

# Peloton MCR Delivery Team

## Quarryman's Trail MCR - Addendum to Scheme Assessment Report

Prepared by Peloton

Prepared for CCC Major Cycleways project

6 October 2016



## Revision History

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## Document Acceptance

Action	Name	Signed	Date
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on behalf of	Peloton		

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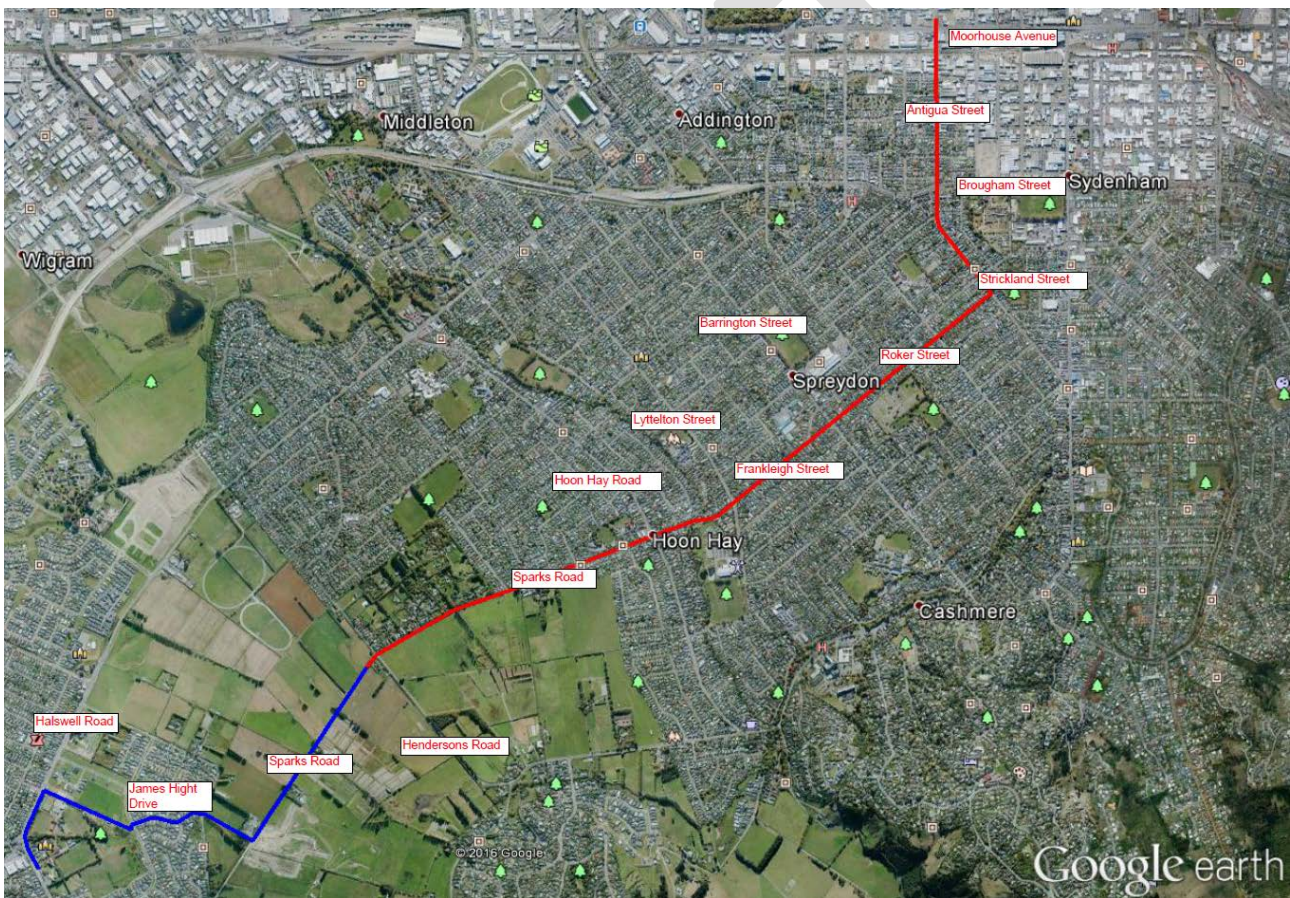


## Executive Summary

Following work by Christchurch City Council (CCC) staff in 2015, this report is an addendum to the Quarryman's Trail Major Cycleway Route (MCR) Scheme Assessment Report (SAR). This report should be read in conjunction with the CCC Scheme Report and follows the same structure for easy reference.

This report reviews and recommends alternative routes and/or facility types for the Quarryman's Trail MCR between Moorhouse Avenue and Hendersons Road. This work has been requested by CCC to provide a solution that is more sensitive to the impacts on local business and residents than the original preferred route and design.

The reassessed portion of the MCR is 5.3 km long between Moorhouse Avenue and Hendersons Road. This is shown by the red line in the map below. The entire route is 8.3 km from Moorhouse Avenue to Halswell.



Key stakeholder engagement has been undertaken as part of the original SAR, and is not presented in this addendum. Engagement is, however, ongoing with key stakeholders. Direct engagement has and/or will be undertaken with schools, businesses, Ecan, emergency services, CDHB and other network agencies (NZTA, CTOC, and KiwiRail). Engagement with residents and other interested parties will be undertaken through the consultation process, including through letterbox drops and drop-in sessions.

The proposed solutions recommended in this addendum seek to mitigate the impacts of the scheme whilst retaining safety and function for cyclists on the MCR. In order to do this some compromise has had to be made to the MCR desirable standards.

A two-way cycleway has been proposed along Frankleigh Street and Sparks Road, to retain as much on-street parking as possible, and to reduce the number of crossings that would delay both cyclists and motorists. A crash risk assessment has been completed, which showed that the two-way cycleway offers a similar level of safety to conventional one-way cycleways, if most or all turning movements to and from Rydal Street can be banned. Most of the safety benefits arise from the two-way cycleway crossing less side roads, and avoiding the BP Hoon Hay service station.

A Safety Audit and Network Functionality Review (SANF) of the proposed design has been completed. The SANF found the proposed route has found a good balance between safety, access, manoeuvrability and parking to fit the MCR into the existing road corridor. The SANF, with designer's responses, is included in Appendix C. Design changes from the SANF that could affect access and parking have been addressed, whilst smaller changes will be incorporated along with any post-consultation design changes.

The proposed amendments to the original scheme design are summarised on the following pages:

### **Section 1: Antigua Street between Moorhouse Avenue and Brougham Street**

Route to be kept as per CCC's route selection recommendation, which connects best with other cycle routes, provides a direct link, and avoids running along Moorhouse Avenue and/or Brougham Street. Adopt revised cross sections to allow on-street parking (around 30% of existing retained) and a flush median in some locations, as follows:

- Between Disraeli Street and Burke Street (300 m) – Narrow one-way separated cycleways to 1.8m wide to allow some on-street parking and a flush median in key areas at local businesses.
- North of Disraeli Street and south of Burke Street (230 m and 240 m, respectively) – 2.2 m wide one way separated cycleways (narrowing to 1.8 m at signalised intersections), allowing some on-street parking.

### **Key issues/opportunities:**

- Bus route with in-lane bus stop (southbound) where no on street parking provided
- Parking time restrictions introduced to keep spaces free for visitors to residents and local businesses
- Reduced cycleway width in order to accommodate on street parking and flush median
- Removal of four bus stops, relocation of two bus stops – ongoing discussions with Ecan around rationalisation and design of bus stops
- New traffic signals at Antigua Street/Disraeli Street intersection
- Turning restrictions at Moorhouse Avenue (no right turns from south approach) and Hazeldean Road (left-in/left-out only). Traffic modelling has been undertaken to understand impacts of the right turn ban at Moorhouse Avenue, whilst re-routing from Hazeldean Road is assisted by the new signals at the intersection with Disraeli Street.

## **Section 2: Brougham Street to Hoon Hay Road**

Adopt an alternative route continuing along Strickland Street to Roker Street, along Roker Street and Strauss Place to Frankleigh Street, continuing to Hoon Hay Road via Sparks Road.

- Strickland Street facility to be 2.0 m wide one-way separated cycleways with some on street parking alternating between the east and west sides (around 40% of existing retained), 6.5m carriageway retaining existing kerb and channel on one side. Total length of 450 m to Roker Street.
- Existing signalised intersections to be upgraded and new MCR crossing signals at Barrington Street and Strickland Street
- Roker Street as a neighbourhood greenway facility on low volume street/cul-de-sac, existing carriageway width of 9 m, total length of 1,000 m. Very little impact on parking.
- Strauss Place as a neighbourhood greenway facility on low volume cul-de-sac for 100 m, existing carriageway width of 14 m. Very little impact on parking.
- Frankleigh Street and Sparks Road to Hoon Hay Road to be a 3.0m wide two-way cycleway on the south side, with a 8.2 m wide carriageway including a 1.8m wide flush median, with on street parking on the north side
- Left in entry only proposed for Rydal Street to minimise conflict at side road, mitigating safety concerns around a two-way cycleway crossing an intersection along a busy road.

### **Key issues/opportunities:**

- Roker Street connection to Barrington Street requires purchase of two properties.
- Some road widening required to provide 3.0 m wide two-way cycleway between Lyttelton Street and Hoon Hay Road
- Good level of service provided to cycleway and road users
- Most on-street parking maintained of the options available, therefore more likely to be acceptable to the public

## **Section 3: Hoon Hay Road to Halswell**

The cycleway is to be a two-way separated facility on the south side of Sparks Road between Hoon Hay Road and Hendersons Road, crossing at a new signalised intersection at Hendersons Road to a shared cycle and pedestrian path continuing west towards Halswell on the north side of Sparks Road.

- Cross section to be a 2.5-3.0 m wide two-way cycleway on the south side with a 8.2m wide carriageway, including a 1.8 m wide flush median, with 2 m wide on-street parking on the north side
- The remainder of the route from Hendersons Road is unchanged from the CCC developed option and has not been reviewed in this addendum, as per CCC instruction



**Key issues/opportunities:**

- Limited accesses across proposed two-way cycleway on south side, however future development may involve additional access points
- Good level of service for cyclists and other road users, whilst also maintaining on street parking on north side
- Signalised crossing at nearby location to replace existing zebra crossing outside Hoon Hay and Our Lady of the Assumption schools
- Diagonal connection at new signals at Hendersons Road to connect the two cycleways on opposite sides of Sparks Road
- Safety of two-way cycleway crossing at new signalised intersections at Lyttelton Street and Hoon Hay Road; some concern about non-compliance by cyclists who may have long delays between green signal phases, resulting in potential injury crashes. Traffic signal cycle times are expected to be kept as short as possible to minimise delay.
- Bus route along Frankleigh Street and Sparks Road will have in-lane bus stops on the side without on-street parking, however space has been provided for traffic to bypass a stationary bus. Some bus stops to be relocated owing to changed road layouts.
- Speed of traffic in rural and semi-rural areas likely to be higher than posted limits. The current speed limit will need to be decreased in the future as cycle volumes increase, although this reduction will be required to accommodate the future residential development along Sparks Road regardless of the installation of the cycleway.

# 1 Introduction

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This report is an addendum to the Quarryman's Trail Major Cycleway Route (MCR) Scheme Assessment Report (SAR) produced by the Christchurch City Council (CCC), dated November 2015. This report should be read in conjunction with the CCC Scheme Report and follows the same structure for easy reference.

This report reviews and recommends alternative routes and facility types for the Quarryman's Trail MCR between Moorhouse Avenue and Hendersons Road. This work has been requested by CCC to provide a solution that is more sensitive to the impacts to local business and residents than the original preferred route and design.

The changes recommended in this addendum seek to mitigate the impacts of the scheme whilst retaining safety and function for cyclists on the MCR. In order to do this some compromise has had to be made to the MCR desirable standards. This report is presented to accompany the publicity material released for public consultation in October 2016.

## 2 Background

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For background information refer to the CCC SAR dated November 2015.

This addendum is in accordance with the Christchurch Cycle Design Guidelines (Part B, Revision B – Design Principles Best Practice Guide - BPDG), dated July 2016. Exceptions from the BPDG are noted in Section 5.3.2. This guidance document has been revised since the original scheme assessment report was completed by CCC staff.

## 3 Route Selection

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### Objectives and MCA Analysis

Following on from the five key requirements for the Major Cycle Routes identified in the original SAR and detailed in the BPDG (safety, directness, attractiveness, coherence and comfort), additional consideration is now being given to:

- The effects of the cycleway on businesses along the route, including access and on-street parking
- The effects of the cycleway on residents along the route, including access and on-street parking
- The effects of the cycleway on the operation of the surrounding road network, including access and delay for other road users

Along with budget and timing considerations, these factors have been added to a revised options assessment for assessing route and facility type options. As stated in the Executive Summary, the purpose of the revised scheme design was to attempt to minimise the adverse effects of the original scheme design whilst providing a facility that is safe for all road users.

This report reviews and comments on multi criteria analysis (MCA) scoring from the original SAR in consideration of the alternative option proposals, but does not revise the original MCA.

### 3.1 Section 1 (Antigua Street - Moorhouse Avenue to Brougham Street)

This section has been reviewed, with the original preferred alignment of Antigua Street being supported. This is shown in Figure 1.

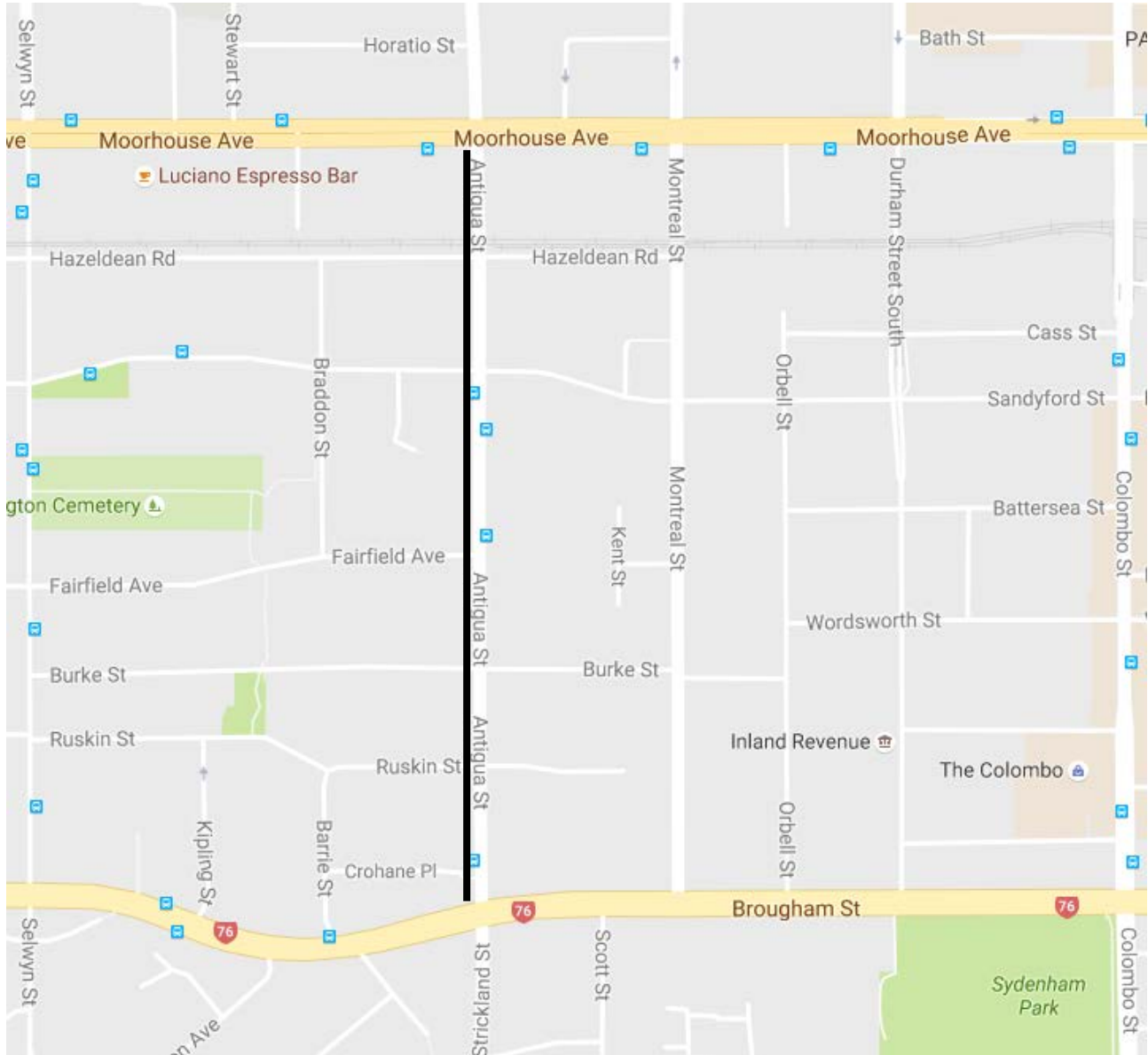


Figure 1: Route alignment for Section 1

### 3.2 Section 2 (Brougham Street to Hoon Hay Road)

An alternative to the Option 4 route has been identified, which follows Strickland Street and Roker Street as per the original option. Instead of going down Roberta Drive, however, the alternative option crosses Barrington Street, before re-joining Frankleigh Street via Strauss Place. This improves directness and removes the need to provide an additional crossing point at Lyttelton Street. Refer Figure 1 below.

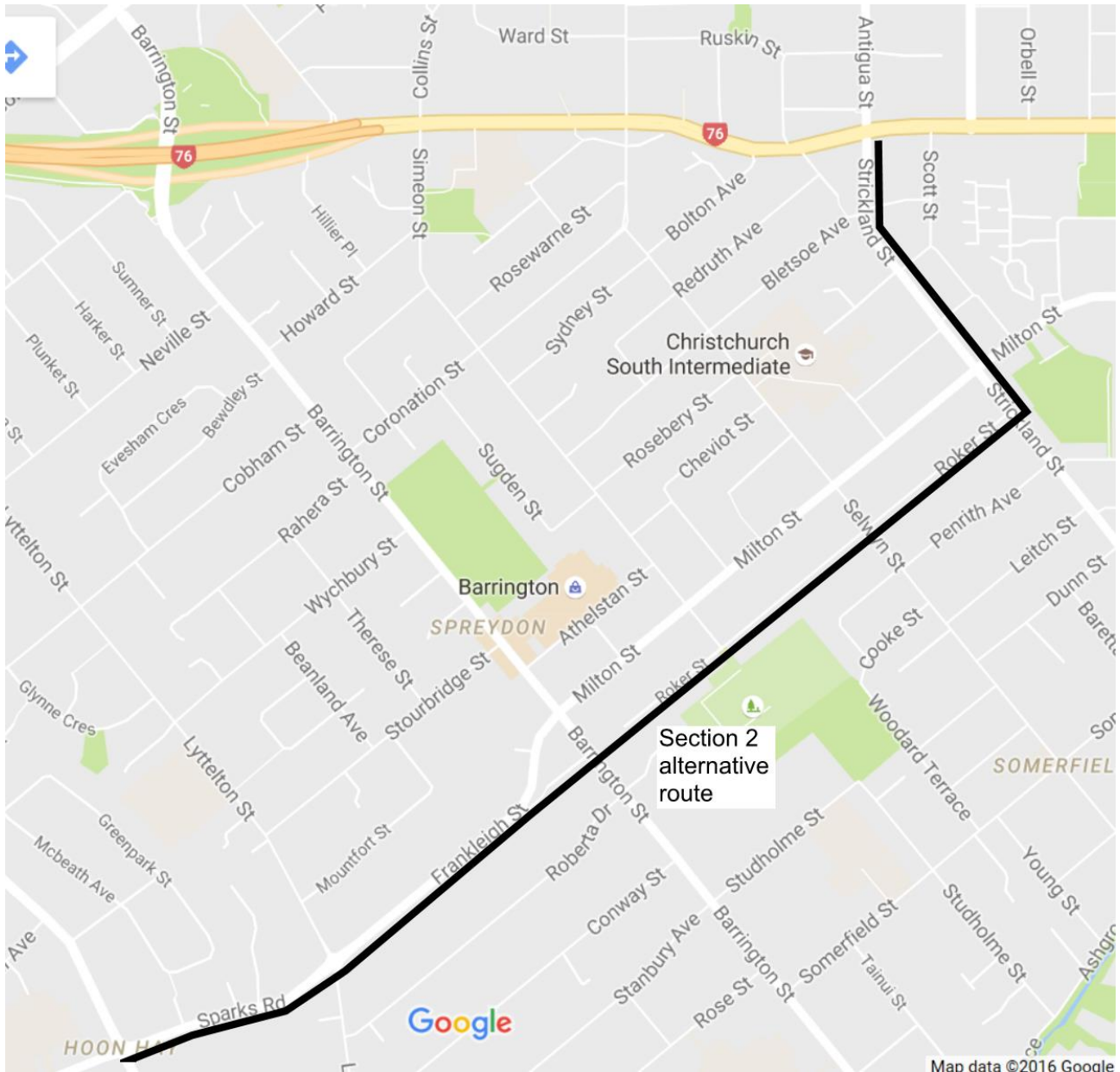


Figure 2: Alternative route alignment for Section 2

The Option 4 route was originally discounted due to scoring poorly in the areas of directness and coherence in the MCA assessment. In reviewing the scoring for this alternative option, it is noted that it would provide a connection almost as direct as the most direct option (Milton Street), and that a coherent facility could be provided with well-designed transitions.

The Roker Street route is preferable to the Bletsloe Avenue/Wychbury Street route due to it providing a connection to a greater catchment area, requiring less complicated turns and crossings, and not having the constructability issues associated with the old dish channel and steep shoulders. Some parking removal would be required with both options, with some turning restrictions for general traffic likely on the Bletsloe Avenue/Wychbury Street route.

The Roker Street route has the advantage of providing a better connection to the link through Somerfield Park & Cemetery, which is presently a popular cycling route. It is also further from the Little River Link Major Cycle Route.

Roker Street provides an alternative with lower impacts to on street parking and road network operations than the Milton street option.

Therefore the Roker Street – Strauss Place alternative route option provides some key strategic benefits and will be reviewed in a detailed scheme assessment later in this report.

It is noted that the Roker Street option is further away from key local destinations such as Barrington Mall and Christchurch South Intermediate than other routes. However this route is only 100 m further away from the mall than the Milton Street route, with half of the users also needing to cross Milton Street to access the mall. It also passes close to Christchurch South Intermediate from the east and the south. It is recommended that local cycleway connections be implemented in the future to improve these connections. These connections could include:

- Roker Street to Barrington Mall via Simeon Street
- Roker Street to Christchurch South Intermediate via Selwyn Street
- Strickland Street to Christchurch South Intermediate via Dominion Avenue

With less accesses and side roads on the southern side of Frankleigh Street and Sparks Road, it is recommended that consideration be given to a two-way cycleway on this side west of the connection onto Frankleigh Street at the end of Strauss Place.

Note this route relies on the purchase of two properties (at least one cross-leased) to connect the end of Roker Street through to Barrington Street. This is likely the reason this alternative was not considered in the original assessment. However, with the desire to mitigate impacts of the MCR this option is now being reviewed. CCC property team will need to complete the land purchase with the affected owners.



### 3.3 Section 3 (Hoon Hay Road to Halswell)

This route has not been reviewed as part of this addendum, but has been shown in Figure 3 for completeness. The following scheme assessment review considers an alternative facility type on this route between Hoon Hay Road and Hendersons Road.

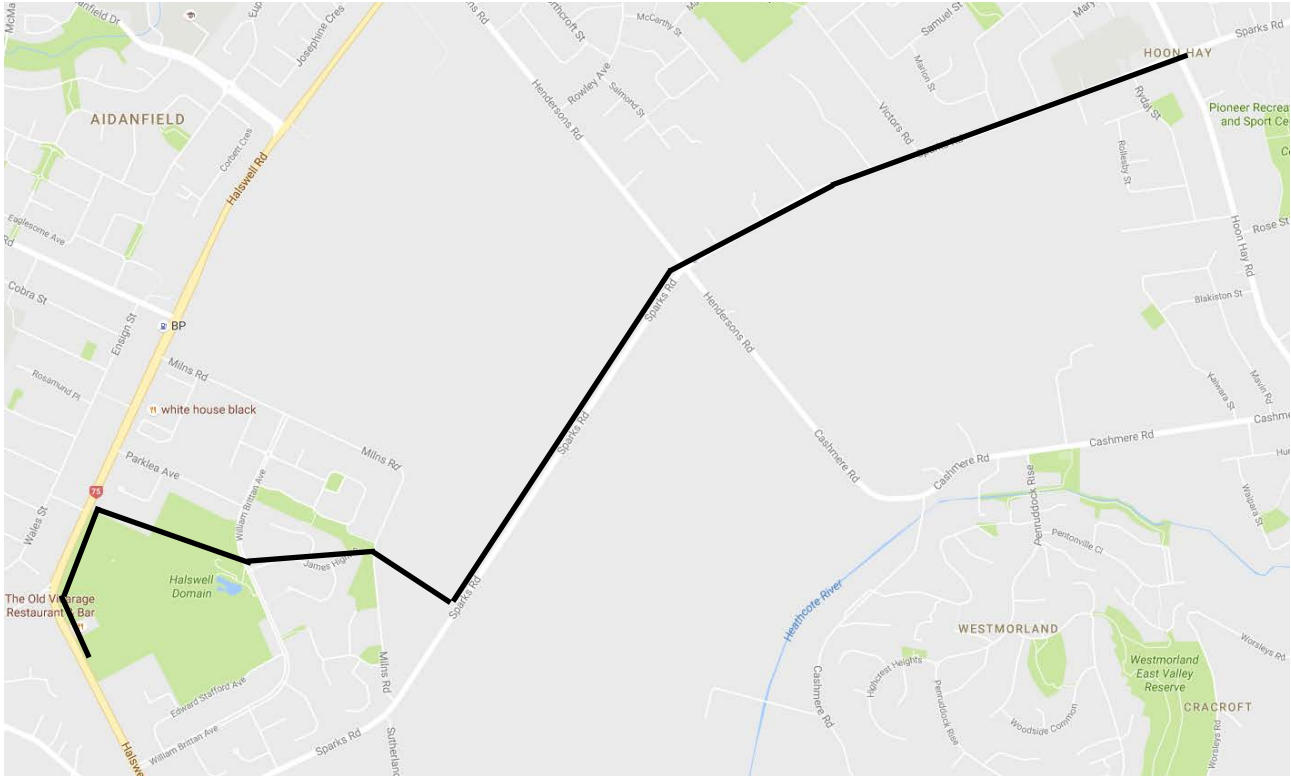


Figure 3: Route alignment for Section 3

## 4 Route Alignment – Existing Conditions and Scheme Options

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### 4.1 Section 1 – Antigua Street (Moorhouse Avenue to Brougham Street)

The existing conditions in this section are as described in the original SAR. Scheme options are discussed below with regards to facility type and cross section design to provide additional on street parking.

#### 4.1.1 Crash Analysis

As per original SAR.

#### 4.1.2 Proposed facility

##### Midblock

The preferred facility type of one-way separated cycleways on Antigua Street has been retained, with changes only made to the details of the cross-section. Due to the high parking demand of the area, parking will be provided on one side of the road throughout Antigua Street, where possible, being limited by sight distance constraints and additional lanes at intersections. To accommodate on street parking and a flush median in the commercial area, a compromised cross section has been considered.

The original scheme design did not provide a flush median, due to traffic volumes expected to decrease following the changes proposed to the Moorhouse Avenue/Antigua Street intersection, along with other network changes, such as traffic signals at the Brougham Street/Montreal Street intersection. The proposed changes to the Moorhouse Avenue/Antigua Street intersection have been removed from the scheme, and the signalisation of Montreal Street is not scheduled to proceed. This increases the need for a flush median, given that the cycleway would be making the road carriageway somewhat narrower than it is at present.

Antigua Street has an existing kerb to kerb width of 14.6 m, with the kerbs being offset approximately 2.7 m from property boundaries. This means that any road widening could only be undertaken around accessways with good visibility, where vehicles exit in a forwards direction. This criteria is met on the eastern side, between Disraeli Street and Burke Street (with the exception of the one residential property closest to Burke Street, where lowering the fence between properties will be investigated in consultation with the affected property owners).

Therefore road widening is required between Disraeli Street and Burke Street to allow for turning movements in and out of the commercial and medium-density residential properties in this section. Maintaining a 2 m offset from the boundary on the east side, a 1.8 m wide flush median could be provided past the commercial properties, narrowing to 1.6 m to the south where the land use changes to residential. This is based on 1.8 m wide one-way cycleways, the minimum desirable under the Christchurch Cycle Design Guidelines (desirable is 2.1-2.3 m). The desirable minimum width of the cycleway may be acceptable from a cycling level of service perspective as it is located away from the Moorhouse Avenue and Brougham Street intersections, which is where most cyclist bunching is expected; most overtaking would be completed prior to cyclists arriving at this section. The 1.8 m width may still allow some overtaking to occur, if approached with courtesy. This option is shown in Figure 2.

**This is the preferred option for the section between Disraeli Street and Burke Street.**

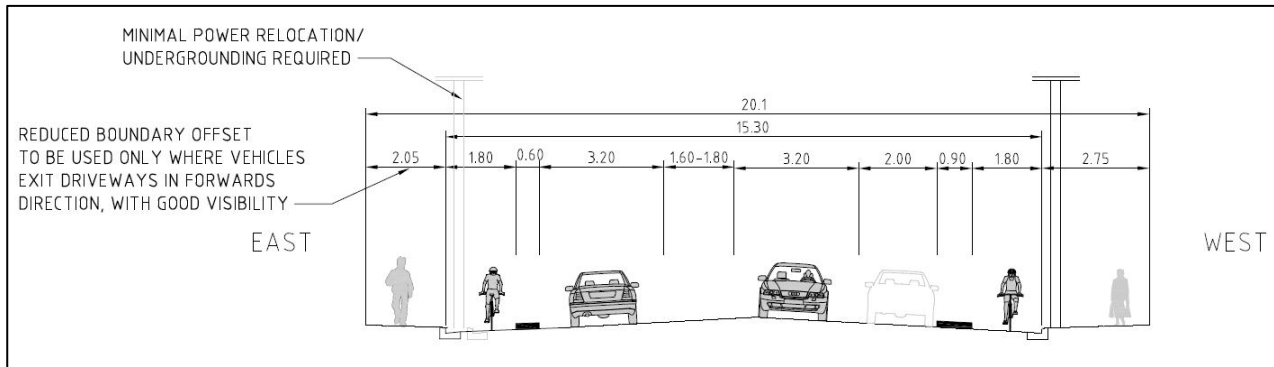


Figure 4: Preferred cross-section for Antigua Street, Disraeli Street to Burke Street

An alternative cross-section has been developed to provide a flush median, whilst retaining parking on one side of the road, within the existing kerblines. The 1.5 m wide flush median would require narrowing the one way cycleways to 1.6 m. A 1.5 m wide flush median would offer limited benefit to commercial vehicles accessing the properties along the Disraeli Street to Fairfield Avenue section of the route, and 1.6 m wide cycleways are an absolute minimum, to be used only for short, isolated sections. It is expected that the use of a facility of this width over extended lengths would result in increased numbers of cyclists riding on the footpath or in the general traffic lanes. This option is not recommended due to the poor level of service and reduced safety it offers cycleway and general road users, but is shown in Figure 3 for completeness.

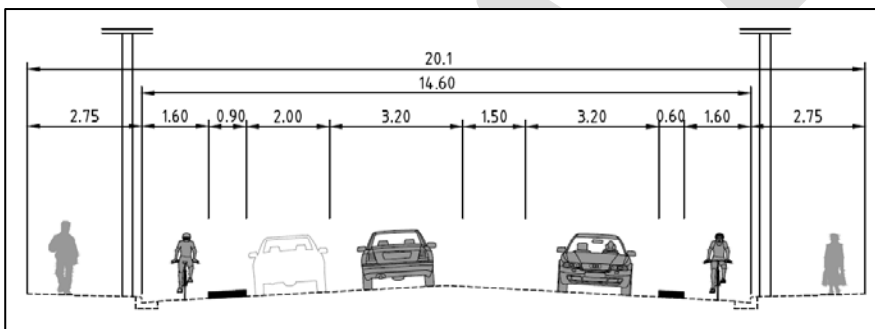


Figure 5: Cycleways with flush median in existing roadway – substandard treatment, not recommended

In the sections to the north of Disraeli Street and to the south of Burke Street, visibility limitations at property accesses preclude any road widening. There is also expected to be a greater demand for wider cycleways at these locations, with faster cyclists overtaking slower riders they will have caught up with at the intersections with Moorhouse Avenue and Brougham Street, where the signal cycle times are the longest. There is also expected to be a higher demand for overtaking on the approaches to the intersections, given that signal phase times are typically reduced with installation of protected movements for cyclists. These factors mean that widening to provide a flush median is not feasible, nor is installing the absolute minimum width cycleway in order to provide a narrow flush median.

The land use in these sections is commercial/industrial to the north of Disraeli Street, and residential to the south of Burke Street. A cross-section without a flush median is more appropriate in a residential area, where the volumes of vehicles entering and exiting properties are lower. The gaps between parking spaces, especially closer to intersections, will provide some room for vehicles to manoeuvre around stationary vehicles waiting to turn right.

To provide a flush median around the commercial and industrial properties between Hazeldean Road and Disraeli Street would require the removal of all on-street parking in this section, which services a bakery, amongst other businesses. This would be expected to attract significant opposition during consultation.

The new signalised intersection at Disraeli Street precludes the installation of a flush median to service the businesses closest to it, regardless of parking provision. It is not proposed to provide any parking to the north of the railway crossing as the properties in this area all have good off-street parking provision, with the space being prioritised for the development of the auxiliary lanes approaching Moorhouse Avenue and the provision of a flush median to service the commercial property on the eastern side.

Therefore the cycleways in this section could be widened to 2.2 m in each direction, with 3.35 m wide traffic lanes and no flush median. This option is shown in Figure 4.

**This is the preferred option for the sections north of Disraeli Street and south of Burke Street.**

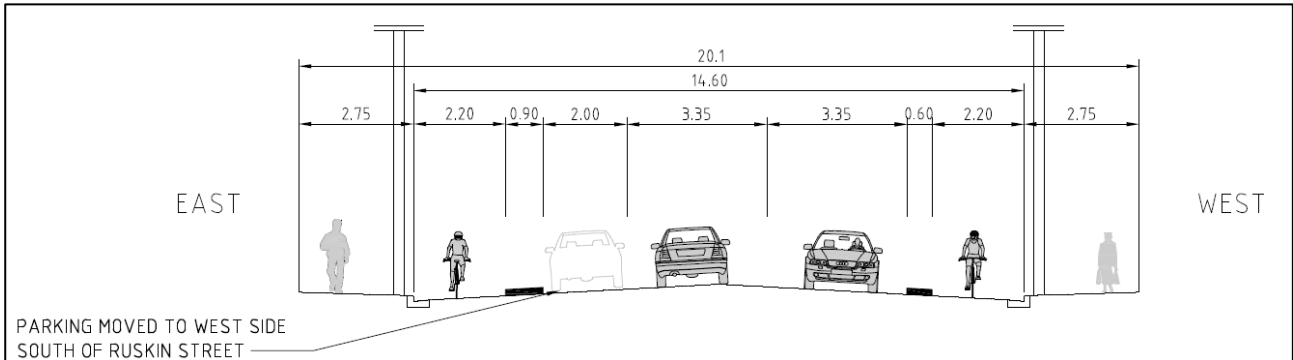


Figure 6: Preferred cross-section for Antigua Street, north of Disraeli Street and south of Burke Street

## Intersections

As stated above, some of the turning restrictions and network changes proposed in the original scheme are not recommended. These are summarised in Table 1 below, with more detail later in this section and in 4.1.3.

Table 1: Moorhouse Avenue to Brougham Street intersection changes from original scheme

Street name	Original scheme intersection form	Revised scheme intersection form
Moorhouse Avenue	Left-in/left-out off Moorhouse Avenue only for general traffic, full crossing for cyclists on protected phase, two-stage pedestrian crossing.	All movements permitted, except right-turn from Antigua Street (south) onto Moorhouse Avenue (eastbound) – refer 4.1.3. Protected phase for cyclists.
Brougham Street	Ban left-turns from Antigua Street (north) approach, three approach lanes from Strickland Street (south) approach. Protected phase for cyclists.	All movements permitted, shared through/left approach lanes north and south (original scheme reviewed and three lanes on south approach unable to be provided without providing sub-minimum footpath widths). Protected phase for cyclists.
Montreal Street/Brougham Street (non-MCR)	Signalised intersection.	Existing priority control to remain at this time (non-MCR intersection).

Apart from the above locations, proposed intersection treatments are the same as the original scheme design, with only minor geometric modifications to be made. The design vehicle for turning space is the RTS-18 large rigid truck for all signalised intersections and the RTS-18 medium rigid truck for all priority intersections. Traffic

signal phasing diagrams are shown in Figure 5, Figure 6 and Figure 7, with full modelling outputs included in Appendix B.

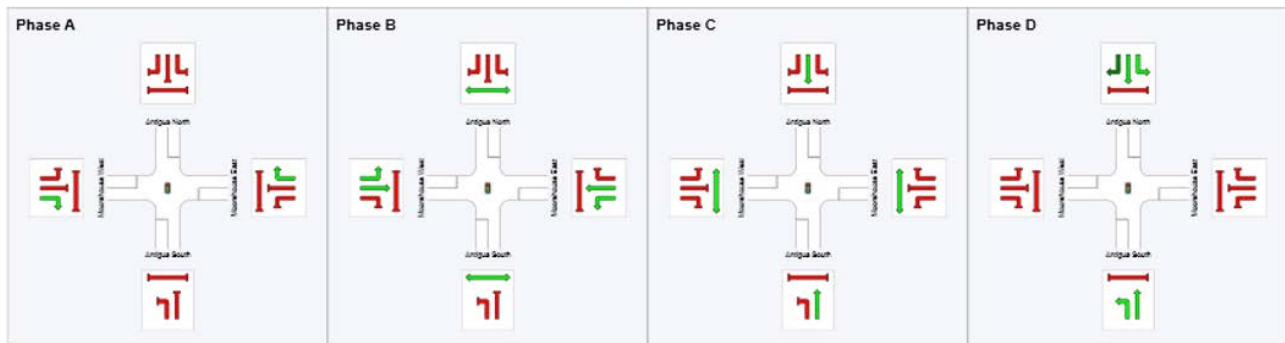


Figure 7: Proposed traffic signal phasing for Moorhouse Avenue/Antigua Street intersection

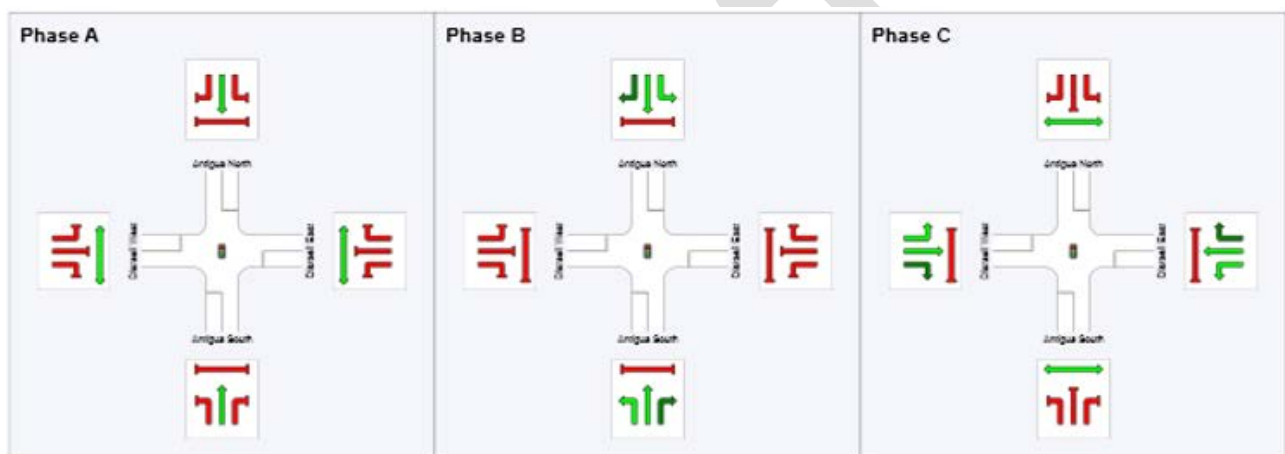


Figure 8: Proposed traffic signal phasing for Antigua Street/Disraeli Street intersection

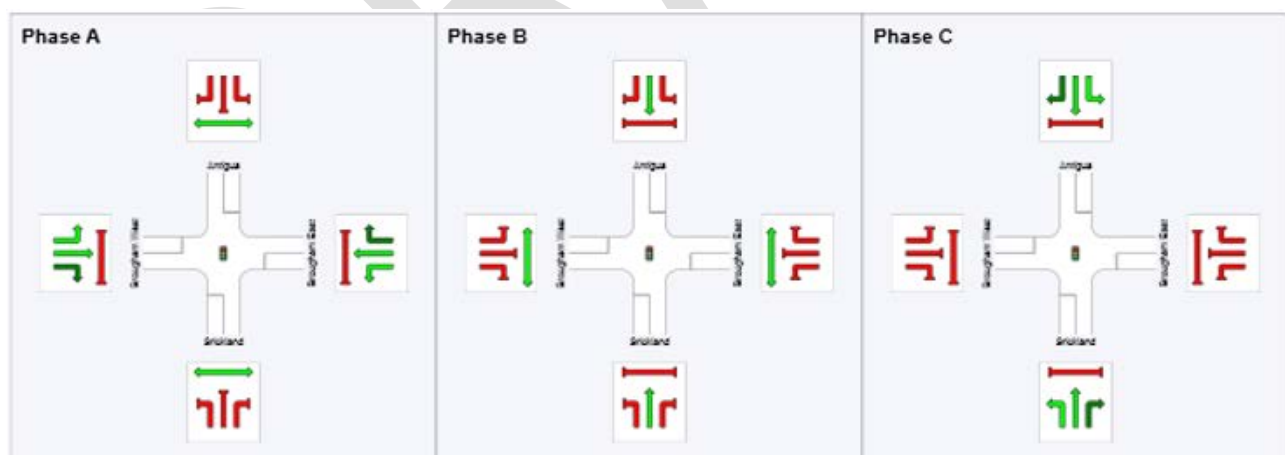


Figure 9: Proposed traffic signal phasing for Antigua Street/Brougham Street/Strickland Street intersection

Table 2 summarises the modelled Levels of Service (LoS) for the proposed intersections incorporating the one-way cycleways along Antigua Street:



Table 2: Signalised intersection performance for one-way cycleways on Antigua Street

Intersection	Year	LoS AM Peak	LoS PM Peak	Notes
Antigua/Moorhouse	2031	D	F	Maintains LoS for Moorhouse Avenue  Based on removing right turn from Antigua Street (south). AM peak would have LoS F if right turn was to be retained.
Antigua/Disraeli	2031	B	B	New signals
Antigua/Strickland/Brougham	2031	F	F	Maintains LoS for Brougham Street

An alternative option of providing a mixing zone, or shared cycle and left-turning traffic lane with appropriate transitions, has been considered for use at the signalised intersections along this route. Giving cyclists a head-start and allowing traffic to 'filter turn' across the cycleway has also been considered. These options have the potential to offer the least delays for both cyclists and general traffic, however have not been recommended for the following reasons:

- MCR's are trying to attract people to cycling who currently will not cycle due to perceived safety risk. Mixing zones are likely to be perceived by the "interested but concerned" group as less safe than full separation, and are less suitable where traffic volumes, vehicle sizes and speeds are higher, such as on this route.
- There is generally support from cyclists for the safe-hit posts installed on both approaches to Brougham Street; the mixing zone treatment would remove these and left turning traffic would block cyclist movements whilst queuing or if waiting for a pedestrian to cross Brougham Street
- Allowing general traffic to 'filter turn' across the cycleway will not prevent the most common cycle crashes at signalised intersections, namely right-turn against and left-turn sideswipe. There is also the risk of confusion for cyclists arriving at the end of the head start phase, where vehicles could begin to turn left as cyclists undertake them.

#### 4.1.3 Wider network

The option to improve the **Brougham Street and Montreal Street intersection** is being investigated by NZTA, however signalising this intersection is not currently programmed. The signal phasing of the Brougham Street and Antigua Street intersection has been modelled based on not affecting the level of service of Brougham Street.

The option to allow left-in and left-out only traffic moments at the **intersection of Antigua Street and Moorhouse Avenue** will also not be progressed, on the basis that:

- It is not supported by the Metro Sports development

- It would hinder movements exiting the future Christchurch Hospital Outpatients Unit to the south and west. Many drivers visiting Outpatients would be unfamiliar with the alternative route around Hagley Avenue and Selwyn Street
- It would hinder movements from the Justice and Emergency Services Precinct towards the south and south-west of Christchurch
- It would require drivers wishing to access the hospital from Antigua Street to do so via Moorhouse Avenue, making a right turn from Moorhouse Avenue onto Selwyn Street, adding time in terms of both distance and intersection delay
- It is likely to be opposed by local businesses and employers

An alternative option treatment has been developed, which modelling shows will maintain or even improve the overall level of service of this intersection from the base case. This involves banning the right turn from the Antigua Street south approach, which allows for separate through and left turn lanes from this approach. All other movements will be maintained. Traffic will have the opportunity to turn right at either Brougham Street, Disraeli Street or Tuam Street. The availability of land from the Metro Sports development on the western side of Antigua Street to use for road widening will provide a wide (5 m) shared and through traffic lane on the north approach to Moorhouse, allowing for most through traffic to run whilst left-turning traffic is held for cyclists to proceed.

Traffic modelling has been undertaken to investigate the impacts of banning the right turn onto Moorhouse Avenue. This shows that traffic (around 220 vehicles in the peak hour) will be redistributed into the surrounding network without causing any notable network issues.

#### 4.1.4 Parking

To reduce the impacts of the original scheme design on local businesses and residents, the revised scheme has sought to increase the amount of on-street parking whilst still providing a high standard cycleway, in a road environment that is safe for all road users.

CCC advise the wider parking strategy proposed in the original SAR will not be progressed in conjunction with the cycleway as its scope extends considerably beyond the area affected by the cycleway. Parking restrictions along Antigua Street and some side roads will be progressed, as discussed below.

The revised scheme design has adopted a 3 m offset of parking from the edge of driveways, in accordance with the July 2016 revision of the Christchurch Cycle Design Guidelines. Exceptions to this, to a minimum of 2.5 m are proposed in short lengths of parking, where this makes the difference of providing a parking space or not. The original scheme was based on a 5 m offset, which was from an earlier version of the Design Guidelines.

Where the original scheme design retained a total of eight of the approximately 90-100 (depending on counting criteria) existing parking spaces on Antigua Street between Moorhouse Avenue and Brougham Street, the revised scheme now provides 28 parking spaces, or around 30% of existing.

On street parking has been provided that maximises parking space numbers to best serve the adjacent land use. Parking is generally provided outside the medium-density housing areas, as opposed to the commercial and industrial properties opposite, which generally have good off-street parking provision. Parking is provided directly outside the dairy at Fairfield Avenue, however opposite the bakery at Hazeldean Road in order to maximise parking in this area. Short-term (P10) parking is proposed outside these two premises, and on the adjacent side roads to serve traffic travelling in the opposite direction. The P120 parking between the hours of

10 am and 3 pm Monday to Friday from the original scheme will be retained throughout the length of Antigua Street to prioritise its use for customer and visitor parking, rather than all-day commuter parking. Direct consultation with affected parties is recommended.

#### 4.1.5 Refuse collection

A review of the number of bins that could be generated has been undertaken, based on actual wheelie bin measurements, which shows that not as much space is needed for bins as originally thought. It is also noted that bins are often not placed with the required 0.5 m spacing between them, and that residents of medium density housing often don't put their green waste bins out for collection, meaning the space provided will be somewhat on the conservative side at some locations. This will provide some capacity for additional residential development, given that residential properties on Antigua Street are zoned L3. A consented development has been noted at No. 79 Antigua Street. Sufficient space has been provided for bins at this location.

The revised scheme proposes that wheelie bins be placed on an area level with the surrounding ground, i.e. not on a raised island, to make it easier for less physically able residents to put their bins out for collection.

Collection of the bins will generally be undertaken as per the original scheme, with the collection truck straddling the separator where there is no parking, and undertaking collection from the traffic lane where there is parking. There is one section outside the five units at number 101 Antigua Street, where the bins from these and adjacent units would prevent what would have otherwise been two parking spaces. It is proposed to designate this section of parking as no parking during the time at which refuse collection is undertaken. This means the bins can be placed on the kerbside as they are presently, with the collection truck straddling the separator through this section in order to access the bins. Consultation with CCC/Waste Management services will be required to coordinate this issue. This is shown in Figure 8.

Note this strategy may also be adopted in other MCR projects where on street parking is affected by refuse collection. Maintaining as much on street parking as possible is a desirable outcome for these projects.

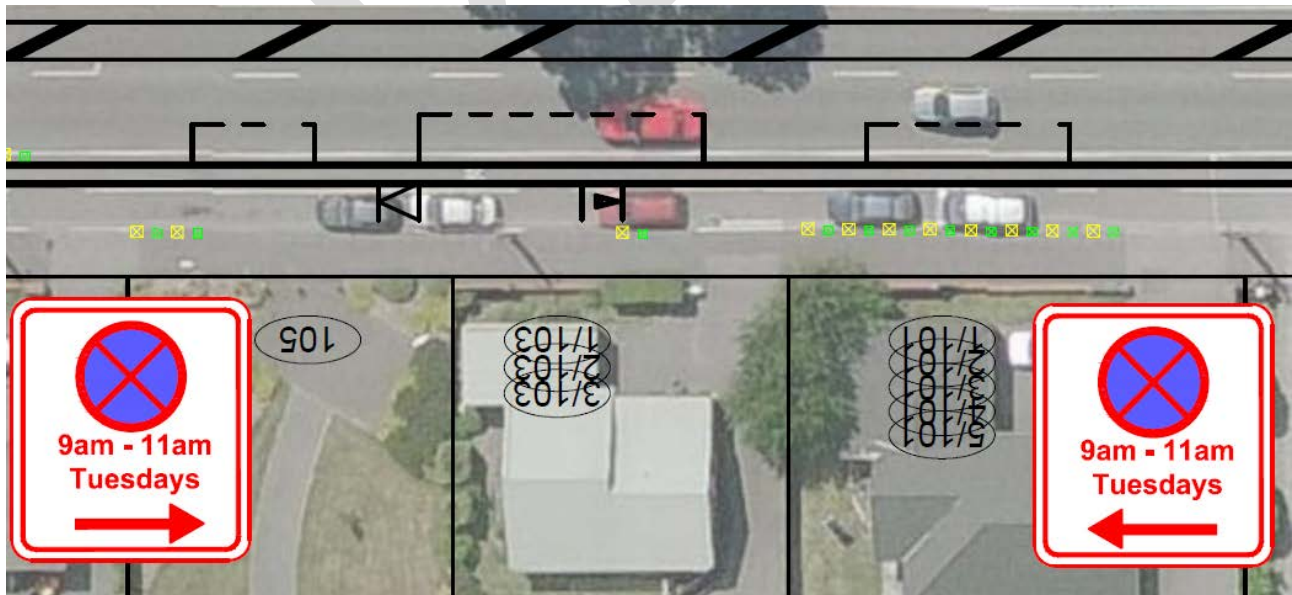


Figure 10: Refuse collection option to provide parking with large numbers of wheelie bins (bus stop in the centre)

#### 4.1.6 Public Transport

The bus stop rationalisation from the original scheme has effectively been retained. The northbound bus stop has been shifted approximately 40 m to the north at 103 Antigua Street, where there is sufficient space to provide the required platform, ramps, and offset between the ramps and driveways. This is shown in Figure 8, above. This also places the bus stop partially adjacent to a reserve, allowing a shelter to be placed in front of a reserve rather than a residential property. This northbound bus stop, which has considerably higher boarding numbers than the southbound stop, will be set along the same line as parking, meaning it will not require buses to stop in the lane 100 m from a signalised intersection.

The southbound bus stop has been shifted approximately 60 m to the south to a location outside Placemakers, where it is located further from entrances.

It is noted that this rationalisation would result in bus stop spacings of 660 m and 520 m around the northbound bus stop, and 560 m and 460 m around the southbound bus stop. Whilst these spacings are somewhat longer than the recommended spacings in the Christchurch City Bus Stop Guidelines, the good pedestrian links in the area and the bus stops on Brougham Street and Disraeli Street mean that virtually all households within the area currently serviced by the bus route will be within a 400-500 m walk of a bus stop. Public transport planners generally observe that the walking distance that most people seem to tolerate is about 400 metres for a local stop service, meaning that the revised bus stop locations will still provide a reasonably good level of service for bus users.

#### 4.1.7 Rail Crossing

Antigua Street crosses the railway to the north of Hazeldean Road, where the on-road cycle lanes are controlled by the barrier arms and the footpath is uncontrolled. Since the cycleway will take the form of cycle lanes across the rail crossing, it is proposed to keep the barrier arms to control the cycleway. A compact maze constructed from two standard handrails is proposed to be installed on each footpath to deter cyclists from bypassing the barrier arms, as well as improving pedestrian safety.

## 4.2 Section 2 (Brougham Street to Hoon Hay Road)

### Route 1 (Strickland, Milton, Frankleigh, Sparks)

This review discusses alternative cross section options to that proposed in the CCC SAR of November 2015.

#### 4.2.1 Existing conditions

The existing conditions are as is described in the original SAR.

#### 4.2.2 Strickland Street, Milton Street and Frankleigh Street crash analysis

As per the original SAR.

#### 4.2.3 Sparks Road crash analysis

As per the original SAR.

#### 4.2.4 Facility type

##### Strickland Street

A revised cross-section is proposed for Strickland Street, narrowing the cycleways to 2.0 m wide in order to maintain a 3 m offset from property boundaries to the cycleway, allowing for drivers exiting properties more opportunity to observe approaching cyclists. This is shown in Figure 9.

**This is the preferred option for Strickland Street.**

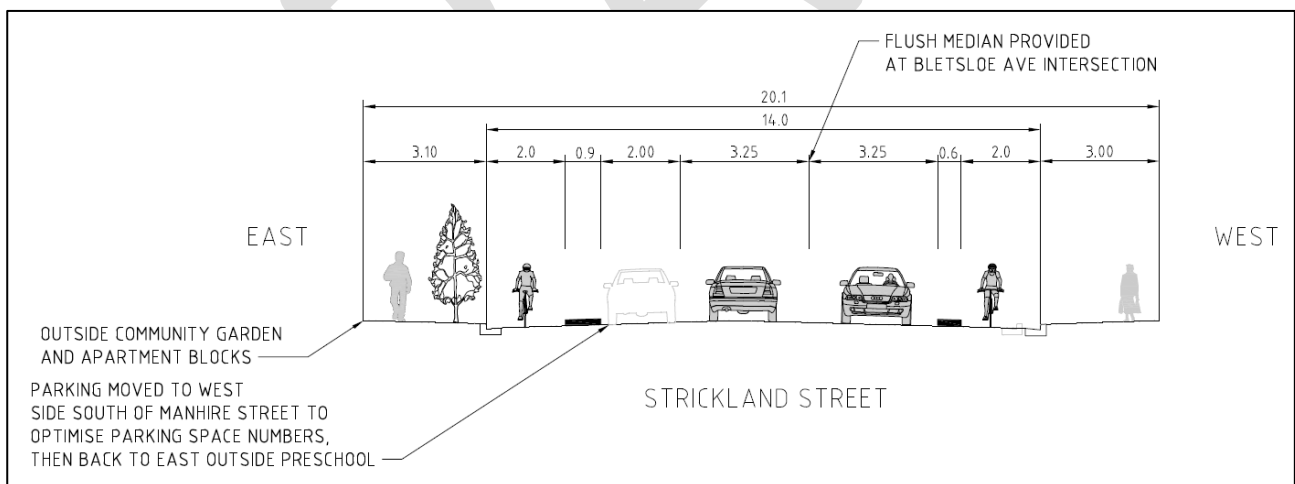


Figure 11: Preferred cross-section for Strickland Street

##### Milton Street, Frankleigh Street and Sparks Road

An alternative cross-section has been developed that provides parking on one side of the road with one-way cycleways, resulting in parking retention of around 30-40%, with additional parking removal for traffic signals, intersection and crossing treatments. This would be achieved by reducing the offset between the westbound cycleway and property boundaries, removing horizontal separation between westbound cyclists and parked cars, and providing a narrower flush median. Some width could be added to the flush median by reducing the



eastbound cycleway down to a width of 1.8 m, however this would make overtaking within the cycleway quite uncomfortable, and would likely result in the footpath or general traffic lane being used for this purpose.

This option would also require significant costs in utility relocation and new stormwater assets. Whilst this treatment would be highly undesirable from most points of view, it does provide an option for providing a one-way MCR facility down these streets that retains some parking.

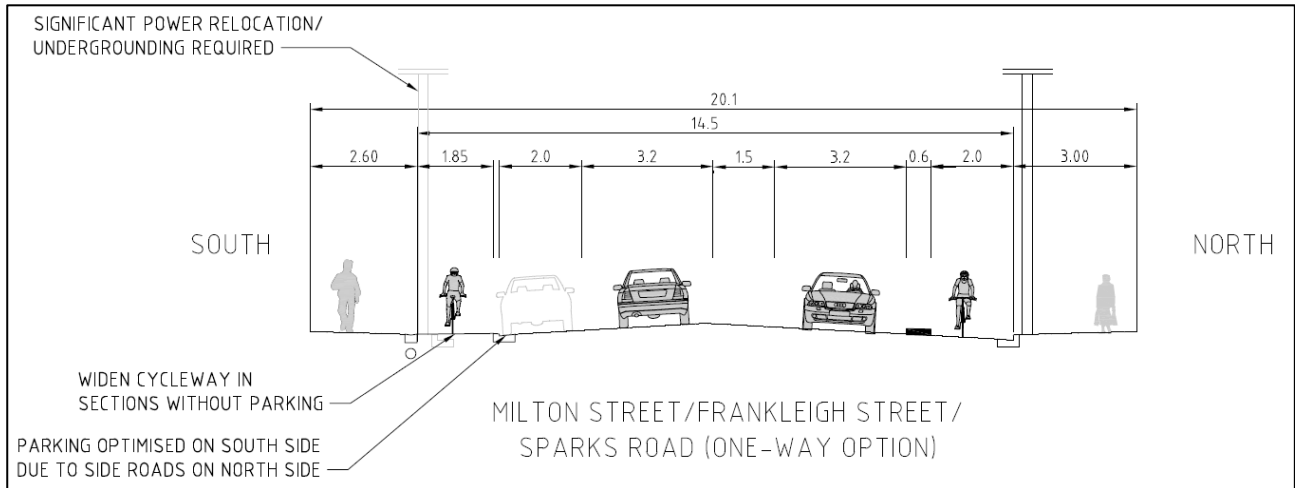


Figure 12: Cross-section option to retain parking on one side of Milton Street/Frankleigh Street/Sparks Road

#### 4.2.5 Milton Street Shops

This has not been reassessed as part of the revised scheme assessment.

#### 4.2.6 Hoon Hay School, Our Lady of the Assumption School, Hoon Hay Medical Centre

This has not been reassessed as part of the revised scheme assessment, however some parking could be provided on one side of the road around this location.

#### 4.2.7 Intersections

Apart from minor, geometric changes, intersection treatments are unchanged from the original SAR. The intersection of Strickland Street and Milton Street will have protected phases for cyclists, shown in Figure 11.

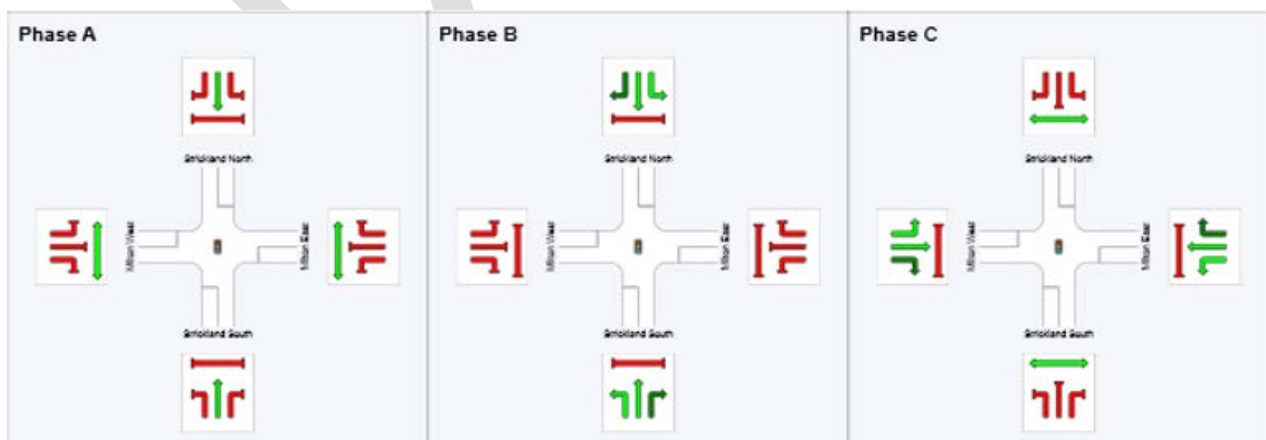


Figure 13: Proposed signal phasing for Strickland Street/Milton Street intersection

Table 3 summarises the modelled Levels of Service (LoS) for the proposed intersections incorporating the one-way cycleways along Strickland Street:

Table 3: Signalised intersection performance for one-way cycleways on Strickland Street

Intersection	Year	LoS AM Peak	LoS PM Peak	Notes
Strickland/Milton	2031	C	C	5-10 seconds increase in average delay from base case

A signalised, mid-block crossing is proposed at the end of Roker Street, joining the separated cycleways on Strickland Street with the Roker Street neighbourhood greenway and the pathway through Bradford Park. The proposed phasing of this crossing is run in conjunction with the signals at Milton Street, allowing for the crossing to run up to twice per cycle of the intersection signals.

#### 4.2.8 Traffic modelling for the blue (Milton-Frankleigh-Sparks) route

No further modelling has been undertaken for this route option, beyond that detailed above.

#### 4.2.9 Parking

Additional parking on Strickland Street has been provided in the revised scheme design by rationalising the space required for wheelie bin placement, reducing the offset of parking from accesses from 5 m to 3 m, as discussed in the section on Antigua Street, and alternating parking between the east and west sides of the road based on the number of potential spaces available on either side. Where the original scheme design retained a total of five of the approximately 60 (depending on counting criteria) existing parking spaces on Strickland Street, the revised scheme now provides 21 parking spaces.

Some parking can be provided in the alternative cross-section on Milton-Frankleigh-Sparks, resulting in parking retention of around 30-40%, with additional parking removal for traffic signals, intersections and crossing treatments.

#### 4.2.10 Refuse collection

As per the original SAR.

#### 4.2.11 Public transport

The impacts of the MCR on public transport have not been reassessed as part of the revised scheme assessment. The alternative Route 2 described below considers public transport issues for Frankleigh Street and Sparks Road in Section 4.2.20. The existing number of bus stops are proposed to be retained, however some would need to be relocated due to changes to intersections and the additional space required for raising a separated cycleway up to path level for the bus stops.

### Route 2 (Strickland, Roker, Strauss, Frankleigh, Sparks)

This section has been added to the SAR following the identification of the Roker Street – Strauss Place alternative to Milton Street. This route avoids the significant parking loss on Milton Street, and the issues of the compromised cross section put forward in Section 4.2.4. It would also have less network impacts, with the Milton Street/Barrington Street intersection phasing remaining unchanged and a signalised midblock crossing being provided on Barrington Street instead, which could be coordinated with the signals at Milton Street. If

the two-way option was to be selected as the preferred option, a midblock crossing on Frankleigh Street would not be required.

#### 4.2.12 Existing conditions

The alternative route through Roker Street and Strauss Place continues 100 m further south up Strickland Street, past Milton Street, where the road environment is much the same as on the northern side. Bradford Park, with pedestrian and cycle connections through to Colombo Street via local streets, is located on the eastern side of Strickland Street, opposite Roker Street. There is limited parking in this section.

Roker Street is a local road, with low traffic volumes. It is around 1,000 m long and tree-lined, with mature trees on the eastern end. It is mostly residential, with the exception of the access to the Somerfield Park and Cemetery opposite Simeon Street. Roker Street terminates with a cul-de-sac/hammer head at its western end.

Roker Street intersects with the following streets along its length:

Street name	Intersection form	Road hierarchy status	Bus route	Cycleway
Strickland Street	Uncontrolled T-intersection	Collector	No	Proposed Southern Lights MCR
Selwyn Street	Priority cross-roads (Selwyn priority)	Collector	No	No
Simeon Street	Priority T-intersection (Roker priority)	Local	No	Local cycle connection

Strauss Place is a cul-de-sac, joining Barrington Street with an uncontrolled T-intersection at its eastern end. It terminates with a cul-de-sac head at its western end, adjacent to Frankleigh Street. Strauss Place services around 16 residential properties.

#### 4.2.13 Crash analysis

Crash analysis for the section of Strickland Street to the north of Milton Street (beyond that investigated previously), Roker Street, and the intersection of Strauss Place with Barrington Street has been undertaken.

In the five years from 2011-2015, there have been two crashes within this area.

In 2012, a driver turning right into a driveway on Strickland Street opposite Roker Street turned in front of an overtaking ambulance with flashing lights and sirens.

In 2015, a motorcyclist turning right out of 209 Barrington Street (between Strauss Place and Milton Street) failed to give way to a car approaching on Barrington Street from the south. A parked vehicle had obstructed the motorcyclist's view.

#### 4.2.14 Property requirements

This option is contingent on Council purchasing property at the end of Roker Street to connect through to Barrington Street. Two viable options have been identified, which are shown in Figure 12. It might be possible

to subdivide the cross-leased properties, retaining one of the units. This needs to be confirmed from a planning and building perspective as part of the development of the connection.



Figure 14: Roker Street-Barrington Street connection options

#### 4.2.15 Facility types, including intersections

##### Strickland Street

As the road environment changes little as Strickland Street crosses Milton Street, it is proposed to continue with the cross-section shown in 4.2.4.

##### Roker Street

Roker Street has a carriageway width of 9 m, with mature trees planted in the berms. Fitting any kind of separated facility in this environment would either require the removal of all parking, giving a narrow carriageway and narrow cycleway, or the removal of trees and road widening. Since Roker Street has traffic volumes of under 500 vehicles per day, it would be an appropriate environment for a neighbourhood greenway with appropriate traffic calming, utilising the existing kerblines. The surface of much of Roker Street is a relatively rough chipseal, which would benefit from a slurry seal treatment.

##### Strauss Place

Strauss Place has a carriageway width of 14 m, with kerb and flat channel. Servicing only 16 residential properties approximately, traffic volumes would be expected to be no more than around 150 vehicles per day. This would be an appropriate environment for a neighbourhood greenway, with traffic calming not required due to the short (approximately 100 m) length of the street.

An alternative facility option for Strauss Place is a separated, two-way cycleway. This would have the advantage of not requiring cyclists to cross Strauss Place near the intersection with Barrington Street when transitioning between the crossing and the neighbourhood greenway. This could be achieved with very little parking loss, although might affect the radius of the cul-de-sac turning head.

##### Frankleigh Street/Sparks Road

The transition from the Strauss Place to Frankleigh Street via a two-way cycle path offers the opportunity to continue the cycleway as either a two-way facility on the southern side of Frankleigh Street, or as one-way facilities on either side of the road via a mid-block crossing for eastbound cyclists.

Whilst the traffic volumes on Frankleigh Street and Sparks Road at around 15,000 VPD are somewhat higher than the volumes for a two-way cycleway in the Christchurch Cycle Design Guidelines, there are advantages to a two-way facility in terms of avoiding additional road crossings and avoiding conflicts from side roads and BP Hoon Hay on the northern side of the road. The two-way facility could continue down to the intersection with Hendersons Road.

Three facility type options have been considered for this section:

**Option 1: Original scheme design; one-way separated cycleways**

One-way cycleways could be provided as in the original scheme assessment, providing a flush median but no parking up until Hoon Hay Road, with the flush median being replaced by parking beyond this point. Road widening would be required west of Lyttelton Street. Intersections would be treated as per the original scheme design.

**Option 2: Alternative scheme design; one-way separated cycleways with parking one side**

One-way cycleways could be provided like the Milton Street option discussed in 4.2.4, providing a narrower cycleway, flush median, and retaining approximately 30-40% of parking. Intersections would be treated as per the original scheme design.

**Option 3: Two-way separated cycleway with parking opposite**

On Frankleigh Street, a 3 m wide, two-way separated cycleway, along with a 1.8 m wide flush median and the retention of all existing parking on the northern side could be provided within the existing carriageway width of 14 m. This is shown in Figure 13.

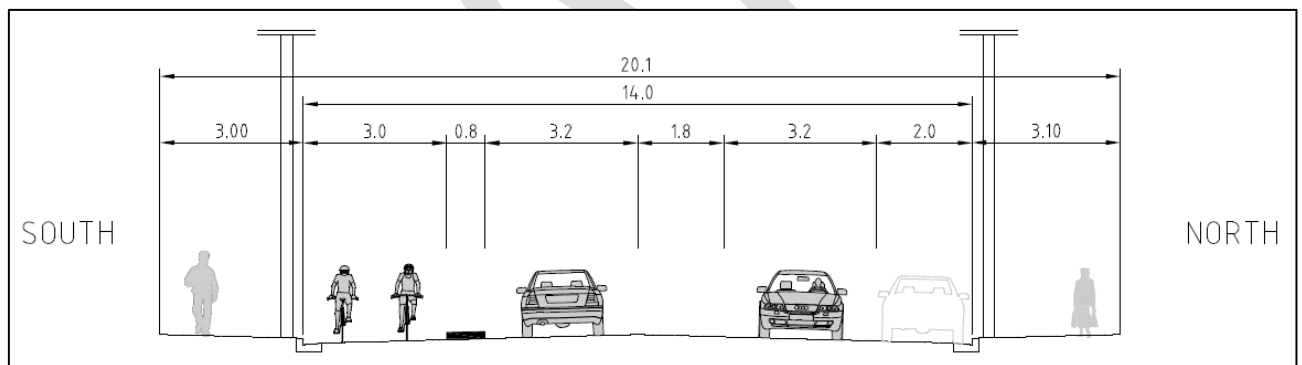


Figure 15: Two-way cycleway option for Frankleigh Street

On Sparks Road, a 3 m wide, two-way separated cycleway, along with a 1.8 m wide flush median and the retention of all existing parking on the northern side could be provided with around 0.6 m road widening. This is shown in Figure 14.



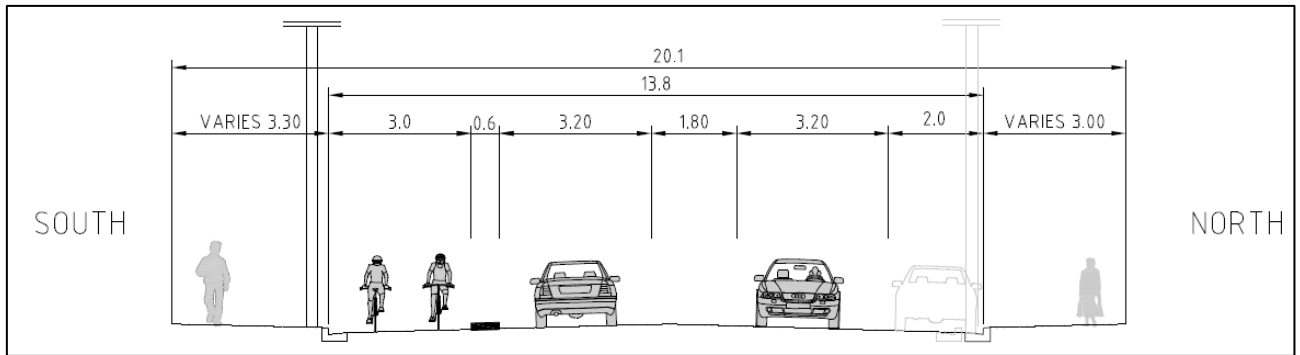


Figure 16: Two-way cycleway option for Sparks Road (Lyttelton Street to Hoon Hay Road section shown)

To the west of Hoon Hay Road, the cycleway would need to be narrowed to 2.8 m to maintain sufficient clearance from property fences along this section of the route. Narrowing it further to 2.5 m would avoid significant utility alterations.

The two-way cycleway could extend to Hendersons Road, where it would cross onto the north side of Sparks Road.

The proposed signalised intersections with Lyttelton Street and Hoon Hay Road have been reconfigured to accommodate the two-way cycleway. Traffic lanes would be similar to the original scheme configuration for the one-way facilities, with shared through/left turn lanes and dedicated right turn lanes on all approaches.

Modelling shows that these intersections could offer a slightly improved level of service for general traffic over the one-way cycleway option, assuming through traffic can run parallel with the cycleway in both directions. Consideration has been given to holding all traffic in the through/left turn lane immediately adjacent to the cycleway, to reduce the likelihood of left-turning traffic missing the red arrow and turning during the cycleway phase. This, however, would typically reduce the level of service of the intersection from around C/D to E/F, so is not considered a feasible option. Note that the geometry of the Sparks Road/Hoon Hay Road intersection presently requires west-bound through traffic to be held on red with left-turning traffic. Investigations will be made during later stages of scheme design to provide a wider shared left/through lane, allowing through traffic to run in conjunction with the cycleway.

Due to the geometry of the Lyttelton Street intersection, the right turn onto Frankleigh Street for general traffic would need to be protected with a green arrow, as drivers' views would be obstructed by opposing right-turning vehicles. It is also proposed to provide full protection to pedestrians crossing Hoon Hay Road to the north of Sparks Road, as this crossing would replace the existing Kea Crossing that services Our Lady of the Assumption School. The Kea Crossing would need to be removed as the signalised intersection around 80 m away would lead to an increased risk of "drive-throughs" and nose to tail crashes around the crossing.

Phasing diagrams for the intersections on Sparks Road are shown Figure 15 and Figure 16, with full modelling information is shown in Appendix B.

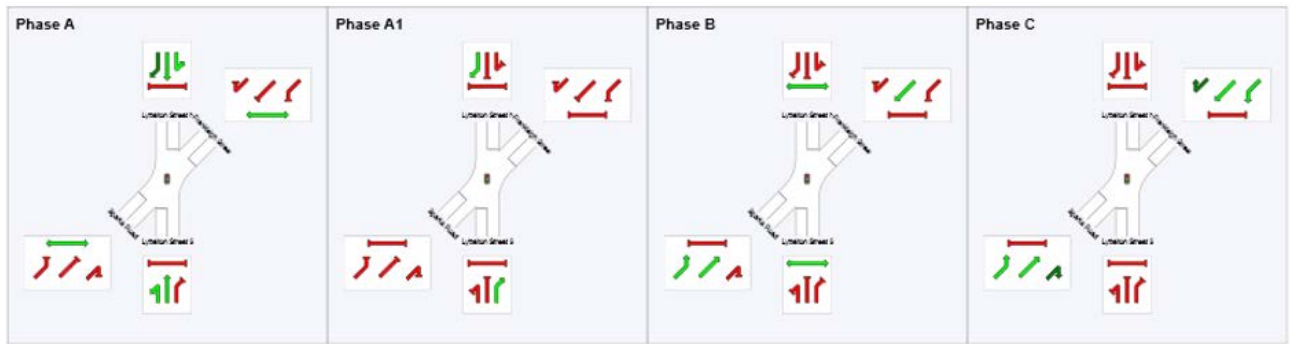


Figure 17: Proposed signal phasing at Sparks Road/Frankleigh Street/Lyttelton Street intersection

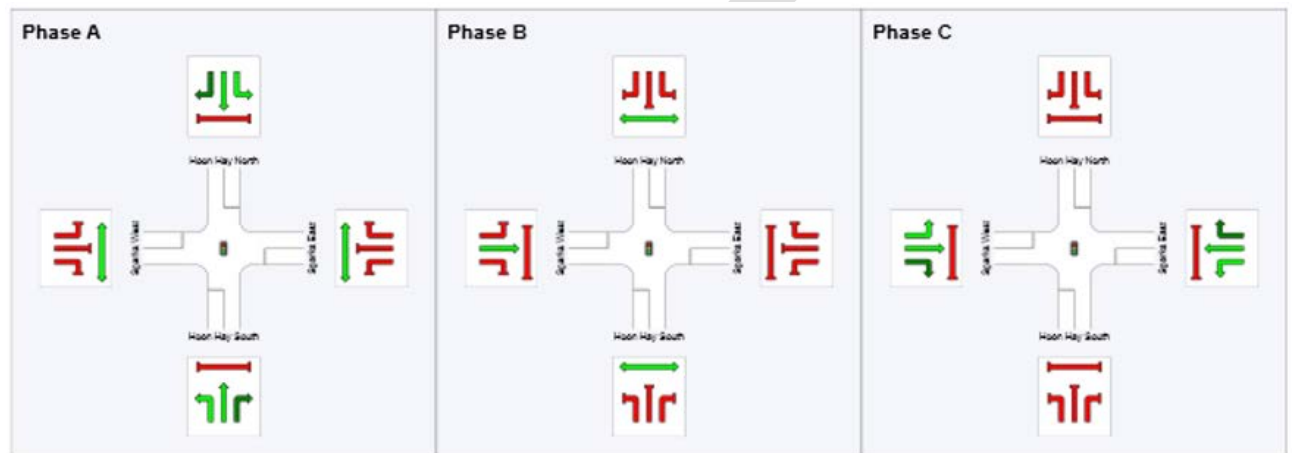


Figure 18: Proposed signal phasing at Sparks Road/Hoon Hay Road intersection (investigations to be made to allow westbound through traffic during Phase B)

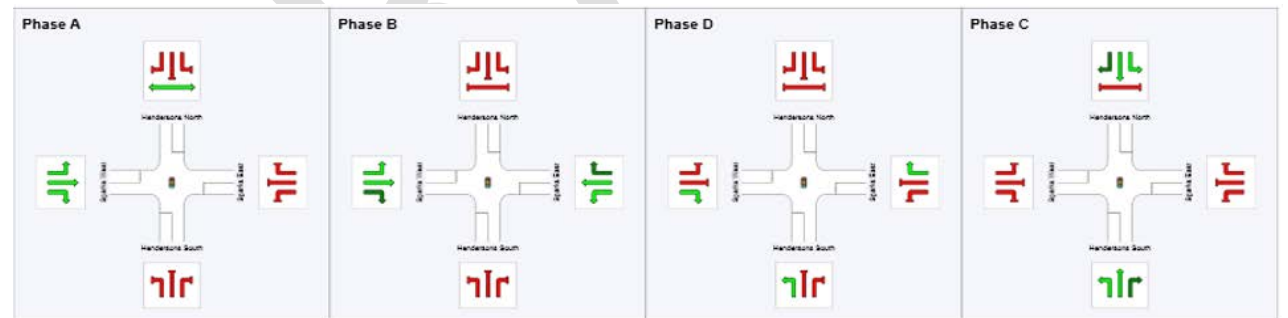


Figure 19: Proposed signal phasing at Sparks Road/Hendersons Road intersection (cycle crossing is during Phase D)

Table 4 summarises the modelled Levels of Service (LoS) for the proposed new signalised intersections incorporating the two-way cycleway along Sparks Road:

Table 4: Performance of new signalised intersections with two-way cycleway on Sparks Road

Intersection	Year	LoS AM Peak	LoS PM Peak	Notes
Sparks/Frankleigh/Lyttelton	2031	D	D	Adding protected right turn drops LoS from B/C
Sparks/Hoon Hay	2031	C	E	PM LoS would be improved by widening westbound through/left turn lane, as discussed previously.
Sparks/Hendersons	2015	C	C	CAST model has different layout for 2031

A potential disadvantage of the two-way cycleway option at signalised intersections is that there isn't the opportunity, as with one-way facilities, to convert the cycleway to another type, such as a mixing zone or allowing left-turning traffic to filter turn across the cycleway, or even allowing cyclists to enter the traffic lanes and cross the intersection with general traffic. This means the level of service for cyclists will be limited, likely resulting in increased non-compliance. The cycle time for these intersections will be kept as short as practicable, meaning delays will be limited.

Whilst these issues are acknowledged, the MCR projects including Quarryman's Trail are aimed at the "interested but concerned" group. With intersections located on a minor arterial road in a >50 km/h speed environment, mixing zones or filter left-turns across the cycleway are undesirable, regardless of any future road user rule changes.

The phasing of the traffic signals is expected to have a large impact on cyclists' compliance with the signals. During the interpeak, when traffic volumes are low, shorter cycle times should be used for the intersections, so that the cycleway phase is called more often. During the morning peaks there is less demand for turns across the cycleway located on the southern side of the road, meaning these turning movements can be held longer, allowing for a longer phase time for the cycleway. Modelling also suggests that shorter cycle times can be used during the morning peaks. During the evening peaks, larger volumes of left-turning traffic would be expected to cross the cycleway, however higher rates of cyclist compliance with the signals would be expected if there are clearly more vehicles turning across the cycleway.

To improve safety of the two way option, it would be proposed to introduce turning restrictions at the intersection with Rydal Street where it crosses the cycleway. This is in order to remove movements that place a higher demand on drivers or where they are less likely to look for contraflow cyclists – two-way cycleways across priority intersections with busy roads are known to have a much higher crash risk than one-way cycleways. Whilst it would be ideal to cul-de-sac and close Rydal Street, a cul-de-sac with left-in only would maintain access into the area whilst removing the movements most likely to result in crashes with cycleway users.

The design vehicle is the RTS-18 large rigid truck for all signalised intersections and the RTS-18 medium rigid truck for all priority intersections.

The cycleway will transition to a shared path on the eastern approach to the intersection with Lyttelton Street due to the two driveways located in close proximity to the existing roundabout. Keeping the cycleway as an on-road, separated facility would lengthen the intersection by approximately 15 m, and would result in the driveways being located within the intersection. Alternatively, the driveways would

cross the cycleway where cyclists would be expected to queue for the intersection. Consideration will be given to converting the other approaches of two-way cycleways to signalised intersections to shared areas, for consistency and to make more efficient use of space. Given that the paths will be shared areas to enable connectivity on and off the cycleway anyway, providing wider paths could allow for higher-standards to be used in their design, mitigating the fact that more cyclists would use them. Anecdotal observations of pedestrian behaviour around separated cycleways show that pedestrians will often stand in the cycleway, or on the separator, without first looking for cyclists. Making the whole intersection area a shared space could make cyclists more aware of pedestrians crossing their path.

The three options for a cycleway on Frankleigh Street and Sparks Road are considered in the following section.

#### 4.2.16 Option assessment: facility type

An options assessment has been completed to determine the preferred cycleway facility type for the section along Frankleigh Street and Sparks Road:

Table 5: Frankleigh Street and Sparks Road options assessment

Option 1: One-way original scheme design	Option 2: One-way alternative scheme design	Option 3: Two-way
<b>Safety</b>		
<ul style="list-style-type: none"> <li>+ No parking alongside cycleway to obscure cyclists</li> <li>- Eastbound facility will cross multiple priority side roads, front of schools (adjacent to parking), and BP</li> <li>- Inline bus stops in both directions</li> </ul>	<ul style="list-style-type: none"> <li>- No horizontal separation between westbound cyclists and parked cars</li> <li>- Narrower flush median</li> <li>- Reduced cycleway to boundary offset for westbound cycleway</li> <li>- Inline bus stops eastbound</li> </ul>	<ul style="list-style-type: none"> <li>+ Avoids most priority side road intersections and BP</li> <li>+ No parking alongside cycleway to obscure cyclists</li> <li>+ Higher standard bus stops provided</li> <li>- Higher crash risk at accesses and intersections for cyclists travelling in the contraflow direction</li> </ul> <p>Refer also crash risk assessment of one-way versus two-way facilities on this section</p>
<b>Comfort</b>		
<ul style="list-style-type: none"> <li>+ Good facility widths, more comfortable to ride in, more space for overtaking</li> </ul>	<ul style="list-style-type: none"> <li>- Narrower westbound facility, no horizontal separation to cars, harder to overtake in</li> </ul>	<ul style="list-style-type: none"> <li>+ Wider facility more comfortable to ride in, more space for overtaking</li> <li>- Riders might feel uncomfortable with oncoming traffic closer to them (however this also offers better visibility of approaching traffic)</li> </ul>
<b>Coherence</b>		
<ul style="list-style-type: none"> <li>- Midblock crossing on Frankleigh Street introduces sharp turn and change of facility type for eastbound cyclists</li> <li>- Change of facility type at Hendersons Road</li> </ul>	<ul style="list-style-type: none"> <li>- Midblock crossing on Frankleigh Street introduces sharp turn and change of facility type for eastbound cyclists</li> <li>- Change of facility type at Hendersons Road</li> </ul>	<ul style="list-style-type: none"> <li>+ Consistent facility from Strauss Place out to Halswell</li> </ul>

Option 1: One-way original scheme design	Option 2: One-way alternative scheme design	Option 3: Two-way
<b>Directness and Connectivity</b>		
<ul style="list-style-type: none"> <li>- Delay for eastbound cyclists with signalised midblock crossing on Frankleigh Street</li> </ul>	<ul style="list-style-type: none"> <li>- Delay for eastbound cyclists with signalised midblock crossing on Frankleigh Street</li> </ul>	<ul style="list-style-type: none"> <li>+ Easy access from pathway behind Centennial Park</li> <li>- Potential lower LoS for cyclists at signalised intersections, also less ability to provide different crossings in the future, i.e. mixing zones or filter left-turn movements across cycleway.</li> <li>- More difficult to make some movements onto and off MCR: Cyclists wishing to join MCR from properties or side roads on north side of MCR will need to cross the road when travelling in both directions (however cyclists joining MCR from properties or side roads on south side of MCR will never need to cross the road, refuge islands provided at side roads, signalised crossing at schools)</li> </ul>
<b>Local Business Impact</b>		
<p>Local businesses along the route have their own off-street parking</p> <ul style="list-style-type: none"> <li>- Removal of parking opposite schools. Providing parking outside schools on one side of the road requires removal of flush median</li> </ul>	<p>Local businesses along the route have their own off-street parking</p> <ul style="list-style-type: none"> <li>- Removal of parking opposite schools</li> </ul>	<p>Local businesses along the route have their own off-street parking</p> <ul style="list-style-type: none"> <li>+ Retains the most parking of all options, along with flush median</li> <li>- Removal of parking opposite schools</li> </ul>
<b>Local Resident Impact</b>		
<ul style="list-style-type: none"> <li>- All parking outside residential properties to be removed</li> <li>- Additional midblock crossing would create some noise nuisance to adjacent properties</li> </ul>	<ul style="list-style-type: none"> <li>+/- 60% to 70% parking loss expected</li> <li>- Additional midblock crossing would create some noise nuisance to adjacent properties</li> </ul>	<ul style="list-style-type: none"> <li>+ Most parking retention of all options – all parking retained on one side of the road</li> </ul>
<b>Operational and Network Impacts</b>		
<ul style="list-style-type: none"> <li>- Requires new signalised midblock crossing on Frankleigh Street</li> <li>- In-line bus stops would be required on the side of the road without parking</li> </ul>	<ul style="list-style-type: none"> <li>- Requires new signalised midblock crossing on Frankleigh Street</li> <li>- In-line bus stops would be required on the side of the road without parking</li> </ul>	<ul style="list-style-type: none"> <li>+ Wider facility on one side of the road only requires less maintenance</li> <li>+ Best LoS for general traffic out of all the options</li> <li>- Removal of most movements at Rydal Street intersection (local road) required for safety of two-way cycleway</li> </ul>

Option 1: One-way original scheme design	Option 2: One-way alternative scheme design	Option 3: Two-way
<b>Ease of Construction and Costs</b>		
+ Works within existing roadway on Frankleigh Street (some widening on Sparks Road)  - Proposed separator is on top of, or within 1 m of a 66 kV cable for approximately 1300 m in the section immediately east of Hendersons Road	- New kerbing required on one or both sides throughout  - Proposed separator is likely on top of, or within 1 m of a 66 kV cable for approximately 1300 m in the section immediately east of Hendersons Road	+ Works within existing roadway on Frankleigh Street (some widening on Sparks Road)
<b>Land Requirements/Easements/Other Agreements</b>		
None	None	None

Out of the three options, the original scheme design of one-way cycleways provides the best facility for cyclists, however with the removal of all on-street parking, it has a major and likely unacceptable impact on local residents, along with the worst impact on the surrounding road network and issues with the conflict with the 66 kV underground cable.

The alternative one way facility option provides the worst facility for cyclists, whilst having a moderate impact on local residents.

The two-way facility will provide a good facility for cyclists if the safety issue of the two-way cycleway at intersections and access can be addressed, whilst allowing for the most on-street parking out of all of the options and the least road network impacts. It also would be the easiest and cheapest to construct. A crash risk assessment of one-way versus two-way cycleways for this section has been undertaken to determine if a safe two-way facility can be provided:

### One-way versus two-way cycleway risk assessment

A summary of the private and commercial driveways, side streets and signalised intersections are shown below:

Table 6: Frankleigh Street and Sparks Road driveway and intersection summary

	Southern side (used by two-way facility and westbound one-way facility)	Northern side (used by eastbound one-way facility)
Residential driveways	78 driveways, servicing 126 properties	104 driveways, servicing 144 properties (includes Claude Henry Lane)
Non-residential driveways	<b>Centennial Hall</b> (currently closed), exit only onto cycleway. 6 parking spaces, assume <b>50 movements/day</b> when open. <b>Hoon Hay Medical Centre</b> , movements based on TDB of 80 per doctor per day, giving 560, plus allowance for pharmacy trips not associated with doctors visits giving a total of <b>650 movements/day</b> .	<b>BP Connect Hoon Hay</b> , movements based on TDB of 50 in/out per 100 m2 site area, assume 60% via Sparks Road giving <b>1,000 movements/day</b> . <b>Our Lady of the Assumption</b> , assumed teachers' parking. Approx. 12 spaces, used 2 x day, say <b>50 movements/day</b> . <b>Hoon Hay School</b> , assumed teachers' parking. Approx. 30 spaces, used 2 x day, say <b>120 movements/day</b> . + deliveries
Side roads	<b>Rydal Street, 2498 VPD</b> (2031 CAST). Based on possible subdivision, volumes otherwise likely to be significantly lower. Note	<b>Waimokihi Place, 290 VPD</b> , based on 10 movements/day from 29 properties



	Southern side (used by two-way facility and westbound one-way facility)	Northern side (used by eastbound one-way facility)
	that the two-way option proposed restricts most movements at this location.	<b>Pablo Place, 100 VPD</b> , based on 10 movements/day from 10 properties. <b>Maryhill Avenue, 912 VPD (2031 CAST)</b> . Expect additional movements on this street for school parking due to cycleway, say <b>1,000 VPD</b> . <b>Gainsborough Street, 886 VPD (2031 CAST)</b> <b>Victors Road, 566 VPD (2031 CAST)</b>
Signalised intersections	The intersections with both Lyttelton Street and Hoon Hay Road will need to be signalised. All signalised intersections would have protected phases for cyclists, meaning any increased risk of one facility type over the other would mostly result from non-compliance with the signals. Intersection safety has been discussed in 4.2.15. If the Nor'West Arc crosses Quarryman's Trail at Lyttelton Street, a cyclist Barnes Dance would likely be used to facilitate connections whilst maintaining the level of service for general traffic.	
Other	A signalised midblock crossing on Frankleigh Street near Strauss Place would be required for the one-way options. This could pose some risk to cyclists from drivers missing the crossing, in addition to the risk of rear-end crashes from traffic stopping for the cycleway crossing.	

The Separated Cycleway Options Tool (SCOT), as detailed in the NZTA Technical Note TN001, provides a quantitative risk assessment tool to use as guidance in assessing the relative crash risks of one-way versus two-way separated cycleways. It should be noted that SCOT provides guidance on crash risk, and is not intended to be used as the sole deciding factor regarding the form of a separated cycleway. The results of the SCOT analysis are shown below.

Table 7: Crash prediction for facility type options

Predicted crashes/year for cycleway options				
Option	Residential driveways	Non-residential driveways	Side roads	Total
One-way cycleways – original scheme design (no parking)	0.60	0.18	0.39	<b>1.17</b>
One-way cycleways – alternative scheme option (parking one side)	0.79	0.18	0.39	<b>1.37</b>
Two-way cycleway – closure at Rydal Street	1.06	0.23	0	<b>1.29</b>
Two-way cycleway – no closures	1.06	0.23	0.39	<b>1.68</b>

Assumptions used in the assessment are:

- 810 cyclists/day westbound, 750 cyclists/day eastbound (from QTP modelling)
- Signalised intersections have not been modelled in SCOT due to the wide range of considerations around their operation in the context of a Major Cycle Route in these particular locations, and the fact that there are few models available to compare their safety for cyclists. Their safety has been discussed in a qualitative measure in Section 4.2.15.
- 5% HCV on all side roads and at BP, 0% at other properties
- 10 driveway movements per residence per day
- CAST traffic volumes assumed to be correct unless otherwise noted, however these are known to sometimes be inaccurate for local roads. Traffic counts would need to be undertaken to determine actual traffic counts.
- Parking occupancy adjacent to cycleway assumed to be 70% where provided
- Assume signalised crossing on Sparks Road by schools would go ahead with both options (although more likely to be needed with two-way)
- Assume there is no impact of flush median on crash rates (but common for both options)

Some crash types and influencing factors have not been included in the SCOT analysis. These include:

- Signalised intersections (refer above)
- Severity of crashes
- Car dooring risk or cyclist vs car passenger crash due to no horizontal separation
- Mitigation measures that might be used to lower crash risk for two-way facility (i.e. active warning signs and flashing studs)
- Pedestrian vs cyclist or cyclist vs cyclist crashes
- Crashes not involving cyclists
- Crashes at Frankleigh Street midblock crossing for one-way cycleway option

From the figures in Table 7, it can be seen that the two-way cycleway option has a higher overall crash risk than both the original scheme design and alternative scheme design for the one-way facilities, if full movements are retained at Rydal Street. If Rydal Street was to be closed at Sparks Road, or the higher-risk turning movements banned, the overall crash risk of the two-way cycleway would be comparable with the one-way cycleways. In which case, engineering judgement, taking into account factors not included in the SCOT assessment, should be used to determine the appropriate facility type. This is discussed in further detail, below.

Closing Rydal Street at Sparks Road would have a considerable impact on access to Rydal Street and the connecting Streets. An option allowing left turns into Rydal Street could allow access into the area, whilst not likely increasing the crash risk notably. Egress from the area could be achieved via Leistrella Road onto Hoon Hay Road, which is a detour of up to 1 km. Whilst this might not be popular with some residents, it is a

compromise that will significantly improve the safety of the intersection for cycleway users over allowing full movements. It is also expected to improve the operation of Sparks Road around the new signalised crossing, outside the schools.

**This is the preferred solution for the treatment of the Rydal Street/Sparks Road intersection for a two-way cycleway.**

Note that other options for the treatment of the Rydal Street intersection were considered. Allowing a left-turn out of Rydal Street would be dangerous for cycleway users travelling in the contraflow direction, as drivers turning left often don't look to the left until they are already turning. Right turns in and out of Rydal Street are the also high-risk for contraflow cycleway users, due to the fact that these movements put higher demands on drivers' attention, making them less likely to look for or notice these people. Providing full signalisation of the intersection was considered, however the entrance to OLA School and No. 89 Sparks Road would be within the intersection and/or the area where pedestrians would be expected to wait to cross the road. Operational issues with queues extending into the intersection with Hoon Hay Road could also be expected in the evening peak, with morning traffic potentially rat-running through roads like Maryhill Avenue to avoid the delays.

As noted above, the SCOT analysis does not include crash severity. Most of the crash risk for the two-way cycleway comes from residential driveways. The two-way cycleway, with a closure or left-in turns only at Rydal Street, has a lower crash risk at side roads. Driveway crashes would be expected to be lower severity than intersection crashes, so whilst the two-way facility may have a higher overall crash risk, factoring in the severity of the crashes could make the actual risk (likelihood x severity) of crashes on the two-way facility lower than the one-way facility. The factors not included in the SCOT analysis (listed above) would not be expected to significantly alter this.

One-way cycleways are generally preferred over two-way cycleways at signalised intersections, however it is believed a safe facility can be provided for cyclists at these locations, as discussed in 4.2.15.

A factor in favour of the two-way facility is that it doesn't require the midblock crossing on Frankleigh Street. This would be expected to add to the crash risk for both cyclists, as well as other road users, from drive-through and rear-end crashes. The additional delay could also be expected to add to cyclist non-compliance, with an associated crash risk. The crash risk from this crossing has not been modelled.

The Beach Road two-way cycleway in Auckland was opened in mid-2014. Beach Road is located in Central Auckland, with traffic volumes of around 18,000 VPD and no flush median. The adjacent land use ranges from reserve land and carparks to retail and accommodation, as well as two rental car agencies. No crashes involving cyclists on this facility have been reported to date, despite the traffic volumes being higher than the Quarryman's Trail route, with an increased likelihood of drivers unfamiliar with the facility crossing it.

In light of the multi-criteria options assessment and safety assessment, **the two-way facility is recommended as the preferred option** due to it being the best balance between the needs of cyclists and impacts on local residents.

#### **4.2.17 Hoon Hay Medical Centre, Hoon Hay School and Our Lady of the Assumption School**

Hoon Hay Medical Centre is located on the same side of the road as the proposed two-way cycleway, whilst the two schools are located opposite, in the section of Sparks Road to the west of Hoon Hay Road.

The medical centre has a sizable amount of off-street parking, so would not be affected by the cycleway. The biggest issue would arise with traffic crossing the cycleway, particularly as many drivers would not be familiar with the facility. It is proposed to install cyclist-activated active warning signs and flashing studs for vehicles

crossing the cycleway in both directions, to highlight the presence of cyclists to drivers about to cross the facility.

Parking on the side of Sparks Road adjacent to the schools will be retained, with some spaces being shifted as part of installing pedestrian crossing facilities.

#### 4.2.18 Parking

With the exception of around the new signalised intersections and pedestrian facilities, all existing parking would be retained on the side of the road opposite the two-way cycleway.

#### 4.2.19 Refuse collection

Refuse collection on the side of the road opposite the cycleway will be unaffected by the cycleway, and will be undertaken from the kerbside as it is currently. Refuse collection on the cycleway side of the road can generally be undertaken with the refuse collection truck fully within the cycleway, outside of peak hours. If the section of cycleway west of Hoon Hay Road is narrowed to avoid utility relocation, an assessment will be undertaken as to what width the cycleway would need to be to accommodate a refuse collection truck, or if the truck could straddle the separator and reach the bins, as with one-way facilities.

#### 4.2.20 Public transport

Five bus stops are located on the sections of Frankleigh Street and Sparks Road adjacent to the cycleway. Three of these are on the opposite side of the road, and as such their operation would be unaffected by the cycleway. Of the two on the same side of the road, the standard treatment of the cycleway ramping up to the top of separator level, with cyclists yielding to bus passengers will be employed. The flush median will be tapered down to nothing around the bus stop, allowing for vehicle movements past a stopped bus.

Five bus stops need to be relocated to accommodate the cycleway, crossings, and new signalised intersections. These are summarised in Table 8.

Table 8: Bus stop relocations for Section 2

Bus stop No.	Location	Direction	Current location	Proposed location	Reason for shift
43397	Sparks Road, east of Hoon Hay Road	Eastbound	O/S No. 65	O/S No. 59	Additional width required for traffic lanes at new signals puts bus stop in present location in traffic lane.
43378	Sparks Road, near Waimokihi Place	Eastbound	O/S No. 27	O/S No. 25	Pinch point with refuge island opposite Centennial Park being shifted to the north, not enough room for a bus stop.
37093	Frankleigh Street, east of Lyttelton Street	Westbound	O/S No. 32	O/S No. 22/24	Bus stop by separated cycleway requires additional length to fit ramps, not enough space between driveways in present location.
22442	Barrington Street, near Strauss Place	Northbound	O/S No. 201	O/S No. 205	New pedestrian and cycle crossing will be in the way of the bus stop.
22314	Barrington Street, opposite Strauss Place	Southbound	O/S No. 220	O/S No. 218	New pedestrian and cycle crossing will be in the way of the bus stop - only 10 m shift, bus stop has and will overlap both properties slightly

### 4.3 Section 2 – Route 2 – Bletsloe, Barrington, Wychbury

This route has not been reassessed as part of the revised scheme assessment.

### 4.4 Section 3 – Sparks (Hoon Hay to Halswell)

The two-way cycleway up to the intersection with Hendersons Road has been covered in 4.2.15 as an extension of the previous section.

The original scheme design option of traffic signals at the intersection with Hendersons Road has been modified slightly to accommodate the two-way cycleway crossing diagonally onto the northern side of Sparks Road. The original scheme design had westbound cyclists only crossing diagonally.

The section beyond Hendersons Road has not been reassessed as part of the revised scheme assessment.

## 5 Preferred Option

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The following sections summarise the preferred scheme option for the three sections, where differing from the original scheme assessment.

### 5.1 Preferred option for Section 1 (Antigua Street)

The background to this section is described in the original SAR.

#### Key Features

##### 5.1.1 Antigua Street (north of Moorhouse) and the Antigua/Moorhouse Intersection

#### People travelling by bike

- 1.8 m wide one-way separated cycleways on both sides of Antigua Street on the approaches to Moorhouse Avenue, with 1.8 m – 2.0 m wide separated cycleways on the departures. The separators on the approaches are 0.3 m wide solid concrete kerbs to allow additional space for lane widths, whilst the separators on the departure are 0.6 m wide to be more conspicuous and to tie in with the midblock sections. The separators on the departures will be flush painted separators up until a point approximately 12 m beyond the intersection, to allow heavy vehicle tracking onto Antigua Street from Moorhouse Avenue. These movements would be made during a different signal phase to cyclist movements, so would not introduce a conflict.
- Turning traffic on Antigua Street will be held to provide protection for people on bikes.
- Hook turns will be provided on all corners of the intersection to provide connections onto and off of the cycleway.

#### People travelling on foot

- The existing pedestrian crossings will be retained, with at least partial protection from vehicles on the Moorhouse Avenue crossing being provided via the turning restrictions for the cycleway.

#### People travelling by vehicle

- Right turns from Antigua Street (south) onto Moorhouse Avenue (east) will be banned to improve the level of service of the intersection, whilst providing protected phases for the cycleway. All other movements are being retained. Drivers will be able to make right turns off Strickland Street or Antigua Street at Brougham Street, Disraeli Street, or Tuam Street. This would put more traffic onto Streets such as Montreal Street, or possibly Selwyn Street, which supports the road hierarchy for this part of the city.

#### Trees and landscaping

- There is presently little greenery around this intersection, and none is proposed as part of this revised scheme design.



### 5.1.2 Antigua Street (Moorhouse to Brougham)

- 1.8 m – 2.2 m wide one-way separated cycleways on both sides of Antigua Street. The wider facilities are provided at each end, closer to the intersections with Moorhouse Avenue and Brougham Street, where there will be the most demand for cyclist overtaking, noting that both the cycleways are to be narrowed to 1.8 m to accommodate the traffic lanes on the immediate approach and departures.

#### People travelling on foot

- New pedestrian refuge islands at Burke Street and Ruskin Street, along with crossings associated with the signalisation of the Antigua Street/Disraeli Street intersection.

#### People travelling by bus

- Remove two sets of bus stops as per the original scheme design, providing one centrally located bus stop outside 103/110 Antigua Street.
- Bus passengers will have priority over people on bikes at bus stops

#### People travelling by vehicle

- As per original scheme design

#### Trees and landscaping

- There are currently no grass berms and limited landscape plantings along Antigua Street. Some plantings around reconstructed intersections will be added through this scheme.

#### Refuse collection

- Residents with parking outside their properties will put their bins on the road side of the separator island.
- Residents with no parking outside their properties will put their bins on the kerbside, as is done presently.
- Residents at No. 101-107 Antigua Street will put their bins on the kerbside, with parking at these locations not permitted at the time of refuse collection in order for the refuse collection truck to straddle the separator. This allows parking in an area where parking would otherwise be precluded due to the space required for bins.

#### Parking

- 29 parking spaces will be retained on Antigua Street between Hazeldean Road and Brougham Street, from approximately 90 existing.
- P15 parks will be provided opposite the bakery by Hazeldean Road (2) and outside the dairy by Fairfield Avenue (2). P15 parks will also be installed on those two side roads, to provide parking for drivers travelling on the side of Antigua Street without parking. Other businesses on the street have off-street parking for customers.
- All remaining parking spaces will be restricted P120 between the hours 10am – 3pm Monday to Friday, to provide parking for visitors to residents and businesses, rather than all-day commuter parking.

### 5.1.3 Antigua/Brougham/Strickland intersection

#### People travelling by bike

- 1.8 m wide one-way separated cycleways on Antigua Street and Strickland Street on the approaches to Brougham Street, with 1.8 m wide separated cycleways on the departures. The separators on the approaches are 0.3 m wide solid concrete kerbs to allow additional space for lane widths, whilst the separators on the departure are 0.6 m wide to be more conspicuous and to tie in with the midblock sections. The separators on the departures will be flush painted separators up until a point approximately 12 m beyond the intersection, to allow heavy vehicle tracking onto Antigua Street and Strickland Street from Brougham Street. These movements would be made during a different signal phase to cyclist movements, so would not introduce a conflict.
- Turning traffic on Antigua Street and Strickland Street will be held to provide protection for people on bikes.
- Hook turns will be provided on all corners of the intersection to provide connections onto and off of the cycleway.

#### People travelling on foot

- The existing pedestrian crossings will be retained, with at least partial protection from vehicles on the Brougham Street crossing being provided via the turning restrictions for the cycleway.

#### People travelling by vehicle

- All existing movements will be retained, along with the existing lane configurations.
- Whilst turning traffic will be held while the cycleway phase is running, the shared through/left turn lanes on Antigua Street and Strickland Street have been widened to 4.6 m and 5.2 m, respectively. This will allow most through traffic to continue whilst left-turning traffic is held, especially on Strickland Street, where left-turning vehicles waiting for cyclists will often block through traffic heading north.

## 5.2 Preferred option for Section 2 (Brougham Street to Hendersons Road)

The background to this section is described in the original SAR.

### Key Features

#### 5.2.1 Strickland Street

##### People travelling by bike

- 2.0 m wide one-way separated cycleways on each side of Strickland Street.
- A signalised crossing opposite Roker Street provides connection between the separated cycleway on Strickland Street and the neighbourhood greenway on Roker Street, along with the shared path through to Sydenham via Bradford Park. The crossing is expected to be able to operate twice per cycle of the Strickland Street/Milton Street traffic signals, meaning delay for crossing pedestrians and cyclists will be minimised.

##### People travelling on foot

- A pedestrian refuge island is to be provided adjacent to the intersection with Burns and Manhire Streets.
- A signalised crossing opposite Roker Street provides a connection across Strickland Street from Roker Street into Bradford Park.

#### **People travelling by car**

- Painted medians will be provided for drivers to turn right into Bletsloe Avenue, Deyell Crescent and Manhire Street off Strickland Street

#### **Trees and landscaping**

- Some existing trees on the western side of Strickland Street are required to be removed to fit the cycleway. Trees on the eastern side, which are healthier and more mature, will be retained. Replacement trees will be planted, pending confirmation of clearance from underground services.

#### **Refuse collection**

- Residents with parking outside their properties will put their bins on the road side of the separator island.
- Residents with no parking outside their properties will put their bins on the kerbside, as is done presently.

#### **Parking**

- 21 parking spaces have been retained on Strickland Street north of Milton Street out of the approximately 60 existing spaces. Parking has been placed on the side of the road that maximises parking numbers.
- South of Milton Street, all of the approximately five existing parking spaces will be removed.

### **5.2.2 Strickland Street/Milton Street intersection**

#### **People travelling by bike**

- 1.8 m wide one-way separated cycleways on Strickland Street on the approaches and departures to Milton Street. The separators on the approaches are 0.3 m wide solid concrete kerbs to allow additional space for lane widths, whilst the separators on the departure are 0.6 m wide to be more conspicuous and to tie in with the midblock sections. The separators on the departures will be flush painted separators up until a point approximately 12 m beyond the intersection, to allow heavy vehicle tracking onto Strickland Street from Milton Street. These movements would be made during a different signal phase to cyclist movements, so would not introduce a conflict.
- Turning traffic on Strickland Street will be held to provide protection for people on bikes.
- Hook turns will be provided on all corners of the intersection to provide connections onto and off of the cycleway. Advance stop boxes on Milton Street will remain.

#### **People travelling by foot**

- The existing pedestrian crossings will be retained, with at least partial protection from vehicles on the Milton Street crossing being provided via the turning restrictions for the cycleway.

- The pedestrian crosswalk lines are being shifted away from the intersection to allow for the hook turn boxes, providing a better location for the pedestrian crossings away from the centre of the kerb returns.

#### **People travelling by vehicle**

- All existing movements will be retained, along with the existing lane configurations.
- Whilst turning traffic will be held while the cycleway phase is running, the shared through/left turn lanes on Strickland Street have been widened to 4.6 m. This means there will be some opportunity for through travelling vehicles to pass vehicles waiting to turn left.

#### **5.2.3 Roker Street neighbourhood greenway**

- Roker Street will have a 30 km/h speed restriction, supported by raised platforms located at approximately 100 m spacings
- Two 2.5 m wide islands will be provided on Selwyn Street where crossed by Roker Street to assist people on bikes and pedestrians in crossing Selwyn Street.
- The intersection of Roker Street and Simeon Street will be narrowed with a raised platform added to reduce vehicle speeds.
- Some parking removal will be required around the traffic calming measures
- Property purchase at the end of Roker Street is required to make the connection through to Barrington Street.

#### **5.2.4 Barrington Street crossing/Strauss Place**

- A new signalised midblock crossing to the south of Strauss Place will be provided for pedestrians and people on bikes to cross Barrington Street between Roker Street and the continuation of the Quarryman's Trail down Strauss Place.
- The northbound bus stop will be shifted approximately 35 m to the north of Strauss Place, whilst the southbound bus stop will be shifted approximately 10 m south, away from the crossing.
- The cycleway on Strauss Place will operate as a neighbourhood greenway, with parking removal required only where the paths from the Barrington Street crossing and connection to Frankleigh Street enter the roadway.

#### **5.2.5 Frankleigh Street**

##### **People travelling by bike**

- A 3.0 m wide two-way separated cycleway on the southern side of Frankleigh Street continues from the pathway from the end of Strauss Place.

##### **People travelling on foot**

- Two pedestrian refuge islands are to be provided along Frankleigh Street.

### **People travelling by car**

- A 1.8 m wide painted median runs the length of Frankleigh Street, narrowing only around the westbound bus stop.

### **Refuse collection**

- All refuse collection will be undertaken from the kerbside as it is currently, with the refuse collection truck travelling up the cycleway in off-peak periods to access bins on the southern side of the road.

### **Parking**

- All parking will be removed adjacent to the cycleway, on the southern side of the road.
- Parking will be retained opposite the cycleway, on the northern side of the road.

## **5.2.6 Frankleigh Street/Lyttelton Street/Sparks Road intersection**

### **People travelling by bike**

- The cycleway will cross Lyttelton Street on the southern side of Frankleigh Street/Sparks Road at a new signalised intersection, with a protected phase.
- The cycleway will transition to a shared path on the eastern approach to the intersection due to the two driveways located in close proximity to the existing roundabout. A shared path area will also be provided adjacent to the western approach, to facilitate the right turn onto the cycleway on Frankleigh Street from Lyttelton Street.
- Hook turn boxes will be provided on the southern side of the intersection to facilitate connection to and from Lyttelton Street.

### **People travelling on foot**

- Pedestrian crossings will be provided as part of the signalisation of the intersection.

### **People travelling by car**

- The signalisation of the intersection will provide improve traffic flows from the South-West Christchurch growth area.
- The right turn from Lyttelton Street into Frankleigh Street will be protected due to the low visibility afforded by the existing alignment of the intersection.

## **5.2.7 Sparks Road**

### **People travelling by bike**

- A 3.0 m wide two-way separated cycleway will be provided on the southern side of Sparks Road, narrowing down to 2.5 m wide in the section between Hoon Hay Road and Victors Road to avoid conflict with underground services.

### **People travelling on foot**

- New refuge islands are to be provided near the intersections with Pablo Place, Maryhill Avenue, Gainsborough Street and Victors Road.
- A new signalised crossing will be provided on Sparks Road approximately 30 m west of Rydal Street, which will provide access to Hoon Hay School and Our Lady of the Assumption School. This will replace the existing zebra crossing.

### **People travelling by car**

- All turning movements, except left-in will be banned at the intersection of Sparks Road and Rydal Street, with a new cul-de-sac head being constructed in Rydal Street.
- A 1.8 m wide painted median runs the length of Sparks Road, narrowing only around the westbound bus stops.

### **Refuse collection**

- All refuse collection will be undertaken from the kerbside as it is currently, with the refuse collection truck travelling up the cycleway in off-peak periods to access bins on the southern side of the road.

### **Parking**

- All parking will be removed adjacent to the cycleway, on the southern side of the road.
- Parking will be retained opposite the cycleway, on the northern side of the road.

## **5.2.8 Sparks Road/Hoon Hay Road intersection**

### **People travelling by bike**

- The cycleway will cross Hoon Hay Road on the southern side of Sparks Road at a new signalised intersection, with a protected phase.
- Hook turn boxes will be provided on the southern side of the intersection to facilitate connection to and from Hoon Hay Road.
- Shared path areas will be provided adjacent to both cycleway approaches, to facilitate turns onto or off the cycleway where hook turn boxes can't be accessed.

### **People travelling on foot**

- Pedestrian crossings will be provided as part of the signalisation of the intersection. The crossings over Hoon Hay Road will be protected from turning traffic.

### **People travelling by car**

- The signalisation of the intersection will provide improve traffic flows from the South-West Christchurch growth area.



## 5.3 Risks and Issues

### 5.3.1 Land purchase timing and costs

Roker Street connection to Barrington Street requires purchase of two properties.

### 5.3.2 Exceptions from Christchurch Cycle Design Guidelines (Part B, Revision B – Design Principles Best Practice Guide - BPDG)

Departures from the BPDG are summarised below:

- Two-way cycle facilities on arterial roads (Frankleigh Street and Sparks Road), which is outside the BPDG criteria of 5,000 vpd. This has been covered off by the risk assessment in Section 4.2.16.
- The offset from property boundaries to the cycleway is less than 3 m along Antigua Street. The existing kerbs around 2.7 m from the boundaries will be retained in some sections. Elsewhere, the offset is reduced to 2 m, where vehicles can exit properties in a forwards direction, with clear visibility.
- The parking offset has been reduced to 2.5 m (from 3 m) at several locations on Antigua Street and Strickland Street, where this makes a difference as to whether a parking space is provided. This is for groups of one or two parks, meaning sight distance will be achieved between vehicles.
- The preferred scheme utilises minimum cross section widths for the cycleway in some locations: 1.8 m wide, one-way cycleways for 300 m on Antigua Street, between Disraeli Street and Burke Street, and 2.5 m wide, two-way cycleway for around 1,000 m west of Hoon Hay Road. Clear sight distance is provided on both of these sections.

These aspects have been reviewed by the SANF team prior to taking this scheme forward to consultation.

### 5.3.3 Consultation

There are some risks that the proposal will not be supported by the community during consultation. The alternative scheme layout recommended in this addendum is a direct response to that risk prior to consultation scheduled in October 2016.

### 5.3.4 Planning and Consents

Not covered in this revised scheme assessment.

## 5.4 Safety in Design

Key Safety in Design issues associated with the Alternative Preferred Options are as follows:

- Mitigation of side road crossings with two-way cycleway facilities
- Safe crossings of roads with new signals and upgrading existing signals providing separate phasing for MCR users
- Use of technology to warn of access movements at commercial crossings of two-way facilities.
- Impact to existing services – access to service covers within new cycleway space

- Width of facilities and need to perform maintenance cleaning and rubbish collection. Potential for new plant to allow sweeping within separated facility
- Potential issues associated with more detailed traffic management to gain maintenance access to existing utilities and three waters services, impacting on cycleway, pedestrian and other road users.
- Higher vehicle speeds in rural areas, including around new traffic signals at Hendersons Road.

## 5.5 Cost Estimate

A detailed cost estimate will be completed upon finalisation of scheme design, post-consultation

## Appendices

**Appendix A: Consultation Plans**

**Appendix B: Traffic Modelling**

**Appendix C: Safety Audit and Network Functionality Review (SANF)**

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