

## 6. MAIDSTONE ROAD/WAIMAIRI ROAD INTERSECTION IMPROVEMENT RR 9954

<b>Officer responsible</b> City Streets Manager Mark Gordon	<b>Author</b> Bill Greenwood Transportation Safety Engineer
Corporate Plan Output: Maidstone Road/Waimairi Road Traffic Signals Installation \$188,000	

### INTRODUCTION

The purpose of this report is to consider options for capacity improvements at the intersection of Maidstone Road and Waimairi Road.

The location of this intersection places it on the boundary between the Riccarton/Wigram Community Board and the Fendalton/Waimairi Community Board and therefore in addition to the City Services Committee, this is a significant matter of concern for both Boards.

Traffic congestion at the Waimairi Road/Maidstone Road roundabout has been a matter of concern for a number of years. The congestion delays are caused by unbalanced traffic flows during the morning and evening peak periods.

The type, design and extent of improvement to be constructed at the Waimairi/Maidstone intersection is very dependent on any potential changes to the nearby Wadeley Road that limit the movement of through traffic along it. For this reason the City Services Committee supported the view that any proposal for the restriction of traffic movement through Wadeley Road be treated as an integral part of this intersection's improvement.

This report discusses several options for addressing the congestion, their merits and issues as well as estimated funding and programme implications.

### BACKGROUND

Congestion at this intersection is caused by unbalanced traffic flows during the morning and evening peak periods. During the morning peak period the major traffic flows are south bound on Waimairi Road and east bound on Maidstone Road. This movement results in vehicles heading south on Waimairi Road having to give way to traffic at the roundabout which is on their right. This causes queuing on Waimairi Road back to the Grahams Road roundabout. In the evening period the flows are reversed and the Waimairi Road north bound major movement is required to give way to the Maidstone Road west bound traffic. This situation favours Avonhead traffic causing considerable delays to the ring road. The situation has deteriorated to an extent that the vehicles on Waimairi Road in the evening period are queuing back to Peer Street.

In addition to the problems at Waimairi Road the community has expressed concern regarding the amount of traffic short cutting through Wadeley Road. Wadeley Road is an unclassified local road carrying around 4,700 vehicles per day. A number of years ago the Council installed a threshold treatment at the Waimairi Road/Wadeley Road intersection to discourage short cutting traffic in this area.

Drivers are experiencing problems making the right turn from Waimairi Road into Wadeley Road and injury crashes have been recorded.

The business community is concerned that any changes to the Maidstone/Waimairi intersection does not unnecessarily impinge on the viability of their businesses. Any loss of frontage carparking in this area is likely to be seen as a disbenefit by the adjacent business community and the property owner.

In 1994 the Waimairi Board members visited the site to survey the traffic patterns and discuss the residents' and business owners' concerns. As part of their budget proposals, the Board's requested that funding for traffic signals be included in the budget. An amount of \$ 188,000 is included in this year's budget for the installation of traffic signals at the intersection. This level of funding was based originally on a concept design that excludes any further traffic calming effects from Wadeley Road.

Subsequent discussions with the Riccarton/Wigram Board have focused on the desirability of installing strong traffic restraint measures in Wadeley Road. Such traffic restraint would mean that significant additional traffic would be diverted through the Maidstone/Waimairi intersection. Major modifications are required to the initial traffic signal proposal in order to cater for this diverted traffic.

## OPTIONS

Six options have been put forward for consideration here with respect to their merits in addressing the objectives and issues. They are categorised into two distinct groups viz. firstly, those which deal with Wadeley Road remaining open to traffic currently using it and secondly, those which would accommodate the additional traffic created by the restriction of traffic through Wadeley Road:

- With Wadeley Road remaining open to through traffic:
  - Option 0 Do nothing – ie retain the existing layout.
  - Option 1 Budgeted option - Installation of traffic signals with the loss of five customer car parks.
  - Option 2 Installation of traffic signals with no loss of customer parking.
  - Option 3 Installation of a dual laned roundabout with reduced customer parking.
- With through traffic movement along Wadeley Road restricted:
  - Option 4 Installation of traffic signals with reduced customer parking.
  - Option 5 Installation of traffic signals with reduced customer parking and designed to four lane median divided standard.

The analysis undertaken for this report is **attached** as APPENDIX A shows that traffic signals can be installed at this intersection within the existing budget if Wadeley Road remains open to through traffic. The traffic signals will have a design life of almost 10 years before any further improvements are required.

If through traffic movements along Wadeley Road are to be restricted then the installation of traffic signals to cater for the additional traffic flows would require

further land purchase, and would also result in the loss of a number of customer carparks at the shopping centre.

Construction of a dual laned roundabout at the intersection is only feasible if Wadeley Road remains open to through traffic. This would require additional land purchase and result in the loss of a number of customer car parks at the shopping centre. This option is not recommended by the report because of the adverse safety environment it would create for pedestrians and cyclists.

The conclusions of the report are that:

- If Wadeley Road is to remain open to through traffic then Option 2 - the installation of traffic signals at the intersection should proceed with out the loss of any carparks in front of the shops. To install traffic signals with out loss of customer carparks will require a request for additional funding of \$62,000.
- If through traffic movements along Wadeley Road are to be restricted then Option 5 – the installation of traffic signals to 4 lane median divided standard with the loss of some customer carparks at the shopping centre should be planned for through the normal planning process. This option requires land purchase that would need to be purchased directly or designations put in place for its purchase.
- The Option 2 traffic signals have a design life of about 10 years. The required planning and land purchase to install the Option 5 traffic signals could take some 3 to 5 years. In this case it would appropriate planning practice to install the Option 2 traffic signals and reassess the downgrading of through traffic movement along Wadeley Road in 10 years time at the end of the design life of the Option 2 traffic signals.

- Recommendation:**
1. That the proposal to install the Option 2 traffic signals at the Maidstone/Waimairi intersection proceed without the loss of carparks in front of the shops.
  2. That planning and consultation for the restriction of the traffic volume on Wadeley Road in conjunction with associated capacity improvements at the Maidstone/Waimairi Intersection continue.
  3. That subject to the acceptance of Recommendation 1 hereof, the additional amount of \$62,000 be sought from the 1999/2000 budget process for allocation to the Maidstone/Waimairi intersection improvement project

**Chairman's**

- Recommendation:**
1. That the foregoing recommendations be adopted.
  2. That Option 2 for improvements at this intersection be endorsed as a basis for public consultation.
  3. That the Board be informed of the outcomes from the consultation process.

4. That the Council provide for the appropriate planning to progress option 4 for implementation in as shorter time frame as possible.

## **APPENDIX A**

### **OPTION 0 – DO NOTHING – RETAIN EXISTING ROUNDABOUT – PROJECT COST \$0**

As indicated in the main report, the existing roundabout is operating at above capacity during both the morning and evening peak traffic periods which large delays and long traffic queues.

Analysis carried out using the intersection modelling package SIDRA, confirms that the design life of the existing roundabout has been exceeded by about 4 years.

<b>INTERSECTION DESIGN LIFE</b>		
<b>Option 0</b>		
<b>Do Nothing – Retain Existing Roundabout</b>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
-4 years	>+25 years	-3 years

The option of retaining the existing roundabout is not recommended. Already significant traffic delays would continue to worsen, and would increase the likelihood of further unsafe manoeuvres by drivers at the intersection. The long traffic queues at the intersection would continue to grow and begin to interfere with the operation of adjacent intersections.

### **OPTION 1 – INSTALL TRAFFIC SIGNALS (BUDGETED OPTION) - PROJECT COST \$188,000**

This option provides cycle lanes, combined straight through and left lanes and right turn lanes on Waimairi Road. It will overcome the traffic safety and capacity problems currently being experienced at the Maidstone/Waimairi intersection. The proposed layout would result in the loss of 5 carparking spaces in front of the adjacent shops. The proposed lane marking and the change from a roundabout would be expected to considerably increase cycle safety at this intersection.

Analysis carried out using the intersection modelling package SIDRA, shows that the traffic signals would have a design life of almost 10 years, at which time further work would be required at the intersection. However, this option does not provide sufficient additional traffic capacity to accommodate any traffic diverted due to the installation of traffic restraints along Wadeley Road.

<b>INTERSECTION DESIGN LIFE</b>		
<b>Option 1 – Budgeted Option</b>		
<b>Installation Of Traffic Signals</b>		
<b>Loss of 5 Customer Car Parks</b>		
<i>Wadeley Road remains open to through traffic</i>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>

+10 years	>+25 years	+9 years
<i>Restricted through traffic movement along Wadeley Road</i>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
-4 years	+ 20 years	- 9 years

**OPTION 2 – INSTALL TRAFFIC SIGNALS - NO LOSS OF CUSTOMER CARPARKS – PROJECT COST \$250,000**

This option provides cycle lanes, combined straight through and left lanes and right turn lanes on Waimairi Road. It will overcome the traffic safety and capacity problems currently being experienced at the Maidstone/Waimairi intersection. The proposed layout shown on the attached plan would not result in the loss of any carparking in front of the adjacent shops. To increase safety for vehicles entering and leaving the carparks in front of the shops it will be necessary to recess the angle parking 1.5 m closer to the buildings. The proposed lane marking and the change from a roundabout could be expected to considerably increase cycle safety at this intersection. Pedestrians would also find access at the intersection safer and easier to use. To install this option without loss of customer carparks will require a request for additional funds (\$62,000).

The analysis results for this option are the same as for option 1. Analysis carried out using the intersection modelling package SIDRA, shows that the traffic signals would have a design life of almost 10 years, at which time further work would be required at the intersection. However, this option does not provide sufficient additional traffic capacity to accommodate any traffic diverted due to the installation of traffic restraints along Wadeley Road.

<b>INTERSECTION DESIGN LIFE</b>		
<b>Option 2</b>		
<b>Installation Of Traffic Signals</b>		
<b>No Loss Of Customer Car Parks</b>		
<i>Wadeley Road remains open to through traffic</i>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
+10 years	>+25 years	+9 years
<i>Restricted through traffic movement along Wadeley Road</i>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
- 4 years	+ 20 years	- 9 years

**OPTION 3 - DUAL LANED ROUNDABOUT– PROJECT COST \$852,000**

The property owner of the shopping centre and some of the adjacent business owners suggest modifying the roundabout to provide extra capacity to handle the current traffic demand. A roundabout to provide this capacity would need to be dual laned as shown in. To be effective the roundabout needs to provide two laned entry and departure. As a result considerable undesignated property purchase will be required. A multi laned roundabout would not allow the closure of Wadeley Road as it provides only 5.5 years capacity before further work at the intersection would be required. Limited provision is made for cyclists and pedestrians with this proposal. The removal of a considerable amount of car parking in front of the commercial premises would need to occur. The loss of customer carparks will effect the remaining businesses. The need to designate

for purchase land and also obtain budget provision for \$852,000 means the project would be unlikely to proceed within the next 3 – 5 years.

Analysis carried out using the intersection modelling package SIDRA, shows that the roundabout would have a design life of 17 years if Wadeley Road remains open to through traffic and only 5 years if through traffic movement along it is restricted.

This option is not recommended because of the very poor pedestrian and cyclist accident record dual laned roundabouts have in Christchurch A design life of 5 years is also considered too short to consider implementing this option if through traffic movements along Wadeley Road are to be restricted.

<b>INTERSECTION DESIGN LIFE</b> <b>Option 3</b> <b>Installation Of A Dual Laned Roundabout</b> <b>Some Loss Of Customer Car Parks</b>		
<i>Wadeley Road remains open to through traffic</i>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
+19 years	>+25 years	+17 years
<i>Wadeley Road closed to through traffic</i>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
+11 years	>+ 25 years	+5 years

#### **OPTION 4- MINIMUM ULTIMATE DESIGN - INSTALLATION OF TRAFFIC SIGNALS** **PROJECT COST \$850,000**

The Riccarton/Wigram Community Board is considering restricting short cutting traffic in Wadeley Avenue. To accommodate traffic diverted from Wadeley Avenue if a turning ban was installed at the Waimairi Road intersection, further capacity would need to be provided at the Maidstone/Waimairi intersection. To accommodate this diverted traffic it would be necessary to introduce an additional straight through traffic lane in Waimairi Road and a left turn lane in Maidstone Road.

A diagram showing this option is attached.

This option represents the minimum ultimate design necessary to accommodate the restriction of through traffic movement along Wadeley Road. This option does not include a median island along Waimairi Road to safely separate opposing traffic flows.

This option would require the purchase of undesignated property on the east side of Waimairi Road. For safety reasons the customer carparking in front of the shops would also need to be converted to parallel parking from the existing right angle parking. This would result in the loss of half of the carparking spaces. The need to purchase land and obtain budget provision for \$850,000 means the project would be unlikely to proceed within the next 3 – 5 years.

Analysis carried out using the intersection modelling package SIDRA, shows that the signals would have a design life of close to 10 years with through traffic movement along Wadeley Road restricted.

<b>INTERSECTION DESIGN LIFE</b> <b>Option 4 – Minimum Ultimate Design</b> <b>Installation of Traffic Signals</b> <b>No Median On Waimairi Road</b> <b>Some Loss Of Customer Car Parks</b> <b>Restricted Through Traffic Movement Along Wadeley Road</b>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
+9 years	>+ 25 years	+13 years

**OPTION 5 – PREFERRED ULTIMATE DESIGN - INSTALLATION OF TRAFFIC SIGNALS**  
**PROJECT COST > \$850,000**

This option is almost identical to option 4 except that median islands would be included in the design of the Waimairi Road approaches to the intersection to increase the safety of the intersection. This is the preferred ultimate design of the intersection should through traffic movements along Wadeley Road be restricted.

A diagram of this option has not been draughted but would be similar to option 4 but with median islands and larger property purchases required.

The need to purchase land and obtain budget provision for greater than \$850,000 would mean the project would be unlikely to proceed within the next 3 – 5 years.

The analysis results for this option are the same as for option 4.

<b>INTERSECTION DESIGN LIFE</b> <b>Option 5 – Preferred Ultimate Design</b> <b>Installation Of Traffic Signals</b> <b>Some Loss Of Customer Car Parks</b> <b>Waimairi Road Designed To 4 Lane Median Divided Standard</b> <b>Restricted Through Traffic Movement Along Wadeley Road</b>		
<i>Morning Peak Period</i>	<i>Afternoon Period</i>	<i>Evening Peak Period</i>
+9 years	>+ 25 years	+13 years

**CONCLUSION**

The conclusions of the analysis report are that:

- If Wadeley Road is to remain open to through traffic then Option 2 - the installation of traffic signals at the intersection should proceed with out the loss of any carparks in front of the shops. To install traffic signals with out loss of customer carparks will require a request for additional funding of \$62,000.
- If through traffic movements along Wadeley Road are to be restricted then Option 5 – the installation of traffic signals to 4 lane median divided standard with the loss of some customer carparks at the shopping centre should be planned for through the normal planning process. This option requires land purchase that would need to be purchased directly or designations put in place for its purchase.

- The Option 2 traffic signals have a design life of about 10 years. The required planning and land purchase to install the Option 5 traffic signals could take some 3 to 5 years. In this case it would appropriate planning practice to install the Option 2 traffic signals and reassess the downgrading of through traffic movement along Wadeley Road in 10 years time at the end of the design life of the Option 2 traffic signals.