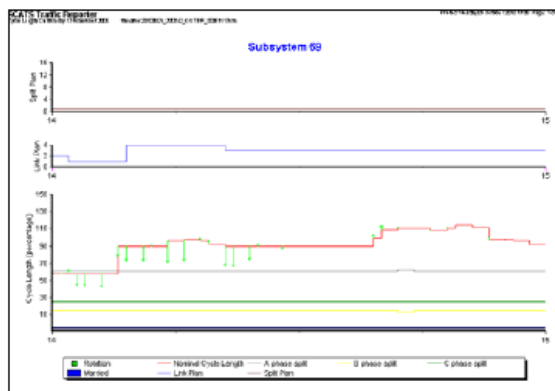
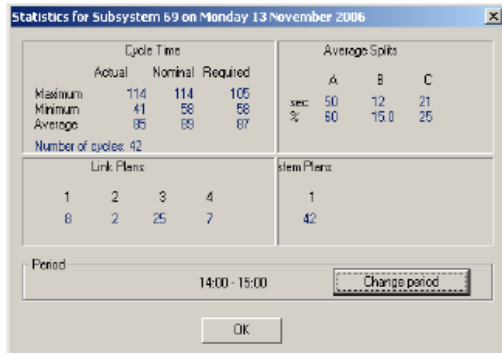
PM 14:00 – 15:00pm



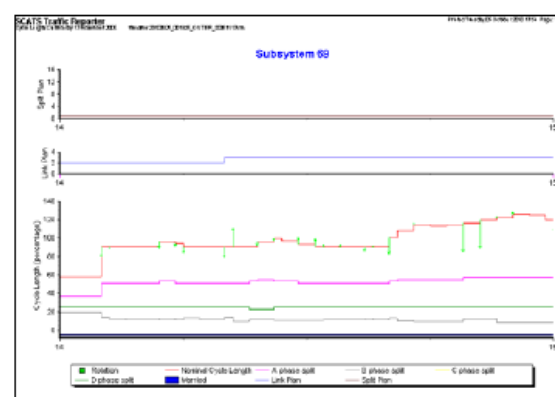
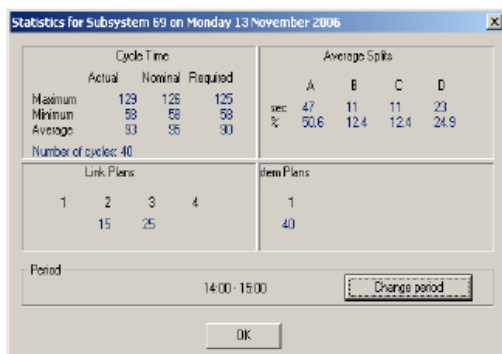
Base



Option 1



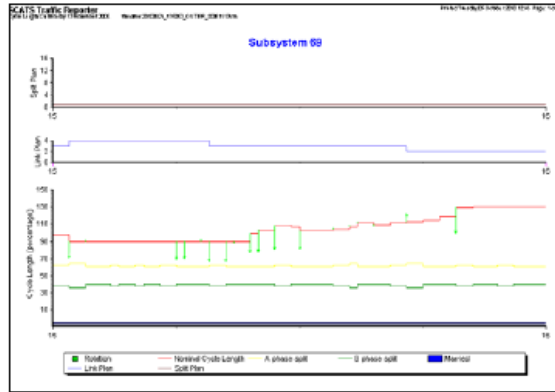
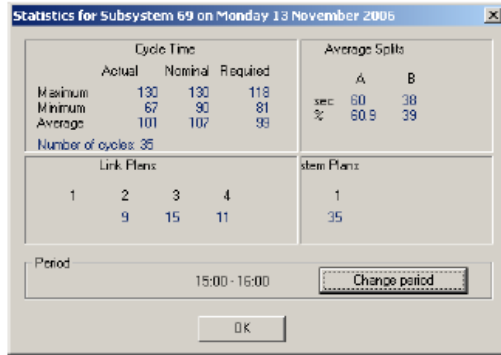
Option 2



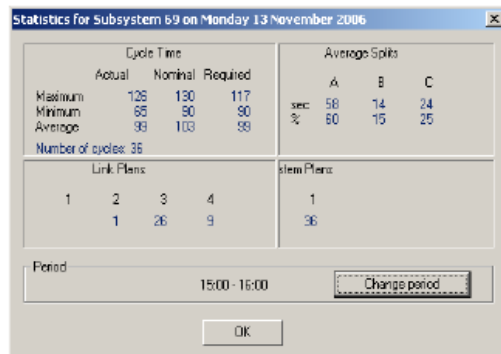
Option 3



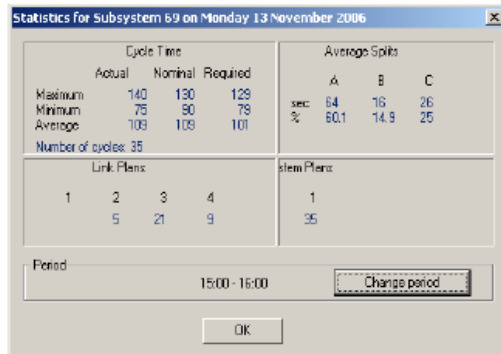
PM 15:00 – 16:00pm



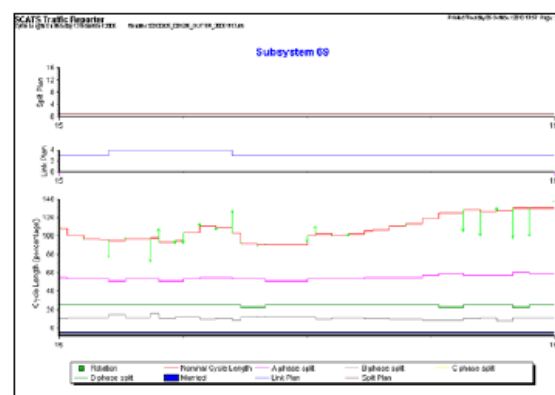
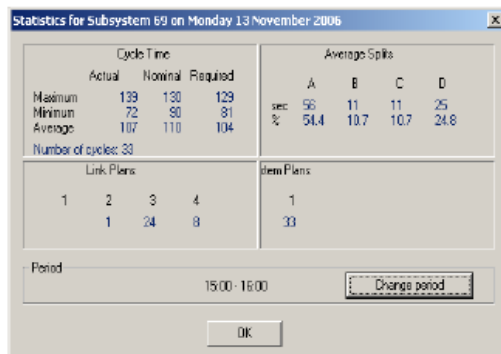
Base



Option 1



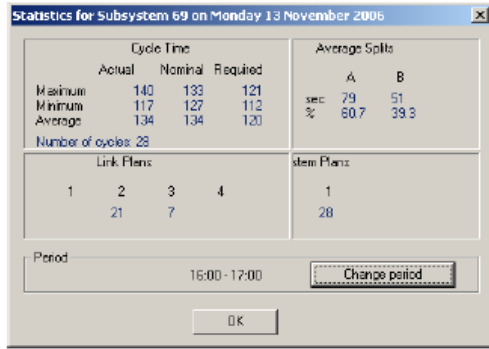
Option 2



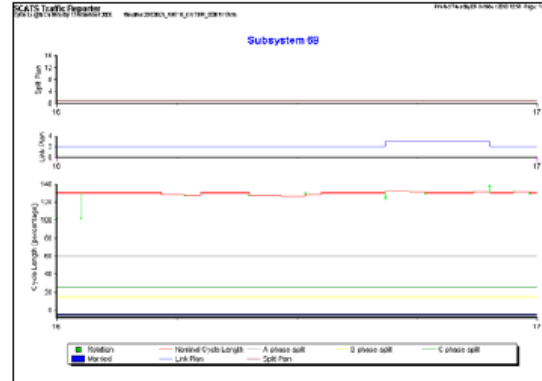
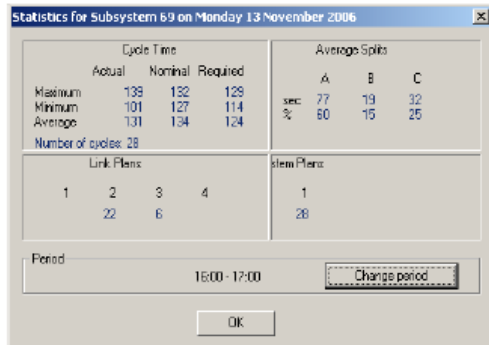
Option 3



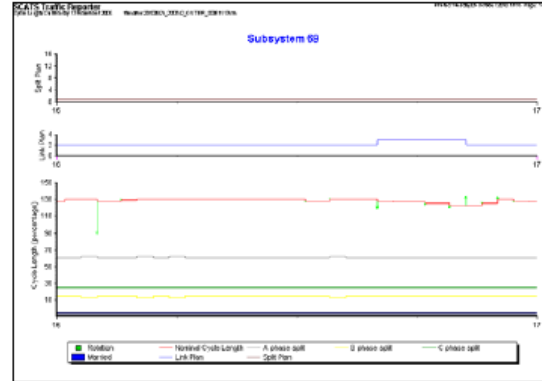
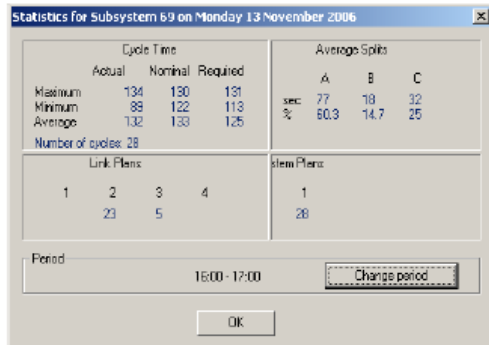
PM 16:00 – 17:00pm



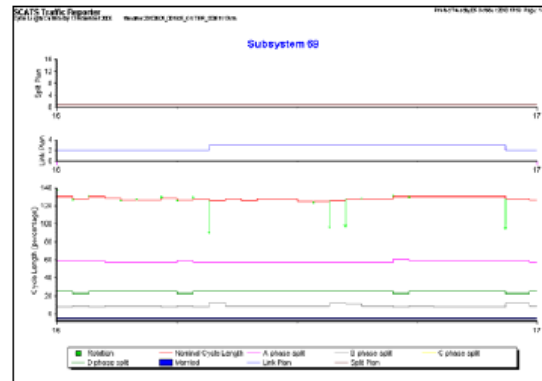
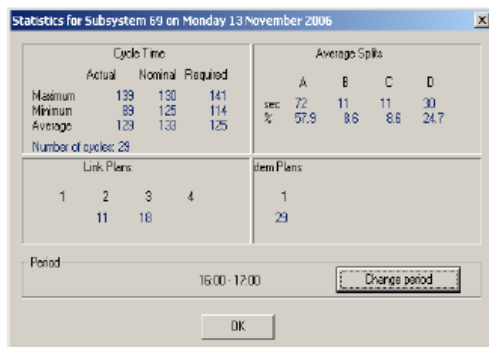
Base



Option 1



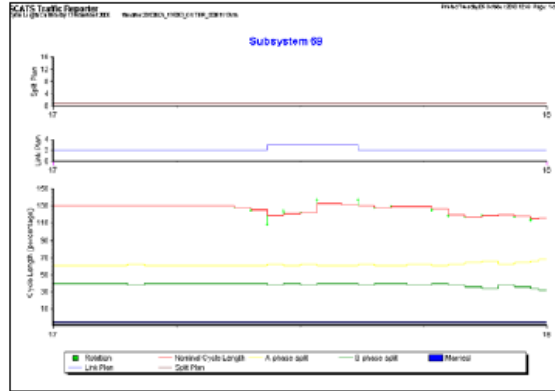
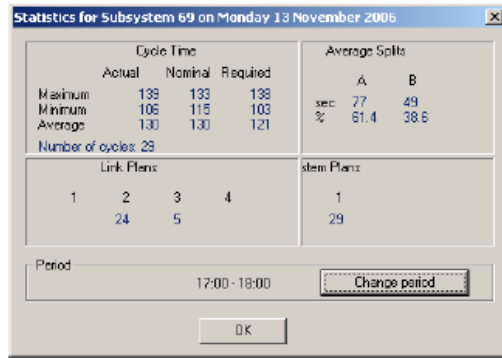
Option 2



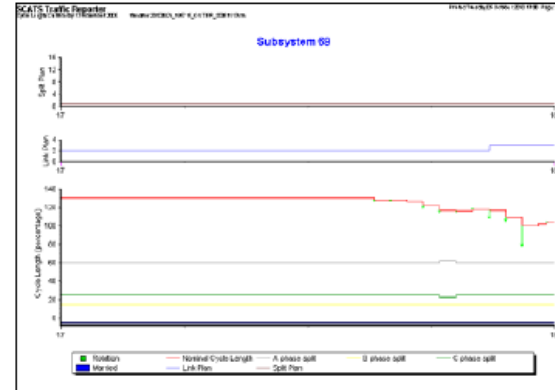
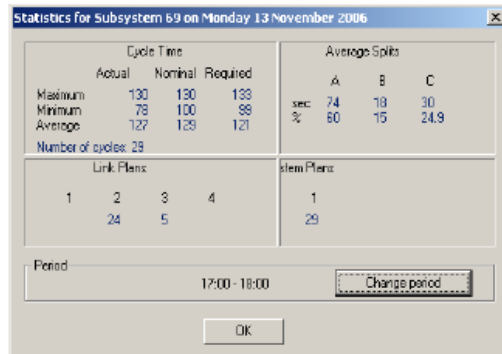
Option 3



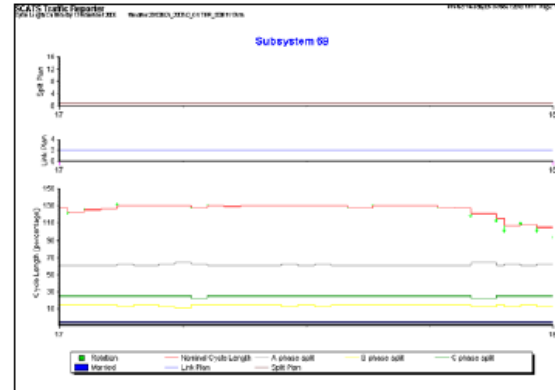
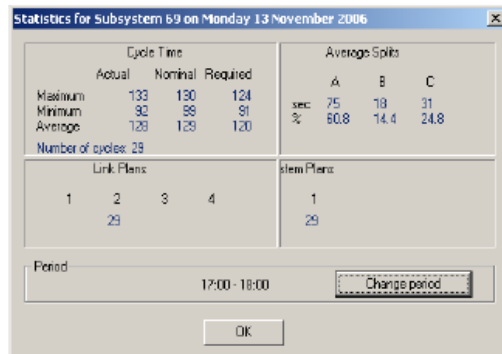
PM 17:00 – 18:00pm



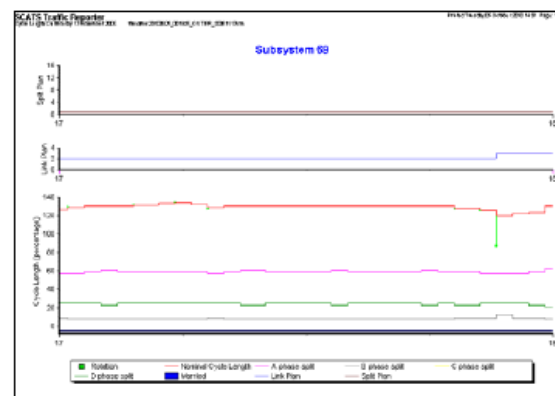
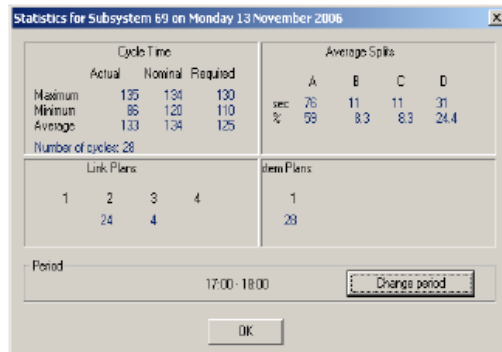
Base



Option 1



Option 2



Option 3



8. Summary

Three Options have been investigated to reduce the conflicts and improve the safety of this intersection for both vehicles and pedestrians:

- Option 1 – Split approach phasing with an exclusive RT lane and a shared through and left turn lane on Langdons.
- Option 2 – Option 1 with the addition of an exclusive RT lane and a shared through and left turn lane on Mary Street.
- Option 3 – Option 2 with the addition of an exclusive right turn phase into Langdons Road, limiting the right turn phase and the Mary Street phase to a maximum of 11sec.

The split approach phasing ensures that the Langdons Road and Mary Street approaches operate in separate phases, thereby removing any vehicle conflicts.

The pedestrian crossing across Main North Road on the south side of the intersection operates in the Langdons Road phase, but the Langdon right turn movement is held red for 11sec to ensure minimal vehicle-pedestrian conflicts.

In all three Options, the total amount of green time for the side roads is limited to a maximum of 40% of the cycle time. This ensures that Main North Road continues to receive 60% of the cycle time as it currently does.

The modelled Network Statistics show that the Base is still the most efficient operation. The best of the Options is Option 3 and the increased mean delay and journey time over the Base needs to be compared to the benefits of reduced vehicle and pedestrian conflicts.

The intersection Delays and Levels of Service detailed in Table 5 show:

- The Base and all Options show similar delays in the AM peak.
- In the PM peak, the Base performs better than any of the Options but Option 3 performs best out of the three Options. This is however, dependent on both the Mary Street phase and the Main North Road right turn phase being limited to a maximum of 11sec each. If this limit is not placed on these phases, SCATS will try and optimise how busy each approach is and the delays and LOS on Main North Road will be negatively affected.
- In the PM peak between 4:30pm and 6pm, Option 3 has similar delays to the Base. Options 1 and 2 still have much larger delays on Langdons than in the Base.

The journey time graphs show very little difference between the Base and Options for both northbound and southbound. Differences are in the order of 10-20sec over the whole route between Blighs Road and QEII Drive.

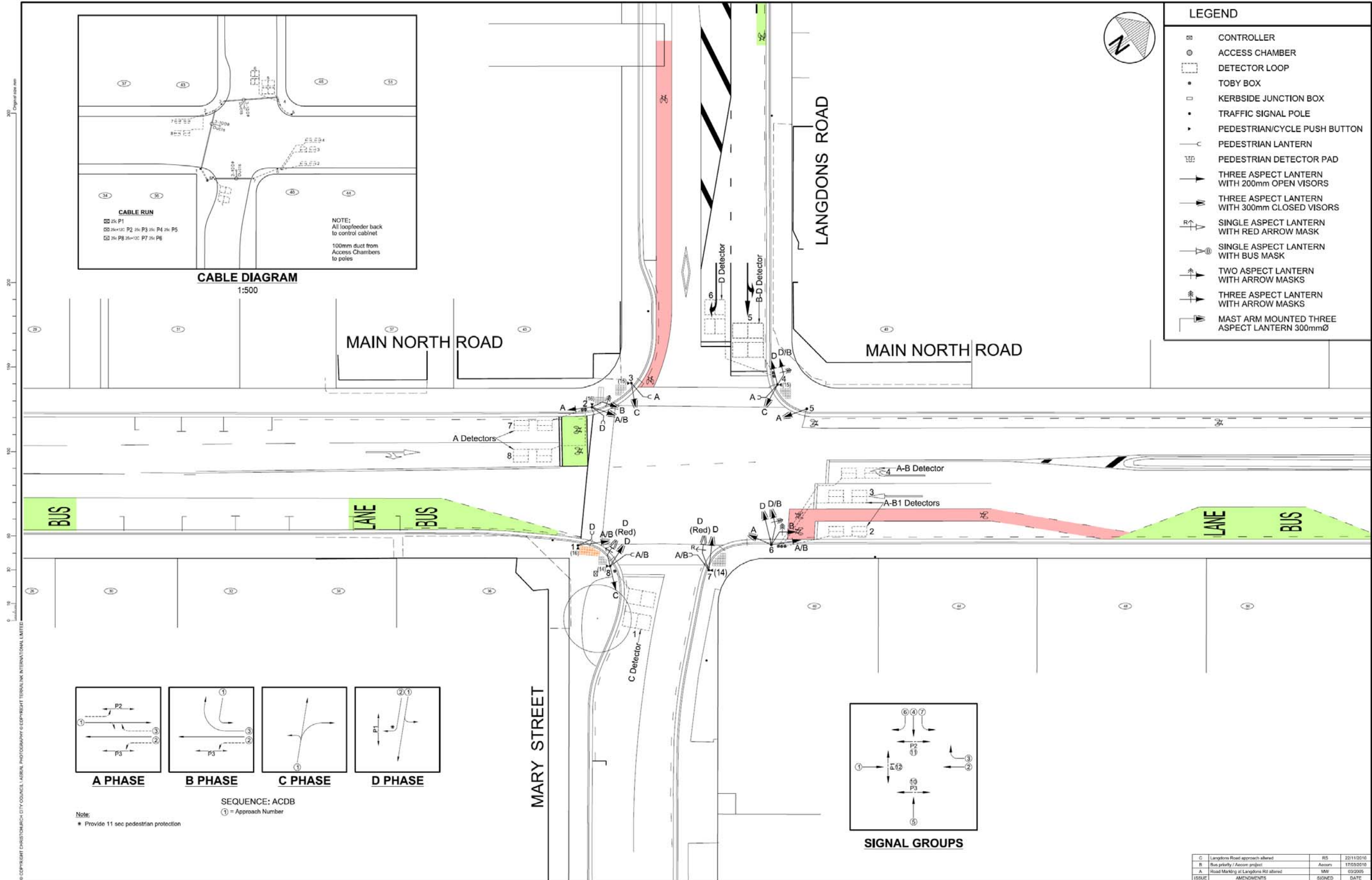
Because the Mary Street phase is limited to 11sec, the only affect on excluding the proposed addition of an exclusive right turn lane is to reduce the capacity of Mary Street. Without the extra lane, only half the number of vehicles currently on Mary Street will be able to get through the intersection.

9. Recommendations

To reduce the conflicts and improve the safety of the Langdons/Main North/Mary intersection for both vehicles and pedestrians, install split approach phasing on Langdons and Mary and install a right turn phase into Langdons Road.

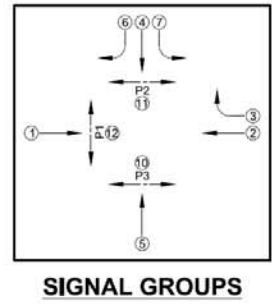
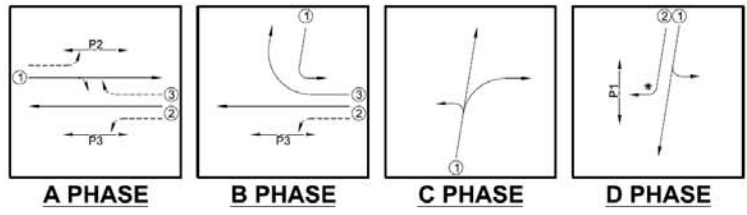
In conjunction with this phase arrangement, the Mary and Main North right turn phases **must** be limited to a maximum of 11sec each at all times. The lane arrangement on Langdons must be changed to be an exclusive right turn lane plus a share through and left turn lane.

The addition of an exclusive right turn lane on Mary Street is not essential as it will only improve the LOS for Mary Street and have no effect on the other three approaches.



LEGEND

- ⊠ CONTROLLER
- ⊙ ACCESS CHAMBER
- DETECTOR LOOP
- TOBY BOX
- KERBSIDE JUNCTION BOX
- TRAFFIC SIGNAL POLE
- PEDESTRIAN/CYCLE PUSH BUTTON
- PEDESTRIAN LANTERN
- ⊞ PEDESTRIAN DETECTOR PAD
- THREE ASPECT LANTERN WITH 200mm OPEN VISORS
- THREE ASPECT LANTERN WITH 300mm CLOSED VISORS
- SINGLE ASPECT LANTERN WITH RED ARROW MASK
- SINGLE ASPECT LANTERN WITH BUS MASK
- TWO ASPECT LANTERN WITH ARROW MASKS
- THREE ASPECT LANTERN WITH ARROW MASKS
- MAST ARM MOUNTED THREE ASPECT LANTERN 300mmØ



| | | | |
|-------|-------------------------------------|--------|------------|
| C | Langdons Road approach altered | RS | 22/11/2010 |
| B | Bus priority / Access project | Access | 17/03/2010 |
| A | Road Marking at Langdons RD altered | MW | 03/2005 |
| ISSUE | AMENDMENTS | SIGNED | DATE |

| <p>Christchurch City Council CAPITAL PROGRAMME GROUP</p> | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>DATUM</th> <th>C.O.D.</th> <th>NAME</th> <th>SIGNED</th> <th>DATE</th> </tr> <tr> <td>BENCH MK.</td> <td>DESIGNED</td> <td>R. Shanks</td> <td></td> <td>28/10/2010</td> </tr> <tr> <td>RL</td> <td>DES. REVIEW</td> <td></td> <td></td> <td></td> </tr> <tr> <td>SURVEY</td> <td>DRAWN</td> <td>S.J. PRATT</td> <td></td> <td>12/10/2010</td> </tr> <tr> <td>SURVLY LB</td> <td>DRW. CHECK</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>FILE LOCATION</td> <td></td> <td></td> <td></td> </tr> <tr> <td>DRAN. REF.</td> <td colspan="4">S:\Data\Digital\Traffic\CPA1000\102901.dgn</td> </tr> <tr> <td>SAP WBS</td> <td>SAP WBS</td> <td>PRINTED ON 24/11/2010 BY pratt</td> <td colspan="2"></td> </tr> </table> | DATUM | C.O.D. | NAME | SIGNED | DATE | BENCH MK. | DESIGNED | R. Shanks | | 28/10/2010 | RL | DES. REVIEW | | | | SURVEY | DRAWN | S.J. PRATT | | 12/10/2010 | SURVLY LB | DRW. CHECK | | | | | FILE LOCATION | | | | DRAN. REF. | S:\Data\Digital\Traffic\CPA1000\102901.dgn | | | | SAP WBS | SAP WBS | PRINTED ON 24/11/2010 BY pratt | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">APPROVED</th> <th colspan="2">FOR TENDER</th> </tr> <tr> <td>DATE</td> <td>SIGNED</td> <td>DATE</td> <td>SIGNED</td> </tr> <tr> <td></td> <td></td> <td>Tender Date</td> <td></td> </tr> <tr> <th colspan="2">FOR CONSTRUCTION</th> <th colspan="2"></th> </tr> <tr> <td>DATE</td> <td>SIGNED</td> <td>DATE</td> <td>SIGNED</td> </tr> <tr> <td></td> <td></td> <td>Comm Date</td> <td></td> </tr> </table> | APPROVED | | FOR TENDER | | DATE | SIGNED | DATE | SIGNED | | | Tender Date | | FOR CONSTRUCTION | | | | DATE | SIGNED | DATE | SIGNED | | | Comm Date | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>CONSULTANT</td> <td>PROJECT TITLE</td> <td>DRAWING TITLE</td> </tr> <tr> <td></td> <td style="text-align: center;">LANGDONS ROAD / MAIN NORTH ROAD / MARY STREET INTERSECTION</td> <td style="text-align: center;">TRAFFIC SIGNALS AND ROAD MARKINGS</td> </tr> <tr> <td>CONSULTANT PROJECT REF.</td> <td>CONSULTANT FILE REF.</td> <td>CONTRACT NUMBER</td> </tr> <tr> <td></td> <td></td> <td>TS102901.DGN</td> </tr> <tr> <td></td> <td></td> <td>CP500000</td> </tr> </table> | CONSULTANT | PROJECT TITLE | DRAWING TITLE | | LANGDONS ROAD / MAIN NORTH ROAD / MARY STREET INTERSECTION | TRAFFIC SIGNALS AND ROAD MARKINGS | CONSULTANT PROJECT REF. | CONSULTANT FILE REF. | CONTRACT NUMBER | | | TS102901.DGN | | | CP500000 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>ORIGINAL SHEET SIZE</td> <td>SIGALLS</td> </tr> <tr> <td>A1</td> <td>1:200</td> </tr> <tr> <td>INTERSECTION NUMBER</td> <td></td> </tr> <tr> <td style="text-align: center; font-size: 24px;">257</td> <td></td> </tr> </table> | ORIGINAL SHEET SIZE | SIGALLS | A1 | 1:200 | INTERSECTION NUMBER | | 257 | |
|---|--|--|-----------|------------|------------|------|-----------|----------|-----------|--|------------|----|-------------|--|--|--|--------|-------|------------|--|------------|-----------|------------|--|--|--|--|---------------|--|--|--|------------|--|--|--|--|---------|---------|--------------------------------|--|--|---|----------|--|------------|--|------|--------|------|--------|--|--|-------------|--|------------------|--|--|--|------|--------|------|--------|--|--|-----------|--|---|------------|---------------|---------------|--|---|--|-------------------------|----------------------|-----------------|--|--|--------------|--|--|----------|--|---------------------|---------|----|-------|---------------------|--|------------|--|
| | DATUM | C.O.D. | NAME | SIGNED | DATE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BENCH MK. | DESIGNED | R. Shanks | | 28/10/2010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RL | DES. REVIEW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SURVEY | DRAWN | S.J. PRATT | | 12/10/2010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SURVLY LB | DRW. CHECK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | FILE LOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DRAN. REF. | S:\Data\Digital\Traffic\CPA1000\102901.dgn | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SAP WBS | SAP WBS | PRINTED ON 24/11/2010 BY pratt | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| APPROVED | | FOR TENDER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DATE | SIGNED | DATE | SIGNED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Tender Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FOR CONSTRUCTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DATE | SIGNED | DATE | SIGNED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Comm Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONSULTANT | PROJECT TITLE | DRAWING TITLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LANGDONS ROAD / MAIN NORTH ROAD / MARY STREET INTERSECTION | TRAFFIC SIGNALS AND ROAD MARKINGS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONSULTANT PROJECT REF. | CONSULTANT FILE REF. | CONTRACT NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | TS102901.DGN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| ORIGINAL SHEET SIZE | SIGALLS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A1 | 1:200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| INTERSECTION NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 257 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |