Business Case for Implementation

Detailed Business Case to proceed from Initiation to Implementation

Dunedin Separated Cycle Lanes

AUGUST 2015

Approval

PREPARED BY:	REVIEWED BY:	ENDORSED BY:	APPROVED BY:
Jamie Povall	Andrew Quigley		
Shaun Bosher	Oliver Brown		
Martin Hoffmann	Graeme Stanton		
TRANSPORTATION ENGINEERS	MWH QA APPROVAL	PROJECT SPONSOR - HNO	DELEGATED AUTHORITY - HNO
16 FEBRUARY 2015	19 FEBRUARY 2015	DATE:	DATE:

Revision Status*

REVISION NUMBER:	IMPLEMENTATION DATE:	SUMMARY OF REVISION
1	15 June 2015	Update following client feedback
2	31 August 2015	Update following further client review & DCC comments

Delete table on production of final version

Template Status

REVISION NUMBER:	IMPLEMENTATION DATE:	SUMMARY OF REVISION
0.5	1 November 2012	Incorporating learnings from PPP DBC

Contents

Glossary of Terms

Abbreviation	Term
AEE	Assessment of Environmental Effects
AO	Approved Organisation
BCR	Benefit-Cost Ratio
CAPEX	Capital Expenditure
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CVIU	Commercial Vehicles Investigation Unit
D&C	Design and Construct
DBC	Detailed Business Case
DCC	Dunedin City Council
DE	Design Estimate
DSi	Death & Serious Injury
EEM	Economic Evaluation Manual
EIR	Environmental Impact Report
EOI	Expression of Interest
EPA	Environmental Protection Agency
FYRR	First Year Rate of Return
GIS	Geographic Information Systems
GPS	Government Policy Statement
HCV	Heavy Commercial Vehicle
HNO	Highways and Network Operations
HPT	Historical Places Trust
IAP2	International Association for Public Participation
ILM	Investment Logic Map
IRS	Investment and Revenue Strategy
ITS	Intelligent Transport Systems
KPI	Key Performance Indicator
LHS	Left-Hand Side
LILO	Left In, Left Out
LLR	Lessons Learnt Review
LTMA	Land Transport Management Act
MOU	Memorandum of Understanding
MVKT	Million Vehicle Kilometres Travelled
NES	National Environmental Standards
NIU	National Infrastructure Unit
NLTF	National Land Transport Fund

Abbreviation	Term
NLTP	National Land Transport Programme
NOR	Notice of Requirement
NPC	Net Present Cost
NZCID	New Zealand Council for Infrastructure Development
NZTA (or the Transport Agency)	The New Zealand Transport Agency
NZTS	New Zealand Transport Strategy
ORC	Otago Regional Council
OPEX	Operating Expenditure
P&I	Planning and Investment
PI	Performance Indicator
PMS	Project Management Services
PoPS	Portfolio Procurement Strategy
PPFM	Planning Programming and Funding Manual
PPM	Principal Project Manager
PPP	Public Private Partnership
PT	Public Transport
PWA	Public Works Act
RAMM	Road Assessment and Maintenance Management
RFP	Request for Proposal
RHS	Right-Hand Side
RLT	Regional Land Transport
RLTS	Regional Land Transport Strategy
RMA	Resource Management Act
RoNS	Road of National Significance
SAR	Scheme Assessment Report
SCL	Separated Cycle Lane
SE	Scheme Estimate
SH(#)	State Highway (number)
SOI	Statement of Intent
SSC	State Services Commission
SSEMP	Site Specific Environmental Management Plan
TA	Territorial Authority
TDM	Traffic Demand Management
TOC	Total Outturn Cost
VAC	Value Assurance Committee (formerly SSRC)
VMS	Variable Messages Sign
WEBs	Wider Economic Benefits

Executive Summary

The Dunedin One-Way System Separated Cycle Lanes project is a partnership between the Agency and Dunedin City Council, with the Agency taking the lead role. The project is necessary to appropriately protect cyclists who travel on the existing SH 1 cycle lanes from fatal or serious injury crashes, with four cyclist fatalities in 1998, 2005, 2011 and 2012.

The Programme Outcomes are; to improve road safety for cyclists, by providing a safe route choice for cyclists, facilitate the adoption of cycling as a safe and practical choice for inner city transport, contribute to an integrated central city cycle network and adjoining wider city cycle network and integrate opportunities to improve pedestrian safety and amenity. The main Project Outcome is to design and construct a separated cycleway on SH 1 that is free of fatal and serious injury crashes. Other project outcomes include 'Network Performance & Capability' benefits such as increased throughput by cycle, improved comfort & customer experience regarding the ease of cycling (perceived) and health benefits by increasing physical activity.

Work completed prior to this Detailed Business Case (DBC) includes a mixture of both physical and theoretical work completed on the SH 1 cycle route. There have been a number of short-term physical improvements made to the existing cycle lanes, but as a result of cyclist deaths in 2011 and 2012, there was a strong public response that changes were necessary to provide better facilities for cyclists.

The SCL improvements considered in this DBC are an important component of the strategy for greater Dunedin cycle network, as pedestrian and cyclist crashes accounted for approximately 60% of the high severity crashes (15 high severity crashes resulting in 15 DSi) during 2009 – 2013. The key safety deficiency of the existing SH 1 cycle lanes is that cyclists are only protected from vehicular traffic by painted lines on the road and their own self-awareness.

There are few key constraints to this project other than ensuring the SCL fits within the existing road corridor, without adversely affecting the level of service for vehicle traffic and pedestrians.

Five options were initially assessed under the Strategic Assessment prior to this DBC and two options were put forward for further consideration. The first was an SCL on each leg of the one-way pair and the second was a bi-directional facility running the length of Cumberland Street. This second option is not preferred on the grounds that the safety concerns created for cyclists on a bi-directional facility are too difficult to overcome without adversely affecting other road users.

The option selected (Uni-directional One-way pair SCL) is considered the optimum solution which closely meets the desired programme and project objectives. The recommended option provides a high standard of safety for new and existing cyclists due to the separation and physical barrier from vehicular traffic. A summary of the recommended project economic assessment is provided below:

Option Description	Expected Construction Estimate (undiscounted)	Benefits	Benefit Cost Ratio
Option 1: Uni-directional SCL	$8.0M	$20.2M	**3.1**

The project has been categorised as having a **HHM** assessment profile.

Consultation has been undertaken on both options prior to this DBC. There is general support from stakeholders and affected parties. However, the removal of on-street parking is a key concern, particularly for local business owners, who fear it may adversely affect ‘drop-in’ traffic and consequently ongoing business viability over time.

The key risks remaining on the project relate to the need to maintain a high standard of design / provision for the SCL, in the face of competing demands from stakeholders and general road users, managing the outcomes from further consultation and availability of detailed information (i.e. topographical and services survey data).

Overall, the project is considered to support the GPS objectives, and will deliver on the desired outcomes of reducing fatal and serious injury cyclist crashes on the state highway. The project should therefore be progressed to the next phase of the Business Case process.

PART A – THE CASE FOR THE PROJECT

1 Background

The Dunedin One Way System Separated Cycle Lanes (SCL) project is a partnership between the NZ Transport Agency (NZTA) and Dunedin City Council (DCC), with the Transport Agency taking the lead role. The purpose of the SCL project is to reduce instances of fatal and serious cyclist crashes, as well as improving pedestrian facilities.

There have been a number of short-term physical improvements made to the existing cycle lane and some reports completed on a possible long term solution. This is the second investigative stage for this project, after an initial report of cycling options for central city Dunedin was completed.

The Transport Agency Board has overall responsibility for NZTA projects and reports directly to the Minister of Transport. NZTA is also the project sponsor.

The Dunedin One-Way System Separated Cycle Lanes project is a partnership between the Transport Agency and DCC, with the Transport Agency taking the lead role. The project area is bound within the section of SH 1 starting where SH 1 diverges in the north (at Pine Hill Road), to Rattray Street in the south. The vast majority of this section of SH 1 runs through central Dunedin and SH 1 is unique in that it is a one-way system separated by a street block.

1.1 Work Completed to Date

Prior to this Detailed Business Case (DBC) a mixture of both physical and theoretical work has been completed on the SH 1 cycle route. There have been a number of short-term physical improvements made to the existing cycle lanes and written reports outlining the possible long term solutions and the obstacles to overcome to create a safe separated cycle facility.

1.1.1 Short-term Safety Improvements to Existing Cycle Lanes

As a result of cyclist deaths in 2011 and 2012, there was a strong public response that changes were necessary to provide better facilities for cyclists. DCC contacted the Transport Agency in November 2012 requesting the creation of a high level plan for improved cyclist safety on the one-way pair, with an emphasis on separated facilities.

1.1.2 Reports Completed to Date

In October 2013 ViaStrada completed a report of possible cycling options for central city Dunedin. This was the only site specific report completed in advance of this DBC, so in effect acts in place of an Indicative Business Case (IBC) or Project Feasibility Report (PFR).

A SH 1 Cycle Lanes Parking Study was completed jointly by the Transport Agency and DCC, which investigated the parking demand and supply in the city centre.

1.1.3 Background Information

The following information was supplied for the creation of this DBC:

- North South Central City Cycling Options Report (Via Strada October 2013)
- North South Central City Cycling Options – Appendices (Via Strada October 2013)
- Central Dunedin Bicycle Corridors Data – Appendix (October 2013)
- Option 1 Plan : One-way Pair SCL uni-directional (Via Strada March 2014)
- Option 2 Plan : Cumberland St SCL bi-directional (Via Strada March 2014)
- Central Dunedin Cycle Survey Results (January 2012)
- Dunedin One-way System (SH 1) Cycle Survey Report (NZ Transport Agency March 2014)

- Consultation Response Report (DCC / NZ Transport Agency December 2013)
- Consultation Output Summary Report (DCC / NZ Transport Agency December 2013)
- Cross-sections: Types 1- 6 (Via Strada March 2014)
- Option 1A Plan Set (Via Strada March 2014)
- Cycle Lane FAQs (NZ Transport Agency November 2013)
- SH 1 Scheme Development Traffic Signal Operation Report (Via Strada April 2014)
- SH 1 Cycle Lanes Parking Study (DCC / NZ Transport Agency undated)

1.2 Project Governance

The governance structure for the project is depicted in Figure 1-1. In addition to the NZ Transport Agency organisational structure below, the working group also consists of DCC, and is supported by:

- Dave Cull, Mayor, Dunedin City Council
- Dr Sue Bidrose, CEO, Dunedin City Council
- Sarah Connolly, Transport Planning Manager

1.2.1 Organisation structure

The following diagram represents the decision-making process structure within the Transport Agency with regards to this project.

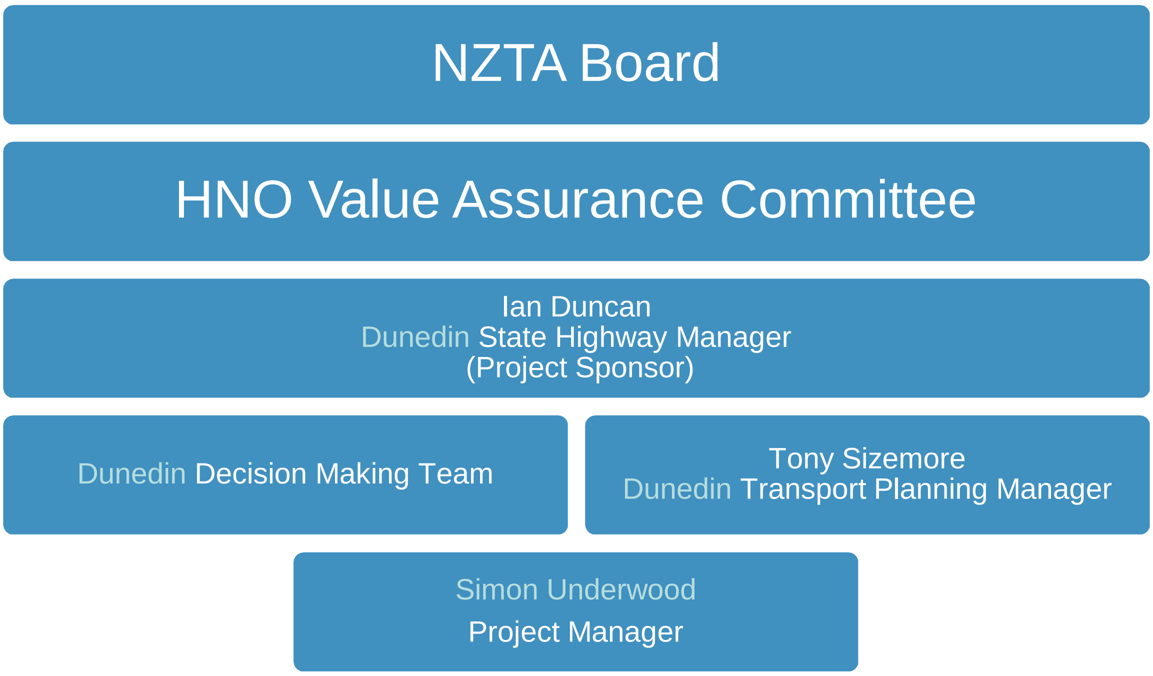


Figure 1-1: NZTA Organisation Structure

1.2.2 NZTA Board

The Transport Agency Board has overall responsibility for NZ Transport Agency projects. The Board reports directly to the Minister of Transport and is responsible for:

- land transport planning
- managing the state highway network
- regulating access to, and participation in, the land transport network
- promotion of land transport safety and sustainability.

1.2.3 Highways and Network Operations Group Value Assurance Committee

The HNO Group Value Assurance Committee (VAC) is the most senior project decision making team within the HNO group, which comprises the National Manager Professional Services and various other senior managers and technical specialists.

1.2.4 Project Sponsor

The Project Sponsor is Ian Duncan, Coastal Otago Region 13 State Highway Manager. The Project Sponsor is responsible for:

- Ultimate authority and responsibility for the project
- Endorsing changes to scope, schedule, budget and quality
- Endorsing escalation and championing recommendations to the Highways VAC
- Providing policy guidance to the Project Manager
- Endorsing the Project Management Plan to confirm that project scope and deliverables are correct
- Reviewing progress and providing advice on resolution of issues
- Supporting the Project Manager
- Resolving issues beyond the Project Managers authority.

1.2.5 Dunedin Decision Making Team

The Coastal Otago Regional Management Team comprises senior decision makers within HNO in the Southern region. It includes representation from the Coastal Otago Region State Highway Manager and their direct reports.

2 Problems, Opportunities and Constraints

This SCL project is located within the Dunedin central city, on SH 1 between Pine Hill Road and Rattray Street. The primary problem for this section of state highway is the occurrence of fatal and serious cyclist and pedestrian crashes, which account for approximately 60% of all the high severity crashes that have taken place on this section of SH 1. It is clear from the crash analysis the majority of high severity cyclist and pedestrian crashes occurred due to regular interaction, with vehicle drivers' failing to give way, or the doors of parked cars opening into the path of the cyclist. By separating cyclists and vehicles, the severity of crashes can be greatly reduced.

There is also the opportunity to increase the number of cyclists commuting in Dunedin, by providing a safe route that has strong links to other existing and planned cycle ways in the city. Where possible, improvements will also be made to pedestrian facilities.

The main project constraint is the numerous property accessways throughout the project extents. There are number of high usage commercial accessways that the SCL will pass adjacent to. This includes accessways for supermarkets, petrol stations, the Cadbury Factory and fast food outlets.

Another constraint is that if the facility becomes too popular (a desired outcome) there is the potential that passing opportunities within the facility become more and more limited. This could reduce the overall Level of Service (LoS) for the facility and its attractiveness to users.

Furthermore, small business and retail owners are concerned with the loss of short term parking throughout the SCL project extents.

It is expected there will not be any major issues obtaining RMA approvals for this project. Any service relocation should be limited and confined to highway lighting, fibre optic cables and power cables.

2.1 Problems and Opportunities

2.1.1 Site Description

This cycle project is located within the Dunedin central city, on SH 1 between Pine Hill Road and Rattray Street (see Figure 2-1). This includes the part of SH 1 known as the "one-way system". The route position reference for this section runs between 01S-0704/0.0 to 01S-0706/0.44.

This DBC investigates the best arrangement for a SCL along SH 1. It also includes all 'whole of intersection' areas at each intermediary intersection along the one-way system, as well as extensions at either end, for which treatment is necessary to enable the project work to be properly integrated with the wider network.

There are existing cycle lanes running the full length of the project section. These are generally 2.4m wide lanes, line-marked on each leg of SH 1 through Dunedin, running parallel to the live traffic lanes on the left hand side of drivers. The lanes are commonly located in between the live lane and parked vehicles against the kerb. There is no specific protection for cyclists other than the painted solid lines on the road surface and the cyclists' own awareness.

Pedestrian facilities consist of common footpaths running parallel to the road, no different than would be found in any urban situation. At signalised intersections there are existing pedestrian facilities, with pedestrian phases providing for the various signalised pedestrian movements. Pedestrian signals operate with either no protection (i.e. filtering with vehicles), partial protection (early start for pedestrians with a red arrow for vehicles). No full protection movement exists i.e. where the pedestrians receive a completely separate phase with no vehicle conflict.

The Dunedin city street layout is a block (or grid) pattern, apart from the two sets of S-bends i.e. reverse curves, in SH 1. The first set is located approximately halfway through the project section, the second set towards the southern end. Therefore signalised intersections occur frequently at common intervals in both directions of SH 1, providing for intersections with the local road network. A large number of accessways exist within the project extents, some of which are very busy and provide access to supermarkets, hotels, car park buildings, the hospital and commercial activity etc. The number of accessways along the section significantly increases the number of conflict points that cyclists and pedestrians would have with vehicular traffic.

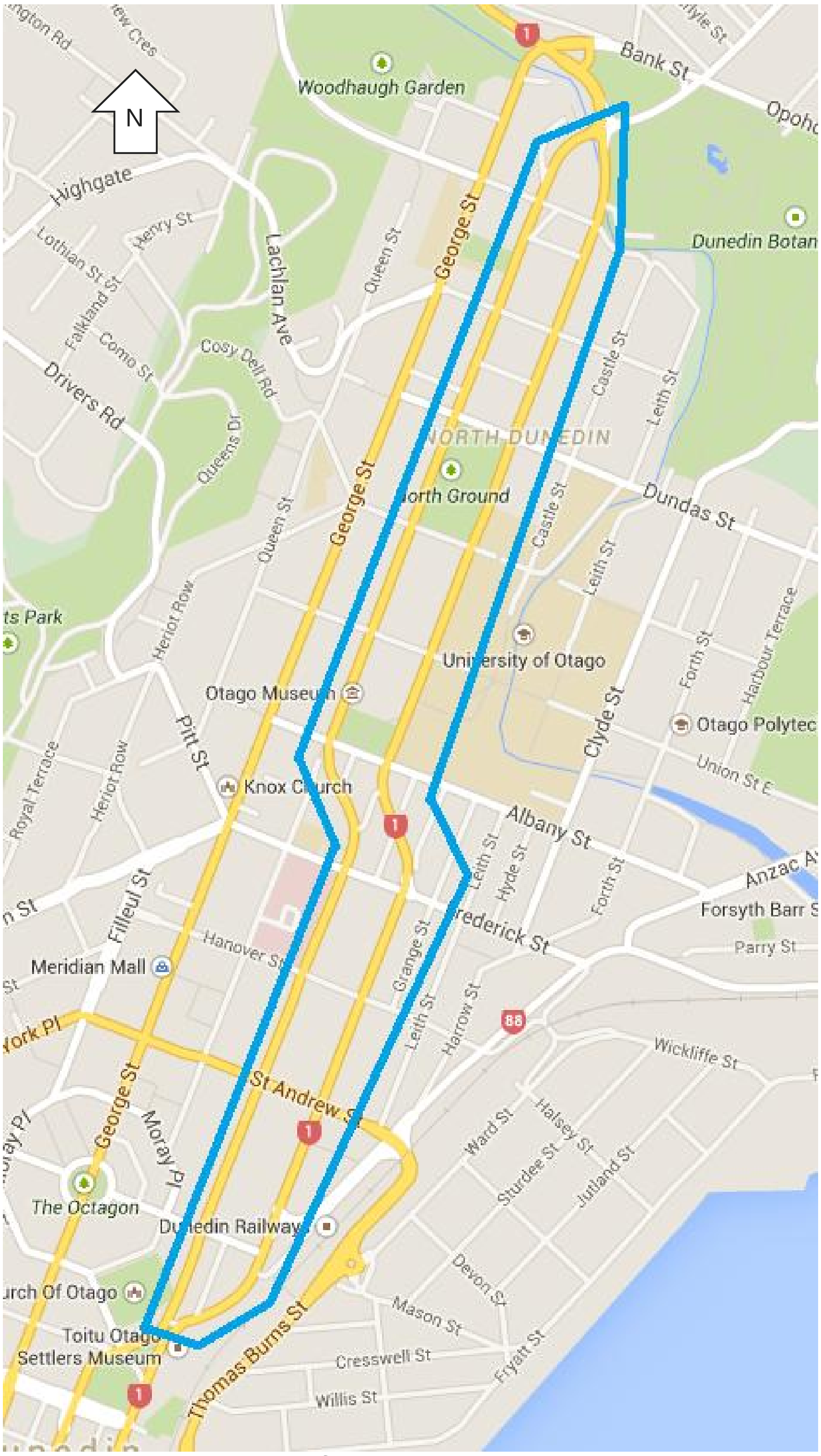


Figure 2-1: SH1 Area of consideration (Source: Google Maps)

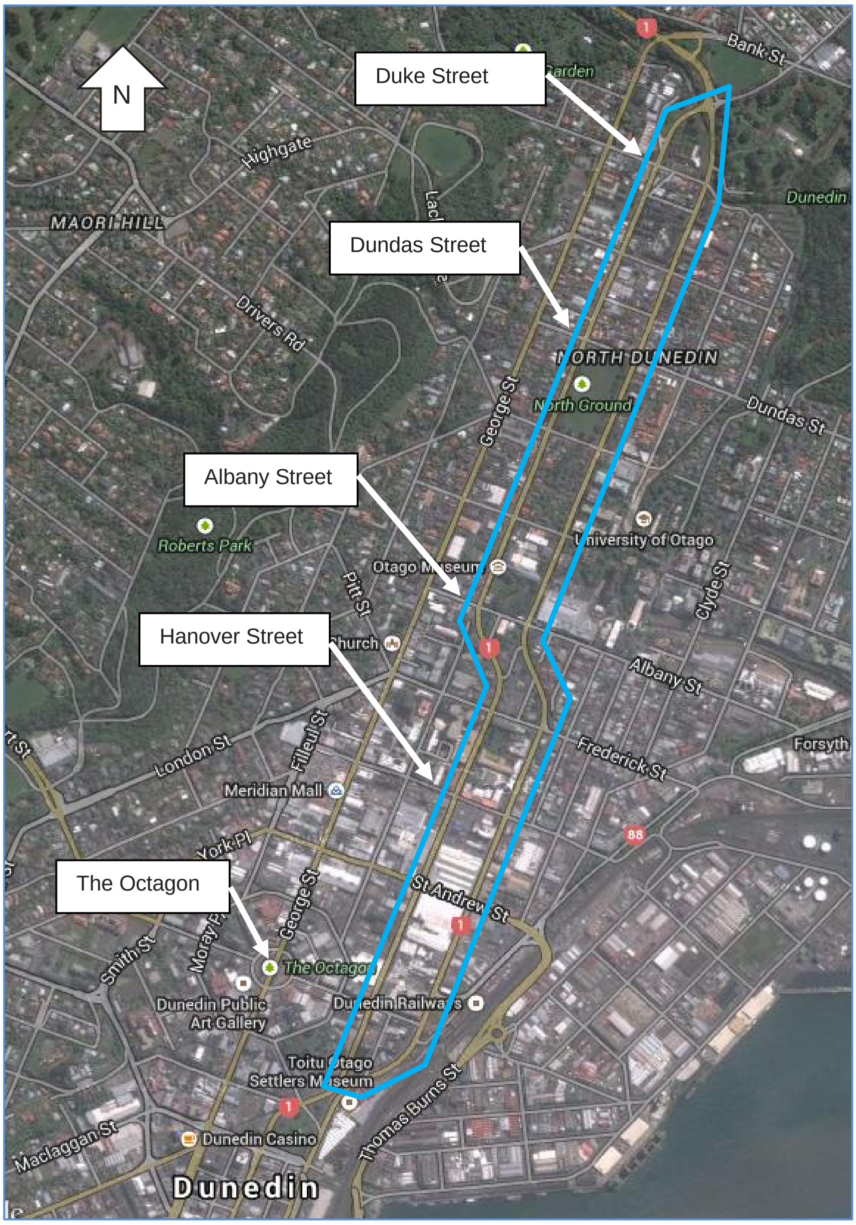


Figure 2-2: SH1 Area of consideration - aerial map (Source: Google Maps)

2.1.2 Problems

Cyclist fatalities on the one-way system occurred in 1998, 2005, 2011 and 2012. Marked cycle lanes were installed following the 1998 fatality, but did not effectively prevent any of the subsequent fatal cycle crashes. Common to all four fatalities, is that the crash involved a sudden or an unexpected interaction with the general traffic.

Strategic investigation work undertaken during 2013[1], together with public consultation, established there was a travel demand for safe cycling on the one-way system. It was further recognised that while alternative routes do provide an essential role in providing for travel by cycle within the central city, the one-way system would remain central to the existing, and any new, cycle network infrastructure within the central city.

Further, it established the safety risk to users of the SH 1 one-way system was sharply focused on cyclists and pedestrians. Therefore to achieve the necessary substantial improvement in

[1] Submissions Summary Report on Dunedin Separated Cycle Lane Options, NZ Transport Agency & DCC, December 2013

the safety performance of the one-way system required improved planning and provision for these road user modes. While this DBC relates primarily to improving road safety via improved cycle infrastructure, attention is also drawn to aspects where safety improvements can also be provided for pedestrians along the route.

2.1.3 Opportunities

To develop this proposal and implement the SCL on the SH 1 one-way system, the desired objectives/outcomes are to;

- improve road safety for cyclists;
- provide a safe route choice for cyclists;
- facilitate the adoption of cycling as a safe and practical choice for inner city transport;
- contribute to an integrated central city cycle network and the adjoining wider city cycle network;
- integrate opportunities to improve pedestrian safety and amenity.

2.2 Issues and Constraints

2.2.1 Transport Issues and Constraints

A key transport issue is the total volume of cyclists using the one-way pair cycle lanes combined with the safety issues that eventuate. An issue for cyclists, using the existing on-road cycle lanes, is the regular interaction with other road users. This interaction takes place due to the competing demands for road space, and the cross sectional layout, with cycle lanes provided on the left side of the highway between the through lane and the parking lane. This results in a situation in which cyclists, using the on-street cycle lanes, still interact with other roads users at accessways, car parking, manoeuvring, dooring and pedestrians crossing the cycle lanes. This high level of interaction reduces the LoS of the facility for both safety and efficiency. The existing position of the cycle lanes, located on the left side of the traffic lanes does also result in a situation where cyclists are positioned in the blind spot of heavy vehicles.

Safety is considered further in Section 2.2.7 and 2.2.8.

A further transport constraint is the need to maintain operational efficiency of the SH 1 system in central Dunedin. Any facilities provided to support cycling have the potential to reduce the existing LoS for motor vehicle traffic. Ensuring that the efficiency of the through movement of traffic on SH 1 travelling along the one-way pair is not adversely affected by the introduction of separated cycling facilities is a fundamental requirement.

The high number of traffic signal intersections along the SH 1 corridor is also a further constraint. Whilst the signal timings can (and do) provide a good level of traffic signal coordination for motor vehicles by providing a green wave, this good level of coordination does not, generally, exist for cyclists due to their lower progression speeds. This means that the existing LoS for cyclists is not particularly high, given the necessity to stop at repetitively[2].

2.2.2 Economic Issues and Constraints

SH 1 through Dunedin is an important economic area of the city, with a large number of businesses adjacent to the SH 1 one-way pair that could ill afford any negative outcomes arising from the installation of an SCL. A main concern of local businesses would be the removal of parking spaces near their business and the potential for loss of income due to a decrease in ‘drop-in’ traffic that no longer have somewhere convenient to park.

Of particular note is the P5/P10 parking for businesses along SH 1 that allows a high turnover of customers and also facilities for loading on-street. If this parking is removed, it is likely to result in economic disbenefits for businesses that rely on such parking.

[2] The current traffic signal operation and effect on the progression speed of cyclists, traveling at a variety of speeds, is covered in detail in the MWH (2014) Traffic Signal Operation Report.

There is also metered parking along some sections of the SH 1 one-way pair which results in revenue generation for DCC and any changes to this will obviously affect existing revenue. It is possible some parking could be relocated, or currently unrestricted or time restricted/unpaid parking could be converted to meter parking to offset the loss of current metered parking. However, it is likely that the current metered parking is located in the areas of highest demand and so alternatives may not be as attractive to drivers wanting to park. The particular area encompassing the SH 1 one-way pair is the Dunedin CBD and this predominantly includes well established buildings. No property acquisition is envisaged for the SCL, so the project is not constrained in this regard.

2.2.3 Social Issues and Constraints

The proposed cycleway runs through the older part of central Dunedin. Numerous sites that attract large numbers of visitors are located in this vicinity including the University of Otago, Otago Museum, Cadbury's, the Dunedin Railway Station Toitu and to the west The Octagon. The location of these important sites within the study area is shown on Figure 2-3. These are important Dunedin landmarks and contain heritage buildings and trees. They attract residents, tourists and students into central Dunedin and contribute to its vibrancy and vitality. Further sites that attract people are identified in Table 2-1.

All of these sites are traffic generators that create a level of parking demand. Currently parking provided on the highway serves at least some of this parking demand. Any reduction of (convenient) on-street parking provision could reduce peoples accessibility to those sites, particularly the elderly or mobility impaired. This issue is particularly relevant in respect of the museum and Dunedin Hospital.

Figure 2-3: Key Traffic Generators

A number of significant traffic generators exist in close proximity to the project area. The sites that are considered the highest traffic generators are shown in Figure 2-3. All of the sites that have been identified as generating are detailed in Table 2-1 and are included if there is the potential for significant pedestrian or vehicle movement, and/or of historic or cultural importance (including tourist attractions). The information below has been compiled from consultation with stakeholders and other available sources.

Table 2-1: Significant Traffic Generators

Site	Comment on significance
Beaurepairs	Busy access on Cumberland Street.
BP Service Station	Separate busy entry and exit accesses on Cumberland Street.
Cadbury Factory	Heavy vehicle commercial entrance and exit on Cumberland Street and Castle Street.
Caltex Service Station	Separate busy entry and exit accesses on Great King Street.

Central Fire Station	Main exit on Castle Street for fire engines.
Copland's	Entrance access only to car park.
Countdown Supermarket	Separate entry and exit accesses to large car park on Cumberland Street.
Cumberland College	House of residents for Otago University students, busy access.
Dunedin Hospital	Access to hospital car parking from Cumberland Street. Short term parking for access to physiotherapy centre.
Dunedin Railway Station	Heritage building (Category 1) opened in 1906. This is a very important example of early Dunedin architecture.
KFC	Entry and exit access for fast food drive through and car parking.
Leviathan Hotel	Heritage Hotel built in 1884
McDonalds	Entry and exit access for fast food drive through and car parking.
Mobil Service Station	Separate busy entry and exit accesses on Cumberland Street.
New World Supermarket	Entry only access from Cumberland Street
Otago Museum	Established in 1868 and is Dunedin's most visited attraction.
Shell Service Station	Separate busy entry and exit access on Castle Street.
The Octagon	Major hub for public transport and centre of Dunedin's café and hospitality culture.
University of Otago	Established in 1869 with main campus on Cumberland Street. Car parking access and multiple service accesses.
VTNZ	Through access from Cumberland Street to Castle Street for vehicle testing station.
Wilson Car park	Separate entry and exit access to car park building on Cumberland Street and Castle Street.

A key safety design criteria is to ensure vehicles accessing any of the above locations are treated appropriately in relation to the SCL. At busier accessways i.e. Wilson car park, the design of the facility will be critically important to ensure the safety of all road users (e.g. safety measures may need to be implemented that alert both cyclists and motorists that they are entering into high conflict zones where motorists cross the SCL). Some of the significant sites above have high use accessways, either by the public or commercially, and therefore require specific focus.

2.2.4 Resource Management Issues and Constraints

There are a number of Resource Management documents (both statutory and non-statutory) that must be considered when planning for cycleway projects. The key statutory plans and standards applicable to the Dunedin SCL project are as follows:

- Dunedin City District Plan ('DCDP');
- Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 ('NES');
- Otago Regional Council – Regional Plan: Water and Regional Plan: Air.

Under the Dunedin City District Plan the corridor is designated for "State Highway Purposes (SH 1)"[3]: However, this does not inhibit what can be achieved with the SCL design.

[3] Dunedin City District Plan, Schedule 25.5 – Designations.

Table 2-2: Dunedin City District Plan Designation Detail

Designation Number	D453	D454
Requiring Authority	NZ Transport Agency	NZ Transport Agency
Designation Name and "purpose"	SH 1 - South Bound One-Way System (Cumberland Street - Gowland Street - Castle Street - Lower High Street - Cumberland Street - Andersons Bay Road) - "State Highway Purposes (SH 1)"	SH 1 - North Bound One-Way System (Andersons Bay Road - Crawford Street - Lower High Street – Cumberland Street - Malcolm Street - Great King Street) - "State Highway Purposes (SH 1)"
Location	SH 1 - South Bound One-Way System through Dunedin City Centre, Dunedin	SH 1 - North Bound One-Way System through Dunedin City Centre, Dunedin
Legal Description	Lots 1 and 2 DP 25488, and Pt Road Reserve	Sec 1 Blk LIV, Sec 1 Blk XLV, Pt Reserve No 4, Pt Town Belt and Pt Blk L Town of Dunedin, and Pt Road Reserve
Conditions	No	No

In addition to the designated State Highway, there is a small amount of local road (Emily Siedeberg Place) connecting Cumberland Street north and south, which is shown on the planning maps as "road". Other than this section, which could potentially be incorporated (into the cycleway project), it is expected that the cycleway works would be primarily contained within the designated State Highway corridor, potentially with some ancillary works on other local roads.

Adjoining the designated State Highway corridor are a number of different District Plan Zones including the Central Activity Zone (CA), Large Scale Retail Zone (LSR), Campus Zone, Residential 3 (R3) and Residential 1 (R1). The corridor passes through three Townscape Precincts (TH12, TH10 and TH01) and an Urban Landscape Conservation Area (ULCA 1).

The District Plan maps also identify a number of protected buildings and trees adjacent to the designated State Highway and road corridor. Within the project extent, there are thirteen listed heritage trees on sites adjoining the State Highway designations[4]. Under the Dunedin City District Plan the removal or modification of any tree or pruning, trimming or any other modification or activity within the canopy spread of any listed tree is a discretionary activity[5]. If the physical works impact on the adjoining heritage trees, resource consent may be required prior to commencing the works. Also, given the minimal quantity of earthworks proposed, the re-use of existing paved surfaces and the connection into the existing stormwater infrastructure, modification of listed trees is unlikely.

There are no conditions on the NZ Transport Authority State Highway designations, south or north bound. An outline plan under Section 176A of the RMA needs to be submitted to DCC once the detailed design has sufficiently progressed to indicate the detail of the proposed works. The territorial authority may request changes. Outline plan applications are processed on a "non-notified" basis within 20 working days.

The NES seeks to ensure that any land affected by soil contaminants is appropriately identified and assessed before it is disturbed or developed, and if necessary, is remediated or the contaminants are confined as to make the land safe for human use.

[4] Dunedin City District Plan, Planning maps 34, 35, 36, 49 and Schedule 25.3– T362, T360, T531, T533, T028, T532, T534, T363, T364, T366, T365, T295, T294

[5] Dunedin City District Plan, Chapter 15 Trees, Rule 15.5.1.

The Hazardous Activities and Industries List (HAIL) compile activities and industries that are considered likely to cause land contamination resulting from hazardous substance use, storage or disposal.

The DCC GIS system records do not identify any know hazard information within the road corridor. A number of adjoining sites are identified as potentially contaminated (See Appendix G – Planning Information.

The Otago Regional Council (ORC) and DCC records do not identify any known contaminated sites within the road corridor. There are records associated with nine sites adjacent to the SH 1 corridor held on the ORC's "Database of Selected Land Uses."

Under the NES, any small-scale soil disturbance activities which disturb no more than 25 cubic metres per 500 square metres of affected land and that are of a temporary duration (up to two months'), is a permitted activity. The cycleway construction is not anticipated to exceed these thresholds, therefore the disturbance of soil on these sites would be permitted under Regulation 9 of the NES.

The two key ORC statutory plans are the Regional Plan: Water and the Regional Plan: Air. The cycleway does not involve any works in a waterbody or streambed. The majority of hard surface areas already exist and stormwater from the road and footpaths is collected and discharged via the existing Council stormwater infrastructure. No new or additional discharges of stormwater are proposed for the new cycle facilities.

Under the Regional Air Plan the discharge of contaminants into air from road construction activities is a permitted activity[6]. Therefore in terms of the two key ORC plans, no resource consent requirement is activated.

The other regional council documents of relevance to this project include:

- The Otago Regional Council Regional Policy Statement
- Urban Water Quality Strategy

The cycleway proposal is expected to be consistent with these two higher level documents and does not breach any conditions set within.

The resource management process to obtain the necessary outline plan approval and any potential resource consent under the NES, would not involve public notification. Therefore from a consenting perspective the project is relatively straightforward.

2.2.5 Stakeholder Issues and Constraints

The key stakeholder concerns related to existing user safety concerns, parking-economic, parking-social. These issues have been summarised and responded to in a previous report[7].

Some of the other concerns raised during consultation were; the perception of increased mid-block crossing by pedestrians (with use of parking further afield); the use of the cycle lane by skateboarders; and the potential of younger, less skilled cyclists, entering a busy inner city traffic environment.

Stakeholders that supported the proposed SCL options were generally those from a cyclist viewpoint. There was no clear indication of a preferred SCL option amongst stakeholders, with both SCL options (bi-directional or uni-directional – see Section 4.14) evenly supported. Consultation is further discussed in Section 6.

2.2.6 Maintenance Issues and Constraints

The existing maintenance regime consists of typical urban road routine maintenance. Since the 1997/98 financial year, $365,000 has been spent on routine maintenance, including;

[6] Otago Regional Council Air Plan, Rule 16.3.13.1.

[7] Consultation Response Report (2013) DCC / NZ Transport Agency December 2013

signage cleaning and repair, minor levelling, emergency works, surfacing defects repair, stormwater structure maintenance, digouts, potholes, surface water channel maintenance, environmental clean-up, resurfacing, shoulder maintenance, vegetation clearing and paint re-marking

The current alignment has formalised drainage that requires routine clearing of kerbs and sumps. There are numerous trees that require routine trimming to maintain adequate sight lines. There is street lighting present on both sides of the road the entire project extent that requires routine maintenance. There are numerous utility service pits located in the road reserve that are accessed for routine maintenance.

The forward works programme indicates that a section of SH 1 is programmed for maintenance resurfacing in 2014/15, with further sections resurfaced in 2015/16 and 2016/17. The local roads and SH 1 are maintained by the DCC and NZTA respectively. For SH 1, NZTA maintenance area is the carriageway bound by the lip of channel with the DCC maintaining from the lip of channel to the property boundaries.

2.2.7 Crashes Issues and Constraints

A full review of the crash history of the 2.5km section of SH 1 (RP 704/0.0 to RP 706/0.44) is analysed in Appendix C – Crash History Information, including crash classification and a crash map. For the five year period from January 2009 to December 2013, there was a total of 359 crashes (26 high severity crashes resulting in 28 DSi).

Of the total reported crashes, only 11% involved pedestrians and cyclists. However, pedestrian and cyclist crashes accounted for approximately 60% of the high severity crashes (15 high severity crashes resulting in 15 DSi). This indicates that pedestrians and cyclists are over-represented in high severity crashes along the project length. Three of the 15 DSi crashes resulted in a fatality, these were due to; an elderly pedestrian crossing in at an incorrect location (i.e. not a designated crossing place); a truck failing to give way to a cyclist; and a cyclist manoeuvring to dodge an opening parked vehicle door and into the path of a truck. An additional four serious injury, seven minor injury and four non-injury crashes involving pedestrians and cyclists occurred during 2014 to date[8].

Of all of the 13 cyclist crashes, two were fatal, four were serious, six were minor and one was non-injury.

Five crashes involved rear end / obstruction crash types with cyclists colliding into motor vehicles resulting in one fatal and one serious injury crashes (2 DSi).

- The fatal crash involved a cyclist manoeuvring to miss a door opening from a parked vehicle into the path of a truck.
- The serious injury crash involved a cyclist colliding into the back of a parked truck and trailer.
- Two minor injury crashes involved a cyclist colliding with a door opening from a parked vehicle.

Six crashes involved crossing / turning crash types with cyclists impacting motor vehicles resulting in one fatal, three serious injury crashes (4 DSi) as well as two minor injury crashes.

- The fatal crash occurred due truck failing to giveway to cyclist and colliding with cyclist resulting in cyclist run over at Anzac / SH1S intersection.
- The three serious injury crashes involved motor vehicle drivers failing to giveway to cyclists and a cyclist failing to stop at a red light running into motor vehicle.

All five hit object crashes included cyclists colliding with an opening door of a parked motor vehicle, colliding with a parked truck and trailer and hit kerb due to medical event. These crashes resulted in one fatality, one serious injury and three minor injury crashes.

[8] For the crash statistics currently contained within the CAS system.

Six crashes involved ‘failed giveway / stop’ as the crash causation factor resulting in one fatal, three serious injury and two minor injury cyclist crashes. The fatal crash involved a motor vehicle failing to giveway to a cyclist travelling along SH1 at Anzac Avenue / SH1 intersection.

Three cyclist crashes occurred at the fault of the cyclist. The cyclist crashes resulted from running red light at a signal controlled intersection, mechanical failure and failure to stop colliding with truck and trailer. Resulting in two serious and one minor injury crash.

The pedestrian crashes resulted from; incorrect crossing location; stepping into the path of an on-coming vehicle; and inattention when crossing road.

It is clear from the crash analysis that the majority of high severity pedestrian and cyclist crashes occurred due to drivers failing to give way or parked vehicle doors opening into the cyclist’s path.

Interestingly, there were four crashes involving pedestrian mobile users’ i.e. vulnerable users. This term is somewhat ambiguous, but is believed to include skaters (skateboarders, roller skaters etc.) resulting in four crashes (1 minor injury, 3 non-injury).

It is also noted that there is a level of underreporting in crash statistics, with the EEM[9] stating that for minor injury crashes 50km/h environment, the underreporting factor for pedestrian crashes is 4.5, whereas for ‘other’ minor injury crashes this is 2.75 i.e. for every reported pedestrian minor injury crash, there are 4.5 others that go unreported. It is also expected that this is a similar situation for non-injury crashes with a considerable number going unreported.

2.2.8 Safety and Geometric Issues and Constraints

The key safety issue is the overall number and severity of cyclist crashes that have occurred within the project area given there is a known demand for cyclists to use this route, interacting with other traffic (private cars, commercial vehicles and public transport).

Given the crash history, it is evident that both cyclists and pedestrians are over-represented in high severity crashes.

The current State Highway environment is challenging for cyclists to negotiate due to:

- Interaction with parking and opening vehicle doors
- Multiple intersections (mostly signalised)
- Accessways and associated conflicts (exacerbated at accessways with poor sight distance)
- Multiple traffic lanes
- Loading and unloading, and
- Pedestrian movements.

Intervisibilility between drivers and cyclists can be problematic, with various turning and manoeuvring of vehicles taking place.

Another key safety issue that the project needs to consider is the risk of cyclists being on the left hand side of turning trucks in the ‘blind spot’ for truck drivers. Whilst this is a risk in any situation where cyclists are on the left side of the road, it is considered a higher risk issue on the one-way system, due to the number of side roads combined with the higher volumes of trucks and cyclists. The occurrence of crashes in this situation has not been an issue for the one-way system at present, however it is known nationally as being a problem and numerous high severity crashes have occurred in these circumstances[10]

[9] Economic Evaluation Manual (2013), NZTA, Table A6.20(a)

[10] Examples include the fatal Lincoln Road crash in Christchurch on 02/04/14 where a female cyclist was travelling in a LHS on-road cycle lane and was struck by a left turning truck with the driver not seeing the cyclist; a further crash of this

The existing geometry within the one-way pairs is not considered to be a particular constraint to cycling. However, there are geometric constraints along the one-way pair system that any cycling facility proposal needs to be cognisant of;

- Existing road corridors: with there being no desire to acquire land not already used for road purposes, the environment to improve cycling must be contained purely within the existing highway corridor
- Northern extent: the four arm intersection at George Street / Pine Hill Road is already challenging due to vehicle speeds, gradients on one approach and conflicting movements, restricted sight distances and the storm channel bridge in close proximity further reinforces this constraint.

The existing gradient throughout the project area is relatively flat with minor gradients changes, which is not considered to be a constraint to cycling, slightly uphill to the north and downhill to the south.

A further constraint is the high number of traffic signal intersections which don't currently cater for any protected cycle or pedestrian movements.

2.2.9 Stormwater Issues and Constraints

The existing management of stormwater from road runoff is considered to operate in a satisfactory manner. Stormwater is therefore not currently considered an issue or constraint.

From the preliminary work undertaken prior to this DBC, it is expected, generally, that stormwater infrastructure will not be altered or additional sumps and associated pipework constructed. Any permanent separator between the traffic and cycle lanes must include breaks that allow water to runoff to the existing kerb and channel.

It is noted that stormwater management will be a high profile concern for the public and stakeholders after recent flooding in Dunedin.

2.2.10 Geotechnical Issues and Constraints

No known geotechnical issues exist within the existing highway corridor. Therefore, it is expected that there will be no geotechnical issues or constraints as all construction work will take place at or just below the existing pavement and footpath surfaces. As no major excavation work will take place, no geotechnical investigations have taken place.

2.2.11 Service Utilities Issues and Constraints

Initial contact with service utility providers has been made and they have supplied some limited information as to service location information. This is discussed further in Section 5.2.13. It is prudent that service utility providers are consulted further to better refine service information and locations. Service location and/or pot-holing is likely to be required in due course to better determine accurate service locations and impacts. The following services have been identified within the project extents;

- Chorus telecom cable
- Water, waste water and storm water services
- Delta underground power cables
- Vodafone buried fibre optic cables
- Kordia buried fibre optic cables
- LINZ Benchmarks

Stakeholders in the area must be notified of planned disruptions during any utility service relocation work.

nature occurred in Mosgiel in 1998 where a left turning truck collided with a straight through cyclist after failing to see them.

3 Outcomes

The Strategic Outcomes for any activity proposed by NZTA should align with the impacts sought by the Government Policy Statement for Land Transport Funding 2015. In particular to reduce deaths and serious injuries resulting from road crashes and to deliver better use of the existing transport capacity. Encouraging cycling has both positive health outcomes for cyclists and also reduces the adverse environmental effects of vehicle emissions.

The Programme Outcomes for the SCL are to improve road safety for cyclists by providing a safe route choice and to encourage cycling as a safe and practical mode choice for Dunedin inner city transport. NZTA, with cooperation with DCC, is striving to create an integrated central city cycle network, which connects with the wider Dunedin cycle network. The programme will also use the opportunity to integrate any pedestrian safety improvements and amenity to the network.

The main Project Outcome is to eliminate the occurrence of cycle and pedestrian related fatal and serious injury crashes within the project length on SH 1. Two cyclists and one pedestrian lost their life from 2009 to 2013, while 12 serious injuries occurred during the same five year period. The secondary project outcome is to increase the number of cyclists commuting in Dunedin, by providing an improved safer cycling facility. Cyclist numbers should increase, as previously hesitant cyclists may now be more confident that the route is safe enough to traverse.

3.1 Strategic Outcomes

The strategic outcomes for any activity proposed by NZTA should align with the impacts sought by the Government Policy Statement for Land Transport Funding 2015. The overall strategic direction for land transport is to drive improved performance from the land transport system by focusing on:

- Economic growth and productivity
- Road safety
- Value for money

The following applicable long term impacts should be achieved by the provision of the SCL facility as it enhances transport efficiency and lowers the cost of transportation through:

- Better access to markets, employment and areas that contribute to economic growth (for cyclists).
- Reductions in deaths and serious injuries as a result of road crashes.
- More transport choices, particularly for those with limited access to a car.
- A secure and resilient transport network.
- Reductions in adverse environmental effects from land transport.
- Right infrastructure and service to the right level at the best cost.

The following are walking and cycling improvements associated with short to medium term results:

- Extension of the dedicated cycle networks in main urban areas.
- Improve suburban routes for cyclists.
- Improve linkages to the NZ cycle trails.
- Progress the Safer Journeys Action Plan.
- Improve the transparency of road safety related investment.
- Improve transparency of investment in mitigating environmental effects, including climate change.

- Associated health benefits

No specific Strategic Assessment Report was undertaken in advance of this DBC, as this project and its development have occurred as working partnership between NZTA and DCC. Also, this project had commenced prior to the changeover to business case reporting for Government Agencies. The initial option assessment for this project started with a report conducted by ViaStrada[11].

3.2 Programme Outcomes

This separated cycle lane forms part of the Dunedin Strategic Cycle Network, which NZTA is constructing in cooperation with Dunedin City Council. The programme objectives for the Dunedin Strategic Cycle Network are;

- to improve road safety for cyclists, by providing a safe route choice for cyclists;
- facilitate the adoption of cycling as a safe and practical choice for inner city transport;
- contribute to an integrated central city cycle network and adjoining wider city cycle network;
- to integrate opportunities to improve pedestrian safety and amenity.

3.3 Project Outcomes

The main project outcome is to design and construct a section of separated cycleway on SH 1 that is free of fatal and serious injury crashes. Safety improvements to pedestrian facilities will also be undertaken within this project extent at the same time. The key project outcome[12] is therefore

- Safety, with the desire to increase safety by reducing death and serious injuries, by cycling mode (measured by the number of death and serious injuries occurring on the one-way system following implementation, compared against pre-implementation numbers – with the intended project outcome being to eradicate death and serious injury crashes to cyclists using the SCL facility).
- A further safety outcome sought relates to reducing death and serious injuries to pedestrians using the one way system, seeking a reduction between pre and post implementation pedestrian DSi casualties.

Another project outcome is to increase cyclist numbers, as those users who previously thought the route too dangerous to cycle, may now consider the proposed improvements as now sufficiently providing a safe route to traverse to their final destination. It is predicted that 200 new daily users will be attracted to the facility. To ensure that these new users materialise, it is important the new facility links well to other cycling facilities in the city centre. This outcome sits within the PIKB ‘Network Performance & Capability’ stream whereby the following benefits will be measured:

- Increased throughput; throughput, people, by cycle, measured against existing cycling counts
- Decrease journey time; travel time by cycle, measured against the current journey time for cyclists on the one-way system (note – this is covered in detail in the MWH Traffic Signals Operation Report[13]); however it is recognised the desired effect on journey

[11] Dunedin Central City: Cycling Options – ViaStrada, October 2013

[12] Defined within the Planning & Investment Knowledge Base within the Investment Performance Measurement list of measures https://www.pikb.co.nz/assets/Uploads/Documents/Investment-performance-measurement-list-of-measures-September-2014-V5.1.pdf

[13] The effect on motorised vehicles is also considered in this report with the design philosophy adopted as being generally ‘no worsening’ for traffic using the one-way system

time for cyclists should be considered as a 'no significant worsening' given the separation from motor vehicles.

- Improve comfort & customer experience; ease of cycling (perceived) – by measuring levels of satisfaction regarding ease of cycling

Finally, there are benefits that sit within the PIKB 'Health' category of investment performance measurement. Benefits will be achieved through the 'increase physical activity' category. This will not be specifically measured but confirmed by a proxy of the measurement of cyclist numbers with a total increase in daily numbers assumed to have achieved this health outcome.

These project outcomes can therefore be considered as the benefits of investment.

4 Alternatives and Option Assessment

Option development began with the strategic study that considered potential options for the SCL facility through central Dunedin with two options progressed to this DBC investigation; Option 1 (Cumberland Street & Great King Street uni-directional SCL) and Option 2 (Cumberland Street bi-directional SCL).

The key measures that these options need to deliver are a high LoS for cyclists, and spatial separation from general traffic at mid-block locations and temporal separation from vehicular traffic at signalised intersections. To achieve this, the existing road width must be reallocated from the current provisions between road users.

Options 1 and 2 were then analysed in greater detail against a wide range of factors such as technical, safety, social, environmental, cultural and economy impacts.

4.1 Alternatives Analysed

Prior to this DBC, a variety of options were investigated to consider opportunities for cycling within Dunedin city centre. The previous assessment[14] reviewed the existing cycle network and identified where key gaps existed within the central city cycle network. The primary focus of the assessment was the provision of north-south corridor options. An assessment of five localised options for this area was undertaken during the previous evaluation. These five options are listed below:

- One-way system SCLs
- Cumberland St bi-directional SCL
- Great King St SCL
- One-way system (left hand side) SCL
- George St SCL

The previous evaluation concluded two options should be investigated in further detail; One-Way Pair SCL and the Cumberland Street SCL options.

Further, although Cycling Options report considered that the Leith St corridor did not provide an equivalent level accessibility for cycling within the central city, it was recognised as a complementary route for cycling between North East Valley, the University and Otago Polytechnic, and the harbour-side cycle routes. The concept of 'on-highway' SCL's are a derivative of the earlier work undertaken and is not reconsidered as part of this DBC.

All prior investigation was undertaken before the transition to the Better Business Case methodology.

4.2 Recommended Package of Options

Two options are therefore considered to be worthy of further, more detailed, investigation within this Detailed Business Case. These two options are:

- Option 1: One way pair SCL (uni-directional)
- Option 2: Cumberland Street SCL (bi-directional)

[14] Detailed within the 'Dunedin Central City – Cycling Options Report: 2013' *ViaStrada & Dunedin City Council / NZ Transport Agency / Inner City Cycle Safety Working Group* http://www.nzta.govt.nz/network/projects/dunedin-sh1-cycle-lane-safety-improvements-project/docs/north-south-central-city-cycling-options-report-excluding-appendices.pdf

It is worthwhile to note that the previous investigation work then advanced these options slightly further, by providing an early concept design for Option 1. In the concept design, as much parking as possible was retained alongside the SCL (on the true right) and this option that retained parking was termed Option 1A[15].

The recommended package of alternatives is described below and is based on the information considered / analysed during the strategy study, and subsequent investigations.

4.2.1 Physical Separation

Physical separation of cyclists and motor vehicles is considered an essential part of the project, due the improved level of safety that physical separation achieves. Separated facilities will remove the vast majority of conflicts between cyclists and other traffic, by limiting interaction and thereby achieving desired safety benefits.

Therefore physical separation is a minimum requirement for the proposed cycle facilities. Furthermore, during consultation over 86% of respondents (using the online feedback method) were supportive of introducing a SCL facility.

The current system of wider on-road cycle lanes is considered not to offer the necessary level of protection to cyclists and forces a level of interaction between road users that is undesirable. Providing fully separated cycling facilities is therefore considered to be a step change improvement for both safety and quality of facility for cyclists.

However, the one-way pairs contain a significant number of side road intersections and existing accessways, which users of the SCL will be forced to cross, reintroducing conflict with other vehicles. At all intersections currently signalised (and those which could be upgraded to signals as part of these improvements), temporal separation is provided (see Section 4.2.2).

At non-signalised intersections and accessways, temporal separation through separate signal phasing is not possible. Therefore, it must be accepted that some form of interaction will continue to take place. There is no feasible alternative to avoid this, however through the application of suitable design techniques, the risk from allowing a level of interaction at such locations is considered to be low (and unavoidable).

4.2.2 Temporal Separation

The greatest level of interaction between cyclists and other motor vehicles occurs at intersections due to the high number of conflicting movements that exist at these points on the route. Given the large number of intersections present throughout the one-way pairs, measures must be provided to reduce or remove this level of conflict at intersections.

Given the vast majority of intersections along the one-way pairs are currently controlled by traffic signals, a possible method of separating conflicting movements between cyclists and motor vehicles would be to provide a separate signal phase for cyclists on the SCL. This is no different than the principles currently employed at signals where opposing movements tend to be operated under separate signal phases (whether that is vehicle-vehicle or vehicle-pedestrian conflicts).

Therefore it is considered necessary that cyclists and conflicting vehicle movements are separated through traffic signal phasing at all signalised intersections.

4.2.3 Cyclist Level of Service

It is recognised that in order for the SCL to be successful at achieving the project objectives, it is essential that a good LoS for cyclists is created. Providing a good LoS will contribute to the success of the project as it would encourage high usage of the facility. Ensuring the facility is well used is necessary for a number of outcomes but specifically should result in improved safety by segregating cyclists from motorised vehicles.

[15] With Option1 (formerly Option A), being the uni-directional one-way pair SCL and incorporating no parking alongside the SCL. Option 2 (formerly Option B) being bi-directional Cumberland Street SCL, and similarly incorporating no parking alongside the SCL.

The LoS for cyclists will be governed by the overall quality of the design i.e. providing a high standard of provision for cyclists, and ensuring cyclists are comfortable and willing to use the facility e.g. by having sufficient width to regularly pass slower moving cyclists. In addition, there will need to be good progression through the one-way system at traffic signal intersections i.e. good cyclist signal green wave coordination, so that users of the SCL do not have to frequently stop at traffic signals and then consider this unacceptable and choose instead to not use the SCL and use alternative routes, modes or riding in the live traffic lanes.

Therefore providing a good LoS for cyclists is critical for safety, usage and ultimately, project viability.

4.2.4 Motor Vehicle Level of Service

As with the LoS required for cycling, a key project requirement is a ‘no worsening’ of the performance of the one-way system for motor vehicles progressing along the one-way system. However for turning vehicles (i.e. for vehicles turning left or right off the one-way system onto the local network) it is accepted that a reduction in the current LoS is necessary, given the enhanced coordination needed for the SCL operation.

4.2.5 Road Space Reallocation & Parking

The existing road widths within the one-way system are a fixed constraint in which any SCL facility can be implemented. Acquisition of additional land to provide more width within the corridor is not considered viable due to affordability constraints.

Therefore, the SCL provision will be achieved via the reallocation of the existing corridor width. The current road width is essentially split between footpaths, parking, on-street cycle lanes and traffic lanes.

A requirement of the project was ‘no-worsening’ for the through traffic using SH 1, this means the number of traffic lanes cannot be reduced. Furthermore, the project aims to provide pedestrian benefits were possible as a secondary objective, so worsening of the pedestrian provision by narrowing footpaths, is only likely to be feasible in a limited number of areas. Therefore, the road width for providing SCLs (and physical separator strip) is made available only from space currently provided to either on road cycle lanes (which will no longer be required) or from space currently provided for on-street parking[16].

4.2.6 Other Design Considerations

4.2.6.1 Commercial Accessways

The interface with accessways is an important consideration because (as referred to above), at these locations the interaction between cyclists and motor vehicles is reintroduced over the length of each accessway. This is true of all accessways, however heavy use commercial accessways are of the greatest concern because of the higher volumes of vehicular traffic, and, in some instances, the heavier nature of the commercial vehicle fleet leading to increased levels of risk - due to the volume of vehicles using the accessway as well as HCV movements which can have reduced close-range visibility of cyclists below the cab, whilst a larger vehicle collision will generally result in a higher severity outcome.

4.2.6.2 Cyclist Volumes

Cycle volumes are considered below, Table 4-1 shows the cycle counts undertaken in 2012[17], which suggest the current peak hour cyclist flows on the one-way system are tidal, with the predominant movements being southbound in the AM peak period and northbound during the PM peak period.

[16] It is noted that minor width alterations to traffic lanes or footpaths is considered feasible.

[17] Taken from Central Dunedin Cycle Survey Results 2012 (NZ Transport Agency), for Wednesday 5 December 2012 – note these counts were undertaken within the school holiday period. Count site at North Ground, northbound and southbound.

Table 4-1: 2012 Cycling Counts

	Northbound		Southbound	
Time	8.00-9.00	17.00-18.00	8.00-9.00	17.00-18.00
Count	3	28	38	11
AADT Estimate	112		191	

Further cycle counts were undertaken in subsequent years. Table 4-2 shows the calculated annual average daily cycle use volumes for each block surveyed during the period 2013 – 2014. This suggests that daily flows are fairly consistent in each direction.

The recorded counts have been adjusted by a scale factor which recognises that the surveys were undertaken during the summer university semester break, when many persons who might otherwise travel by cycle, were absent. The scale factor of 1.13 was taken from the Cycle Network and Route Planning Guide (LTSA 2004).

Table 4-2: Annual (2013/14) Average Daily Cycle Traffic Estimation

DAILY CYCLE VOLUME	Leviathan Hotel -Stuart St	St Andrew St -Hanover St	Frederick St -Albany St	Dundas St -Howe St
Northbound	141	190	198	187
Holiday adjusted value	159	215	224	211
Southbound	127	193	208	196
Holiday adjusted value	143	218	235	221
Combined adjusted volume (north & south)	302	433	459	432

By comparison, in February 2014 DCC undertook 24 hour cycle counts on both North Road (North East Valley) and Portsmouth Drive, where the average number of weekday cyclists recorded (combined for each direction of flow) was 322 and 380 respectively. Whilst these sites are not in close proximity to the study area, they do serve as a validation for the figures extrapolated in Table 4-1 above.

There have been considerable fluctuations in the travel to work by bicycle census data as displayed in Table 4-3:

Table 4-3: Census Travel to Work by Bicycle[18] Data

	2001	2006	2013
Travel to work mode	**1173**	**858**	**1224**

It is not entirely clear why there was such a drop in 2006 from the relatively stable levels of 2001 to 2013, however inclement weather during the census survey day is expected. In terms of a share of the total work commute, this was 2.7% in 2001, 1.8% in 2006 and 2.6% in 2013.

4.2.6.3 Separated Cycle Lane Width

The width of the SCL is an important factor in making the lane safe and efficient, and thereby attractive for cyclists to use. The original investigation work (during the Strategy stage) considered the following widths:

- Option 1 (uni-directional)
  - SCL Midblock: 2.6m
  - SCL intersection: 1.6m

[18] Main means of travel to work for employed people from census data

- o SCL Midblock with parking / accessway shoulder: 1.6m

- Option 2 (bi-directional)
  - o SCL Midblock: 3.2m
  - o SCL intersection: 2.8m

These widths have generally been maintained for the more detailed options analysis except for Option 1 midblock with parking, which has been widened to 1.8m, and different options at accessways. However some additional commentary is provided below as to the implications of these widths.

For Option 1, a standard mid-block width of 2.6m provides a high level of service and sufficient width for cyclists travelling at different speeds to pass each other comfortably. At intersections this width is reduced, as passing would not be expected, so 1.6m for the entry and departure from an intersection is satisfactory. For sections where parking alongside the SCL is provided, the SCL width would need to narrow to 1.6m, which would again prevent passing. Midblock with parking has been widened to 1.8m, which is generally considered too tight to pass other cyclists, however provides an improved visual quality for cyclists. It is noted that passing maybe possible with communication between the two cyclists, and this would not be possible with a 1.6m wide facility.

For Option 2, the SCL must cater for two-way cycling. The 3.2m lane would adequately provide for the two-way movement, with a 1.6m width available for single file cycling in each direction. The 1.6m width would not allow cyclists to pass other cyclists at any point within their marked lane. However, cyclists could potentially pass by using the adjacent (and opposing movement) lane when it is clear of oncoming cyclists. The 1.6m width would also lose the social interaction of cyclists being able to ride side by side and talk. The relatively flat and straight alignments over most of the route assist in this regard, both in terms of visibility in selecting an appropriate location / suitable gap to pass, and also in judging speeds.

It is expected from the outset, there would be sufficient gaps within the cycle traffic flows for this passing manoeuvre to be undertaken with ease. The cycle count data suggests that current cyclist flows on the one-way pair are tidal, with the predominant movements being southbound in the AM peak period and northbound during the PM peak period. Given these figures, it is expected that a two-way 3.2m lane would operate satisfactorily with adequate passing opportunities to allow faster cyclists to pass slower moving cyclists as necessary.

However, an objective of the SCL provision is to facilitate the adoption of cycling within the city, with the desired outcome being a substantial increase in overall cycling trips. Consequently, as usage of the SCL increases, there is the potential that passing opportunities become more and more limited. This could reduce the overall LoS of the facility and its attractiveness to users (leading to some cyclists becoming unwilling to use the SCL), and is therefore considered a potential longer term limitation of Option 2.

4.2.7 Do-Minimum Option

The Do-Minimum alignment is not satisfactory, failing to meet most of the outcomes detailed in Section 3, hence leading to this project investigation.

The Do-Minimum has been assumed as the continued maintenance and operation of the existing State Highway and cycling facilities. There is scheduled pavement and surfacing maintenance work within the near future. However, this makes no impact on cycling provision and is not therefore considered. Instead the Do-Minimum option is considered to include no new cycling infrastructure.

The Do-Minimum consists of maintaining the existing cycle lane infrastructure within the SH 1 one-way pair:

I. The cycle lane on the northbound one-way is currently positioned on the left of traffic and adjacent to the kerbside parking. Changes in early 2013 increased the width of the cycle lane to 2.4m from the Leviathan Hotel throughout the one-way system. With the exception of one block at St Andrew Street (2.0m wide) the cycle lane is between 2.3m - 2.4m for the full length to Duke Street, where it narrows and splits direction at the intersection with Pine Hill Road.

II. On the southbound one-way the existing situation is a separated cycle path from Pine Hill Road to Duke Street. South of Duke Street the cycle lane is again to the left of moving traffic adjacent to the kerbside parking and is a consistent 2.4m wide through to Stuart Street. From Stuart Street the cycle lane narrows as the road transitions from two lanes of traffic to three or four lanes prior to the intersection with Queens Gardens.

4.3 Detailed Business Case Analysis

The tables below outline the development of the two chosen options for the project. The DBC Options are directly derived from the earlier investigation during phase but with the two options progressed to a greater level of assessment.

Table 4-4: DBC Background Summary Table

Proposal Details			
Activity Name:	Dunedin Central City Cycling Options: DBC	Name of Project Manager & Region:	Simon Underwood - Dunedin
Activity Description:	Investigate and develop a concept design for enhanced cyclist and pedestrian safety on the one way pair, through the introduction of separated cycle facilities		
Background Information			
Geographic Context:	The general geography scope for the DBC assessment was considered as the area of: • Cumberland Street, Great King Street to the West • Pine Hill Road, Bank Street to the North • Cumberland Street, Castle Street to the East • Queens Gardens, Rattray Street to the South		
Economic Context:	As expected for a central city area, the land use is a broad mix of retail, commercial, healthcare, leisure and residential (generally higher density). The proportion of residential use increases towards the north further away from The Octagon, with a corresponding decrease in commercial uses.		

Table 4-5: Option 1: Planning Objectives & Implementability

<table>
<tr><th colspan="7">DBC OPTION 1 –One-way Pairs Uni-directional SCL (including variant Option 1A)</th></tr>
<tr><td>Option Description:</td><td colspan="6">This option is based on a uni-directional SCL constructed the whole length of the SH 1 one-way pair north of Rattray Street, with the SCL located on the true right-hand side of the road. This option replaces the existing cycle lanes over the whole length of the route and requires the removal of on-street parking from the right hand sides of the one-way streets.

Option 1 involved the removal of all parking along the kerbside where the SCL was provided. Option 1A retained as much parking alongside the SCL (on the true right side of the road) as was considered practicable for acceptable safety and operational requirements). In both variants, parking on the true left was generally unchanged.</td></tr>
<tr><td rowspan="6">Estimated Total Public Sector Funding Requirement:</td><td colspan="2"></td><td colspan="2">Lower (Expected)</td><td colspan="2">Upper (95th)</td></tr>
<tr><td colspan="2">Capital Cost ($m):</td><td colspan="2">8.0</td><td colspan="2">10.4</td></tr>
<tr><td colspan="2">Net Property Cost ($m):</td><td colspan="2">0.0</td><td colspan="2">0.0</td></tr>
<tr><td colspan="2">Opex ($m/40yr):</td><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td colspan="2">Maintenance ($m/40yr):</td><td colspan="2">13.9</td><td colspan="2"></td></tr>
<tr><td colspan="2">Present Value of Cost to Govt.($m):</td><td colspan="2">12.1</td><td colspan="2"></td></tr>
<tr><td>Timing of need:</td><td colspan="2">Optimal Programme:</td><td colspan="2">2016</td><td>Likely:</td><td>2016</td></tr>
<tr><td>IRS Profile:</td><td>Strategic Fit:</td><td>H</td><td>Effectiveness:</td><td>H</td><td>Efficiency:</td><td>M</td></tr>
<tr><th colspan="7">Planning Objectives</th></tr>
<tr><td>Objective:</td><td colspan="6">Performance against planning objective:</td></tr>
<tr><td>Improve road safety for cyclists; to provide a safe route choice for cyclists</td><td colspan="6">There is an established travel demand for cycling on the one-way system but a safety risk exists particularly for cyclists and a substantial improvement in safety performance is required. Option 1 provides separation between motor vehicles and cyclists by physical means in mid-block sections, and by temporal traffic signal timings at (most) intersections. This separation is expected to result in a step-change safety improvement for cyclists.</td></tr>
<tr><td>Facilitate the adoption of cycling as a safe and practical choice for inner city transport</td><td colspan="6">Investigation work undertaken during 2013, together with public consultation, established there was a strong travel demand for cycling on the one-way system and while alternatives routes play an essential role in providing for those traveling via cycle within the central city, the one-way system would remain central to the existing, and any new, cycle network infrastructure within the central city.

By providing a SCL facility on the route where there is an existing (and expected future) demand, the system provides good connectivity and directness and is likely to be highly attractive to cyclists. In combination with the increased safety performance, the SCL is expected to make cycling a more desirable mode of travel, resulting in a growth of cyclist numbers on the one-way system and consequently more widely across central Dunedin.</td></tr>
<tr><td>Contribute to an integrated central city cycle network and adjoining wider city cycle network</td><td colspan="6">The one-way pair has an established cycling demand and it is expected that an SCL would act as a future major cycling route in an arterial type function. The project (and options) have been developed in full partnership with DCC and will support the creation of a wider connected and integrated cycle network throughout central city Dunedin and the wider area.

In parallel to the SCL project, existing network gaps have been identified, with work being undertaken by DCC to address these gaps and maximise connectivity to the proposed SCL.</td></tr>
</table>

To integrate opportunities to improve pedestrian safety and amenity	At signalised intersections, it has been demonstrated (within the Traffic Signal Operation Report[19]) that the LoS and safety for pedestrians can be significantly improved from the existing situation. Traffic signal phasing to support the SCL and cyclist movements, will reallocate a proportion of the signal cycle time to the pedestrian phase (which runs concurrent to the SCL), thereby affording pedestrians an increased time to cross the street. Therefore reducing the wait time between the pedestrian phases during each signal cycle. From a safety perspective, pedestrian movements will receive full protection from turning traffic when the signal phasing is changed, this is a substantial improvement to the current situation (noting that partial protection has recently been provided in isolation on a number of intersections throughout the one-way system).
Rationale for Selection or Rejection of Option:	Option 1 was approved by NZTA to be considered at Detailed Business Case for a number of reasons; • The proposed works are expected provide a high standard and long term solution which safely provides for cycling within Dunedin city centre. • A uni-directional SCL along the one-way pairs would replace the existing on-road facility and follow a well-known route where an established demand exists and future demand is expected. • There was a high level of support received during public consultation for the provision of an SCL and particularly this option.
Implementability Appraisal of Option 1: One-way Pairs Uni-directional SCL (including variant Option 1A)	
Technical:	Option 1 is relatively straight forward in terms of overall complexity, providing a uni-directional SCL along the right-hand side of the SH 1 one-way pair. No topographical survey has been undertaken for this DBC. This is considered a relatively low risk given the nature of the proposed works and on-site width verification measurements undertaken. However, such a survey will be required at detailed design stage and would record service box locations which may require minor alterations to the design. Avoiding service relocations (resulting from kerb line alterations) is an important requirement, as any major service relocations would result in increased costs and possibly affordability issues. The relocation of some existing kerb line is necessary, though changes are minimal. In addition, any kerb line changes have been cross referenced against existing services plans to avoid any high cost relocations (however pot-holing will be required in the later stages of design). The removal of on-street parking is required to provide a wider lane, ensure sight distances are attained and provide a higher quality facility for cyclists. In some locations parking can be retained and the SCL width reduced, however this reduces the LoS for cyclists and would mean that passing slower cyclists is not possible for the length of this reduction. Parking spaces have been removed in this option, principally for safety reasons at accessways and intersections, but also to maintain and protect the high standard of SCL provision, and finally for logicality, e.g. if only a single parking space could be retained within a street block. The effect on parking is considered in Section 5.2.6. The removal of parking is a contentious issue and is discussed further in the 'Public / Stakeholders' Section below.

[19] MWH Traffic Signal Operation Report (2015),

Consentability	Option 1 has straightforward consentability: • Cycleway works to be carried out within the State Highway designation require an outline plan approval from DCC (20 working days / non-notified). • A resource consent may be required under the NES soil contamination national environmental standard if the 25m³/500m² threshold is exceeded. No regional council consents are required as there are no works in a waterbody and no additional stormwater to be discharged.
Operational / Maintenance:	**Maintenance** The proposed works will result in a minor change to the state highway asset and therefore a corresponding change to the ongoing maintenance and operation of this section of SH 1. In effect, the general premise of the design is to reallocate one lane of the carriageway to SCL and its physical separator. Generally the existing kerb lines will remain in-situ. The overall width of carriageway to maintain will remain unchanged. However, the provision of the SCL and its separator will impact upon maintenance in varying ways: • The traffic loading on the carriageway of the new SCL will be reduced given it will only be trafficked by cyclists in future (though noting this is primarily a parking lane at present so traffic loadings will already be lower). Therefore, it is expected that pavement maintenance intervention in the new SCL will be reduced from current levels given its future use is only by cyclists. • It is expected that future maintenance of the SH 1 carriageway (reseal or rehabilitation) would only be necessary between the existing left-hand side kerb line and the new kerb line of the SCL. This method would also ensure the pavement surface level for the traffic lanes remains higher than the SCL, thereby ensuring positive drainage. • The surface quality of the SCL will become more important and require a high standard finish from the outset. However, following the initial surfacing, the surface should prove durable given the reduced traffic loadings (even with the provision of coloured surfacing material). • A full width resurfacing will be required when the SCL is introduced to remove ghost markings, and to also provide a high standard of surface within the SCL. Some milling of surface irregularities would also be required within the SCL to provide a smooth and consistent shape with no lips. • The design form ensures there are sufficient breaks in the length of the SCL separator to negate the need for significant changes to the existing stormwater infrastructure. A small number of additional sumps / pipework will be required where long lengths of the existing kerb line are being relocated (to provide additional width). Sumps may have to be re-levelled to form a smooth running surface for cyclists to traverse and existing grates exchanged for cycle friendly sump grates. • Similarly any service covers located within the SCL will need to be checked and re-set as appropriate, to form a flush level surface. Service covers may also need to be replaced with cycle friendly (e.g. non-slip types). The overall maintenance implications are expected to be broadly neutral. Rubbish collection would be undertaken with bins collected from the separator strip.

	Operation The operation of the one-way pairs is covered in the MWH Traffic Signal Operation Report. In summary, two through traffic lanes will be provided at all mid-block locations along the one-way system. Leading up to a signalised intersection, an additional lane will be gained either side of the two central through lanes to cater for left and right turning vehicles off the one-way system, thereby creating four separate lanes at the 4-arm signal intersections (replicating the existing layout). Immediately downstream of a signalised intersection, the turn lanes would reduce down to two through lanes again with the outside turning lanes being removed after the intersection. This method of operation has been modelled and accords with the projects overall objective of no reduction in LoS for the SH 1 through traffic. For the SCL, a new phase will be added to the intersection signal operation, so that cyclists can cross the side roads of the one-way system with full protection from turning vehicles. The new phase will also provide additional green time for pedestrians walking adjacent to the one-way system. The change in signal phasing disadvantages vehicles turning right off the SH 1 one-ways into side roads, as wait times will become longer and to a lesser extent, the same applies to side road traffic turning onto the one-way system. Overall the proposed signal operation has been tested and was demonstrated to work satisfactorily for the whole of traffic flow efficiency. Different cyclist progression speeds have been tested and good levels of co-ordination can be provided for cyclists progressing along the one-way system, avoiding the need for cyclists to stop at every signalised intersection.
Financial:	It is proposed to fund the SCL project from the National Land Transport Fund. Maintenance and operation costs should remain stable and broadly the same as the current budget requirement.
Public / Stakeholders:	Refer to stakeholder feedback in Section 6.

Table 4-6: Option 1: Option Assessment

Assessment of Option 1: One-way Pairs Uni-directional SCL (including variant Option 1A)	
Criterion	**Supporting Information**
Safety:	There is a significant safety issue with the current operation with the interaction between cyclists and motor vehicles within the one-way pairs. This has resulted in a significant number of crashes, including fatal and serious injuries. See Section 2.2.7 and Appendix C – Crash History Information. In addition to the actual crash occurrences, it is apparent from the consultation undertaken to date that there are also concerns about near misses and the overall safety of the existing on-road cycling facilities. By providing physical separation (and temporal separation at signalised intersections) between cyclists and motor vehicles, the conflict is removed (other than at accessways). As a result, the cycle safety on the one-way pairs is significantly improved and the number and severity of crashes is expected to be considerably reduced. It is also necessary to acknowledge that the construction of a SCL does create some additional safety considerations. The removal of parking is likely to result in greater pedestrian movement and increased mid-block crossing demand, if drivers' cannot locate a suitable car park in close proximity to their desired destination. Increased mid-block crossing increases the risk of a pedestrian vs. motor vehicle crash. Additionally, the construction of the SCL could potentially increase the risk of a pedestrian vs. cyclist crash, due to pedestrians crossing the SCL at mid-block location and being unaware or unfamiliar with the new cycle facility. The risk of death or serious injury crashes in such circumstances is expected to be very low.
Economy:	The detailed economic analysis is provided in Section 8 of this report and Appendix A - Economic Worksheets The main benefit of this option is the health and environment benefits from the proposed cycling facility. The health and environmental benefits are augmented by both pedestrian and cyclist safety benefits and cyclist travel time savings. The main safety benefits for this option include the separation of cyclists from vehicular traffic and parked vehicles, phasing improvements for pedestrians and cyclists at signalised intersections and a number of additional pedestrian crossing facilities, both signalised and in the form of kerb extensions. These improvements result in a reduction in cyclist hit object and cyclist crossing/turning crashes along with a reduction in pedestrian crossing crash risk. The cyclist travel time savings relate to the higher quality, separated cyclist facility, allowing cyclists to travel at slightly higher speeds in a safe manner. In terms of wider economic effects, appropriately designed, the SCL is not expected to be detrimental to the Dunedin city economy. It is expected that the SCL will create positive economic impacts; the SCL will safely carry a large number of both existing and new cyclists who commute for work and feed them into their place of work in the CBD. This will remove vehicular traffic off SH 1, which helps to reduce any CBD congestion, a problem which is known to cost the NZ economy millions of dollars every year. Whilst not specifically within the New Zealand environment, studies have shown that providing cycling facilities can create considerable economic benefits for a local area[20].

[20] Clifton et al. (2012) *Business Cycles – Catering to the Bicycling Market* TR News 280 May-June 2012

Integration:	The project supports road safety targets of reducing death and serious injury crashes. Promotion and development of active modes is a key government strategy under the GPS 2015, with investment in walking and cycling key to providing a land transport system that offers modal choice. Improved cycle networks are a vital component of this. Cycling is clearly recognised as an opportunity to play a greater role in providing additional transport system capacity, particularly in urban areas. Increased cycling also provides health benefits and mitigation against the adverse environmental effects of CO_2 emissions of motorised travel. Integration with the wider cycle network (existing and proposed) is important to provide a continuous high quality route for cyclists. The extents of this option have been considered for connectivity and future extension of the cycle network, in the context of the wider city cycle infrastructure. Staff at DCC are working on options to improve connectivity and safety within the local road network and to better manage cyclists travel needs when travelling to, from and across the SH 1 one-way system.
Social:	The main positive social impact generated by this proposed project / design, is the reduction of fatal and serious injury crashes. This benefit is predominantly recognised for the wider cycling community (either current or future), however local residents / workers / shoppers benefit by not attending serious crash scenes as a first responder. Witnessing such traumatic events can take a strong emotional toll on those persons unqualified, or not trained to experience such events. Positive social impacts are also expected with health benefits from increased cycling and reduced CO_2 emissions. Negative social impacts are likely to be experienced by retailers, businesses and individuals due to the loss of any parking and/or any negative impacts on delivery vehicle access.
Bio-Physical:	The cycleway passes through a highly modified, central city urban environment and will have minimal impact on this biophysical environment. The cycleway runs adjacent to locations containing 13 listed heritage trees. During the design we will need to confirm that the tree canopies and root systems will not be impacted by physical works, which is contrary to Section 15 of the Dunedin City District Plan.
Human Health:	The SCL has the potential to create many positive human health benefits. Increasing the number of people cycling can have significant benefits for health as people become more active. However, caution must be exercised because additional cyclists could create safety issues as cyclists are already overrepresented in fatal and serious crashes on the one-way system; this risk can however be offset by providing separated facilities that are well designed and provide a safe solution particularly where conflicts still take place (i.e. at accessways and intersections with vehicles). Further, there is the possibility that more cyclists will increase driver awareness around the possible presence of cyclists – the safety in numbers effect. A well designed facility that does not compromise on safety is also important because new riders attracted to the facility may well be less experienced / able and develop an unrealistic / false sense of security within the SCL, not expected any vehicle conflict to still take place (i.e. at accessways). Disturbing soil during construction that has a history of contamination can lead to adverse effects on human health. The NES soil contamination seeks to address this issue and as noted previously, resource consent may be required if the volume of earthworks exceeds the permitted threshold.

Cultural:	There are no known sites of cultural significance within the project extents. Given the small scale earthworks and disturbance proposed, accidental discovery is unlikely. NZTA minimum Standard Z/22 - Accidental Discovery Procedures should still be applied. This specification sets out the particular procedures to be followed in the event that an archaeological site, Koiwi or Taonga is accidentally discovered during investigation, construction and/or maintenance of the state highway network.
Property:	No land acquisition (or temporary occupation of private property) is anticipated for this project option, as the project has been designed to make use of the existing road corridor only.

Table 4-7: Option 2: Planning Objectives & Implementability

<table>
<tr><th colspan="7">DBC OPTION 2 –One-way Pairs Bi-directional SCL</th></tr>
<tr><td>Option Description:</td><td colspan="6">This option is based on a bi-directional SCL constructed the whole length of Cumberland Street, including the local road link on Emily Siedeberg Place, which connects the opposing directions of the SH 1 one-way legs at the central S-bend. This short local road link is suitable for a ‘Quiet Street’ treatment. Therefore, the southern part of this SCL would be located on the northbound one-way link, and the northern part located on the southbound link.

The true right-hand side of the road was been chosen for the SCL, as this side best links up with Emily Siedeberg Place, avoiding the need to cross the SH 1 one-way legs. This option would replace the existing cycle lanes in Cumberland Street and requires the removal of parking from the side of Cumberland Street for which the SCL is proposed.</td></tr>
<tr><td rowspan="6">Estimated Total Public Sector Funding Requirement:</td><td colspan="2"></td><td colspan="2">Lower (Expected)</td><td colspan="2">Upper (95th)</td></tr>
<tr><td colspan="2">Capital Cost ($m):</td><td colspan="2">5.6</td><td colspan="2">7.5</td></tr>
<tr><td colspan="2">Net Property Cost ($m):</td><td colspan="2">0.0</td><td colspan="2">0.0</td></tr>
<tr><td colspan="2">Opex ($m/40yr):</td><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td colspan="2">Maintenance ($m/40yr):</td><td colspan="2">9.5</td><td colspan="2"></td></tr>
<tr><td colspan="2">Present Value of Cost to Govt.($m):</td><td colspan="2">8.4</td><td colspan="2"></td></tr>
<tr><td>Timing of need:</td><td>Optimal Programme:</td><td colspan="2">2016</td><td colspan="2">Likely:</td><td>2016</td></tr>
<tr><td>IRS Profile:</td><td>Strategic Fit:</td><td>H</td><td>Effectiveness:</td><td>M</td><td>Efficiency:</td><td>M</td></tr>
<tr><th colspan="7">Planning Objectives</th></tr>
<tr><td>Objective:</td><td colspan="6">Performance against planning objective:</td></tr>
<tr><td>Improve road safety for cyclists; to provide a safe route choice for cyclists</td><td colspan="6">There is an established travel demand for cycling on the one-way system but a safety risk exists particularly for cyclists and a substantial improvement in safety performance is required. Option 2 provides separation between motor vehicles and cyclists by physical means in mid-block sections, and by temporal traffic signal timings at (most) intersections. This separation is expected to result in a step-change safety improvement for cyclists. However, major concerns exist as to whether a bi-directional facility can be designed to function safely in the Dunedin city centre along this route.</td></tr>
<tr><td>Facilitate the adoption of cycling as a safe and practical choice for inner city transport</td><td colspan="6">Investigation work undertaken during 2013, together with public consultation, established there was a strong travel demand for cycling on the one-way system and while alternatives routes play an essential role in providing for those traveling via cycle within the central city, the one-way system would remain central to the existing, and any new, cycle network infrastructure within the central city.

By providing a SCL facility on the route where there is an existing (and expected future) demand, the system provides good connectivity and directness and is likely to be highly attractive to cyclists. In combination with the increased safety performance, the SCL is expected to make cycling a more desirable mode of travel, resulting in a growth of cyclist numbers on the one-way system and consequently more widely across central Dunedin.</td></tr>
<tr><td>Contribute to an integrated central city cycle network and adjoining wider city cycle network</td><td colspan="6">The one-way pair has an established cycling demand and it is expected that an SCL would act as a future major cycling route in an arterial type function. The project (and options) have been developed in full partnership with DCC and will support the creation of a wider connected and integrated cycle network throughout central city Dunedin and the wider area.</td></tr>
</table>

	In parallel to the SCL project, existing network gaps have been identified, with work being undertaken by DCC to address these gaps and maximise connectivity to the proposed SCL.
To integrate opportunities to improve pedestrian safety and amenity	At signalised intersections, it has been demonstrated[21] that the LoS and safety for pedestrians can be significantly improved from the existing situation. Traffic signal phasing to support the SCL and cyclist movements, will reallocate a proportion of the signal cycle time to the pedestrian phase (which runs concurrent to the SCL), thereby affording pedestrians an increased time to cross the street. Therefore reducing the wait time between the pedestrian phases during each signal cycle. From a safety perspective, pedestrian movements will receive full protection from turning traffic when the signal phasing is changed, this is a substantial improvement to the current situation (noting that full protection has recently been provided in isolation on a number of intersections throughout the one-way system). A negative aspect is the need to reduce footpath widths at intersections to accommodate the two-way bi-directional SCL, which will reduce the pedestrian amenity.
Rationale for Selection or Rejection of Option:	Option 2 was approved by NZTA to be considered at Detailed Business Case for a number of reasons; The proposed works are expected to provide a high standard long term solution to provide for cycling within Dunedin city centre. As this option requires only a single (wider) SCL along Cumberland Street, it considerably reduces the need to remove car parking spaces (approximately 50% reduction in parking loss when compared to Option 1). The effect on access to property frontages is also significantly reduced (again the affect is approximately halved due to the overall SCL route length being effectively halved). A bi-directional SCL along the one-way pairs would replace the existing on-road cycle facilities and follows the well-known route where an established demand exists and future demand is expected. There was a high level of support received during public consultation for the provision of an SCL. Option 2 was also provisionally supported by key stakeholders. Ultimately this option is not preferred as the safety of cyclists using a bi-directional facility in this busy city centre environment is not considered acceptable. An additional issue is the reduced efficiency of operation of a two-way SCL facility on the signalised intersections of the SH 1 one-way pairs.
Implementability Appraisal of Option 2: One-way Pairs Bi-directional (Cumberland Street)	
Technical:	Option 2 has a greater level of technical complexity than Option 1, due to the bi-directional nature of the SCL. This means at times some cyclists ride against the flow of the State Highway system. This would occur between Burlington Street and Malcolm Street for southbound cyclists on Cumberland Street, then between Emily Siedberg Place and the SCL termination at the northern extent (Pine Hill Road) for northbound cyclists on Cumberland Street. This is considered further in the Operational and Safety sections below. It is desirable to avoid service relocations (resulting from kerb line alterations) where practical, as any major service relocations would result in increased costs and possibly affordability issues. Option 2 necessitates the relocation of substantial lengths of kerb line at intersections due to the

21 MWH Traffic Signal Operation Report (2015),

	cross-sectional width required to accommodate two-way cycle movements within the SCL. Kerb lines would require relocation on both sides of the highway. Reducing footpath widths at intersections down to between 2.0-2.5m is not considered to be a positive approach and is counterproductive to the objective of providing pedestrian (as well as cyclist), improvements. Intersections are locations of high pedestrian demand and density. Therefore reducing footpaths is not desirable, particularly in locations of very high foot traffic and periodic concentrated pedestrian flows (such as near the university). The removal of parking adjacent to the SCL is required, as it would not be possible to maintain parking at any location alongside the SCL due to width constraints. However parking could remain on the opposite side of the State Highway. As the facility is bi-directional, no new facilities would be required on Great King Street or Castle Street meaning parking could be maintained at current levels. The effect on parking has not been considered in detail but is expected to be less than Option 1, given that roughly 50% less of SH 1 is effected by Option 2. The removal of parking is a contentious issue and discussed further in the 'Public / Stakeholders' cells below. No topographical survey has been undertaken for this DBC. This is considered a relatively low risk given the nature of the proposed works and on-site width verification measurements undertaken. However, such a survey will be required at detailed design stage and would record service box locations which may require alterations to the design.
Consentability	Option 2 also has straightforward consentability. The only point of difference is the small section of road connecting Cumberland Street north and south, which is not subject to the state highway designation. This is shown as "road" on the Dunedin City District Plan maps and the written approval of DCC is required to use this section of road.
Operational / Maintenance:	**Maintenance** The proposed works will result in a minor change to the state highway asset and therefore a corresponding change to the ongoing maintenance and operation of this section of SH 1. In the midblock sections, 4-5m of the existing carriageway would be reallocated to SCL and its physical separator. Whereas at intersections, part of the existing footpath would have to be removed (both sides of the road), with the kerbs setback to provide additional space for the SCL. The overall width of carriageway to maintain will remain unchanged for the mid-block situation, but would need to increase at intersections by at least 1m due to the reduced footpath widths. The provision of the SCL and separator will impact upon maintenance in varying ways: • The traffic loading on the carriageway of the new SCL will be reduced given it will only be trafficked by cyclists in future (though noting this is primarily a parking lane at present so traffic loadings will already be lower). Therefore, it is expected that pavement maintenance intervention in the new SCL will be reduced from current levels given its future use is only by cyclists. • It is expected that future maintenance of the SH 1 carriageway (reseal or rehabilitation) would only be necessary between the existing left-hand side kerb line and the new kerb line of the SCL. In the mid-block sections this would reduce from the existing 14m of carriageway down to around 10m. Maintaining a 10m width has cost benefits and it also ensures the pavement surface level for the

vehicle traffic lanes remains above the SCL, thereby ensuring positive drainage.
- The surface quality of the SCL will become more important and require a high standard finish from the outset. However, following the initial surfacing, the surface should prove durable given the reduced traffic loadings (even with the provision of coloured surfacing material).
- A full width reseal will be required when the SCL is introduced to remove ghost markings, and to also provide a high standard of surface within the SCL. Some milling of surface irregularities would also be required within the SCL to provide a smooth and consistent surface with no lips.
- For the midblock sections, the design form ensures there are sufficient breaks in the length of the SCL separator to negate the need for significant changes to the existing stormwater infrastructure. A small number of additional sumps / pipework will be required where long lengths of the existing kerb line are being relocated (to provide additional width). Sumps may have to be re-levelled to form a smooth running surface for cyclists to traverse and existing grates exchanged for cycle friendly sump grates.
- For the intersections, where kerb lines are setback, new sumps and pipework would be required as the existing stormwater infrastructure would be incorrectly located (i.e. sumps would be offset from the new kerb line).

Rubbish collection would be undertaken with bins collected from the separator.

The overall maintenance implications are expected to be broadly neutral.

Operation

The operation of the one-way pairs is covered in the MWH Traffic Signal Operation Report. In summary, two through traffic lanes will be provided at all mid-block locations along the one-way system. Leading up to a signalised intersection, an additional lane will be gained either side of the two central through lanes to cater for left and right turning vehicles off the one-way system, thereby creating four separate lanes at the 4-arm signal intersections. Immediately downstream of a signalised intersection, the turn lanes would reduce down to two through lanes again with the outside turning lanes being removed after the intersection.

This method of operation has been tested and agrees with the projects overall objective of no reduction in LoS for the SH 1 through traffic.

For the SCL, a new phase will be added to the intersection signal operation, so that cyclists can cross the side roads of the one-way system with full protection from turning vehicles. The new phase will also provide additional green time for pedestrians walking adjacent to the one-way system.

The change in signal phasing disadvantages vehicles turning right off the SH 1 one-ways into side roads, as wait times will become longer and to a lesser extent, the same applies to side road traffic turning onto the one-way system.

Overall the proposed signal operation has been tested and demonstrated to work satisfactorily for whole of traffic flow efficiency.

However, for cyclists progressing against the flow of vehicular traffic on the one-way system, a good level of cyclist green wave co-ordination is more difficult to achieve. This is because the priority for the green wave co-ordination is given to motor vehicles travelling along the one-way. As a result of this, cyclists travelling in a contraflow direction are likely to be required to stop regularly along the route. This reduced LoS is unlikely to be acceptable to cyclists and is expected to result in a transferral of users to other routes or cyclists running red lights. This is considered to be a flaw in

	this option.
Financial:	It is proposed to fund the SCL project from the National Land Transport Fund. Maintenance and operation costs should remain stable and broadly the same as the current budget requirement.
Public / Stakeholders:	Refer to stakeholder feedback in Section 6.

Table 4-8: Option 2: Option Assessment

Assessment of Option 2: One-way Pairs Bi-directional (Cumberland Street)	
Criterion	**Supporting Information**
Safety:	There is a significant safety issue with the current operation with the interaction between cyclists and motor vehicles within the one-way pairs. This has resulted in a significant number of crashes, including fatal and serious injuries. See Section 2.2.7 and Appendix C – Crash History Information In addition to the actual crash occurrences, it is apparent from the consultation undertaken to date that there are also concerns about near misses and the overall safety of the existing on-road cycling facilities. By providing physical separation (and temporal separation at signalised intersections) between cyclists and motor vehicles, the conflict is removed (other than at accessways). However, with Option 2, there is a major safety concern that cyclists travelling in a contra-flow direction to the one-way system would be at risk of crashes with vehicles at accessway locations. This is because the direction of cyclists approaching the accessway will be unexpected for road users entering or exiting an accessway for the one-way system (with their expected focus being on other one-way system traffic). This is further compounded by the central city location with busy commercial accessways, resulting in high usage and heavier vehicles (in some cases with reduced cab visibility). Furthermore, commercial accessways are also considered to be more problematic given that commercial vehicle drivers may be less familiar with the local surroundings (unlike residential accessway users), and fail to notice the contraflow cyclist movements. This safety issue is deemed to be a fatal flaw in the design for Option 2. Research from overseas suggests that two-way cycle paths alongside roads can create serious safety issues[22], and it has even been suggested that the crash rate may be up to 12 times the rate of providing no cycling measures at all.
Economy:	The detailed economic analysis for this option is provided in Section 8 and Appendix A - Economic Worksheets The main benefit of this option is the health and environment benefits from the proposed cycling facility. The health and environmental benefits are augmented by both pedestrian and cyclist safety benefits and cyclist travel time savings. The main safety benefits for this option include the separation of cyclists from vehicular traffic and parked vehicles, phasing improvements for pedestrians and cyclists at signalised intersections and some additional pedestrian crossing facilities. These improvements result in a reduction in cyclist hit object crashes and pedestrian crossing crashes; however, due to the two-way separated cycle lane arrangement and one-way vehicle traffic intersections will need to be negotiated with care, as a result there is no expected reduction in crossing/turning crashes for this option. The cyclist travel time savings relate to the higher quality, separated cyclist facility, allowing cyclists to travel at slightly higher speeds in a safe manner. As with Option 1 In terms of wider economic effects, appropriately designed, the SCL is not expected to be detrimental to the Dunedin city economy. It is expected that the SCL will create positive economic impacts; the SCL will safely carry a large number of both existing and new cyclists who commute for work and feed them into

[22] Autumn-Hall L. & Adams M. 1998 “Sidewalk Bicycling Safety Issues”. Transportation Research Record 1636.

Leden. 1989 Technical Research Centre of Finland. Safety of Cycling children – Effect of the street environment.

Linderholm. 1984. University of Lund, Sweden. Signalised intersections function and accident risk for unprotected users.

Wachtel, A. & Lewiston, D. 1994. Risk Factors for Bicycle-Motor Vehicle Collisions at Intersections. ITE Journal, published by ITE, September 1994

	their place of work in the CBD. This will remove vehicular traffic off SH 1, which helps to reduce any CBD congestion, a problem which is known to cost the NZ economy millions of dollars every year. Whilst not specifically within the New Zealand environment, studies have shown that providing cycling facilities can create considerable economic benefits for a local area[23].
Integration:	The project only partially supports road safety targets of reducing fatal and serious injury crashes. Major concerns exist about the safety of contraflow cyclists near commercial accessways. Promotion and development of active modes is a key government strategy under the GPS 2015, with investment in walking and cycling key to providing a land transport system that offers choice. In this regard, Option 2 meets these GPS objectives. However, road safety remains a key government priority and the GPS specifically refers to the priority of safe cycling. This option is assessed as not providing a safe cycling solution. Integration with the wider cycle network (existing and proposed) is important to provide a continuous high quality route for cyclists. The extents of this option have been considered for connectivity and future extension of the cycle network, in the context of the wider city cycle infrastructure. Staff at DCC are working on options to improve connectivity and safety within the local road network and to better manage cyclists travel needs when travelling to, from and across the SH 1 one-way system.
Social:	Introducing an SCL should have the positive social impact of reducing fatal and serious crashes. With a bi-directional facility, separation is still provided for cyclists and the number of fatal and serious crashes should reduce from current levels. However, given concerns around the safe operation of this bi-directional facility, if crashes continue to take place, then all of the social benefits possible will not have been realised. This benefit is predominantly recognised for the wider cycling community (either current or future), however local residents / workers / shoppers benefit by not attending serious crash scenes as a first responder. Witnessing such traumatic events can take a strong emotional toll on those persons unqualified, or not trained to experience such events. Positive social impacts are also expected with health benefits from increased cycling and reduced CO_2 emissions. Negative social impacts are likely to be experienced by retailers, businesses and individuals due to the loss of any parking and/or any negative impacts on delivery vehicle access. Option 2 is however likely to result in the need to remove less parking spaces than Option 1. An additional negative social impact is the requirement to reduce footpath widths at intersections. This may create pedestrian congestion and increased difficulty for visually and mobility impaired pedestrians, or parents with pushchairs.
Bio-Physical:	The cycleway passes through a highly modified, central city urban environment and will have minimal impact on this biophysical environment. The cycleway runs adjacent to locations containing 7 listed heritage trees. During the design it will be necessary to confirm that the tree canopies and root systems will not be impacted by physical works, which is contrary to Section 15 of the Dunedin City District Plan.
Human Health:	The SCL has the potential to create many positive human health benefits. Increasing the number of people cycling can have significant benefits for health as people become more active. However, caution must be exercised because additional cyclists could create safety issues as cyclists are already overrepresented in fatal and serious

[23] Clifton et al. (2012) *Business Cycles – Catering to the Bicycling Market* TR News 280 May-June 2012

	crashes on the one-way system; this risk can however be offset by providing separated facilities that are well designed and provide a safe solution particularly where conflicts still take place (i.e. at accessways and intersections with vehicles). Further, there is the possibility that more cyclists will increase driver awareness around the possible presence of cyclists – the safety in numbers effect. A well designed facility that does not compromise on safety is also important because new riders attracted to the facility may well be less experienced / able and develop an unrealistic / false sense of security within the SCL, not expected any vehicle conflict to still take place (i.e. at accessways). With a two-way (i.e. bi-directional) facility, it is known that safety issues can be exacerbated, due to drivers not anticipating cyclist movements from the contraflow direction, causing collisions at intersections and accessways. Disturbing soil during construction that has a history of contamination can lead to adverse effects on human health. The NES soil contamination seeks to address this issue and as noted previously, resource consent may be required if the volume of earthworks exceeds the permitted threshold.
Cultural:	There are no known sites of cultural significance within the project extents. Given the small scale earthworks and disturbance proposed, accidental discovery is unlikely. NZTA minimum Standard Z/22 - Accidental Discovery Procedures should still be applied. This specification sets out the particular procedures to be followed in the event that an archaeological site, Koiwi or Taonga is accidentally discovered during investigation, construction and/or maintenance of the state highway network
Property:	No land acquisition (or temporary occupation of private property) is anticipated for this project option, as the project has been designed to make use of the existing road corridor only.

5 Recommended Project Option Description

The preferred project option is Option 1: One-way pair uni-directional facility, and was selected on the basis of both safety performance and network operation. The overriding differentiator between the two options was considered to be safety performance, with the safety of the two options considered to be markedly different. Option 2 was unable to be supported due to critical concerns around the safety of cyclists in two-way (bi-directional) SCL operation in the Dunedin central city environment.

The safety concern with Option 2 relates to the interaction of vehicles and cyclists at intersections and accessways where drivers would be less aware of contraflow cyclists riding against the one-way system, with the expectation of a significant increase in collisions.

The scope of Option 1 is to provide a one-way SCL along the one-way pairs. Mid-block, where no parking is provided, this would generally include a 2.6m separated cycle lane, with 1.6m physical separator to traffic. Where parking is retained alongside the SCL, this would result in a 1.8m SCL, with 0.8m physical separator to the traffic lane. At intersections, the SCL would be 1.6m width, with 0.5m separator strip.

The design of intersections and accessways and coordination of traffic signals is considered an essential component of providing a high quality and safe SCL. The specific approach proposed for these locations is detailed. Further detail is provided including the other design aspects such as pedestrian provision, parking, stormwater management and lighting.

5.1 Preferred Option Selection & Rationale

The recommended project option for the central Dunedin SCL is Option 1: One-way pair uni-directional facility.

The rationale for the selection of this option is summarised below:

- **Safety:** Option 1 was considered to be considerably safer than Option 2, as safety concerns relating to the safe passage of two-way cyclists on the one-way pairs system was too great to overcome. This issue relates specifically to the presence of accessways and intersections and the potential for drivers to fail to notice that a cyclist is approaching from the contraflow direction. This has been covered in more detail in Section 4.3. Option 2 is not supported in the Dunedin city centre on the one-way pairs due to the significant volume of accessways and intersections and fundamental concerns around cyclist safety.

- **Operation:** Option 1 can be accommodated within the traffic signal phasing coordination with an acceptable level of service provided to cyclists using the uni-directional SCL. This is possible because the cyclists' movements can be coordinated well with the 'same-direction' vehicular traffic on the one-way pairs. With a bi-directional facility (Option 2), a reasonable level of co-ordination could still be achieved[24] despite the fact that some cyclists are riding against the one-way vehicle flow i.e. against the motor vehicle green wave. Achieving a good level of service through coordination of motor vehicles (on the one-way pair) and SCL cyclists travelling in the same direction is possible by using the expected speed range of cyclists (15-20km/h), lead / lag signal phasing, and reallocation of spare capacity within the intersection.

Whilst the operational performance of both options does appear to be similar from the analysis undertaken, the overriding safety concerns of a two-way SCL conflicting with private accessways / intersections and drivers not necessarily expecting contra-flow cyclists, which results in Option 1 being selected as the preferred option.

This option has been developed further for the DBC and the details of this recommended project option are described herein.

[24] Refer to the MWH Traffic Signal Operation Report (2015), noting only the AM peak period was tested.

5.2 Project Scope

5.2.1 Proposed Cross Section

Refer to the drawings provided in Appendix F – Project Drawings.

The cross section proposed for the preferred option has been adapted from the original cross-sections considered as part of the preliminary options investigation. The cross-sectional splits described below have been derived based on the best allocation of road space that is considered to meet the needs of all road users in each scenario. It is however a fine balance between all users, with competing demands for road space within a constrained corridor.

The cross-sectional split has been selected for a variety of reasons which is described below.

5.2.1.1 Mid-block sections without parking (Figure 5-1)

- RHS Footpath (existing width) ~3.0m
- Separated Cycle Lane 2.6m
- Separator 1.6m
- RHS Shoulder 0.3m
- Traffic lane 3.3m
- Traffic lane 3.3m
- LHS Parking lane 2.9m
- LHS Footpath (existing width ~3.0m
- Total Width = 20.0m

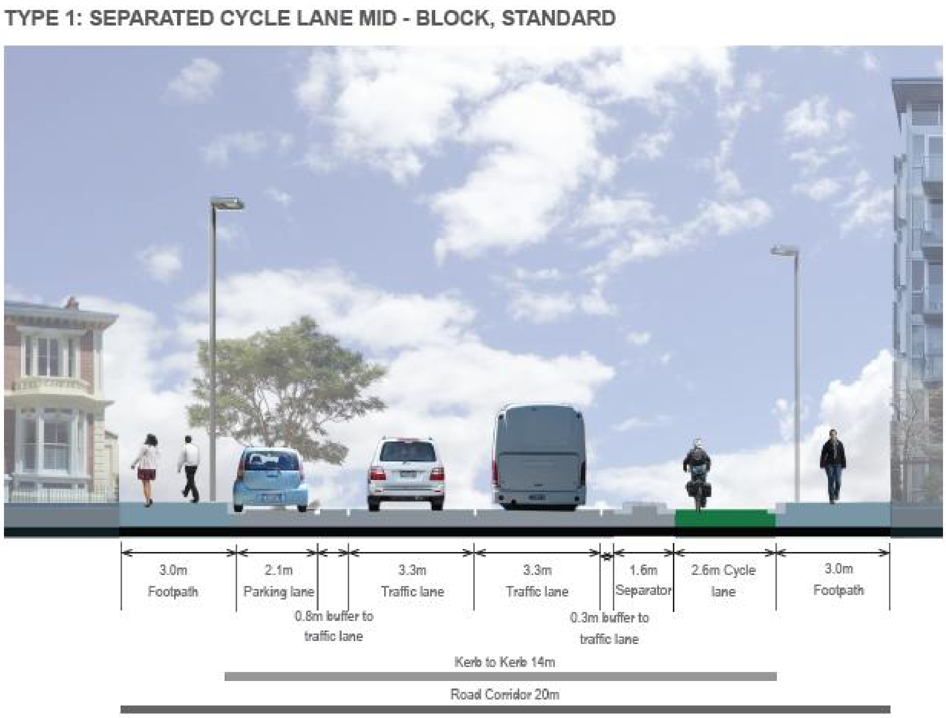


Figure 5-1: Typical Mid-Block Layout (no parking)

Maintaining the existing footpath width is considered preferential wherever possible, as it maintains a higher level of service for pedestrians, whilst also avoiding additional projects costs where they are unnecessary. In addition, relocating kerb lines carries additional risks because of the impact to services, both below and above ground apparatus, which can carry significant financial impacts.

A 2.6m wide lane is sufficient enough to allow cyclists to pass one another, providing a good quality of route that does not restrict cyclists of differing ability levels (and speeds preferences). The cycle lane is combined with a separator of 1.6m. Providing reasonable width for a separator is beneficial for providing a greater offset between cyclists and motor vehicles, also a wider separator is likely to prove attractive for cyclists. Furthermore, the width of the separator will also be sufficient for a wheelie bin to be placed upon, simplifying the ease in which rubbish collection can occur. A 0.3m shoulder between the edge of the physical separator and the lane edge line is also provided to further enhance the space between the cycle lane and motor vehicle traffic. The 0.3m provided in the mid-block sections without parking, also ensures consistency of line between adjacent sections that include parking (rather than have the edge line deviate between sections which would not be desirable).

Traffic lanes 3.3m wide are proposed, which is slightly narrower than existing width, but sufficient for safe and efficient traffic operation. Traffic lanes are widened around the S-curves (at Albany Street and Fredrick Street) to cater for the tracking of heavy vehicles. This is achieved via narrowing of the right hand side footpath from 3.0m to 2.0m. It is acknowledged that this results in a reduced level of service for pedestrian movement. However, given the locations this is proposed are mid-block (between intersections), then this is deemed a good balance between pedestrian and heavy vehicle tracking needs.

A left-hand side 2.9m parking lane is provided which consists of a parking bay (nominally 2.1m) and a buffer strip (0.8m) for opening car doors.

5.2.1.2 Mid-block sections with parking (Figure 5-2)

- RHS Footpath 2.0m
- Separated Cycle Lane 1.8m
- Separator (kerbed) 0.8m
- Parking lane 2.1m
- RHS Shoulder 0.8m
- Traffic lane 3.3m
- Traffic lane 3.3m
- LHS Parking lane 2.9m
- LHS Footpath (existing width ~3.0m)
- Total Width = 20.0m

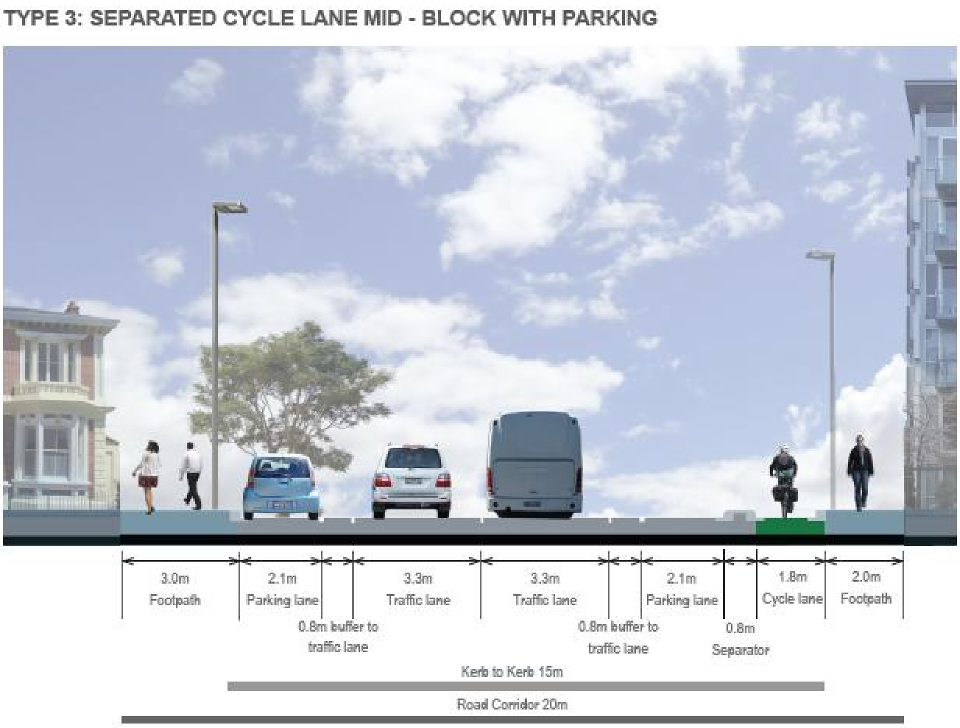


Figure 5-2: Typical Mid-Block Layout (with parking)

A reduction in the RHS footpath in the midblock situation (from 3.0m to 2.0m) is proposed to allow for the retention of some on-street parking on the right-hand side of the highway adjacent to the SCL. It is acknowledged that this results in a reduced level of service for pedestrian movement. However, given the locations this is proposed are mid-block (between intersections), then this is deemed a good balance between pedestrian and parking needs. The 2.0m footpath width, whilst narrow in a central city environment, is provided between intersections where densities of pedestrians are expected to be lower than the concentrations expected at intersections. In addition, the location of street furniture (signs posts, lighting columns, bins etc.) will need careful planning to maintain as much effective pedestrian width as possible.

An SCL width of 1.8m is proposed. This is a slight increase beyond the original concept widths of 1.6m where parking is provided. The additional 200mm is expected to offer the ability for competent cyclists to be able to pass slower cyclists in some circumstances, whereas at 1.6m, this is expected to be too narrow. This small reallocation of road space is therefore considered to be a positive measure in achieving improved route quality.

A separator strip of 0.8m is proposed to provide a buffer between the SCL and the parking bay. The concept design phase originally proposed this separator strip to be painted, rather than a physical measure. However, this has been refined and a physical separator is proposed. The basis for this change is to maintain continuity through the route. Furthermore, the expectation is that it will encourage better parking discipline with vehicles parking correctly next to the kerb, avoiding the potential to encroach over into the painted flush buffer strip. The risk with such encroachment is that car doors would then open into the SCL, which must be avoided. Whilst a 1.0m clearance for car door opening has traditionally been used across New Zealand, spatial constraints dictate this is not possible (without corresponding width reductions, and negative impacts on the rest of the cross section. The desirable minimum of 0.8m is in accordance with the Christchurch City Major Cycleway Design Guidelines (2015).

Traffic lanes 3.3m wide are proposed, keeping consistency through mid-blocks in the project area, except though the S-curves where lane widening is required to cater for the tracking of heavy vehicles. Similarly, a left-hand side 2.9m parking lane is provided which consists of a parking bay (nominally 2.1m) and a buffer strip (0.8m) for opening car doors.

It is important to recognise that maintaining consistency of line, and avoiding any sharp deviation of the lane and edge lines is important to ensure the safe and smooth operation of the vehicular traffic flow. The cross-sections proposed (and the transition between the different cross-sections) achieves this, by providing linear consistency for the through lanes in terms of centre line and edge line position.

5.2.1.3 Traffic Signalised Intersections (Figure 5-3)

- RHS Footpath (existing width) ~3.0m
- Separated Cycle Lane 1.6m
- Separator 0.5m
- Right turn lane 2.7m
- Traffic lane (through) 3.2m
- Traffic lane (through) 3.2m
- Left turn lane 2.8m
- LHS Footpath (existing width ~3.0m
- Total Width = 20.0m

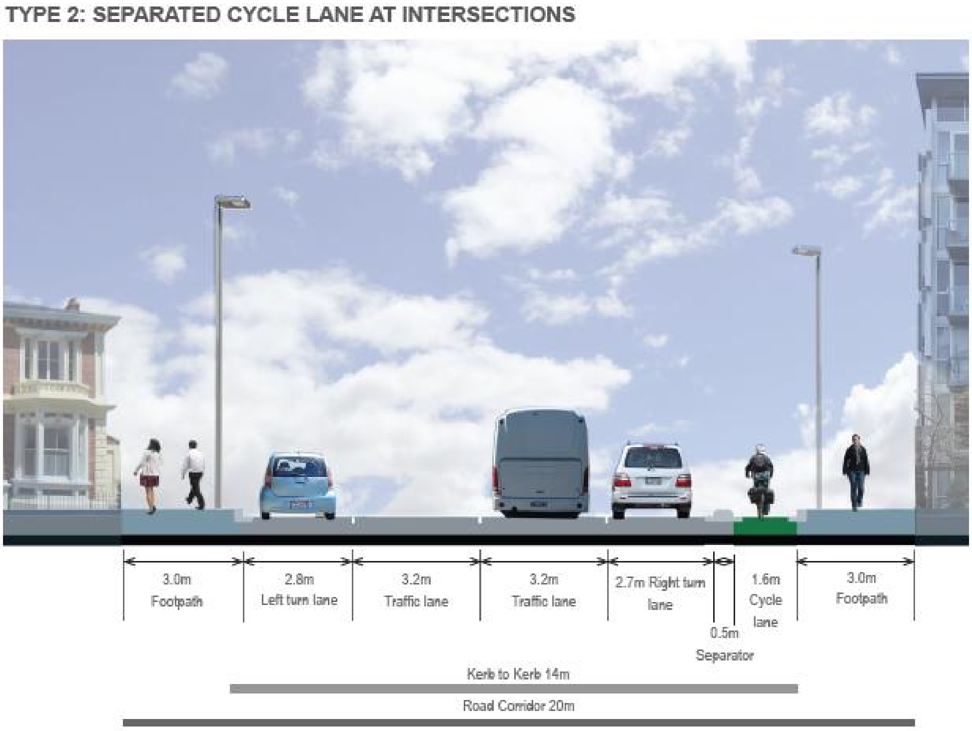


Figure 5-3: Typical Traffic Signal Intersection Layout

Both footpaths would be maintained at their current widths (except as noted at the S-curves), because of the concentration and stacking of pedestrians at intersections. Reducing these footpath widths over the greater project area was considered but rejected, as the need to maintain a high level of service for pedestrians was paramount.

In order to provide for all of the requirements of different road users at the intersections, it is necessary to reduce the SCL width down to 1.6m. This width is not sufficient to allow cyclists to pass over this length. However this is considered reasonable on the approach to the traffic signals to maximise usage of the available space given competing demands.

The separator will also be reduced down to 0.5m at signalised intersections. The early stages concept design proposed 0.3m separator at intersections. However, 0.5m is considered preferable given the additional separation – particularly as the right turn lane will be narrowed, combined with the potential for the protrusion of vehicle wing mirrors.

The right turn lane is proposed to be 2.7m wide, which is acknowledged as a necessary compromise, given the limited width available. It is expected that extra wide vehicles would actually need to straddle the right turn lane and part of the adjacent through lane, because the length of the right turn bay makes it difficult for larger vehicles to fully enter the right turn lane (given no over steer is possible). From the tracking undertaken for the existing intersection layouts, this situation already occurs. This is considered an acceptable and safe situation (no different from now) even when larger vehicles are queued at a right turn red arrow while waiting for cyclists and pedestrians.

The turning paths for right turning vehicles has been checked[25] and can be accommodated within the intersection footprint proposed.

Traffic lanes of 3.2m width are proposed, closely consistent with the mid-block sections, where the lane lines that form the mid-block sections provide consistency of line, avoiding any major deviations between the mid-block and intersection interface. By reducing the through lanes down from 3.3m to 3.2m at the intersection, it allows an additional 0.2m to be provided to the right turn lane, which is considered important to cater for larger turning vehicles.

[25] Using the RTS18 design vehicle (18m semi-trailer) tracking curves

A left turn lane of 2.8m width is proposed. Whilst this may be considered narrow, it is important to recognise that the current width of the left turn lane is generally narrow at typically 2.6m (with a range between 2.6m and 3.0m). There is an existing on-street cycle lane between the left turn lane and the through lane, which will be removed. Larger vehicles have been observed encroaching into the cycle lane to make their left turn more easily. A lane of 2.8m would continue to pose some difficulty for very large vehicles and it is expected that some heavy vehicles drivers would straddle part of the through lane. At detailed design stage it will be necessary to analyse the tracking paths for the left turn and determine whether the side road stop lines should be set back.

At traffic signal intersections a cyclist hook turn box is also proposed. A hook turn box is provided close to intersection kerb radius and caters for cyclists in the SCL that wish to turn left (i.e. across the SH 1 through traffic. It is acknowledged that the cyclist tracking into the left turn hook is tight and will need to be performed at low speed.

5.2.1.4 Priority Intersections (non-signalised)

There are only a small number of non-signalised intersections along the route of the SCL. The general treatment on these locations is a raised table to continue the SCL through the intersection, with a give-way / stop requirement for vehicles approaching the intersection (from the minor road), in advance of the SCL. This applies to any of the tee intersections on the route.

The detail of the treatment at the Howe Street / Cumberland Street intersection requires further consideration at detailed design. This is the only intersection that is not currently signalised at present, or proposed for signalisation as part of the SCL works. There is a risk at this intersection of drivers heading west on Howe Street and crossing Cumberland Street and only looking out for approaching motor vehicle traffic to the right, and failing to see cyclists in the SCL.

The specific signage and markings for the unsignalised intersections will be important during detailed design to ensure road users awareness of the facility and conflicts.

5.2.2 Separator Type

The separator type proposed in this DBC is a mountable concrete kerb with an asphalt infill between the concrete kerbs. No vertical measures are proposed on the separator at this stage – however, it is possible that some form of vertical feature could be provided during detailed design. Such features have a beneficial effect of reinforcing the presence of the SCL to vehicle drivers. Furthermore, additional vertical features could potentially assist in making cyclists feel safer (though the counter-productive effect of creating a false sense of security will also need further assessment). An example of additional vertical features within the separator could take the form of reflective safe hit posts.

Where accessways cross the SCL, a raised delineator is proposed. Providing vertical measures for vehicles to cross is considered highly beneficial in highlighting to drivers the presence of the cycleway and raising awareness. The intent would also be to provide high visibility markings on the raised accessway ramp to further reinforce the proximity of the cycleway.

The type of separation proposed is shown in **Figure 5-4** below from Beach Road in Auckland.

Figure 5-4: Example of separator type from Beach Road, Auckland

Additional signage and road markings will also need to be considered for the treatment of accessways. A small sign could be placed on the separator to warn drivers of the presence of the cycleway / cyclists. Furthermore, providing the green surfacing on the SCL through the accessways will also contribute to driver awareness.

5.2.3 Pedestrians

The desire to provide improvements for pedestrians, where possible, is an overall project objective. The need to maintain footpath widths at intersections is clearly important to avoid reducing pedestrian LoS. Whilst reducing the footpath at some mid-block locations to (generally) facilitate parking is proposed, this is not considered as a substantial reduction in LoS for pedestrians at these locations, as pedestrians should be less concentrated than at intersections. Furthermore, the impact of the reduced width can be mitigated by ensuring all street furniture is reduced and kept to a minimum by combining items (such as rubbish bins with lighting columns) and reducing footpath clutter. This will need to be considered in the detailed design phase.

As part of the Option 1 proposal there are a number of improvements also provided for pedestrians. These improvements will be most noticeable at signalised intersections, At all of the signalised intersections along the corridor, the pedestrian green time will be increased for those pedestrians moving parallel with the one-way system, on the same side as the SCL (i.e. RHS). This is due to changes to the signal phasing and the extra green time provided for the SCL movement, which will also provide extra green time for the parallel pedestrian crossing. In addition, this movement will become fully protected from turning vehicles (presently no or partial protection). Similarly, the pedestrian movement on the side opposite the SCL (i.e. LHS) will be provided with either full of partial pedestrian protection (presently no or partial protection), which can run with the SCL and through vehicle phase, affording a good level of service to pedestrians i.e. better than current LoS due to better protection and increased green time. The LHS pedestrian movement timing can occur independent of the RHS pedestrian movement.

For pedestrians crossing the SH 1 one-way on the upstream arm of the intersection, pedestrians will receive the same amount of green time as the current signal operation running during the side road phase/s. For the downstream pedestrian crossing on the one-way, protection will be required (either partial or full), with a lag applied to vehicles turning from side roads. It is envisaged there will be no change to the LoS for pedestrians crossing the one-way on either side of the intersection.

Additional mid-block uncontrolled pedestrian crossing provision is proposed, with kerb build outs to reduce the effective on carriageway crossing widths. These crossing points were originally identified in the early strategy work and have been verified as being suitable and beneficial locations. They are:

- Cumberland Street (northbound), opposite ASB House
- Cumberland Street (northbound), between Countdown Supermarket and Cadbury World
- Cumberland Street (northbound), opposite New World Supermarket
- Castle Street (southbound), opposite Cadbury World
- Castle Street (southbound), opposite Dunbar Street (Toitu)

5.2.4 Property Access

Property access is a key consideration for the project. Whilst the project aims to provide for cycling, maintaining a good level of access to property is essential in this central city environment.

The intent throughout, in terms of the treatment of existing accessways, has been to maintain as near as possible to the same level of access that is currently provided. It is not essential that any existing accessways or side roads are closed, however there are locations where closure would have benefit to the operation of the SCL – for example by providing greater lengths of continuous kerbed separation. Any accessways or side roads that could potentially be closed will be subject to consultation with affected parties and only selected for closure if a suitably convenient[26] alternative exists.

In terms of local road intersections, changes could be made to both Walsh Street and Clarendon Street that could benefit the SCL operation. No changes to either are considered essential, and whilst there would be benefit to the SCL, this needs to be balanced against impact on affected parties:

- Clarendon Street: for the SCL operation, one option considered was to close the intersection with Gowland Street and for Clarendon Street to operate as a two-way street. However, this is not considered feasible and therefore no changes are proposed.
- Walsh Street: as with Clarendon Street, an option considered was to close Walsh Street at the intersection with Malcolm Street, but this is not considered essential at this stage. On-site observations suggest Walsh Street is used as a rat-run to avoid the Albany Street / Malcom Street signals (though it is not known if there is sufficient enough volumes for this to be considered problematic), so it is possible that network changes could have broader benefits. Consultation with the University has shown numerous near misses with pedestrians in this area and they would support a closing or a one-way reversal.

5.2.5 Accessway Design

The layout treatment of accessways and basis for design is included with the Design Philosophy Statement. This includes details of sight distances adopted (and associated impact on parking spaces), expected driver behaviour for turning into and out of accessways, classification of types of access and consequential treatment selected.

The design objective is to provide a safe and efficient accessway for drivers, cyclists and pedestrians which can cater for the expected range of cycle user abilities with minimal disruption to highway traffic.

An 85th percentile operating speed of 55 km/h has been adopted for the one-way system. This reflects the speed that a portion of drivers are expected to travel along the route in free-flow conditions, particularly later in the green phase and in off-peak times.

[26] Suitably convenient is a subjective assessment but is taken to mean reasonably close, avoiding the need for excessive detours or significant additional journey length

For all accessways that allow a right turn in movement from the highway, the on-street parking shall be banned for a minimum of 30m in advance of the accessway measured from the nearside of the accessway.

The preferred approach for accessway treatment has been agreed with the client as follows:

- The governing parameter for accessway design and sight distance will be a 30m parking ban on the approach to any accessway. The 30m parking ban will govern the available sight distance.

- No application of additional SSD/SISD/MGSD will be applied to accessways with the 30m parking ban dictating available sight distance.

This approach is agreed on the basis of there being an established practice of on-street parking currently provided right up to accessways with only 1m of banned parking. The 30m parking ban and resultant sight distance provided is considered by the client to be an acceptable balance between the current parking in close proximity to accessways, and the full provision of Minimum Gap Sight Distance.

In terms of accessway design detail, three different treatment options are proposed:

- Low use: for the lowest use accessways (in terms of volumes), no formalised provision to cater for turning (in) vehicles – vehicles will simply turn from the through lane. This means that the SCL width remains at 2.6m when crossing the accessway.

- Medium use: for accessways that experience moderate usage, a level of shoulder / turning provision is provided for right turners into accessways. The facility provided a kerbed taper and then 10m bay prior to the accessway; this enables a right turning vehicle to move clear of the through traffic lane prior to turning. Following traffic could, at slow speed and with care (and dependent upon the type / size of vehicle turning and vehicle following) pass without crossing the centreline. This option reduces the width of the SCL through the accessway to 2.1m width.

- High use: for accessways that experience the highest levels of use, a higher standard facility is provided for vehicles turning into the accessway. A minimum of 10m length of fully developed shoulder / turning lane is provided prior to the accessway. The design for the high use accessway is similar to the medium use type, but provides greater width for turning vehicles. This greater width is provided by narrowing the SCL down to 1.6m through the accessway. This provides a width of 2.4m between the edge of the mountable separator and the edge line. Reducing the SCL width to such an extent will have a consequential reduction in LoS for cyclists – however given this type of treatment is only applied in a small number of instances, this is not considered to be an issue. Further, reducing the SCL width down through the highest use accessways is a positive measure to raise cyclists awareness of the presence of a high use accessway and increased potential for vehicle conflict (i.e. signifying a clear change).

5.2.6 Parking

It is necessary to remove on-road parking in a significant number of locations to accommodate the SCL. The parking removed is adjacent to the SCL (i.e. the RHS of the highway), whereas parking opposite (LHS) can be fully retained.

Parking removal is necessary to provide a safe and high quality system for cyclists and pedestrians. However, some right-hand side parking can be retained where this is not in conflict with accessways (in terms of safety and operation). Where parking is retained, it necessitates a reduced width SCL. The reduced width is likely to result in single file cycling where overtaking is either not possible, or becomes difficult (dependent upon various factors such as the lane position of the cyclists, behaviour, speed, size etc.).

A number of different options have been considered in respect of parking:

- Option 1 (uni-directional facility): Removal of all right-hand side parking (with a few exceptions)

- Option 1A (uni-directional facility): Removal of parking as is required for safe operation uni-directional facility
- Option 1B (uni-directional facility): Removal of all parking, with a small number of 'operational essential' parks retained
- Option 2 (bi-directional facility): Removal of all parks directly alongside the bi-directional SCL

5.2.6.1 Option 1

Detailed analysis of Option 1 has not been undertaken. However, the expectation is that almost all of the existing 393 parks would be removed, with the exceptions listed below:

- Outside Galaxy books, northbound, between Moat St and Duke St (as the SCL diverts down Moat St)
- Northbound, between Burlington St and the Leviathan (as the SCL will not commence until beyond this point)
- Southbound, between Stuart St and Dunbar St (due to the removal of a traffic lane)

5.2.6.2 Option 1A

Where parking is retained, it has been agreed[27] that a minimum of four adjacent car parking spaces must be provided. If it is not possible to fit at least four, then none will be provided. This is to provide some consistency in the kerb line position and avoid the solution becoming unsightly. Furthermore, providing parking in reasonable 'blocks' together should assist drivers' in identifying / recalling where on-road parking is provided on the true right-hand side of the road, avoiding late manoeuvring or excessive vehicle braking when isolated and unexpected parking places are observed as vacant.

The effect on parking (of implementing Option 1A) is assessed as follows:

[27] With the NZ Transport Agency Project Manager

Table 5-1: Parking Impacts Option 1A

	Southbound			Northbound		
Location	Existing	Proposed	Change	Existing	Proposed	Change
Dowling Street to Leviathan Cnr	0	0	0	10	9	-1
Leviathan Cnr to Stuart Street	13	8	-5 (1)	17	0	-17(4)
Stuart Street to St Andrew Street	29	0	-29(1)	23	0	-23(5)
St Andrew Street to Hanover Street	6	0	-6(2)	8	0	-8(2)
Hanover Street to Frederick Street	17	0	-17	18	13	-5**
Frederick Street to Albany Street	29	19	-10(2)	26	17	-9
Albany Street to Union Street	16	5	-11*	25	22	-3
Union Street to St David Street	23	10	-13	22	0	-22
St David Street to Dundas Street	28	28	0	25	22	-3
Dundas Street to Howe Street	12	0	-12(5)	14	0	-14(2)
Howe Street to Duke Street	19	0	-19(2)	13	2	-11
Duke Street to Great King St North	0	0	0	-	-	-
	192	70	-122	201	85	-116

Includes loss of a disabled park [signifies two disabled parks]*
Numbers shown in parentheses signify P5/P10 parks lost

Table 5-2: Option 1A Parking Summary

Parking Places	Number
Existing Total	393
Proposed	155
Parking places lost	238
Percentage Reduction	-61%

The figures above only include the parking on the side of SH1 where the SCL will be located (i.e. the true right side). In total it is estimated that 238 on-road parking spaces will be lost. It should be noted that these figures will require verification during detailed design and should be considered indicative only at this stage. No detailed site survey has been undertaken to verify the total number of spaces currently available, with totals derived from assessment of aerial imagery – as such it is not unexpected that there is some variation here to other studies undertaken[28].

5.2.6.3 Option 1B

This option focuses on those areas of greatest need, adjacent to those properties where there is a reasonable basis for either high customer turn-over, or need to have available for people drop-off/pick up. It is assumed that each location requires 2 parks, which would be marked as P5/P10s

- Southbound

  a. Good Earth Café. This could be immediately preceding the St David St traffic signals, or just after. Audience: order and run customers and delivery stops.

[28] Such as the Transport Agency / DCC SH1 Cycle Lanes Study, referencing a 2012 Parking Study conducted by Abley Transportation Consultants

   b. Te Rangi Hiroa College. This is a student halls of residence, which has a P5 now. Audience: taxis, drop-off/pick-ups (including mobility impaired students).

- Northbound

   a. ASB house. North of the Leviathon. Audience: office building deliveries, taxis, pick-up/drop off.

   b. Cadbury World. Audience: taxis, drop-off/pick-ups (including mobility impaired visitors).

   c. Food Department Café, at Walsh St. Audience: order and run customers and delivery stops.

   d. The Roast Office, Albany St corner. Audience: order and run customers and delivery stops.

   e. Alhambra rugby ground. North Ground. Located immediately past the northern end of building (also with a relocated post box). Audience: post box users, taxis, drop-off/pick-ups (including mobility impaired visitors).

   f. Cutlers/video/pizza. Dundas St to Howe St block. Audience: business delivery, order and run customers.

In summary Option 1B would retain 16 parks, and lose 377. It is important to recognise that this option for parking has only been subject to a brief high level assessment and it is possible that other locations would have an equally justifiable need for short term on-street parking.

5.2.6.4 Option 2

No detailed assessment has been undertaken for the parking impact associated with Option 2. However, given the total extent of the route is roughly half of the uni-directional facility, by virtue of this being two-way facility, it is reasonable to assume half of the existing parking supply would be removed. This therefore equates to a loss of around 195-200 spaces, with a similar number retained.

5.2.6.5 Parking Summary

Option 1A is considered to be the preferred approach for dealing with parking given it retains a reasonable amount of parking along the right-hand side of the highway, but removes sufficient parking for the facility to operate in a safe manner. However, as providing for parking results in a reduced width SCL, this option does have a consequential worsening of the overall LoS for cyclists. Option 1B provides a more efficient and higher quality facility for cycling because it retains a more consistent and wider SCL, and therefore offers an improved LoS to cyclists. Ultimately, Options 1, 1A and 1B could all be feasible, and will require a policy, rather than technical, based decision. Further clarification from DCC Working Group as to their preference for the approach taken to parking is required.

It should also be noted that a small number of side road parking spaces are anticipated to require removal, to allow for dual approach lanes and stacking capacity. From the assessment undertaken to date, this is expected to be in the region of 20 spaces for Option 1A (but will be subject to further intersection modelling for confirmation).

5.2.7 Intersections

As with accessways, the treatment of intersections becomes vitally important as they remain the only places where cyclist / vehicle conflict can occur.

The treatment at intersections for the SCL will be to continue the physical separation up to the signal stop line on SH 1. Cyclists will then receive a separate signal phase running with the parallel pedestrian stream. For ‘through’ cyclists (i.e. continuing along SH 1), the phase will run with through traffic on SH1, but separate to the right turn vehicle phase, so there will be no conflict with turning vehicles. For cyclists wishing to turn right, this will be done by filtering through the crossing pedestrians, which is considered very low risk. For left turning cyclists, they will need to wait in a new hook turn box (on the kerb radius) for the side road phase to commence, where cyclists can then continue ahead (i.e. completing the left turn in two stages without any vehicle conflicts).

Ensuring cyclists comply with the traffic signals is important so as the conflicting movements can be separated. Compliance will be more likely if delays to cyclists are minimised and a good LoS provided. This is covered further in the MWH Traffic Signal Operation Report (2015).

The design of the intersections will be similar to the current arrangement, comprising two through lanes and a left and right turn lane, though with the SCL replacing the current on-road cycle lanes and switched to the other side. Further, there will be a requirement to undertake various modifications to the intersections, including relocating signal poles / push button units, providing push button units for cyclists, provision of red arrow signal aspects for vehicles, setting back stop lines, providing hook turn boxes and cutting new loops (or providing new detention equipment), relocating kerbs and kerb cut-downs (and tactile paving).

The modifications have been included in the cost estimate.

5.2.8 Project Extents

The treatment of the SCL at the northern and southern extent is essential to ensure there is a suitable connection into the wider network for cyclists, this approach is described below:

- Southern Extent (Queens Gardens): The extent of the investigation for the southern termination of the SCL is Queens Gardens opposite Vogel Street. From a directness perspective, the ideal solution would be to create a new high quality path through Queens Garden, around the Cenotaph and connect to the existing intersection pedestrian crossing facility over Queens Gardens onto SH 1. However, from discussions with DCC Parks team, it is understood that a conservation order exists preventing such works taking place.

  The solution progressed therefore involves using the wide footpath on Queens Gardens opposite Vogel Street, heading east around the perimeter of the Gardens. The footpath here is wide enough to do so and avoids any widening (or tree removal). A pinch point exists for a small length on the radius from SH 1 into Queens Gardens effectively on the section that acts as an extension of Burlington Street. A right turn lane is developed on this section of Queens Gardens. It can be reduced in length so that it commences on the SH 1 section of Queens Gardens rather than around the curve (reducing its length from around 110m to 65m. The turning volumes here do not require such a long lane. This allows the kerb to be built out and the pinch point removed. From here two-way cyclist continue along a widened path (where parking will be removed), alongside the war memorial, before the splitting of the northbound and southbound SCLs either side of the Leviathan Hotel.

- Northern Extent (Pine Hill Road): Various options were considered but a key issue to overcome was the crossing of cyclist at Pine Hill Road / Great King Street intersection. No solutions for using this already complex high speed intersection with poor safety performance were considered viable. Instead a 3m wide shared path is proposed on the eastern side of Cumberland Street between Duke Street and Pine Hill Road for two-way cycling. This path curves around into Great King Street without the need for a crossing. Cyclist can then be crossed away from the intersection into the gardens (in a two stage movement with a wide median island provided).

  It is proposed to signalise the Cumberland Street / Duke Street intersection. At this location a diagonal crossing would cross southbound cyclists over the road and into the SCL.

  Northbound cyclists using the Great King Street SCL would turn down Moat Street (quiet street) into an eastbound SCL on Duke Street where they would connect into the new traffic signals and diagonal crossing over to the shared path running alongside the Botanic Gardens.

5.2.9 Pavement

The existing carriageway cross-section has a high crown and a very pronounced cross-fall between the kerb, edge lines and lane lines, some exceeding 10%. There are steep shoulders with high build-ups of AC above the existing lip of channel from +10-100m in places along a large proportion of the route. The recently surfaced sections have almost no AC build up above the lip of channel level. The existing markings are predominantly on the high crowns between the varying crossfall sections.

The design methodology is to correct the shape of the existing to match the proposed design. This will also allow for markings to be placed on the new crowns and will remove the ghost markings that generally occur on sites that require significant reconfiguration of lane space has occurred. This will also reduce the chance of the new wheel paths being located on the crown of a road which may affect driver behaviour and weaving along the route to stay on one side of the crown.

Areas with no AC build up adjacent to the kerb can have the existing crossfall improved with isolated milling (i.e. from kerb to edge line), however areas with extensive build ups will require extensive milling to remove this and improve the grade.

Most section lengths have been sandblasted in 2012 due to the last cycle way reconfiguration and any removal of markings needs to account for existing and dealing with the old markings. We have reviewed the forward works programme and agree with most of the renewal dates and have used this to help strategise when we would be best to implement a treatment, however this brings risks that treatments may not occur as programmed. The Transport Agency's maintenance and operations team may have different drivers once this project goes to construction and the current sites may be deferred. To counter this, the resurfacing of these sites is included in the scheme estimate to meet the project objectives rather than the asset management objectives.

From an asset management perspective reshaping the carriageway to remove crowns, ghost markings and AC build-ups at the edge of channel may be hard to argue. As a fall-back, an additional option has been investigated should this not be a preferable treatment option. This alternative option would only undertake isolated milling / resurfacing, and relies upon the forward works programme to undertake more comprehensive surfacing and shape correction. This option may save hundreds of thousands of dollars which could be utilised elsewhere, however it may potentially result in some safety issues and cause constructability issues for achieving the intent of the project. Furthermore, it would leave behind a facility that would not be fully completed until 2024/25.

5.2.10 Stormwater

No concept design for stormwater management has been undertaken for this DBC as the impact on the stormwater system will be localised and minimal. It is however noted that, given the need to relocate a number of kerb lines within the project, it is expected that some minor localised changes to the stormwater system will be required. Because in locations where the kerb line is relocated (with the footpath reducing in width from 3m to 2m), the existing sumps will no longer be correctly situated to catch the surface water runoff at the kerb line.

Due to the existing pavement lips observed at the channel (where in places the asphalt is around 100mm higher than the lip of channel, forming a pronounced step) at various places throughout the one-way system, milling and reshaping of the surface is required. This should be undertaken in conjunction with the kerb and sump relocations. Further assessment will be required at detailed design to determine the exact extent of the milling and reshaping to ensure suitable crossfalls are maintained and surface water continues to flow to the kerb.

Any relocated sumps, together with all of the existing sumps situated within the SCL need to be fitted with high quality cycle friendly grates to avoid becoming a hazard to cyclists. Such a grate is shown in **Figure 5-5**:

Figure 5-5: Example of cycling friendly sump grate

5.2.11 Trees

The impact on trees has been assessed. The removal of any designated trees is unlikely to be necessary through two trees may require periodic crowning (refer to Section 7.2.3).

In addition to the effect on designated trees, there are numerous other trees (within the road corridor) that will be affected by the implementation of the SCL. A confirmed number of trees lost will be dependent on the form of the detailed design and the final option selected for the SCL (and parking); however, Option 1A has been assessed as it is considered to the worst case scenario.

Table 5-3: Tree Impacts Option 1A

	Northbound	Southbound
Location	Number removed	Number removed
Dowling Street to Leviathan Cnr	-	1
Leviathan Cnr to Stuart Street	-	-
Stuart Street to St Andrew Street	3	3
St Andrew Street to Hanover Street	1	-
Hanover Street to Frederick Street	3	1*
Frederick Street to Albany Street	-	-
Albany Street to Union Street	-	1
Union Street to St David Street	-	1
St David Street to Dundas Street	-	-
Dundas Street to Howe Street	1	-
Howe Street to Duke Street	-	5
Duke Street to Great King St North	-	-
Total	**8**	**12**

**A number of trees exist along this section of the route close to the existing kerb line. At this stage of assessment it is expected they could be retained through regular trimming*

There may be opportunities for a number of replacement street trees to be planted but this will require further analysis during the next phase of design.

5.2.12 Signage and Road Markings

The drawings provided have included indicative road markings and these must be fully considered at the detailed design stage. Nevertheless the drawings provide a reasonable level of detail to demonstrate how the road markings would be used within the proposed layout.

Signage has not been included at this stage of the investigation. Signage plays an important safety role in providing road user information and will be an important aspect of detailed design, particularly due to the changed road layouts and turning restrictions (though at DBC stage signage design is not considered necessary). An indicative value has however been included in the cost estimate.

5.2.13 Services

Investigation of utility services through the proposed designation was undertaken using the "BeforeUdig" website. The following services were identified within the project extents;

- There are numerous obsolete, live copper and fibre optic cables underground in the area. There are also University of Otago ducts and cable;
- Delta Network has numerous underground power cables passing through the proposed designation. FXnetworks also has a fibre optic cable installed in the Delta Network ducts;
- Vodafone fibre optic cables;
- Kordia fibre system;
- Street lighting;
- Stormwater, water and wastewater utilities.

The telecom fibre cables are located throughout the project extents. There are also obsolete and live copper wire cables with above ground pedestals located at the back of the footpath.

Delta Networks has underground power cables running along Cumberland Street North from Albany Street to the northern end of the project extents. There is also a Delta Network underground cable that runs along Frederick Street between Cumberland Street and Castle Street. Furthermore, FXnetworks has fibre optic cables at the Cumberland Street / Frederick Street intersection which runs North and West of intersection. FXnetworks also has a fibre optic cable that runs along Great King Street North from Albany Street to Union Street West, it then heads East to Cumberland Street North.

The Vodafone fibre optic cable network extends south of Union Street West to the southern end of the project extents.

Kordia fibre system has a fibre cable that runs along Castle Street from the southern extent of the project up to Frederick Street.

The existing street lighting is located alongside both sides of the road with the majority of lighting columns located on the back of the kerb line.

Stormwater, water and wastewater utilities run along Great King Street and Cumberland Street for the entire length of the project extents.

Detailed discussions with utility service providers will be required in due course; they have not been undertaken at present.

5.2.14 Bus Provision

Buses in Dunedin only stop to pick up or set down passengers on the left side of the road, as a result of the passengers doors located on the left side of buses. This means that the conflict with the SCL is removed from the project extents.

As a result, no specific bus provision is required, other than ensuring the SCL does not interfere with the bus turning path movements (i.e. at intersections). This has been checked and the turning paths are acceptable.

A bus / coach park is proposed in front of the Leviathan Hotel on Castle Street (southbound). This replicates an existing coach park at this location, but the facility has been redesigned, and provides a more substantial and safer facility for coaches for the boarding or alighting of passengers.

It is also noted that another coach park currently exists on Cumberland Street (northbound). At present buses stop on the right side of the road with passengers disembarking (or embarking) into the live traffic lanes. This is an extremely unsafe solution and this coach stop will need to be removed. For northbound buses wising to access the Leviathan Hotel (or close proximity), they will need to divert 400m using Stuart Street and Dunbar Street to use the coach stop immediately outside the hotel on Castle Street. Alternative options were considered for providing a northbound bus stop, however no options were considered suitable.

5.2.15 Property

The DBC concept design has been kept within the existing road corridor, avoiding the need for any land / property acquisition. This approach therefore limits the need to consider property impacts.

There is the potential to provide of a right turn bay from Cumberland Street into Duke Street which may potentially require a very small acquisition of land to accommodate the extra lane – however the necessity of the right turn bay and whether land acquisition is required will be subject to further investigation and survey.

At this stage, there has been no input from property consultants and none is expected herein, as the intention is to avoid any property acquisition.

It is possible that relocation of removed parking to alternative areas may ultimately require the acquisition of land. However, this has not been considered at this stage of investigation. Ultimately, this may not be required if parking demand can be accommodated in the spaces remaining, or adjacent side streets.

5.3 Excluded from Scope

The following is excluded from the scope of the project:

5.3.1 Signage Design

The design of signage (and road markings) is generally considered outside of the scope of this DBC because it is a matter of detail, to be resolved in the detailed design phase. Despite this, some key areas have been considered in terms of signage and road markings because there is a need to understand whether they can be suitably signed, otherwise they may need to be redesigned. An example of this would be in close proximity to the Leviathan hotel where the northbound and southbound SCLs cease and cyclists need to merge with pedestrians into a shared zone. Ensuring this can work from a signage and markings perspective, and therefore be easily understood is essential prior to proposing this layout as the preferred scheme stage design for this location.

In addition, the provision of adequate signage and markings has been included within the DBC cost estimate.

5.3.2 Lighting

No lighting improvements have been specifically designed as part of this DBC. However, it is recognised that lighting currently exists throughout the extent of works and, where kerb lines are being relocated, and footpaths widths reduced, street lighting columns will need to be relocated onto the footpath. Generally kerb relocations have been minimised so the relocation of columns is limited. Lighting relocation has been allowed for in the cost estimate.

6 Consultation

NZTA and Dunedin City Council have worked together throughout the consultation process. The consultation commenced in June 2013 with Dunedin People's Panel Quickfire Cycle Survey. A more intensive consultation process commenced on 8 November 2013 with a media briefing and ran through till the 6 December 2013 and focussed on two proposed options. The consultation process included direct consultation with the adjacent landowners, wider public and key stakeholder engagement.

There is Local Government, non-government organisation and general public support to improve the cyclist safety of the road section, as it is known for high number of collisions or near misses involving cyclists and motorists. However those stakeholders directly affected by the proposed separated cycle lane are concerned with reduced on-road parking and potential high conflict zone at accessways (motorist and cyclist).

6.1 Consultation and Communication Approach

A thorough consultation process for the two proposal options was undertaken between November 8 and December 6 2013 by NZTA together with the Dunedin City Council. The process is presented in more detail in Section 6.1.2. The two proposed options are presented in Sections 4 and 5. In addition, the Dunedin City Council undertook a cycle survey In June 2013.

Full details of the previous consultation processes are contained within the following reports:

- Consultation Response Report (DCC / NZ Transport Agency December 2013)
- Consultation Output Summary Report (DCC / NZ Transport Agency December 2013)

The consultation objectives and consultation undertaken to date is detailed below.

6.1.1 Communication Objectives

Communication is an essential element of consultation. The objective of the communication was to provide information on:

- To raise stakeholder awareness and understanding of the project.
- To understand stakeholder concerns so these can be passed on to the project team.
- To engage early and effectively with all stakeholders on relevant matters that may require stakeholder input.
- To ensure stakeholders are advised on new developments, key milestones and planned activities on the project.
- To work with potentially affected property owners in a fair manner at all times.
- To work with business owners in a helpful and fair manner at all times.
- To maintain contact with stakeholders so as to keep on top of any potential issues.
- Why a change from the present un-protected cycle lanes, to separated cycle lanes is being considered.
- The two options that are being looked at.
- Whether there is a demand for separated cycle lanes?
- Who are the potential users and what type of lane they would prefer?

6.1.2 Stages and Content of Consultation

The Consultation on the two proposals formally commenced with a media briefing on Friday 8 November 2013. To complement this,

1. A 'project' webpage was set-up containing:

    a) A comprehensive brochure of the two options

b) The Central City Cycling Options Report

c) A 'Frequently Asked Questions' information sheet

d) Cyclists traffic count data to date

e) Examples of separated cycle lanes from other international centres

f) Feedback links

2. Concurrently to the media briefing, some 200 letters were sent to owners / landlords of properties with frontage to the one-way routes; together with a similar number of follow-up drops to property tenants. In addition, 95 letters were sent to key businesses and stakeholders and included a copy of the brochure on the two options.

3. Held information drop-in sessions at:

   a) Wall St mall – 14 November 2013

   b) Toitu – 19 November 2013

   c) The Link (university) – 20 November 2013

4. Organised meetings with businesses including:

   a) Mondelez (Cadbury's)

   b) Keogh McCormack

   c) Otago Museum

   d) Otago Daily Times

   e) Otago Chamber of Commerce

   f) Southern District Health Board

   g) University of Otago

   h) Police

   i) Automobile Association

   j) Road Transport Association

   k) Otago Regional Council

   l) Spokes Dunedin

6.2 Written submissions

Over 2000 written submissions were received as either emails, letters, or received directly through the drop-in sessions. Many were very detailed in description, some with drawings, and overall presented a range of preferences, issues or suggestions.

6.2.1 Separated cycle lane option preference

Option 1: a separated cycle lane on both the south and north bound legs of the Dunedin on-way highway system is either favoured or regarded as being the safer option.

The University of Otago, the Southern District Health Board, and the Otago Regional Council also support Option 1.

The Automobile Association (AA) conditionally support Option 2; this is on the basis that this forms part of an integrated solution (i.e. not as an isolated / disconnected treatment).

Retailers / businesses who submitted wanted the status quo retained or preferred Option 2.

6.2.2 Reasons for support for a separated cycle lane (either option)

Supporting comments were largely generated from those with a cyclist perspective. Some 583 people submitted advising they already ride on the on-way routes; and a further 522 people said they would only ride on the one-way routes if they were made safer. The other most common supporting comments were:

- Considered physical separation much safer
- Concern about the safety of existing cycle lanes and sharing experiences of collisions or near misses involving cyclists and motorists
- Improvement in personal health
- Encourage more cycling and
- Less pollution

6.2.3 Parking

Although fewer in number, detailed submissions were received from retailers, businesses, and individuals concerned about the potential loss of on-road parking.

Submissions of smaller retailers along Great King Street, Cumberland Street and Castle Street were concerned with the loss of convenient short term on-road parking near their premises. Another concern for these retailers was the ready access for delivery vehicles to their businesses.

Submissions from larger business including tenants of ASB House, Cadbury's and the Museum; expresses similar concerns about the possible loss of on-road parking in their locality.

The Automobile Association (AA), in conditionally supporting Option 2, were cognisant of the greater loss of on-road parking associated with Option 1.

Individual submissions relating to parking loss, centred around access to convenient parking to the hospital and also the physio pool.

While Dunedin Public Hospital is one of the larger generators of demand for on-road parking, the Southern District Health Board is supportive of Option 1 sighting reasons of improved road safety and providing people with better choices around active forms of transport like walking and cycling.

The University of Otago, which attracts large numbers of people wanting on-road parking, also support Option 1. This is on the basis, that present reliance on on-road car parking is not consistent with the long term sustainable travel targets identified in their 'Travel Plan' (for students and staff). They also see increased cycling through improved cycle infrastructure as a credible alternative to vehicle use. The University also expressed concern at the limited safety of the existing cycle lanes.

Details on the off highway parking opportunities assessment is separately presented in the report, "SH 1 Cycle Lanes Parking Study, March 2014"

6.2.4 Access related concerns

Some businesses with relatively high-use accesses were concerned for the safety of cyclists using the proposed SCL, as well as being concerned for their own operational health and safety requirements. This was particularly in regard to Option 2, where cyclists could travel in both directions as those accesses were also used by heavy vehicles.

The Otago Daily Times, ASB House and Cadbury's all have primary accesses onto Cumberland Street; and it was for this reason that between the two options, Cadbury's preference was for Option 1.

6.2.5 Other safety concerns

Other safety concerns from written submissions were:

- The perception of increased mid-block crossing by pedestrians (with use of parking further afield)
- Use of the cycle lane by skateboarders
- The potential of separated cycle lanes to attract younger less skilled cyclists into a busier inner city traffic environment

6.2.6 Cost

A few written submissions focused on cost / use of funds, in terms of:

- Net cost
- Cost to Council
- Loss of parking revenue

6.2.7 Other views raised

Other views raised from written submissions were:

- Cycling on state highways, or in the central city, should not be encouraged
- Dunedin topography / climate isn't suited to cycling
- Too few cyclists to warrant change

6.2.8 Alternative ideas submitted

Alternative ideas submitted from written submissions were:

- Re-routing of trucks off the one-way highway system
- Reduce / ban vehicle use of George Street, and develop as a pedestrian / cycling route
- Promotion and re-alignment of Leith Street route (through the University campus)
- Move the existing cycle lanes to the right hand side of the highway
- A cycle route further east of the University Campus (Forth Street / Harrow Street / Anzac Avenue) and running more closely to the rail line through to Andersons Bay Road
- Shared use of footpaths (i.e. cyclists and pedestrians)

6.2.9 Submissions from outside of Dunedin

There were 310 submissions from people living outside of Dunedin. While such persons are less likely to directly either benefit or be affected by the proposals; some submissions recounted their experience from when they did live in the city.

6.3 On-line survey results

A variety of measures were used to promote the web page and on-line survey including a brochure, letters and drop-in sessions.

While there were 883 respondents, not everyone provided responses to all the survey questions.

The survey questions are responses are summarised below:

6.3.1 Questions 1: Extent of support for a separated cycleway

Total 849 responded

a) 735 voted either supporting or strongly supporting

b) 89 voted either opposing or strongly opposing

6.3.2 Question 2: Support for Option 1

Total 869 responded

a) 612 voted either supporting or strongly supporting Option 1

b) 151 voted either opposing or strongly opposing Option 1

6.3.3 Question 3: Support for Option 2

Total 872 responded

a) 645 voted either supporting or strongly supporting Option 2

b) 151 voted either opposing or strongly opposing Option 2

6.3.4 Question 4: Preference between options and in comparison with existing cycle lanes

Total 878 responded

a) 328 voted preferring Option 2

b) 299 voted preferring Option 1

c) 131voted they would be okay with either Option 1 or Option 2

d) 55 voted not liking either option

e) 29 voted they were okay with the existing cycle lanes

6.3.5 Question 5: Extent of support to remove parking

Total 876 responded

a) 674 voted either supporting or strongly supporting the removal of parking

b) 139 voted either opposing or strongly opposing the removal or parking

6.3.6 Question 6: How should parking loss be addressed?

Total 858 responded

a) 368 responses supported relocation of parking meters and time limited parking to adjacent streets.

b) 574 responses supported promotion of public car parking areas that are underutilised.

c) 535 responses supported provision of angle parking on adjacent blocks of Union Street, St David Street, Howe Street and Duke Street.

d) 293 responses supported the establishment of more commercial parking

6.4 Other Polls

Two other organisations proposed their own polls:

6.4.1 The Automobile Association (AA)

The AA suggested that they may undertake a separate poll of their members, however no results have yet been made available to the Transport Agency.

6.4.2 The Otago Daily Times (ODT)

The ODT also conducted a poll, in which the following question was asked:

"Do you support the cycleway proposals for Dunedin's one-way system?"

From the 1,415 respondents, 53% (815 respondents) voted 'YES'; 39% (600 respondents) voted 'NO'; with the balance un-decided (requiring more information).

6.5 Dunedin People's Panel Quickfire Cycle Survey

While there were 504 respondents, not everyone provided responses to all the survey questions.

The survey questions are responses are summarised below:

6.5.1 Question 1: What is your main mode of transport for your daily activities?

Total of 503 responses

a) 75% of responses travelled by car

b) 14% of responses walked

c) 5% of rode a bicycle

d) 4% of took the bus

6.5.2 Question 2: What would you like to be your main mode of transport for your daily activities?

Total of 501 responses

a) 39% of responses indicated main mode of transport a car

b) 25% of responses indicated main mode of transport a bicycle

c) 22% of responses indicated main mode of transport to walk

6.5.3 Question 3: Do you have access to or own a bicycle?

Total of 488 responses

a) 63% responded YES

b) 37% responded NO

6.5.4 Question 4: If you do ride a bicycle, on average how often do you ride?

Total of 475 responses

a) 36% responded rarely

b) 31% responded I never ride a bicycle

c) 10% responded 3-6 times a week

d) 2% responded daily

6.5.5 Question 5: If you rarely or never ride a bicycle, why not?

Total of 438 responses

a) 46% responded safety concerns

b) 42% responded area is too hilly

c) 38% responded inadequate cycle infrastructure

d) 26% responded don't own or have access to a bicycle

6.5.6 Question 6: More cycleways that are separated from traffic would be better for cyclists

Total of 504 responses

a) 93% responded agreed or strongly agreed

b) 3% responded disagreed or strongly disagreed

6.5.7 Question 7: More cycleways that are separated from traffic would be better for motorists

Total of 504 responses

a) 86% responded agreed or strongly agreed

b) 3% responded disagreed or strongly disagreed

6.5.8 Question 8: More cycleways that are separated from traffic would encourage me to cycle

Total of 504 responses

a) 59% responded agreed or strongly agreed

b) 20% responded disagreed or strongly disagreed

6.5.9 Question 9: The Dunedin City Council should spend money on constructing separated cycleways

Total of 504 responses

a) 74% responded agreed or strongly agreed

b) 10% responded disagreed or strongly disagreed

6.5.10 Question 10; The removal of on-road car parking should be considered in some locations to make way for separated cycleways

Total of 504 responses

a) 55% responded agreed or strongly agreed

b) 26% responded disagreed or strongly disagreed

6.5.11 Question 11: More Quiet Streets would be better for cyclists

Total of 504 responses

a) 69% responded agreed or strongly agreed

b) 10% responded disagreed or strongly disagreed

6.5.12 Question 12: The Dunedin City Council should spend money on developing Quiet Streets

Total of 504 responses

a) 51% responded agreed or strongly agreed

b) 21% responded disagreed or strongly disagreed

6.6 Further Consultation

Further consultation is required to be undertaken. When the final form of the SCL has been determined, particularly in relation to the loss of parking around property frontages, then discussions will take place with directly affected parties. Consultation will also be required where any amendments to accessways are proposed.

A further wholesale consultation process is not anticipated; instead consultation will take the form of targeted face to face meetings with those property owners that are identified as being most affected by the provision of the SCL.

7 Recommended Option – Assessment

The required project outcomes are met by reducing the occurrence of fatal and serious accidents to cyclists and pedestrians, combined with increasing the numbers of cyclists using the State Highway one-way pairs (in the SCL).

The implementibility of the project is not expected to be restrictive, with only an outline plan is required for the works and no anticipation of impacting sites of cultural or historic significance. However, public and stakeholder acceptance and support will be essential; it is known that many businesses directly affected are likely to be opposed to the loss of parking.

The constructability of the project is fairly straight forward, with works contained within the existing road corridor. Given this is a busy, heavily trafficked central city environment, the construction phase has the potential to create major disruptions to road users and businesses.

Changes in operation have been assessed and it is expected that the capacity or efficiency of flow on for the State Highway through traffic will be unaffected by the implementation of the SCL. More broadly, operational changes will take place for cyclists, pedestrians, side road traffic, State Highway 1 right turning traffic, rubbish collection, parking and deliveries.

7.1 Outcomes

The Project Outcomes defined in Section 3.3 is to reduce the occurrence of fatal and serious injury crashes to pedestrians and cyclists on the SH 1 one-way pair. This project improves the safety of these vulnerable road users in a number of ways.

Firstly the SCL separates cyclists from the vehicle traffic with a physical separator and includes a buffer strip where parked vehicles run adjacent to the SCL, so that car doors do not open in the path of cyclists. This is a common vehicle vs cyclist crash scenario. The SCL will also provide cyclists with a fully protected phase from right turning vehicles at signalised intersections[29], which also increases the green time for pedestrians crossing the side roads along SH 1.

Ultimately a successful outcome will be measured by the crash history record[30] after the proposed SCL has been opened to the public. A successful project would involve no fatal or serious injury crashes occurring within the project length, over the following ten year period. However, with numerous accessways to commercial activities along the corridor, there remains the possibility that a fatal or serious injury crash occurs between a cyclist and vehicle at these conflict points. To decrease the chance of this occurring the design has included raised delineators to alert drivers' they are about to cross the SCL and watch for cyclists in their rear vision mirrors. Therefore it is realistic to assume that the sections of the proposed SCL with the permanent mountable kerb separators, can achieve zero fatal and serious injury crashes during the ten year period post construction. The SCL will strongly meet the Programme Outcomes defined in Section 3.2 by providing a safe route choice for cyclists and improving their safety on the SH 1 one-way pair. Also it will encourage cycling as a practical transport mode choice because it will contribute to the integrated central city and wider city cycle networks. The SCL will become a backbone of the cycle network that feeds the other cycle linkages. The attraction of new cyclists to the SCL will be achieved through the application of a safe and high quality facility, that provides good LoS for cyclists.

The other project outcomes of improved cyclist throughput, decreased cycling journey time (and maintaining the status quo for vehicle journey time), improved customer perceptions and health outcomes can all be achieved with the creation of a high quality and well-designed uni-directional SCL facility on the one-way system.

---

29 Whilst full protection via phasing is currently proposed, it is noted that other options do exists and have not, at this stage, been rejected (such as vehicle right turners filtering through users of the SCL).

30 Careful assessment of the balance between increasing cyclist numbers, and reducing fatal and serious crashes will be required; if cyclists numbers increase, it follows that there is a higher risk exposure. Therefore, assessment of the project against the objectives will need to consider crash rates, as opposed to absolute crash numbers.

Table 7-1: Outcomes Assessment

Oucome Class	Outcome Sought	Existing	Post-implemetation target	Comments
Safety	Reducing death and serious injury by cycling mode	6	0	Measured over a five year analysis period (DSi)
Safety	Reducing death and serious injury; pedestrians	9	<9	Measured over a five year analysis period (DSi)
Network performance and capability	Increased throughput (people) by cycle	215	415	Measured against existing cyclist count data of users of the one-way system Daily users, northbound, St Andrew Street / Hanover Street Measured 1 year from full implementation
Network performance and capability	Decrease journey time; travel time, by cycle – *considered as 'no significant worsening'*	Nthbnd = 785s Sthbnd = 820s	Nthbnd = 865s Sthbnd = 900s	Measured against the current (pre-implementation) journey time for a 15km/h cyclist on the one-way system, northbound and southbound (AM peak) Significant worsening considered to be greater than 10% increase in travel time
Network performance and capability	Ease of cycling - perceived	Pre-implement-ation survey required	Post implementation improvement in perceptions	Level of satisfaction regarding ease of cycling
Health	Increase physical activity	215	215+	Measured against existing and future cycling numbers

7.2 Implementability

There are not likely to be any consents required to construct the SCL facility, though an outline plan will be required. The physical construction of the project does not require any structures or complex works on SH 1, therefore it is not envisaged to be complex in terms of constructability.

The general public and stakeholder feedback has been reasonably supportive for the provision of the SCL. There is however a split in terms of support for the new facility; with many businesses being opposed due to lack of parking contrasting with the high levels of support received from prospective users.

The roading improvements are to be staged to keep traffic moving efficiently during the construction period. Staging will include careful consideration of tie ins and necessary temporary traffic management to minimise disruption in the busy central city area (to residents, businesses and general road users). The treatment of cyclists during the construction phases will be especially important. It is paramount that the general public are notified prior to any construction works.

There is also the possibility of providing semi-permanent features in the first instance (such as planter boxes or bollards / posts). The benefits of this would be to allow a period of assessment and consideration to ensure the proposed measures provide the optimal solution and do not create unacceptable impacts (such as physical turning restrictions) that had not been anticipated. Once all of the proposed features had been assessed and accepted, a second implementation stage would occur, with the permanent measures (such as concrete kerbing). However, whether a two-phase implementation will work is uncertain given the need to move lane / line markings laterally and the considerable concern around existing marking removal / ghost markings. A two-stage implementation has not been allowed for in the cost estimate.

7.2.1 Constructability

A key issue for the construction phase will be minimising disruption to road users and businesses. A level of disruption will be inevitable as the works are constructed as temporary traffic management and lane closures will be necessary to construct the physical measures to provide for the SCL (noting that if a two phase implementation is progressed, using temporary features such as planter boxes in the first instance, this initial disruption can be minimised).

The construction of the SCL is not complex civil construction and generally will require the provision of new kerbing, resurfacing and signs and marking's implementation – all common construction elements for a competent contractor. Where existing kerb lines have to be set back (i.e. the footpath width reduced) there is the potential for conflict with existing services, both above and below ground. Modifying existing underground services should be avoided as far as practicable. Where existing kerb lines are to be moved above ground services such as lighting columns, parking meters etc. will need to be relocated. Early liaison with service providers in the detailed design phase is highly recommended. This will ensure the service relocation costs can be refined from the current rough order estimates. Pot-holing to determine accurate service locations is also recommended.

Works around traffic signal intersections involve a large number of relatively minor changes (kerb radii / cut-downs / tactile paving changes / signal head & push button amendments / loop or detection changes etc.) though in combination have the potential to create significant disruption to road users (both drivers, cyclists and pedestrians) and will need careful management.

A further issue for consideration will be the treatment of cyclists during construction. This will need to be carefully managed because the existing on-road cycle lanes will be removed and the width reallocated (to the SCL) – however if the on-road lanes are unavailable and the separated facility is not yet open for use, provision for cycling will need to be made on a temporary basis.

7.2.2 Operability

Some change in operation will result as a consequence of the SCL provision. The main changes are expected to be:

- Cyclists: Obviously no on-road facilities will remain, with the SCL replacing the existing provision. It is inevitable that at least some cyclists will continue to ride outside of the SCL. This will be discouraged given the traffic lanes will be reduced in width and because drivers will be less expectant regarding the presence of cyclists (i.e. the opposite of the 'safety in numbers' principle). The SCL will also be situated on the right side of the highway, rather than the left side facilities that are currently provided.

- State Highway 1 traffic: Because of the rephasing of traffic signals, right turners from the State Highway to the local network will receive reduced green time as they will not be able to turn at any point when the protected pedestrian / cyclist phase runs parallel to the through movement. Previously this was not the case and right turners filtered through pedestrians or received a late start (i.e. partial pedestrian protection). The capacity and co-ordination for State Highway 1 through traffic will remain unchanged[31]. It is recognised that the narrower lane widths for through traffic could have a detrimental effect on capacity; however given these are through lanes with no turning, and the fact that the signal co-ordination currently sets progression speed to 42 km/h – 45 km/h, the throughput is not anticipated to be negatively affected by the reduced lane widths.

- Side road vehicles: currently the one-way network operates with extra (and unnecessary) capacity for the side road traffic. The spare capacity currently provided to the side roads will be reallocated to the State Highway to provide additional

[31] This is considered extensively within the MWH Traffic Signals Operation Report (2014)

capacity in the newly added third signal phase that provides for the protected cyclist and pedestrian phase. This should however result in only a small (if any) reduction in LoS for side road traffic (given the spare capacity here at present). Further detail is provided in the MWH Traffic Signal Operation Report (2015).

- Pedestrian provision at traffic signals: similar to the above, due to the change in phasing, pedestrians on the right hand side of the road will now receive full protection when crossing parallel to the State Highway. For the left hand side, protection will be either partial or full. For the movements across the one-way, for the upstream side of the crossing, this will be fully protected, whereas for the downstream side (where there is conflict with left and right turners from the side road), partial protection is expected, with a lead red arrow displayed to turning vehicles.

- Pedestrian provision mid-block: generally this should remain as per the current situation, however, in those locations where the footpath width is being reduced, there will obviously be a small change in operation for pedestrians, dealing with a narrower footpath.

- Refuge collection: the current operation is somewhat unclear – it is understood that the existing method of collection is using collection trucks with side arms that extend to the left of the vehicle (only) up to a distance of around 1.5m from the truck. Given the system is currently one-way operation then how collection takes place to the right hand side of the vehicle (i.e. where the SCL will be located) requires clarification. Regardless of this, the SCL has been designed with the need to provide suitable width in the separator strip for a bin to be located (and manoeuvred). Where the separator is 1.6m wide (i.e. mid-block with no parking) this is more than sufficient. Where parking is retained, the separator width is 0.8m – which is enough to place a bin (generally a large standard wheelie bin has a wheel base of 0.55m, with a slightly larger lid) but does not provide much clearance or manoeuvre space. At this stage however this is considered a reasonable compromise. Where the separator drops to 0.5m close to intersections, this would not be sufficient for situating a bin for collection proposes – adjacent properties would need to be informed to take the bin further away from the intersection to where the strip was wider, or alternatively around the corner onto the side street, away from the state highway.

- Parking & Goods Deliveries: the removal of some parking will cause the parking demand to shift to other locations. In addition, the new SCL may affect the current loading practices that some businesses perform from the State Highway, within car parking places (no loading zones are being removed).

Given the provision of SCLs is relatively novel and untested in New Zealand, it is not clear whether increased maintenance will result. In simplistic terms, one of the existing traffic lanes, currently used for parking, will no longer be trafficked by motorised vehicles, and used instead by cyclists (plus separator strip). The structural loading on this section should therefore be reduced. However, the surfacing component may become more important to ensure ride quality (e.g. following utility works, to ensure a smooth high quality riding surface). Asset management implications are covered further in section 7.2.5 below.

7.2.3 Statutory Requirements (Option 1)

An outline plan approval is required for the works within the SH designation. The outline plan must show:

(a) the height, shape, and bulk of the public work, project, or work; and
(b) the location on the site of the public work, project, or work; and
(c) the likely finished contour of the site; and
(d) the vehicular access, circulation, and the provision for parking; and
(e) the landscaping proposed; and
(f) any other matters to avoid, remedy, or mitigate any adverse effects on the environment.

Within 20 working days after receiving the outline plan, the territorial authority may request the requiring authority to make changes to the outline plan. An outline plan is processed on a 'non-notified' basis.

Under the NES soil contamination cycleway construction is not anticipated to exceed the permitted activity thresholds.

Resource consents from the Otago Regional Council are not anticipated as no works are being carried out in a waterbody or stream bed, no new / additional discharges of stormwater and discharges to air from road construction are a permitted activity.

The impact on the designated significant trees along the proposed SCL have been assessed. There is not anticipated to be any issues with the trees with works expected to be sufficiently far away from the trees to be inconsequential. It is however noted that some crowning may be required on T295 and T294 where there is significant overhang into the highway corridor (and location of the SCL).

7.2.4 Property Impacts

Positively, the provision of the SCL does not require any property acquisition given the facilities are fully contained within these existing road corridor.

This is beneficial because it means that there is no requirement for land acquisition from private property ownership. This should have the effect of reducing both time delays and costs for implementing the facility. Land acquisition is generally a high risk item that has the potential to delay implementation.

For property frontages that are located directly along the new SCL, there will obviously be implications of the new facility. Firstly, in many locations parking spaces directly outside properties along the SCL will be removed, with only some parking retained directly alongside the SCL. Secondly, for those properties that have accessways directly onto the one-way pair, there will be a need to cross the SCL and new separator strip when entering or existing the accessway. Where parking has been removed to accommodate sight lines to accessways, this should provide an improvement for drivers to exit from these accessways (i.e. staff or residents), as the parked vehicles that would obstruct the visibility envelope have been removed.

It is also understood that DCC are considering options to provide additional parking on adjacent side streets to offset some of the parking loss on the one-way pair resultant form the SCL. Any relocated parking to side streets will have an impact on properties located there (but this has yet to be determined).

As discussed in Section 5.2.15, there is the potential to provide of a right turn bay from Cumberland Street into Duke Street may potentially require a very small acquisition of land to accommodate the extra lane – however the necessity of the right turn bay and whether land acquisition is required will be subject to further investigation and survey.

7.2.5 Asset Management

The main implication for future highway maintenance is the clearing of storm debris from sumps and kerb alongside the cycleway separator. With the limited width between the kerb and cycleway separator use of a cycleway sweeper will be required increasing the maintenance costs.

Resurfacing of carriageway and cycleway is more complicated from a construction perspective. The installation of the cycleway separator will provide an obstruction and require time consuming maintenance work and therefore increasing the long term maintenance costs. Furthermore, the carriageway and commercial accesses with the higher heavy traffic volumes will need more frequent cyclic maintenance than the cycleway.

The other implications for future highway maintenance are the increase in signage, road marking and green cycleway surfacing. Furthermore, the traffic signals will have a cyclist phase installed for the hook right turn.

The section of SH 1 for the SCL will require a much higher intensity of maintenance compared to neighbouring existing sections of SH 1. This is due to the installation of the cycleway separator and related surface markings.

Conversely, with the considerable upfront costs for resealing along the SH 1 corridor (for shaping and to provide a clean surface for road marking), there will be a positive impact on the future maintenance budgets particularly over the next 10 years where surface maintenance throughout the project extent should be minimal.

7.3 Wider Project Impacts

7.3.1 Environmental Impact

Provision of cycle ways as alternative to car transport will have wider environmental benefits in terms of reduced reliance on cars and a more sustainable transport network.

7.3.2 Social Impact

The fatal and serious injuries of cyclists have a high social impact and the provision of separated cycle lanes will reduce this risk. Health and wider economic benefits are also expected.

7.3.3 Joint Working

The SCL project is already well established as a joint venture between NZTA and DCC. Therefore any other cycling initiatives proposed by DCC will be well integrated with this project.

It has not been discussed at this stage whether there are efficiencies or value for money to be gained with other stakeholders or approved organisations. There is little scope for joint working with service providers, as any service relocations are intended to be kept a minimum.

8 Recommended Option - Economic Analysis

The recommended option of uni-directional separated cycle lanes along the SH1S one-way pair was evaluated against the Do-Minimum of retaining the existing on-road cycle lanes and continued maintenance, in accordance with the Economic Evaluation Manual (EEM, July 2013).

The benefit cost ratio was evaluated as 3.1 for the recommend project option.

Sensitivity testing undertaken shows that the BCR ranges from 1.9 to 3.8; the BCR was found to be the most sensitive to increases in construction cost, the number of new cyclists estimated to use the facility, the cyclist growth rate and the crash analysis method adopted.

The assessment profile is assessed as HHM; high strategic fit, high effectiveness and medium economic efficiency.

8.1 Economic Summary of Recommended Project Option

An economic evaluation has been carried out in accordance with the Economic Evaluation Manual (EEM, July 2013) simplified walking and cycling procedures (SP11), augmented with full procedures crash analysis.

The recommended option of uni-directional separated cycle lanes (Option 1) was analysed against the Do-Minimum option of retaining the existing on-road cycle lanes. The recommended option and the Do Minimum option are in outlined in Section 5 and Section 4.2.7respectively.

The outputs of the economic evaluation are summarised in Table 8-1 below, with key assumptions and inputs outlined in the following sections.

The worksheets used for the economic evaluation of both the recommended option and option 2 (bi-directional facility on Cumberland St) is included in Appendix A – Economic Worksheets.

Table 8-1: Economic Summary Table

Timing				
Earliest Implementation Start Date			September 2016	
Expected Duration of Implementation			12 months	
Analysis Period and Discount Rate			40 years and 6%	
Economic Efficiency				
Time Zero			July 2016	
Base date for Costs and Benefits			July 2014	
Present Value of Total Project Cost of Do Minimum			$5.5m	
Present Value net Total Project Cost of Recommended Option			$12.1m	
Present Value net Benefit of Recommended Option (exc. WEBs)			$20.2m	
Present Value net Benefit of WEBs of Recommended Option			N/A	
BCR (exc. WEBs)			3.1	
BCR (inc. WEBs)			3.1	
P50 Costs				
			Present Value	
	Do Min	**Recommended Option**	**Do Min**	**Recommended Option**
Design	$0m	$0.4m	$0m	$0.4m
Statutory Applications	$0m	$0m	$0m	$0m
Property	$0m	$0m	$0m	$0m
Construction/Implementation	$0m	$7.5m	$0m	$7.0m
External Impact Mitigation	$0m	$0m	$0m	$0m
Other Capital (e.g. insurances)	$0m	$0m	$0m	$0m
Capital Risk Management	$0m	$0m	$0m	$0m
TOTAL IMPLEMENTATION COST	**$0m**	**$8.0**	**$0m**	**$7.5m**
Maintenance	$2.9m	$3.7m	$1.1m	$1.3m
Renewal (Periodic Maintenance)	$13.1m	$10.2m	$4.3m	$3.2m
Operating	$0m	$0m	$0m	$0m
Other Ongoing Costs (e.g. Toll Collection)	$0m	$0m	$0m	$0m
Post Project Evaluation	$0m	$0m	$0m	$0m
ONGOING COST	**$16.0m**	**$13.9m**	**$5.5m**	**$4.6m**
Project Contingency	Included in above figures.			
TOTAL P50 PROJECT COSTS	**$16.0m**	**$21.9m**	**$5.5m**	**$12.1m**
BENEFITS				
			Net Present Value (Benefits)	
			Recommended Option	
Travel Time Cost Savings			$2.3m	
Vehicle Operating Cost Savings			N/A	
Crash Cost Savings			$8.5m	
Vehicle emissions Cost Savings			N/A	
Driver frustration Cost Savings			N/A	
Walking & Cycling Cost Savings			$9.4m	
Travel Behaviour Cost Savings			N/A	
		Option NPV benefits	**$20.2m**	

8.2 Traffic Data

8.2.1 Traffic Volumes

The latest traffic count data for SH1S, sourced from the Transport Agency 's Traffic Monitoring System (TMS), along the project extent is outlined in Table 8-2 below.

Table 8-2: Summary of Traffic Volumes

Traffic Volumes					
Description	**Direction**	**Location**	**AADT**	**% Heavies**	**Count Type**
SH1S Cumberland St near Willowbank (ID: 01S10704)	Southbound	RP 704/0.09	9,450 (2013)	6%	Continuous
SH1S Great King St near Willowbank	Northbound	RP 704/0.11	9,200 (2013)	7%	Continuous
SH1S Castle St - Btwn St Andrews & Stuart St	Southbound	RP 704/2.12	13,900 (2013)	4%	Non-continuous
SH1S Castle St - Btwn St Andrews & Stuart St	Northbound	RP 704/2.12	15,000 (2013)	4%	Non-continuous

Table 8-2 above shows that the traffic volume along SH1S in both directions increases from 9,000 vpd in the northern project extent to approximately 15,000 vpd on SH1S in the vicinity of the Octagon. The traffic volume data also shows a very even directional split in volume at both count locations.

Hourly flow profiles, for a sample week in July 2013 and August 2013, for both count locations is provided in Figure 8-1 and Figure 8-2 below.

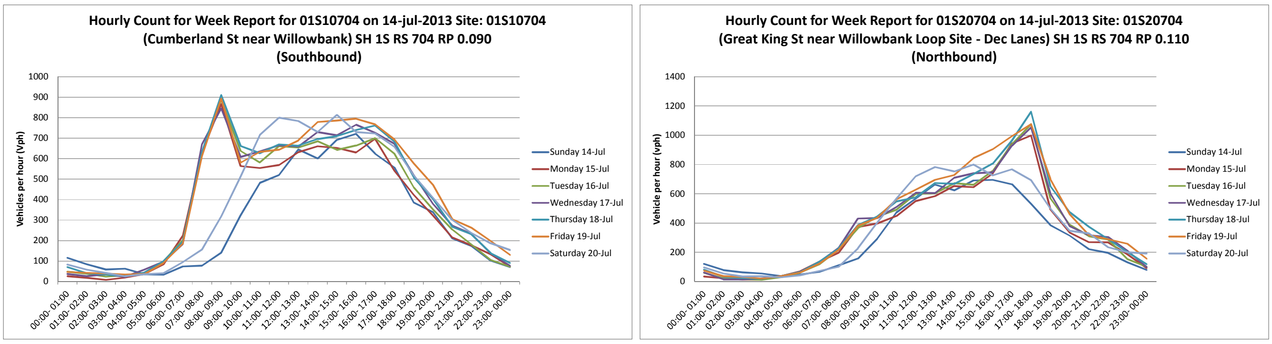


Figure 8-1: Hourly Flow Profile for SH1S Cumberland St near Willowbank and Great King St near Willowbank

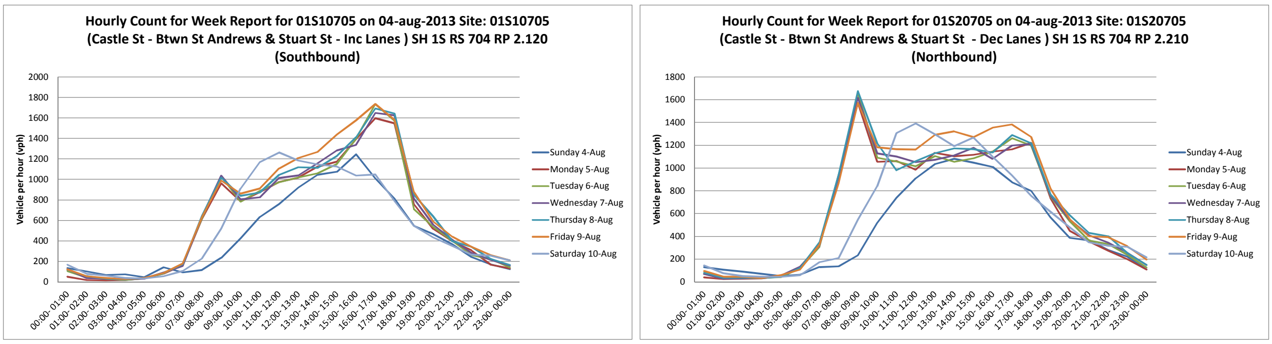


Figure 8-2: Hourly Flow Profile for SH1S Castle St (Between St Andrews and Stuart St) in both directions

Figure 8-1 and Figure 8-2 above show the variation in traffic flows throughout the day, highlighting the morning and afternoon peak periods for each direction of each count site. Of note is the high inter-peak flows for both count sites, at approximately 700 vph for the northern count site (70% of the northbound PM peak) to 1,000 vph for the southern count site (80% of the northbound PM peak).

8.2.2 Traffic Growth

The historic five-year traffic growth rate was calculated at between -1.1% and -2.4% per annum for the continuous dual loop count site at SH1 Cumberland St near Willowbank and Great King St near Willowbank respectively.

The non-continuous Castle Street count site, located in southern project extent, showed traffic growth rates of between +1.3% (southbound) and -0.5% (northbound); although as this count site is non-continuous[32] the data is considered less reliable than the count sites near Willowbank.

For the purposes of this economic analysis, a traffic growth rate of 0% per annum has been adopted.

It is noted that the Transport Agency is investigating traffic growth rate trends on state highways within NZ, with the results expected soon. The investigation was initiated in response to traffic increases detected in the last year or two, linked to economic recovery, and hence this could see traffic growth predictions change.

Refer Appendix A – Economic Worksheets for further traffic information.

8.2.3 Cyclist Volumes

As outlined in Section 2.2.1, recent cyclist counts were undertaken along four sections of the SH1 one-way pair. Table 8-3 below shows the calculated daily average cycle use volumes for each block surveyed during the period 2013 – 2014[33]. This suggests that daily flows are fairly consistent in each direction.

The recorded counts have been adjusted by a scale factor which recognises that the surveys were undertaken during the summer university semester break, when many persons who might otherwise travel by cycle, were absent. The scale factor of 1.13 was taken from the Cycle Network and Route Planning Guide (LTSA 2004).

Table 8-3: Annual Average Daily Cycle Traffic Estimation

DAILY CYCLE VOLUME	Leviathon Hotel -Stuart St	St Andrew St -Hanover St	Frederick St -Albany St	Dundas St -Howe St
Northbound	141	190	198	187
Holiday adjusted value	159	215	224	211
Southbound	127	193	208	196
Holiday adjusted value	143	218	235	221
Combined adjusted volume (north & south)	302	433	459	432

The overall length weighted average for cyclists along the project extent was calculated at 210 AADT northbound and 216 AADT southbound, a total of 426 AADT for both directions.

By comparison, in February 2014 DCC undertook 24 hour cycle counts on both North Road (North East Valley) and Portsmouth Drive, where the average number of weekday cyclists recorded (combined for each direction of flow) was 322 and 380 respectively. Whilst these sites are not in close proximity to the study area, they do serve as a validation for the figures extrapolated in Table 8-3 above.

8.2.4 Cyclist Growth

There is limited available data for accurate measurement of cyclist growth rates. However, comparing the 2012 overall count of 303 cyclists per day in both directions to the 2014 count of 426 cyclists per day indicates a large growth rate, in the order of 20% per annum. This likely

[32] Note: this count site is non-continuous and recorded only 36 accepted days in 2013.

[33] NZTA, Dunedin One Way System (SH1) Cycle Survey Report, 2014.

reflects a step-change in cyclists numbers as improvements to cyclist networks, routes and connectivity have been made in Dunedin.

Census data also shows that there have been considerable fluctuations in the travel to work by bicycle census data as displayed in Table 8-4:

Table 8-4: Census Travel to Work by Bicycle[34] Data

	2001	2006	2013
Travel to work mode	**1173**	**858**	**1224**

It is not entirely clear why there was such a drop in 2006 from the relatively stable levels of 2001 to 2013. In terms of a share of the total work commute, this was 2.7% in 2001, 1.8% in 2006 and 2.6% in 2013.

The census data also indicates a high cyclist growth rate of approximately 6% per annum between 2006 and 2013; however, as outlined above this is only a small increase over historic 2001 values.

For the purposes of this evaluation, a cyclist growth rate of 4% has been adopted to reflect the on-going cyclist route connectivity improvements and likely new users rather than as a result of the limited background population growth.

8.3 Walking and Cycling Benefits

8.3.1 Latent Demand

Latent demand has been calculated using NZ Transport Agency's Economic Evaluation Manual (EEM) procedures.

The 2013 meshblocks from Statistics New Zealand were used and buffers zones were marked on at pre-specified distances from the one-way pair. The three buffer zones used were <0.4km, 0.4<0.8km and 0.8<1.6km.The population of each meshblocks included within the buffers was then prorated against the percentage of the meshblock involved.

It is important to note that commuters make up a large percentage of traffic along the one-way pair during peak hours. This includes cyclists who are more willing to travel further than the 1.6km buffer used in the evaluation to determine latent demand. Similarly there are areas within the 1.6km buffer that are unlikely to attract new cyclists due to Dunedin's topography e.g. Maori Hill.

It is more likely that the majority of the latent demand will be generated by the flatter areas of Dunedin and where cycling infrastructure connects into the proposed improvements. Examples include South Dunedin, North Dunedin and St Leonards, Maia and Ravensbourne areas.

The population base within the first buffer is lower than an area with a high residential proportion as a number of commercial and retail pockets exist along each side of the corridor. To ensure that the latent demand calculations were appropriate a number of gross checks on the assumptions have been made.

These are:

- 30% of the population of Dunedin live below the town belt (approximately 36,000 people).
- The total population included in the three buffer zones was 22,045 with 8,887 in the 800-1600m buffer.
- Population of South Dunedin, St Kilda East, St Kilda Central and St Kilda West area units is 9,612 (similar to the 800-1600m buffer).

[34] Main means of travel to work for employed people from census data

These gross checks show that calculations completed are suitable for use as a conservative estimate of latent demand.

The final latent demand figure of 240 new cyclists per day has been calculated by using the 2014 AADT counts and applying the same ratio aspect as that shown in SP11 Worksheet 7, Rows 10 and 11.

8.3.2 Expected Facility Usage

For the purposes of evaluation a number of assumptions have been made regarding the portion of cyclists who will use the separated facility, these are:

- The cyclist AADT is split evenly between both of the one-ways; and
- 95% of the cyclists surveyed using the one-way system will use the SCL.

8.3.3 Health and Environmental Benefits

The facility benefits were based on the health and environmental benefits from improvements at hazardous sites by the provision of a SCL to separate motorists from cyclists as well as the intersection design and phasing improvements.

The present value of health and environmental benefits for the preferred option was calculated as $9.4m.

8.3.4 Travel Time Benefits

Travel time cost savings for cyclists along the SH1 one-way pair were based on the length of the route, the average speed of the cyclists, a commuter travel time cost of $7.80 and the relative attractiveness of the facility.

The Do-Minimum cyclist speed on the existing on-road cycle lanes has been assumed as 15km/h to reflect both the safety risk of travelling alongside motorised traffic and delays imparted from intersections.

The option cyclist speed has been assumed to be 22 km/h, reflecting both the higher speeds cyclists will likely travel given separation from motorised traffic and the phasing improvements for cyclists at signalised intersections.

In addition, it has been assumed that the relative attractiveness of a SCL is similar to that of a shared path. However, as a there is an existing cycle lane facility, a reduced relative attractiveness ratio of 1.05 has been applied. If a relative attractiveness of 2.0 was applied, the overall BCR would improve from 3.1 to 3.4.

Travel time savings for pedestrians has not been considered as part of this evaluation, as accurate count information is not available.

The present value of cyclist travel time savings for the preferred option was calculated as $2.3m. If a relative attractiveness of 2.0 was applied, the present value would increase to $4.3m.

8.4 Crash Benefits

As outlined in Section 2.2.7 and Appendix C – Crash History Information, all crashes involving cyclists and pedestrians were extracted from the Transport Agency's Crash Analysis System (CAS) for the period between January 2009 and December 2013.

Full procedures, crash by crash analysis was undertaken for the relevant crash movement groups to ascertain the overall safety benefits of the SCL. As there is limited guidance in the EEM for the crash reduction potential of separated cycle lanes, a number of assumptions were made based on the actual crashes and the likely benefit from the recommended option design, taking into account international SCL experience. These reduction factors were then reviewed by an internationally recognised traffic safety expert.

The following table details the number of actual crashes and the predicted crash reduction, by severity, for each movement.

Table 8-5: Estimated Crash Reductions

Movement	CAS Mvmt Code		Fatal	Serious	Minor	Non-injury
Cyclist Hit Object	E	Crashes (09-13)	1	1	2	0
		% Reduction	90	90	90	90
Cyclist Crossing - turning	J,K,L,M	Crashes (09-13)	1	1	2	1
		% Reduction	30	30	-30	-30
Cyclist Crossing - direct	H	Crashes (09-13)	0	2	0	0
		% Reduction	30	30	-30	-30
Cyclist Rear-end - slow	FA,GA-GC,GO	Crashes (09-13)	0	0	1	0
		% Reduction	0	0	0	0
Cyclist Loss of control - off road	AD,CB,CC,CO,D	Crashes (09-13)	0	0	1	0
		% Reduction	0	0	0	0
Pedestrian Crossing Rd- Right turn	ND, NF	Crashes (09-13)	0	4	8	0
		% Reduction	50	50	50	50
Pedestrian Crossing Rd- Other	NA-NC, NE, NG	Crashes (09-13)	1	4	5	4
		% Reduction	30	30	30	30
Pedestrian Other	P	Crashes (09-13)	0	0	1	1
		% Reduction	10	10	10	10

Table 8-5 above shows the following crash reductions as a result of the proposed option:

- A 90% reduction in cyclist hit object crashes, as the SCL will remove the high severity cyclist vs car door crashes
- A 30% reduction in high-severity cyclist crossing/turning crashes as a result of the improved phasing and intersection treatments. However, a conservative increase in minor and non-injury crashes has been assumed as a result of a possible increase in driveway related crashes due to the SCL attracting less experienced cyclists.
- A 50% reduction in pedestrian right turning crashes at signalised intersections due to full protection being provided as part of the recommended option.
- A 30% reduction in other pedestrian crossing crashes as a result of the intersection improvements and new midblock pedestrian kerb extension crossings.
- A 10% reduction in the remaining pedestrian crashes as a result of greater separation between cyclists, pedestrians and vehicles.

The present value of crash cost savings for the preferred option was calculated as $8.5m.

Refer Appendix C – Crash History Information.

8.5 Maintenance Costs

The Do-Minimum future maintenance costs were based on the forward works programme (FWP), noting that there are no significant pavement rehabilitation works planned along the project extent in the near future (i.e. only AC reseals in the 10 year FWP).

As outlined in Table 8-1 above, the recommended option results in a net maintenance present value decrease of $0.9m due to the combined effect of the following:

- The recommended option includes a full overlay as part of construction; this initial capital cost outlay has been assumed to change the FWP (i.e. periodic maintenance will occur several years following completion of works, in contrast to the Do-Minimum where reseals will occur as per the FWP).
- This offsets the likely increase to the annual maintenance costs due to the additional upkeep a separated cycle lane demands (kerb maintenance, vegetation, minor repairs etc.). This increase has been assumed as an additional 25% over the existing annual maintenance of approximately $75,000 per annum.

8.6 Wider Economics Benefits

Wider economic benefits of agglomeration, imperfect completion and increased labour supply were not considered to be significant enough to warrant investigation as part of this project.

8.7 Comparison with Earlier Stages

The outputs of the current economic evaluation were compared to the high level Project Feasibility Stage (2013) and the results are outlined in Table 8-6 below along with discussion on key differences.

Table 8-6: Economic History Summary Table

Timing		
	Previous Estimate	**Current Estimate**
Earliest Implementation Start Date	July 2014	Sept 2016
Expected Duration of Implementation	12 months	12 months

Economic Efficiency			
	Previous Estimate	**Previous Estimate Updated[35]**	**Current Estimate**
Base date for Costs and Benefits	1 July 2013	1 July 2014	
Total Implementation Cost	$4.5m	$4.6m	$8.0m
Total Ongoing Cost	N/A	N/A	$13.9m
Total Project Cost	$4.5m	$4.6m	$21.9m

Economic Efficiency			
	Previous Estimate	**Previous Est. Updated**	**Current Estimate**
Present Value of Costs of Do Minimum	$0m		$5.5m
Present Value net Cost of Recommended Option	$4.2m		$12.1m
Present Value net Benefit of Recommended Option (Exc. WEBS)	$8.6m		$14.9m
Present Value net Benefit of WEBS of Recommended Option	$8.6m		$20.2m
BCR (Exc. WEBS)	2.0		3.1
BCR (Inc. WEBS)	2.0		3.1

[35] Note the EEM 2014 update factor for construction and maintenance costs for 2013 is 1.02.

Key differences which relate to the increase in the BCR include:

- **Increase in PV net benefits:** The increase in the present value of benefits can be attributed to the following:
    - o More recent (2014) and location specific (SH1S one-way pair) cyclist survey information showed that there are now closer to 400 cyclists per day rather than the 240 cyclist per day used in the 2013 evaluation. This results in increased health and environmental benefits as well as cyclist travel time benefits.
    - o Greater confidence in the cyclist growth rate to be more than 0%, based on both the growth between 2012 and 2014 cyclist counts and census growth between 2006 and 2013.
    - o New update factors released by NZTA for July 2014.
- **Total Implementation Cost:** The total implementation cost increased by approximately 80%. This is due to greater detail into the investigation and design aspects whereas the previous estimate was a high-level rough order cost without contingencies. Nevertheless, the increase in cost is offset by the increase in benefits outlined above.
- **Maintenance Costs:** Maintenance costs were not considered in the previous stage of evaluation.

8.8 Other Considerations

The scope of the economic evaluation was agreed with the client to consider only simplified walking and cycling costs and benefits of the recommended option.

Although vehicle delays were not considered in the economic analysis, the project team has taken a number of practicable steps to minimise or reduce any impact on the motorist level of service as a result of the pedestrian and cyclist improvements. The primary dis-benefits for the recommended option relate to the intersection changes, which result in some vehicle delays, these are outlined in the section below.

8.8.1 Signalised Intersections

As outlined in Section 5 and the MWH Traffic Signal Operation Report (2015), the recommended option includes intersection modifications and changes to the phasing of the existing traffic signals.

These changes are summarised below:

- Two through traffic lanes will be provided at all mid-block locations along the one-way system. Leading up to a signalised intersection, an additional lane will be gained either side of the two central through lanes to cater for left and right turning vehicles off the one-way system, thereby creating four separate lanes at the 4-arm signal intersections (replicating the existing layout). Immediately downstream of a signalised intersection, the turn lanes would reduce down to two through lanes again with the outside turning lanes being removed after the intersection.
- This method of operation has been modelled and accords with the projects overall objective of no reduction in LoS for the SH 1 through traffic.
- For the SCL, a new phase will be added to the intersection signal operation, so that cyclists can cross the side roads of the one-way system with full protection from turning vehicles. The new phase will also provide additional green time for pedestrians walking adjacent to the one-way system.
- The change in signal phasing disadvantages vehicles turning right off the SH 1 one-ways into side roads, as wait times will become longer and to a lesser extent, the same applies to side road traffic turning onto the one-way system.

- Overall the proposed signal operation has been tested and was demonstrated to work satisfactorily for the whole of traffic flow efficiency.

8.8.1.1 Cumberland St/Duke St intersection

The existing Cumberland St/Duke Street priority intersection will become signalised as part of the recommended option to improve cyclist and pedestrian safety and provide to connectivity/continuity of the cyclist route.

This intersection has not been modelled as part of this stage of investigation; however, it is likely to result in dis-benefits to SH1S Cumberland St traffic. It is expected any delays can be minimised through signal coordination.

The MWH Traffic Signal Operation Report (2015) contains further modelling information.

8.9 Sensitivity Analysis

8.9.1 Cost/Benefit Variability

A number of sensitivity tests were undertaken to provide a likely BCR range, the results of the analysis are summarised in Table 8-7 below.

Table 8-7: Sensitivity Analysis

Sensitivity Testing								
Variable	Base Case		Lower Bound			Upper Bound		
	Value	Note	Value	Note	BCR	Value	Note	BCR
Cost Variability								
Construction / Implementation	$8.0m	Expected Estimate	$10.4m	95th %tile Estimate	2.3	$7.0 m	Base Estimate	3.6
Benefit Variability								
Cyclist Growth Rate	4%	Estimate	0%	Low Estimate	2.4	6%	Census 06-13	3.4
Estimated new cyclists	240	As per SP11-7 ratio	150	Low Estimate	2.5	365	As per SP11-7 buffer calc.	3.8
Overall Crash Reduction: Hit object	90%	Base Estimate	50%	Low Estimate	2.9	100%	Estimate	3.1
High Sev. Crash Reduction: Crossing/ Turning	30%	Base Estimate	0%	Low Estimate	3.0	50%	High estimate	3.1
Crash Cost Savings Methodology	$3.4m	Full procedures	$0.8m	SP-11 simplified crash benefits	1.9			
Pedestrian Benefits	Included	Cyclists and Ped benefits	excluded	Cyclist benefits only	2.3			
Discount Rate	6%	EEM July '13	8%	Lower long term benefits	2.6	4%	Higher long term benefits	3.8

The results of the sensitivity testing show the BCR ranges from 1.9, when using default simplified procedures crash analysis, to 3.8 when a high end estimate of new cyclists is used. Cyclist growth rate was also a key sensitivity test, shown to have a high a significant impact on the BCR, with a cyclist growth rate of 0% dropping the BCR down to 2.4.

The sensitivity testing also confirms that the BCR is robust through a range of scenarios, remaining in the 2.0 to 4.0 range. The base BCR of 3.1 is in the 'Medium' economic efficiency band according to the Transport Agency's Planning and Investment Knowledge Base (PIKB) for the 2015-18 National Land Transport Plan (NLTP). Although it is noted that any large increase in the project costs will drop the BCR to below 3.0, changing the economic efficiency to 'Low'.

8.10 Assessment Profile

The project was assessed using the latest NZTA Investment and Revenue Strategy profiles. An assessment profile of **HHM** has been determined for the project using the Transport Agency's funding allocation process as detailed below:

Strategic fit of the problem, issue or opportunity that is being addressed: H

The strategic fit factor is a measure of how an identified problem, issue or opportunity that is addressed by a proposed activity or combination of activities, aligns with the Transport Agency's strategic investment direction.

This project achieves a **HIGH** rating for the following reasons;

- The SH1S one-way pair corridor, with two fatal and four serious cyclist crashes in addition to one fatal and eight serious pedestrian crashes, meets the requirements for a high walking and cycling crash risk:
    - Defined by the Transport Agency's PIKB[36] as greater than 3 cyclist and/or pedestrian crashes over a 5-year period.
- The project is also on a primary corridor (SH1S) through central Dunedin providing improved utility cycling (i.e. for commuting to work) for a high volume of existing cyclists as well as being well positioned to attract a high number of new users.
- The project also forms key part of a wider strategic walking and cycling network.

Effectiveness of the proposed solution: H

The effectiveness factor considers the contribution that the proposed solution makes to achieving the potential identified in the strategic fit assessment and to the purpose of the Land Transport Management Act 2003 (LTMA).

Six key criteria need to be considered when determining the effectiveness of any programme or activity according to the Transport Agency's PIKB[37], these are summarised in the table below.

Table 8-8: Effectiveness of the Solution

Component	Explanation	Rating (H/M/L)
Outcomes focused	• tangible change in addressing the problem, issue or opportunity identified in the Strategic Fit assessment o *Reduction in cyclist and pedestrian high severity crashes* • consistency with levels of service in an appropriate classification system o *Increase in pedestrian and cyclist LoS due to improved phasing with minimal or no impact of vehicle LoS on SH 1.*	H
Integrated	• consistency with the current network and future transport plans • consistency with other current and future activities • consistency with current and future land use planning • accommodates different needs across modes • support as an agreed activity across partners o *The separated cycle lane forms an essential part of the wider current and future Dunedin cycling network, with option selection and refinement considering all modes.*	H
Correctly scoped	• the degree of fit as part of an agreed strategy or business case has followed the intervention hierarchy to consider alternatives and options including low cost alternatives and options • is of an appropriate scale in relation to the issue/opportunity	H

[36] NZTA, Planning and Investment Knowledge Base (PIKB), https://www.pikb.co.nz/assessment-framework/strategic-fit-3/strategic-fit-for-walking-and-cycling-2/

[37] NZTA, Planning and Investment Knowledge Base (PIKB), https://www.pikb.co.nz/assessment-framework/effectiveness-2/

Component	Explanation	Rating (H/M/L)
	• covers and/or manages the spatial impact (upstream and downstream, network impacts) • mitigates any adverse impacts on other results o *The scope of the works in this Detailed Business Case phase has been determined through earlier strategic work and then followed by a robust option selection.* o *The separated cycle lane forms part of the wider Dunedin Cycling network and is being developed in partnership with Dunedin City Council, to ensure integration with the wider network* o *Ultimately the selection of the separated cycle lane as the options to pursue followed previous investigation work, as well as various on-road facilities (and improvements to existing facilities) which has not delivered the safety and level of service requirements; in this regard the PIKB intervention hierarchy has been applied*	
Affordable	• is affordable through the lifecycle for all parties • has understood and traded off the best whole of life cost approach • has understood the benefits and costs between transport users and other parties and sought contributions as possible • the opportunity to leverage Urban Cycleway Package funding at a project and programme level has been taken, if applicable (NZTA to confirm)	H
Timely	• delivers enduring benefits over the timeframe identified in the justified strategy or business case • provides the benefits in a timely manner • the programme/project will be delivered within the timing envelope of the Urban Cycleway Package, if applicable o *The proposed SCL will provide immediate benefits once constructed and consideration has been given to the timing of other works (e.g FWP).*	H
Confidence	• manages current and future risk for results/outcomes • manages current and future risk for costs o *Scenario testing has been undertaken to ensure that the project outcomes will be delivered over a range of scenarios.*	H
Overall	• Assessment based on lowest rating of all components	H

Economic efficiency of the proposed solution: **M**

The economic efficiency assessment considers how well the proposed solution maximises the value of what is produced from the resources used. This is primarily undertaken by the Benefit Cost Ratio.

The option investigated has a BCR of 3.1; this falls within the 2015-18 NLTP ‘Medium’ economic efficiency band of a BCR greater than 3.0 but less than 5.0[38].

Sensitivity testing shows the BCR has a range of 1.9–3.8; showing that any large increase in the project costs will drop the BCR to below 3.0, changing the economic efficiency to ‘Low’ and the assessment profile to HHL.

[38] Note: the economic efficiency criteria thresholds for projects in the 2015-18 NLTP was updated in late 2014. This changes the minimum BCR for a ‘Medium’ efficiency from 2 to 3. The new efficiency bands are Low (1 to 3), Medium (3 to 5) and High (5+). Refer https://www.pikb.co.nz/assessment-framework/benefit-and-cost-appraisal/.

9 Financial Case

The project is intended to be funded from the NLTP and has an expected construction estimate of $8.0M. There are no land costs anticipated and unlikely to be opportunities to seek third party contributions.

9.1 Project Delivery Costs

Project delivery costs at this Detailed Business Case stage are based on analysis undertaken to date and certain assumptions, as follows:

- Construction to commence July 2016 with duration of 12 months.
- Property purchase areas based on aerial photos and without input of a specialist property consultant (expected estimate $0.0M).
- Design and project documentation costs including consultancy fees and NZTA-managed costs (expected estimate $0.44M, 95th percentile estimate $0.49M)
- Construction costs (expected estimate $7.95M, 95th percentile estimate $10.35M, inclusive of MSQA costs of expected estimate $0.44M, 95th percentile estimate $0.49M)
- Statutory application costs (expected estimate $10,000)
- Funding risk cost assessed and analysed ($2.4M)

The DBC project proposal cost estimation is found in Appendix B – Capital Cost Estimates .

9.2 Ongoing Maintenance and Operations Costs

Maintenance costs, including the do-minimum option, are detailed in Section 8.5 above.

9.3 Project Revenues

There are no third party contributions or revenue gathering prospects for this project. It however be feasible to seek a contribution from DCC, particularly for measures that directly connect into the DCC Cycling Network.

9.4 Funding Options

Funding for the project is intended to be sourced from the National Land Transport Programme.

9.5 Financial Risk

Project funding is understood to be entirely Government share, therefore no funding risk is associated with the project.

Also refer to Appendix D – Project Risk Analysis.

Appendix A – Economic Worksheets

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 1 - Evaluation summary

Worksheet 1 provides a summary of the general data used for the evaluation as well as the results of the analysis. The information required is a subset of the information required for assessment in terms of the NZTA's *Planning and Investment Knowledge Base* .

1	Evaluator(s)	Kelly Blackie (MWH) & Dhimantha Ranatunga (MWH)		
	Reviewer(s)	Prasad Tala (MWH)		
2	Activity details			
	Approved organisation name	NZTA		
	Activity name	Dunedin One Way Separated Cycle Lanes (SCL)		
	Your reference	80507429		
	Activity description	**Option 1: Construction of a uni-directional SCL**		
	Describe the issues to be addressed	Improve the safety of commuter and recreational cyclists		
3	Location			
	Brief description of location	SH1 Dunedin, one-way pair, 01S RP 704/0.0 to RP 706/0.44		
4	Alternatives and options			
	Describe the do-minimum	Retain existing on-road cycle lanes		
	Summarise the options assessed	Option 1: Uni-directional SCL, Option 2: Bi-directional SCL		
5	Timing			
	Time zero (assumed construction start date)	1 July	2016	
	Expected duration of construction (months)		12	
	Period of analysis		40	
6	Economic efficiency			
	Date economic evaluation completed (mm/yyyy)		Feb-15	
	Base date for costs and benefits	1 July	2014	
	Land designation required		no	
7	Data (only fill the applicable data)			
	Existing pedestrian/cycling volumes		405	AADT in year 2014
	Estimated new pedestrian/cyclist volume	(from WS SP11-7)	240	AADT
	Estimated motor vehicle volumes		9,200-15,050 per direction	AADT
	Estimated motor vehicle speed		45.00	km/h
	Pedestrian/cyclist growth rate		4.0	%
	Width available for walking/cycling before		2.40	m
	Width available for walking/cycling after		2.60	m
	Length walked/cycled after works		2.70	km
	Length walked/cycled before works		2.70	km
	Expected reduction in private vehicle travel			km per year

8	PV cost of do-minimum			$ 5,487,538	A
9	PV cost of the preferred option			$ 12,063,314	B
10	Benefit values from worksheet 4, 5, 6				
	PV travel time cost savings	$ 1,636,752	**C** x Update factor TTC: 1.42	= $ 2,324,188	**X**
	PV facility benefits	$ 8,231,692	**D** x Update factor WCB: 1.14	= $ 9,384,129	**Y**
	PV crash cost savings	$ 6,866,003	**E** x Update factor AC: 1.24	= $ 8,513,844	**Z**

11

$$BCR_N = \frac{\text{PV net benefits}}{\text{PV economic costs}} = \frac{\mathbf{X + Y + Z}}{\mathbf{B - A}} = \frac{20,222,161}{6,575,777} = 3.1$$

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 2 - Cost of do-minimum

Worksheet 2 is used for calculating the PV cost of the do-minimum. The do-minimum is the minimum level of expenditure necessary to keep a facility open and generally consists of maintenance work.

1 Historic maintenance cost data (indicate whether assessed or actual)

Maintenance costs for the site over last three years

Year 1	2013		Actual	$	29,314
Year 2	2014		Actual	$	61,803
Year 3	2015		Actual	$	128,846
Maintenance costs for the site this year		2016	Assessed	$	73,321
Future annual maintenance costs			Assessed	$	0

2 PV of annual maintenance and inspection costs following the work

Annual cost = $ 1,000 x 15.49 = $ 15,490 **(a)**

3 PV of periodic maintenance costs (including any capital work)

Time zero — 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present value
	THSRA (14/15)	39,360		
	AC (15/16)	72,416		
1	UTA/AC/THSRA (16/17)	634,144	0.94	598,249
2	UTA/AC (17/18)	361,472	0.89	321,709
3	AC (18/19)	87,392	0.84	73,376
4	AC (19/20)	133,984	0.79	106,128
6	AC (21/22/23)	205,312	0.70	144,737
8	AC(23/24/25)	753,440	0.63	472,718
10	THSRA (25/26)	52,160	0.56	29,126
15	AC Reseal	2,560,000	0.42	1,068,199
23	Rehab	3,200,000	0.26	837,751
31	AC Reseal	2,560,000	0.16	420,492
39	AC Reseal	2,560,000	0.10	263,822

Sum of PV of periodic maintenance $ 4,336,306 **(b)**

4 PV of annual operating costs

Annual cost = $ 73,321 x 15.49 = $ 1,135,741 **(c)**

5 PV cost of the do-minimum

(a) + **(b)** + **(C)** = $ 5,487,538 **A**

Transfer the PV cost of do minimum **A**, to **A** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 3 - Cost of the option(s)

Worksheet 3 is used for calculating the PV cost of the walking or cycling facility.

1 PV of estimated cost of proposed work (as per attached estimate sheet)

$ 7,952,001 x 0.94 = $ 7,474,881 **(a)**

2 PV of maintenance in year 1 $ 1,000 **(b)**

3 PV of annual maintenance costs following the work

(years 2 to 40 inclusive) $ 1,000 x 14.52 = $ 14,520 **(c)**

4 PV of periodic maintenance costs

Time zero — 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present Value
10	Reseal	2,560,000	0.56	1,429,491
18	Reseal	2,560,000	0.35	896,880
26	Reseal	2,560,000	0.22	562,714
34	Reseal	2,560,000	0.14	353,054
42	Rehab		0.09	0

Sum of PV of periodic maintenance costs = $ 3,242,138 **(d)**

5 PV cost of additional annual maintenance

$ 91,651 x 14.52 = $ 1,330,775 **(e)**

6 PV of total cost of option

PV total costs **(a)** + **(b)** + **(c)** + **(d)** + **(e)** = $ 12,063,314 **B**

Transfer the PV total cost for the preferred option **B**, to **B** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 3 - Cost of the option(s)

Worksheet 3 is used for calculating the PV cost of the walking or cycling facility.

1 PV of estimated cost of proposed work (as per attached estimate sheet)

$ 6,960,341 x 0.94 = $ 6,542,721 **(a)**

2 PV of maintenance in year 1 $ 1,000 **(b)**

3 PV of annual maintenance costs following the work

(years 2 to 40 inclusive) $ 1,000 x 14.52 = $ 14,520 **(c)**

4 PV of periodic maintenance costs

Time zero 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present Value
10	Reseal	2,560,000	0.56	1,429,491
18	Reseal	2,560,000	0.35	896,880
26	Reseal	2,560,000	0.22	562,714
34	Reseal	2,560,000	0.14	353,054
42	Rehab		0.09	0

Sum of PV of periodic maintenance costs = $ 3,242,138 **(d)**

5 PV cost of additional annual maintenance

$ 91,651 x 14.52 = $ 1,330,775 **(e)**

6 PV of total cost of option

PV total costs **(a)** + **(b)** + **(c)** + **(d)** + **(e)** = $ 11,131,153 **B**

Transfer the PV total cost for the preferred option **B**, to **B** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 3 - Cost of the option(s)

Worksheet 3 is used for calculating the PV cost of the walking or cycling facility.

1 PV of estimated cost of proposed work (as per attached estimate sheet)

$ 10,354,491 x 0.94 = $ 9,733,222 **(a)**

2 PV of maintenance in year 1 $ 1,000 **(b)**

3 PV of annual maintenance costs following the work

(years 2 to 40 inclusive) $ 1,000 x 14.52 = $ 14,520 **(c)**

4 PV of periodic maintenance costs

Time zero 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present Value
10	Reseal	2,560,000	0.56	1,429,491
18	Reseal	2,560,000	0.35	896,880
26	Reseal	2,560,000	0.22	562,714
34	Reseal	2,560,000	0.14	353,054
42	Rehab		0.09	0

Sum of PV of periodic maintenance costs = $ 3,242,138 **(d)**

5 PV cost of additional annual maintenance

$ 91,651 x 14.52 = $ 1,330,775 **(e)**

6 PV of total cost of option

PV total costs **(a)** + **(b)** + **(c)** + **(d)** + **(e)** = $ 14,321,654 **B**

Transfer the PV total cost for the preferred option **B**, to **B** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 4 - Travel time cost savings

Worksheet 4 is used for calculating pedestrian and cyclist travel time cost savings.

1 Road category (Select): Urban arterial

2 Travel time data

Walkers and/or cyclists average annual daily traffic current (AADT) (or volumes affected by the improvement)				405
Walking or Cycling growth rate (per annum)				4.0%
Travel time cost (TTC)	(Table 4.1b)		$	7.80

	Do-minimum		Option	
Length of route (km)	L^{dm}	2.70	L^{opt}	2.70
Mean speed	VS^{dm}	15.00	VS^{opt}	22.00
Relative attractiveness	(Table SP11.1)			1.05

3 Annual TTC for the do-minimum

$$\frac{AADT \times 365 \times L^{dm} \times TTC}{VS^{dm}} = \$ \; 207{,}503 \quad \textbf{(a)}$$

4 Annual TTC for the option

$$\frac{AADT \times 365 \times L^{opt} \times TTC}{VS^{opt} \times RA} = \$ \; 134{,}405 \quad \textbf{(b)}$$

5 Value of annual TTC savings — **(a) - (b)** = $ 73,098 **(c)**

6 PV of travel time cost savings — DF 22.39 — **(c)** x DF = $ 1,636,752 **C**

Transfer the PV of travel time cost savings for the preferred option **C**, to **C** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-

Worksheet 5 - Benefits for walking and cycling facilities

Worksheet 5 is used to calculate the walking and cycling facility benefits for the various options. Only one category for walking and one category for cycling may be used in an evaluation of a proposal. If an activity contains more categories, they must be submitted as separate evaluations.

Activities that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional crash costs these must be accounted for in worksheet 6. Make sure the estimates of the new number of pedestrians and/or cyclists generated by the facility are realistic.

Required information:

L Length of new facility in kilometres
NPD Number of additional pedestrians per day
NTD Number of additional cycle trips per day
NSD Number of additional and existing cycle trips per day
DF Discount factor. The discount factor may differ by mode depending on the growth rate

Health and environment benefits for walking facility

Pedestrian growth rate (per annum) 0.04%

1 Health and environment benefits for footpaths and other pedestrian facilities

Benefit = number of additional pedestrians/day x length of new facility in km x 365 x $2.70

L	2.70	x NPD		x 365 x $2.70 x DF	14.61	= $ 0 **(a)**

2 Health and environment benefits from improvements at hazardous sites
(provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

Benefit = number of additional pedestrians/day x 365 x $2.70

NPD		x 365 x $2.70 x DF	14.61	= $ 0 **(b)**

Transfer total **(a)** or **(b)** to **D** on worksheet 1.

Health and environment benefits for cycling facility

Cyclist growth rate (per annum) 4.0%

3 Health and environment benefits for cycle lanes, cycleways or increased road shoulder widths

Benefit = number of additional cycle trips/day x length of new facility in km x 365 x $1.40

L	2.70	x NTD	240	x 365 x $1.40 x DF	22.39	= $ 7,408,523 **(c)**

4 Health and environment benefits from improvements at hazardous sites
(provision of overbridges, underpasses, bridge widening or intersection improvements for cyclists)

Benefit = number of additional cycle trips/day x 365 x $4.20

NTD	240	x 365 x $4.20 x DF	22.39	= $ 8,231,692 **(d)**

Transfer total **(c)** or **(d)** to **D** on worksheet 1.

Safety benefits for cycling facility

5 Safety benefit for cycle lanes, cycleways or increased road shoulder widths in the absence of a specific crash analysis

Benefit = number of new and existing cycle trips/day x length of new facility in km x 365 x $0.05

L	2.70	x NSD	405	x 365 x $0.05 x DF	22.39	= $ 446,756 **(e)**

6 Safety benefit from improvements at hazardous sites in the absence of a specific crash analysis (provision of overbridges, underpasses, bridge widening or intersection improvements for cyclists)

Benefit = number of new and existing cycle trips/day x 365 x $0.15

NSD	645	x 365 x $0.15 x DF	22.39	= $ 790,385 **(f)**

Transfer total **(e)** or **(f)** to **E** on worksheet 1.

		Existing	Predicted	
EEM A6 - model 6	**Midblock** cyclist prediction Model	**Existing**	**Predicted**	
	At	0.628	0.699	11% increase assuming no reduction in midblock crashes
	Q veh AADT	12,025	12,025	
Conflict- urban midblock pedestrian and cyclist facilities	C cyc AADT	405	645	
	L	2.70	2.70	
	CRF	0	0%	
	Actual Cyclist Midblock Crashes (5y)	7		
	Predicted midblock crashes	3.1		
	% difference	223%		
	Total Cyclist Crashes	13		

Movement	CAS Mvmt Code		Option 1: Uni-directional SCL Fatal	Serious	Minor	Non- injury	Comments	Source
Hit Object	E	Crashes (09-13)	1	1	2	0	SCL will remove the majority of 'hit car door' crashes. All 4 crashes involved car doors or hitting a parked vehicle.	-
		% Reduction	90	90	90	90		
Crossing - turning	J,K,L,M	Crashes (09-13)	1	1	2	1	Reduction in crossing/turning crashes from drivers not having to worry/look at cyclists travelling (and turning) in both directions. Assume NEUTRAL or minor INCREASE in minor injury/non-injury crashes due to a higher number of novice cyclists using the facility/driveway risk.	
		% Reduction	30	30	-30	-30		
Crossing - direct	H	Crashes (09-13)	0	2	0	0	Assume a reduction in high severity crossing/turning crashes and an increase in minor/non-injury crashes	
		% Reduction	30	30	-30	-30		
Rear end - slow	FA,GA-GC,GO	Crashes (09-13)	0	0	1	0	Assume neutral	
		% Reduction	0	0	0	0		
Loss of control - off road	AD,CB,CC,CO,D	Crashes (09-13)	0	0	1	0	Assume neutral	
		% Reduction	0	0	0	0		
Ped Crossing Rd- Right turn	ND, NF	Crashes (09-13)	0	4	8	0	Reduction based on full pedestrian protection (up from partial protection only)	50% - add exclusive pedestrian signal phase (http://www.engtoolkit.com.au/default.asp?p=treatment&i=51)
		% Reduction	50	50	50	50		
Ped Crossing Rd- Other	NA-NC, NE, NG	Crashes (09-13)	1	4	5	4	Reduction based on additional crossing points with kerb buildouts	15-35% - EEM table A6.18(c)
		% Reduction	30	30	30	30		
Pedestrians Other	P	Crashes (09-13)	0	0	1	1	Reduction in non-crossing crashes based on separation between pedestrians and cyclists as	
		% Reduction	10	10	10	10		

Movement	CAS Mvmt Code		Option 2: Cumberland St Bi-Directional SCL Fatal	Serious	Minor	Non- injury	Comments
Hit Object	E	Crashes (09-13)	1	1	2	0	SCL will remove the majority of 'hit car door' crashes. Lower reduction due to bi-directional cycle lane
		% Reduction	70	70	70	70	
Crossing - turning	J,K,L,M	Crashes (09-13)	1	1	2	1	Bi-directional path unlikely to result in significance decrease in crossing/turning crashes. Assume Neutral and slightly increased crash rate for minor injury/non-injury intersection crashes
		% Reduction	0	0	-30	-30	
Crossing - direct	H	Crashes (09-13)	0	2	0	0	
		% Reduction	0	0	-30	-30	
Rear end - slow	FA,GA-GC,GO	Crashes (09-13)	0	0	1	0	SCL assumed reduction - reduced due to bi-directional path
		% Reduction	0	0	0	0	
Loss of control - off road	AD,CB,CC,CO,D	Crashes (09-13)	0	0	1	0	SCL assumed reduction - reduced due to bi-directional path
		% Reduction	0	0	0	0	
Ped Crossing Rd- Right turn	ND, NF	Crashes (09-13)	0	4	8	0	Cumberland St changes - will they be reflected for the peds on Great King/Castle - Jamie? i.e. same signal changes?
		% Reduction	25	25	25	25	
Ped Crossing Rd- Other	NA-NC, NE, NG	Crashes (09-13)	1	4	5	4	as above - same midblock crossing opp?
		% Reduction	15	15	15	15	
Pedestrians Other	P	Crashes (09-13)	0	0	1	1	as above
		% Reduction	5	5	5	5	

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Hit object	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	1	1	2	0
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.04	0.96	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.08	1.92	2	0
7	Crashes per year = **(6)**/**(3)**	0.02	0.38	0.40	0.00
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.013	0.319	0.332	0.000
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.013	0.478	0.913	0.000
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	41,168	152,508	14,425	-
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$208,101			
	Option				
18	Percentage crash reduction	90	90	90	90
19	Percentage of crashes 'remaining' [100 - **(18)**]	10	10	10	10
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.05	0.09	0.00
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	4,117	15,251	1,443	-
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$20,810			
27	Annual crash cost savings = **(17)** - **(26)**	$187,291			
28	PV crash cost savings = **(27)** x DF	$1,603,533			E

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Crossing, turning	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity				
		Fatal	Serious	Minor	Non- injury	
3	Number of years of typical crash rate records	5				
4	Number of reported crashes over period	1	1	2	1	
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.03	0.97	1	1	
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.06	1.94	2	1	
7	Crashes per year = **(6)**/**(3)**	0.01	0.39	0.40	0.20	
8	Adjustment factor for crash trend (table A6.1(a))	0.83				
9	Adjusted crashes per year = **(7)** x **(8)**	0.010	0.322	0.332	0.166	
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7	
11	Total estimated crashes per year = **(9)** x **(10)**	0.010	0.483	0.913	1.162	
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1				
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980	
16	Crash cost per year = **(11)** x **(15)**	30,876	154,096	14,425	1,139	
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$200,536				
	Option					
18	Percentage crash reduction	30	30	-30	-30	
19	Percentage of crashes 'remaining' [100 - **(18)**]	70	70	130	130	
20	Predicted crashes per year **(11)** x **(19)**	0.01	0.34	1.19	1.51	
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1				
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980	
25	Crash cost per year = **(20)** x **(24)**	21,613	107,867	18,753	1,480	
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$149,714				
27	Annual crash cost savings = **(17)** - **(26)**	$50,822				
28	PV crash cost savings = **(27)** x DF	$435,127				**E**
	Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1					

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Crossing, direct	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity				
		Fatal	Serious	Minor	Non- injury	
3	Number of years of typical crash rate records	5				
4	Number of reported crashes over period	0	2	0	0	
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.07	0.93	1	1	
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.14	1.86	0	0	
7	Crashes per year = **(6)**/**(3)**	0.03	0.37	0.00	0.00	
8	Adjustment factor for crash trend (table A6.1(a))	0.83				
9	Adjusted crashes per year = **(7)** x **(8)**	0.023	0.309	0.000	0.000	
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7	
11	Total estimated crashes per year = **(9)** x **(10)**	0.023	0.463	0.000	0.000	
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
14	Mean speed adjustment = ((**1**) - 50)/50	-0.1				
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980	
16	Crash cost per year = **(11)** x **(15)**	72,044	147,742	-	-	
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$219,786				
	Option					
18	Percentage crash reduction	30	30	-30	-30	
19	Percentage of crashes 'remaining' [100 - **(18)**]	70	70	130	130	
20	Predicted crashes per year **(11)** x **(19)**	0.02	0.32	0.00	0.00	
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
23	Mean speed adjustment = ((**2**) - 50)/50	-0.1				
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980	
25	Crash cost per year = **(20)** x **(24)**	50,431	103,419	-	-	
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$153,850				
27	Annual crash cost savings = **(17)** - **(26)**	$65,936				
28	PV crash cost savings = **(27)** x DF	$564,523				E

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Rear end, slow vehicle	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	0	0	1	0
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.06	0.94	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0	0	1	0
7	Crashes per year = **(6)**/**(3)**	0.00	0.00	0.20	0.00
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.000	0.000	0.166	0.000
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.000	0.000	0.457	0.000
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	-	-	7,213	-
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$7,213			
	Option				
18	Percentage crash reduction	0	0	0	0
19	Percentage of crashes 'remaining' [100 - **(18)**]	100	100	100	100
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.00	0.46	0.00
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	-	-	7,213	-
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$7,213			
27	Annual crash cost savings = **(17)** - **(26)**	$0			
28	PV crash cost savings = **(27)** x DF	$0			**E**

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Lost control off road	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	**Severity**			
		Fatal	**Serious**	**Minor**	**Non- injury**
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	0	0	1	0
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.11	0.89	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0	0	1	0
7	Crashes per year = **(6)**/**(3)**	0.00	0.00	0.20	0.00
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.000	0.000	0.166	0.000
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.000	0.000	0.457	0.000
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = ((**1**) - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	-	-	7,213	-
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$7,213			
	Option				
18	Percentage crash reduction	0	0	0	0
19	Percentage of crashes 'remaining' [100 - **(18)**]	100	100	100	100
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.00	0.46	0.00
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = ((**2**) - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	-	-	7,213	-
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$7,213			
27	Annual crash cost savings = **(17)** - **(26)**	$0			
28	PV crash cost savings = **(27)** x DF	$0			**E**

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Pedestrian	Vehicle involvement	All vehicles
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	**Severity**				
		Fatal	**Serious**	**Minor**	**Non- injury**	
3	Number of years of typical crash rate records	5				
4	Number of reported crashes over period	0	4	8	0	
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.1	0.9	1	1	
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.4	3.6	8	0	
7	Crashes per year = **(6)**/**(3)**	0.08	0.72	1.60	0.00	
8	Adjustment factor for crash trend (table A6.1(a))	0.83				
9	Adjusted crashes per year = **(7)** x **(8)**	0.066	0.598	1.328	0.000	
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	4.5	7	
11	Total estimated crashes per year = **(9)** x **(10)**	0.066	0.896	5.976	0.000	
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1				
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980	
16	Crash cost per year = **(11)** x **(15)**	205,840	285,952	94,421	-	
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$586,212				
	Option					
18	Percentage crash reduction	50	50	50	50	
19	Percentage of crashes 'remaining' [100 - **(18)**]	50	50	50	50	
20	Predicted crashes per year **(11)** x **(19)**	0.03	0.45	2.99	0.00	
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1				
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980	
25	Crash cost per year = **(20)** x **(24)**	102,920	142,976	47,210	-	
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$293,106				
27	Annual crash cost savings = **(17)** - **(26)**	$293,106				
28	PV crash cost savings = **(27)** x DF	$2,509,495				**E**
	Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1					

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Pedestrian	Vehicle involvement	All vehicles
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	1	4	5	4
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.1	0.9	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.5	4.5	5	4
7	Crashes per year = **(6)**/**(3)**	0.10	0.90	1.00	0.80
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.083	0.747	0.830	0.664
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	4.5	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.083	1.121	3.735	4.648
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	257,300	357,440	59,013	4,555
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$678,308			
	Option				
18	Percentage crash reduction	30	30	30	30
19	Percentage of crashes 'remaining' [100 - **(18)**]	70	70	70	70
20	Predicted crashes per year **(11)** x **(19)**	0.06	0.78	2.61	3.25
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	180,110	250,208	41,309	3,189
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$474,815			
27	Annual crash cost savings = **(17)** - **(26)**	$203,492			
28	PV crash cost savings = **(27)** x DF	$1,742,245			E

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Pedestrian	Vehicle involvement	All vehicles
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity				
		Fatal	Serious	Minor	Non- injury	
3	Number of years of typical crash rate records	5				
4	Number of reported crashes over period	0	0	1	1	
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.1	0.9	1	1	
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0	0	1	1	
7	Crashes per year = **(6)**/**(3)**	0.00	0.00	0.20	0.20	
8	Adjustment factor for crash trend (table A6.1(a))	0.83				
9	Adjusted crashes per year = **(7)** x **(8)**	0.000	0.000	0.166	0.166	
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	4.5	7	
11	Total estimated crashes per year = **(9)** x **(10)**	0.000	0.000	0.747	1.162	
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
14	Mean speed adjustment = ((**1**) - 50)/50	-0.1				
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980	
16	Crash cost per year = **(11)** x **(15)**	-	-	11,803	1,139	
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$12,941				
	Option					
18	Percentage crash reduction	10	10	10	10	
19	Percentage of crashes 'remaining' [100 - **(18)**]	90	90	90	90	
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.00	0.67	1.05	
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
23	Mean speed adjustment = ((**2**) - 50)/50	-0.1				
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980	
25	Crash cost per year = **(20)** x **(24)**	-	-	10,622	1,025	
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$11,647				
27	Annual crash cost savings = **(17)** - **(26)**	$1,294				
28	PV crash cost savings = **(27)** x DF	$11,080.04				**E**

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 7 – Cycle demand

This worksheet is used to calculate cycle demand for a new cycle facility. The new commuters section of the worksheet calculates the total new daily cyclist commuters. The new other section calculates the total daily new other cyclists. Finally the overall new cyclists is devised.

New and Existing cyclists

	Buffers (km)	<0.4	0.4 to <0.8	0.8 to ≤ 1.6
1	Area (km^2)			
2	Density per square kilometre			
3	Population in each buffer **(3)** = **(1)** x **(2)**	8,169	4,989	8,887
4	Total population in all buffers (Sum of **(3)**)	22,045.00		
5	Commute share (single value for all)	2.57%		
6	Likelihood of new cyclist multiplier	1.04	0.54	0.21
7	Row **(7)** = **(3)** x **(6)**	8,495.76	2,694.06	1,866.27
8	Sum of row **(7)**	13,056.09		
9	Cyclist rate **(9)** = (**(5)** x 0.96) + 0.32%	2.79%		
10	Total existing daily cyclists **(10)** = **(4)** x **(9)**	614.69		
11	Total new daily cyclists **(11)** = **(8)** x **(9)**	364.05		

2014 NZTA Cyclist Survey				
Section Name	**Section**	**Northbound**	**Southbound**	**Length**
Leviathon hotel - Stuart St	1	211	221	1.25
St Andrew St - Hanover St	2	224	235	0.5
Frederick St - Albany	3	215	218	0.55
St Dundas St – Howe St	4	159	143	0.22
	Weighted	210	216	
	Overall	**426**		

	Existing Cyclists (AADT -	**Estimated Cyclists that will use the SCL**			
		Option 1		**Option 2**	
		%	Number	**%**	Number
NBD	210	95%	199	75%	157
SBD	216	95%	205	95%	205
Total	**426**		**405**		**363**

Survey Date	NBD	SBD	2012
2012	112	191	303
2014	210	216	426
Growth p.a.	44%	7%	20.3%

ROAD	DIST	FROM	INTN	SIDE	IDNO	DATE	DYWK	TIME	MVMT	VEHS	CSCD	OBJS	CURV	SURF	LITE	WTHR	JNTY	TRAF	MARK	SPDL	NFAT	NSER	NMIN	PEDA	CYCA	EAST	NORTH	MVMT DESCR	CAUSES	SEV
ALBANY ST	30	W		GREAT KING ST	201173723	9/12/2011	Fri	1459	QD	CE1C	428A	M	R	D	B	F			C	50	0	0	0			1406672	4917783	parked CAR1 EBD on ALBANY ST ran away, CAR1 hit Parked Vehicle	CAR1 parking brake not fully applied	N
ALBANY ST	25	W		MALCOLM ST	201021430	23/03/2010	Tue	1850	JA	CE1S	312B 330B 610B 927		R	D	O	F	D	N	C	50	0	0	1		20	1406676	4917782	CAR1 EBD on ALBANY ST hit CYCLIST2 (Age 20)turning right onto ALBANY ST from the left	CYCLIST2 failed to give way entering roadway not from driveway or intersection, inattentive, brakes ENV: entering or leaving other commercial	M
ALBANY ST	20	E		SH 1S	201222980	21/12/2012	Fri	1459	AC	CW1M	159A 132B 532B		R	W	O	H			C	50	0	1	0			1406833	4917726	CAR1 WBD on ALBANY ST changing lanes to left hit MOTOR CYCLE2	CAR1 cut in after overtaking MOTOR CYCLE2 lost control under heavy braking, casualty thrown from vehicle	H
BOW LANE	15	E		SH 1S CASTLE ST	201072796	25/08/2010	Wed	1545	MD	CE1C	371B 927		R	D	B	F	D	N	C	50	0	0	0			1406695	4916999	CAR1 EBD on BOW LANE hit CAR2 doing driveway manoeuvre	CAR2 didnt see/look behind when reversing/manoeuvering ENV: entering or leaving other commercial	N
DUNBAR ST	5	N		SH 1S CASTLE	201171879	12/06/2011	Sun	1710	FB	CS1C	181A 331A 387A 901		R	W	O	H	T	G	C	50	0	0	0			1406476	4916652	CAR1 SBD on DUNBAR ST hit rear end of CAR2 stop/slow for cross traffic	CAR1 following too closely, failed to notice car slowing, misjudged intentions of another party ENV: heavy rain	N
DUNDAS ST	20	E		CUMBERLAND ST NORTH	2973512	16/08/2009	Sun	1820	MO	CE1C	330A 372A	M	R	D	TF	F			C	50	0	0	0			1407058	4918352	CAR1 EBD on DUNDAS ST hit Parked Vehicle while manoeuvring	CAR1 inattentive, didnt see/look behind when changing lanes, position or direction	N
DUNDAS ST	25	E		CUMBERLAND ST NORTH	201070616	22/02/2010	Mon	1303	MB	CE1C	303B 353B 372B		R	D	B	F			C	50	0	0	0			1407062	4918350	CAR1 EBD on DUNDAS ST hit CAR2 U-turning from opposite direction of travel	CAR2 failed to give way when turning to non-turning traffic, attention diverted by other traffic, didnt see/look behind when changing lanes, position or direction	N
FREDERICK ST	30	E		CUMBERLAND ST CENTRAL	2971640	8/05/2009	Fri	1700	DA	CW1C	135A 927	M	R	W	TF	H	D	N	C	50	0	0	0			1406767	4917513	CAR1 WBD on FREDERICK ST lost control turning right, CAR1 hit Parked Vehicle on right hand bend	CAR1 lost control due to road conditions ENV: entering or leaving other commercial	N
HANOVER ST	20	E		CUMBERLAND ST CENTRAL	2972104	18/06/2009	Thu	1254	MG	VW14	371B		R	D	B	F			C	50	0	0	0			1406684	4917308	VAN1 WBD on HANOVER ST hit SUV2 reversing along road	SUV2 didnt see/look behind when reversing/manoeuvering	N
HANOVER ST	10	W		SH 1S CASTLE ST	201074132	21/12/2010	Tue	1800	GD	CE1C	353A 386A		R	D	B	FS	X	T	C	50	0	0	0			1406769	4917278	CAR1 EBD on HANOVER ST hit rear of CAR2 turning right from centre line	CAR1 attention diverted by other traffic, misjudged speed of own vehicle	N
HANOVER ST	20	W		SH 1S CUMBERLAND ST CENTR	2974403	16/12/2009	Wed	1411	EA	CW1	129A	M	R	W	O	L			C	50	0	0	0			1406646	4917322	CAR1 WBD on HANOVER ST hit parked veh, CAR1 hit Parked Vehicle	CAR1 too far left/right	N
HOWE ST	15	E		SH 1S	201172800	7/09/2011	Wed	1634	EE	CE1C	129A 330A 374B	M	R	D	B	F	T	S	C	50	0	0	0			1407125	4918561	CAR2 EBD on HOWE ST opened door into path of another party, CAR1 hit Parked Vehicle	CAR1 too far left/right, inattentive CAR2 didnt see/look behind when opening door or leaving vehicle	N
STUART ST	15	E		CUMBERLAND ST CENTRAL	2973510	3/09/2009	Thu	1700	MO	CW1C	434A 512A	M	R	D	TF	F			C	50	0	0	0			1406503	4916822	CAR1 WBD on STUART ST hit Parked Vehicle while manoeuvring	CAR1 intimidating driving, intentional collision	N
STUART ST	5	S		CUMBERLAND ST CENTRAL	2971749	1/05/2009	Fri	1500	FE	CN1T	181A 427A		R	D	O	F	X	T	C	50	0	0	0			1406494	4916825	CAR1 NBD on STUART ST hit rear end of TRUCK2 stop/slow for signals	CAR1 following too closely, foot slipped or got caught under pedal	N
STUART ST	15	S		SH 1S CUMBERLAND ST CENTR	201021225	11/02/2010	Thu	1030	EE	SE1C	353B 374B	M	R	D	B	F			C	50	0	0	1		52	1406593	4916789	CAR2 EBD on STUART ST opened door into path of another party, CYCLIST1 hit Parked Vehicle	CAR2 attention diverted by other traffic, didnt see/look behind when opening door or leaving vehicle	M
STUART ST	20	W		SH 1S CUMBERLAND ST CENTR	201074174	21/12/2010	Tue	1445	MO	CE1C	386A	M	R	D	O	F			C	50	0	0	0			1406470	4916833	CAR1 EBD on STUART ST hit Parked Vehicle while manoeuvring	CAR1 misjudged speed of own vehicle	N
UNION PLACE	20	E		GREAT KING ST	201273126	28/10/2012	Sun	245	MO	CW1C	357A 371A	M	R	D	DO	F			C	50	0	0	0			1406907	4917934	CAR1 WBD on UNION PLACE hit Parked Vehicle while manoeuvring	CAR1 emotionally upset/road rage, didnt see/look behind when reversing/manoeuvering	N
CUMBERLAND ST NORT			I	1S/700/3.31	2970425	22/02/2009	Sun	1735	HA	CS2C	301B 350B 671B		E	W	O	L	M	S	R	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, attention diverted, blind spot	N
GREAT KING ST NORTH			I	PINE HILL ROAD	201173116	27/10/2011	Thu	1745	FB	CN1V	181A 331A		R	D	O	F	X	S	N	50	0	0	0			1407197	4918962	CAR1 NBD on GREAT KING ST NORTH hit rear end of VAN2 stop/slow for cross traffic	CAR1 following too closely, failed to notice car slowing	N
GREAT KING ST NORTH			I	1S/700/3.31	201372907	29/10/2013	Tue	1515	HA	CE24	301B 353B		E	D	B	F	X	S	N	50	0	0	0			1407197	4918962	CAR1 EBD on SH 1S PINE HILL ROAD hit SUV2 crossing at right angle from right	SUV2 failed to give way at stop sign, attention diverted by other traffic	N
1S/700/3.31			I	GREAT KING ST NORTH	201122551	30/09/2011	Fri	1809	HA	TE1C	301B 375B		E	D	B	F	X	S	R	50	0	0	1			1407197	4918962	TRUCK1 EBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	M
1S/700/3.31			I	GREAT KING ST NORTH	201221562	5/04/2012	Thu	1050	HA	VE1C	321B 501B		R	D	B	F	X	S	R	50	0	0	1			1407197	4918962	VAN1 EBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, illness with no warning (eg heart attack)	M
1S/700/3.31			I	GREAT KING ST NORTH	201021805	18/05/2010	Tue	1409	HA	VS1C	321B 330B 375B		R	D	O	F	X	S	R	50	0	0	2			1407197	4918962	VAN1 SBD on SH 1S PINE HILL hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, inattentive, didnt see/look when required to give way to traffic from another direction	M
1S/700/3.31			I	GREAT KING ST NORTH	201370303	16/02/2013	Sat	1500	KB	CE1C	301B		R	D	B	F	X	S	C	50	0	0	0			1407197	4918962	CAR1 EBD on SH 1S PINE HILL hit CAR2 merging from the right	CAR2 failed to give way at stop sign	N
1S/700/3.31			I	SH 1S	201021355	5/03/2010	Fri	2230	HA	CS1C	301B 351B	S	E	D	DO	F	X	S	C	50	0	0	3			1407197	4918962	CAR1 SBD on SH 1S PINE HILL hit CAR2 crossing at right angle from right, CAR1 hit Traffic Sign	CAR2 failed to give way at stop sign, attention diverted by passengers	M
1S/700/3.31			I	GREAT KING ST	201122921	12/11/2011	Sat	1450	HA	CE2C	301B 375B		R	D	B	F	X	S	R	50	0	0	1			1407197	4918962	CAR1 EBD on GREAT KING ST hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	M
1S/700/3.31			I	GREAT KING ST NORTH	201221039	18/01/2012	Wed	1327	HA	TS1C	301B 404B 902		R	D	B	F	X	S	R	50	0	0	1			1407197	4918962	TRUCK1 SBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, overseas/migrant driver failed to adjust to NZ road rules and road conditions ENV: dazzling sun	M
1S/700/3.31			I	GREAT KING ST NORTH	201172146	23/08/2011	Tue	1314	HA	CS1V	301A 375A		E	D	B	F	X	S	R	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit VAN2 crossing at right angle from right	CAR1 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	N
1S/700/3.31			I	GREAT KING ST NORTH	201123138	15/12/2011	Thu	1250	HA	CE1C	321B 375B		R	D	O	F	X	S	R	50	0	0	3			1407197	4918962	CAR1 EBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, didnt see/look when required to give way to traffic from another direction	M
1S/700/3.31			I	GREAT KING ST NORTH	201074175	20/12/2010	Mon	1320	FB	CS1C	181A 191B		M	D	B	F	X	S	C	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit rear end of CAR2 stop/slow for cross traffic	CAR1 following too closely CAR2 suddenly braked	N
1S/700/3.31			I	GREAT KING ST NORTH	201071261	27/03/2010	Sat	1336	FO	VS1C	130A 181A 191B 404B 440B		R	D	O	F	X	S	R	50	0	0	0			1407197	4918962	VAN1 SBD on SH 1S PINE HILL ROAD hit rear end of CAR2 stop/slow for obstruction	VAN1 lost control, following too closely CAR2 suddenly braked, overseas/migrant driver failed to adjust to NZ road rules and road conditions, parked or stopped	N
1S/700/3.31			I	GREAT KING ST NORTH	201021889	18/04/2010	Sun	1750	HA	CS1C	301B 330B		E	D	DO	F	X	S	R	50	0	0	1			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, inattentive	M
1S/700/3.31			I	GREAT KING ST NORTH	201372367	10/09/2013	Tue	2000	HA	CS1C	301B		R	W	DO	F	X	S	C	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign	N
1S/700/3.31			I	GREAT KING ST NORTH	201272733	27/09/2012	Thu	1300	HA	CS1C	301B		R	D	O	F	X	S	R	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign	N
1S/700/3.31			I	GREAT KING ST NORTH	201272280	5/08/2012	Sun	1210	HA	CS1C	301B		R	D	O	F	X	S	R	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign	N
1S/700/3.31			I	GREAT KING ST NORTH	201270774	18/02/2012	Sat	1228	HA	CE2C	321B 375B		R	W	O	L	X	S	C	50	0	0	0			1407197	4918962	CAR1 EBD on GREAT KING ST NORTH hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, didnt see/look when required to give way to traffic from another direction	N
1S/700/3.31			I	GREAT KING ST NORTH	2921827	24/02/2009	Tue	1505	HA	CS1C	321B 375B 830		E	D	B	F	X	S	R	50	0	0	1			1407197	4918962	CAR1 SBD on SH 1S PINE HILL ROAD hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, didnt see/look when required to give way to traffic from another direction ENV: visibility limited	M
GREAT KING ST NORTH			I	1S/704/0	2922066	24/05/2009	Sun	945	MG	CN1C	355B 371B 645B 801		R	W	O	L	X	S	R	50	0	0	2			1407197	4918962	CAR1 NBD on GREAT KING ST NORTH hit CAR2 reversing along road	CAR2 attention diverted while trying to find intersection, didnt see/look behind when reversing/manoeuvering, windscreen or rear window misted/frosted ENV: road slippery (rain)	M
GREAT KING ST NORTH			I	1S/704/0	201271315	26/04/2012	Thu	2300	MG	CN1C	371B		R	D	DO	F	X	S	R	50	0	0	0			1407197	4918962	CAR1 NBD on GREAT KING ST NORTH hit CAR2 reversing along road	CAR2 didnt see/look behind when reversing/manoeuvering	N
GREAT KING ST NORTH			I	1S/704/0	201221963	6/06/2012	Wed	1320	PO	CS1E	129A		E	D	O	F	X	S	R	50	0	0	1	12		1407197	4918962	CAR1 SBD on GREAT KING ST NORTH hit PEDESTRIAN	CAR1 too far left/right	M
1S/704/0			I	GREAT KING ST NORTH	201121350	17/03/2011	Thu	1920	HA	4S1C	102B 112B 321B 402B		R	D	O	F	X	S	R	50	0	0	2			1407197	4918962	SUV1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 alcohol test below limit, too fast on straight, did not stop at stop sign, new driver showed inexperience	M
1S/704/0			I	GREAT KING ST NORTH	201372745	7/10/2013	Mon	1347	HA	CS1C	301B		R	D	O	F	X	S	R	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign	N
1S/704/0			I	GREAT KING ST NORTH	201021799	23/05/2010	Sun	1740	HA	4S1C	301B 375B		R	D	DO	F	X	S	R	50	0	0	2			1407197	4918962	SUV1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	M
1S/704/0			I	GREAT KING ST NORTH	2923614	6/12/2009	Sun	1100	HA	4W2M	301A 335A		R	W	O	L	X	S	C	50	0	1	1			1407197	4918962	SUV1 WBD on GREAT KING ST NORTH hit MOTOR CYCLE2 crossing at right angle from right	SUV1 failed to give way at stop sign, inattentive: failed to notice intersection or its stop/give way control	H
1S/704/0			I	GREAT KING ST NORTH	2970203	29/01/2009	Thu	1426	KB	CS1C	301B 375B		E	D	O	F	X	S	R	50	0	0	0			1407197	4918962	CAR1 SBD on SH 1S CUMBERLAND ST NORTH hit CAR2 merging from the right	CAR2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	N
1S/704/0			I	GREAT KING ST NORTH	2974600	30/12/2009	Wed	2320	BB	CN1C	205A 410A		M	W	DO	L	X	S	R	50	0	0	0			1407197	4918962	CAR1 NBD on SH 1S CUMBERLAND ST NORTH cutting corner hit CAR2 head on	CAR1 on incorrect side of the island or median, fatigue (drowsy, tired, fell asleep)	N
1S/704/0.04 SBD	40	S		GREAT KING ST NORTH	201021304	10/03/2010	Wed	2108	NB	CS1E	713B 732B		R	W	DO	L			L	50	0	0	1			1407197	4918922	CAR1 SBD on SH 1S CUMBERLAND ST NORTH hit PEDESTRIAN crossing road from right side	PEDESTRIAN2 crossing road, running heedless of traffic, pedestrian attention diverted eg cigarette, cell phone, music player	M
1S/704/0.142 NBD	60	N		DUKE ST	201072967	8/09/2010	Wed	1700	EA	CN1C	330A 358A 363A 902	M	R	D	B	F			C	50	0	0	0			1407097	4918871	CAR1 NBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 inattentive, attention diverted by cigarette etc, attention diverted by driver dazzled by sun/lights ENV: dazzling sun	N
1S/704/0.16 SBD	25	N		DUKE ST	201022896	3/11/2010	Wed	1345	JO	SS1C	301B 308B 375B 930		R	D	B	F	D	S	C	50	0	1	0		46	1407190	4918802	CYCLIST1 (Age 46)SBD on SH 1S hit turning CAR2	CAR2 failed to give way at stop sign, failed to give way at driveway, didnt see/look when required to give way to traffic from another direction ENV: entering or leaving other non-commercial	H
1S/704/0.175 SBD	10	N		DUKE ST	201273100	26/10/2012	Fri	1547	AC	TS1C	386A		E	D	B	F	X	S	C	50	0	0	0			1407188	4918787	TRUCK1 SBD on SH 1S CUMBERLAND ST changing lanes to left hit CAR2	TRUCK1 misjudged speed of own vehicle	N
DUKE ST			I	1S/704/0.185 SBD	201270401	6/03/2012	Tue	1750	BB	4S2C	124A		R	W	O	L	X	T	C	50	0	0	0			1407187	4918777	SUV1 SBD on SH 1S cutting corner hit CAR2 head on	SUV1 cutting corner at intersection	N
1S/704/0.185 SBD			I	DUKE ST	201270628	23/02/2012	Thu	1015	GE	TS1C	372B		E	W	O	H	X	T	C	50	0	0	0			1407187	4918777	TRUCK1 SBD on SH 1S overtaking hit CAR2 turning right	CAR2 didnt see/look behind when changing lanes, position or direction	N
1S/704/0.185			I	DUKE ST	201270959	19/04/2012	Thu	1810	LB	CE2C	303B		R	D	TO	F	X	S	C	50	0	0	0			1407187	4918777	CAR2 turning right hit by oncoming CAR1 EBD on DUKE ST	CAR2 failed to give way when turning to non-turning traffic	N
1S/704/0.185 SBD			I	DUKE ST	201273046	4/11/2012	Sun	1000	GE	CS1C	171A		E	D	B	F	X	S	C	50	0	0	0			1407187	4918777	CAR1 SBD on SH 1S CUMBERLAND ST overtaking hit CAR2 turning right	CAR1 turned right from incorrect lane	N
1S/704/0.185			I	DUKE ST	201071656	31/05/2010	Mon	1715	NE	CW2K	722B 724B		R	D	TN	F	X	S	C	50	0	0	0			1407187	4918777	CAR1 WBD on DUKE ST turning left hit PEDESTRIAN crossing SH 1S CUMBERLAND ST NORTH from right	SKATEBOARDER2 pedestrian playing on road or unnecessarily on road, pedestrian wearing dark clothing	N
DUKE ST			I	CUMBERLAND ST NORTH	2973040	13/08/2009	Thu	2125	LB	CE1C	303A 382A 404A		E	D	DO	F	X	S	C	50	0	0	0			1407187	4918777	CAR2 turning right hit by oncoming CAR1 EBD on DUKE ST	CAR1 failed to give way when turning to non-turning traffic, misjudged speed etc of vehicle coming from another dirn with right of way, overseas/migrant driver failed to adjust to NZ road rules and road conditions	N
DUKE ST			I	1S/704/0.186	201070501	24/02/2010	Wed	1530	LB	CW1C	301B		R	D	B	F	X	S	C	50	0	0	0			1407187	4918777	CAR2 turning right hit by oncoming CAR1 WBD on DUKE ST	CAR2 failed to give way at stop sign	N
1S/704/0.186 SBD			I	DUKE ST	2971452	1/05/2009	Fri	1500	MA	SS1C	373B		R	D	B	F	X	S	C	50	0	0	0			1407187	4918777	CYCLIST1 SBD on SH 1S hit CAR2 parking/unparking	CAR2 didnt see/look behind when pulling out from parked position	N
1S/704/0.186			I	DUKE ST	2970565	16/02/2009	Mon	1730	LB	CW2C	301B 330B		R	D	O	F	X	S	P	50	0	0	0			1407187	4918777	CAR2 turning right hit by oncoming CAR1 WBD on DUKE ST	CAR2 failed to give way at stop sign, inattentive	N
1S/704/0.186 SBD			I	DUKE ST	201070012	4/01/2010	Mon	2130	HA	4S1C	302A		R	D	DO	F	X	G	C	50	0	0	0			1407187	4918777	SUV1 SBD on SH 1S hit CAR2 crossing at right angle from right	SUV1 failed to give way at give way sign	N
1S/704/0.186 NBD			I	DUKE ST	2971163	2/04/2009	Thu	835	LB	CN2T	303B 330B		R	D	O	F	X	S	C	50	0	0	0			1407187	4918777	TRUCK2 turning right hit by oncoming CAR1 NBD on DUKE ST	TRUCK2 failed to give way when turning to non-turning traffic, inattentive	N
DUKE ST			I	1S/704/0.202 NBD	2921928	22/05/2009	Fri	1342	HA	CN2CC	321B 350B		R	W	O	L	X	S	C	50	0	2	4			1407074	4918816	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, attention diverted	H
DUKE ST			I	1S/704/0.202	2970756	9/03/2009	Mon	1545	HA	CE1C	302A 330A		R	D	O	F	X	G	C	50	0	0	0			1407074	4918816	CAR1 EBD on DUKE ST hit CAR2 crossing at right angle from right	CAR1 failed to give way at give way sign, inattentive	N

ROAD	DIST	FROM	INTN	SIDE	IDNO	DATE	DYWK	TIME	MVMT	VEHS	CSCD	OBJS	CURV	SURF	LITE	WTHR	JNTY	TRAF	MARK	SPDL	NFAT	NSER	NMIN	PEDA	CYCA	EAST	NORTH	MVMT DESCR	CAUSES	SEV
DUKE ST			I	1S/704/0.202	201221197	7/02/2012	Tue	820	NA	CW1K	718B		R	D	B	F	X	T	C	50	0	0	1	24		1407074	4918816	CAR1 WBD on DUKE ST hit PEDESTRIAN crossing road from left side	SKATEBOARDER2 crossing road not complying with traffic signal or school patrol	M
1S/704/0.202 NBD			I	DUKE ST	201372359	8/09/2013	Sun	125	KB	VN1C	101B 322B		R	W	DO	L	X	T	C	50	0	0	0			1407074	4918816	VAN1 NBD on SH 1S hit CAR2 merging from the right	CAR2 alcohol suspected, did not stop at steady red light	N
1S/704/0.202 NBD			I	DUKE ST	201372767	7/10/2013	Mon	1015	HA	4N14	322A 334A		R	D	O	F	X	T	N	50	0	0	0			1407074	4918816	SUV1 NBD on SH 1S hit SUV2 crossing at right angle from right	SUV1 did not stop at steady red light, failed to notice traffic lights	N
1S/704/0.202 NBD			I	DUKE ST	201073510	10/10/2010	Sun	1450	HA	CN1C	322A 353A		R	W	B	F	X	G	C	50	0	0	0			1407074	4918816	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, attention diverted by other traffic	N
1S/704/0.202			I	DUKE ST	201071363	15/05/2010	Sat	958	HA	CE2C	302A 330A 355A		R	D	B	F	X	G	C	50	0	0	0			1407074	4918816	CAR1 EBD on DUKE ST hit CAR2 crossing at right angle from right	CAR1 failed to give way at give way sign, inattentive, attention diverted while trying to find intersection	N
1S/704/0.202			I	DUKE ST W	201356153	13/11/2013	Wed	1520	LB	CW2C	301B		R	D	OF	F	X	S	C	50	0	0	0			1407074	4918816	CAR2 turning right hit by oncoming CAR1 WBD on DUKE ST W	CAR2 failed to give way at stop sign	N
1S/704/0.252 NBD	50	S		DUKE ST	201173291	28/10/2011	Fri	1530	DB	CN1	386A 927	J	R	D	B	F	D	N	C	50	0	0	0			1407057	4918768	CAR1 NBD on SH 1S lost control turning left, CAR1 hit Phone Box Etc.	CAR1 misjudged speed of own vehicle ENV: entering or leaving other commercial	N
1S/704/0.287 SBD	30	S		MACKENZIE ST	201071258	2/05/2010	Sun	700	EC	CS14C	129A 130A 330A	M	R	D	DO	L			C	50	0	0	0			1407153	4918682	CAR1 SBD on SH 1S hit obstruction, CAR1 hit Parked Vehicle	CAR1 too far left/right, lost control, inattentive	N
1S/704/0.31 SBD	100	N		HOWE ST	2921021	2/01/2009	Fri	1615	FD	CS1CC	181A 191A 191B 901		R	W	O	H			C	50	0	0	4			1407145	4918660	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, suddenly braked CAR2 suddenly braked ENV: heavy rain	M
1S/704/0.323 NBD	50	S		MOAT ST	201173490	1/12/2011	Thu	1405	FC	CN1C	181A		R	D	B	F			X	50	0	0	0			1407033	4918702	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for PEDESTRIAN	CAR1 following too closely	N
1S/704/0.323 NBD	50	S		MOAT ST	2921690	30/03/2009	Mon	1715	FC	CN1MC	331A		R	D	O	F			X	50	0	0	2			1407033	4918702	CAR1 NBD on SH 1S hit rear end of MOTOR CYCLE2 stop/slow for PEDESTRIAN	CAR1 failed to notice car slowing	M
1S/704/0.36 SBD	50	N		HOWE ST	201271296	5/05/2012	Sat	1920	AO	CS1C	357A 512A		R	D	DO	F			C	50	0	0	0			1407128	4918613	CAR1 SBD on SH 1S CUMBERLAND overtaking CAR2	CAR1 emotionally upset/road rage, intentional collision	N
1S/704/0.404 NBD	20	N		HOWE ST	201270423	8/03/2012	Thu	1615	MG	CN1C	371B		R	D	B	F			C	50	0	0	0			1407005	4918625	CAR1 NBD on SH 1S hit CAR2 reversing along road	CAR2 didnt see/look behind when reversing/manoeuvering	N
1S/704/0.409 NBD	15	N		HOWE ST	201221271	17/02/2012	Fri	1413	CA	CN1CC(	129A 358A	MMM	R	D	B	F			C	50	0	0	1			1407004	4918621	CAR1 NBD on SH 1S lost control but did not leave the road, CAR1 hit Parked Vehicle, CAR2 hit Parked Vehicle, CAR3 hit Parked Vehicle	CAR1 too far left/right, attention diverted by cigarette etc	M
CUMBERLAND ST NORT			I	HOWE ST	201022414	21/07/2010	Wed	1515	LB	CW24	303B 330B		R	D	O	F	X	G	C	50	0	0	1			1407111	4918566	SUV2 turning right hit by oncoming CAR1 WBD on HOWE ST	SUV2 failed to give way when turning to non-turning traffic, inattentive	M
HOWE ST			I	CUMBERLAND ST NORTH	201072337	23/07/2010	Fri	1900	MO	VE1C	371A 671A 801		R	W	DO	L	X	G	C	50	0	0	0			1407111	4918566	VAN1 EBD on HOWE ST hit CAR2 manoeuvring	VAN1 didnt see/look behind when reversing/manoeuvering, blind spot ENV: road slippery (rain)	N
HOWE ST			I	1S/704/0.41	201221341	8/03/2012	Thu	1215	LB	CW1C	303B 375B		R	D	B	F	X	G	C	50	0	0	2			1407111	4918566	CAR2 turning right hit by oncoming CAR1 WBD on HOWE ST	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	M
HOWE ST			I	1S/704/0.41 SBD	201071687	29/05/2010	Sat	2230	DA	CS2V	111A 131A 358A	M	R	W	DO	L	X	G	C	50	0	0	0			1407111	4918566	CAR1 SBD on SH 1S CUMBERLAND ST NTH lost control turning right, CAR1 hit Parked Vehicle on right hand bend	CAR1 too fast entering corner, lost control when turning, attention diverted by cigarette etc	N
1S/704/0.41			I	HOWE ST	201022076	29/06/2010	Tue	1553	HA	CW2T	302A 330A		R	D	O	F	X	G	C	50	0	0	1			1407111	4918566	CAR1 WBD on HOWE ST hit TRUCK2 crossing at right angle from right	CAR1 failed to give way at give way sign, inattentive	M
1S/704/0.41 SBD			I	HOWE ST	201022557	8/09/2010	Wed	1935	HA	CS1C	302B 375B		R	D	DO	F	X	G	C	50	0	0	2			1407111	4918566	CAR1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	M
1S/704/0.41			I	HOWE ST	201270840	6/04/2012	Fri	1817	HA	CW2C	302A 375A		R	D	DO	F	X	G	C	50	0	0	0			1407111	4918566	CAR1 WBD on HOWE ST hit CAR2 crossing at right angle from right	CAR1 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	N
1S/704/0.41 SBD			I	HOWE ST	201221137	30/01/2012	Mon	1020	HA	TS1CC(	302B 507B	MM	R	D	B	F	X	G	C	50	0	0	1			1407111	4918566	TRUCK1 SBD on SH 1S hit CAR2 crossing at right angle from right, CAR2 hit Parked Vehicle, CAR3 hit Parked Vehicle	CAR2 failed to give way at give way sign, impared ability due to old age	M
1S/704/0.41			I	HOWE ST	201272608	14/09/2012	Fri	1830	GF	CE1C	171B		R	W	DO	L	X	G	C	50	0	0	0			1407111	4918566	CAR1 and CAR2 both EBD on SH 1S CUMBERLAND ST and turning; collided	CAR2 turned right from incorrect lane	N
1S/704/0.41			I	HOWE ST	201070799	16/03/2010	Tue	1335	HA	CE2C	302A 377A 404A	T	R	W	O	L	X	G	C	50	0	0	0			1407111	4918566	CAR1 EBD on HOWE ST hit CAR2 crossing at right angle from right, CAR1 hit Tree	CAR1 failed to give way at give way sign, didnt see/look when visibility obstructed by other vehicles, overseas/migrant driver failed to adjust to NZ road rules and road conditions	N
1S/704/0.414 NBD	10	N		HOWE ST	201221833	26/04/2012	Thu	1145	NA	TN1E	505B 506B		R	D	B	F	X	G	C	50	0	1	0	32		1407002	4918616	TRUCK1 NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 mental illness (eg depression), attempted suicide	H
HOWE ST			I	1S/704/0.424	2921857	8/04/2009	Wed	1845	HA	CE1S	302A 351A 357A 800		R	W	DO	H	X	G	C	50	0	1	0		26	1406999	4918606	CAR1 EBD on HOWE ST hit CYCLIST2 (Age 26)crossing at right angle from right	CAR1 failed to give way at give way sign, attention diverted by passengers, emotionally upset/road rage ENV: slippery	H
HOWE ST			I	1S/704/0.424	201322192	4/07/2013	Thu	1910	HA	VE1V	322A 334A		R	D	DO	F	X	T	N	50	0	0	1			1406999	4918606	VAN1 EBD on HOWE ST hit VAN2 crossing at right angle from right	VAN1 did not stop at steady red light, failed to notice traffic lights	M
HOWE ST			I	1S/704/0.424	2970596	5/03/2009	Thu	1730	MO	4E1C	129A	M	R	D	O	F	X	G	C	50	0	0	0			1406999	4918606	SUV1 EBD on HOWE ST hit Parked Vehicle while manoeuvring	SUV1 too far left/right	N
1S/704/0.424 NBD			I	HOWE ST	201073102	29/09/2010	Wed	1948	FA	4N1C	102A 181A 330A		R	D	TO	F	X	G	C	50	0	0	0			1406999	4918606	SUV1 NBD on SH 1S hit rear end of CAR2 stopped/moving slowly	SUV1 alcohol test below limit, following too closely, inattentive	N
1S/704/0.424 NBD			I	HOWE ST	2974549	26/11/2009	Thu	1615	MO	4N1	330A 385A 924	X	R	D	B	F	D	G	C	50	0	0	0			1406999	4918606	SUV1 NBD on SH 1S hit VEHB manoeuvring, SUV1 hit Other	SUV1 inattentive, misjudged size or position of fixed object or obstacle ENV: entering or leaving take away foods	N
1S/704/0.424			I	HOWE ST	2973195	13/09/2009	Sun	1241	HA	CE2C	302A 330A 375A		R	D	B	F	X	G	C	50	0	0	0			1406999	4918606	CAR1 EBD on HOWE ST hit CAR2 crossing at right angle from right	CAR1 failed to give way at give way sign, inattentive, didnt see/look when required to give way to traffic from another direction	N
1S/704/0.424 NBD			I	HOWE ST	2971494	30/04/2009	Thu	1915	GC	CN1C	171A 330A 372A 924		R	W	DO	L	D	G	C	50	0	0	0			1406999	4918606	CAR1 NBD on SH 1S hit rear of CAR2 turning right from left side	CAR1 turned right from incorrect lane, inattentive, didnt see/look behind when changing lanes, position or direction ENV: entering or leaving take away foods	N
1S/704/0.424 NBD			I	HOWE ST	201073304	12/10/2010	Tue	1255	GF	CN1C	142A 387A 142B 381B 387B		R	D	B	F	X	G	C	50	0	0	0			1406999	4918606	CAR1 and CAR2 both NBD on SH 1S and turning; collided	CAR1 didn't signal when turning left, misjudged intentions of another party CAR2 didn't signal when turning left, misjudged speed, etc of vehicle coming from behind or alongside, misjudged intentions of another party	N
1S/704/0.424 NBD			I	HOWE ST	201121151	19/02/2011	Sat	2310	NA	CN1E	105B 711B		R	D	DO	F	X	G	C	50	0	0	1	20		1406999	4918606	CAR1 NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 Intoxicated non-driver, crossing heedless of traffic	M
1S/704/0.424 NBD			I	HOWE ST	201122688	1/11/2011	Tue	1051	HA	CN1C	302B 375B		R	D	B	F	X	G	C	50	0	1	0			1406999	4918606	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	H
1S/704/0.424 NBD			I	HOWE ST	201222524	25/08/2012	Sat	1535	JA	CN1C	302B 377B		R	D	O	F	X	G	C	50	0	1	0			1406999	4918606	CAR1 NBD on SH 1S hit CAR2 turning right onto SH 1S from the left	CAR2 failed to give way at give way sign, didnt see/look when visibility obstructed by other vehicles	H
1S/704/0.425 SBD	15	S		HOWE ST	201073652	13/11/2010	Sat	1415	GC	CS1C	372B 671B 922		R	D	B	F	D	N	C	50	0	0	0			1407106	4918551	CAR1 SBD on SH 1S CUMBERLAND ST NORTH hit rear of CAR2 turning right from left side	CAR2 didnt see/look behind when changing lanes, position or direction, blind spot ENV: entering or leaving service station	N
1S/704/0.435 SBD	25	S		HOWE ST	201071842	16/06/2010	Wed	2122	EC	VS1CC	330A 351A	M	R	I	DO	FF			C	50	0	0	0			1407103	4918542	VAN1 SBD on SH 1S hit obstruction, VAN1 hit Parked Vehicle	VAN1 inattentive, attention diverted by passengers	N
1S/704/0.439 NBD	15	S		HOWE ST	201221234	23/02/2012	Thu	2350	NA	CN1E	105B 711B		R	W	DO	L			C	50	0	1	0	19		1406994	4918592	CAR1 NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 Intoxicated non-driver, crossing heedless of traffic	H
1S/704/0.444 NBD	20	S		HOWE ST	2973576	25/09/2009	Fri	1716	AA	CN1C	330A 372A	M	R	W	TF	L			C	50	0	0	0			1406993	4918587	CAR1 NBD on SH 1S changing lanes/overtaking to right hit CAR2 CAR1 hit Parked Vehicle	CAR1 inattentive, didnt see/look behind when changing lanes, position or direction	N
1S/704/0.458 SBD	60	N		ELLIS ST	201222886	11/11/2012	Sun	929	KB	CS1CC	308B 507B 922	M	R	D	O	F	D	N	C	50	0	0	1			1407096	4918521	CAR1 SBD on SH 1S CUMBERLAND ST hit CAR2 merging from the right, CAR1 hit Parked Vehicle	CAR2 failed to give way at driveway, impared ability due to old age ENV: entering or leaving service station	M
1S/704/0.46 SBD	50	S		HOWE ST	201073286	1/10/2010	Fri	730	AA	CS1T	101A 330A 386A 801		R	W	DO	L			C	50	0	0	0			1407095	4918518	CAR1 SBD on SH 1S changing lanes/overtaking to right hit TRUCK2	CAR1 alcohol suspected, inattentive, misjudged speed of own vehicle ENV: road slippery (rain)	N
1S/704/0.464 NBD	40	S		HOWE ST	2974220	6/08/2009	Thu	1915	MO	CN1	131A 358A 924	M	R	D	DO	F	D	N	C	50	0	0	0			1406986	4918568	CAR1 NBD on SH 1S hit Parked Vehicle while manoeuvring	CAR1 lost control when turning, attention diverted by cigarette etc ENV: entering or leaving take away foods	N
1S/704/0.468 SBD	50	N		ELLIS ST	201324118	25/12/2013	Wed	840	AA	CS1C	372A 801		R	W	O	L			C	50	0	0	1			1407092	4918511	CAR1 SBD on SH 1S CUMBERLAND changing lanes/overtaking to right hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction ENV: road slippery (rain)	M
1S/704/0.47 SBD	60	S		HOWE ST	201170468	26/03/2011	Sat	1210	GC	CS14	372B 922		R	D	O	F	D	N	C	50	0	0	0			1407092	4918509	CAR1 SBD on SH 1S hit rear of SUV2 turning right from left side	SUV2 didnt see/look behind when changing lanes, position or direction ENV: entering or leaving service station	N
1S/704/0.47 SBD	60	S		HOWE ST	2971746	9/05/2009	Sat	1930	KB	CS1C	308B 351B 924		R	D	DO	F	D	N	C	50	0	0	0			1407092	4918509	CAR1 SBD on SH 1S hit CAR2 merging from the right	CAR2 failed to give way at driveway, attention diverted by passengers ENV: entering or leaving take away foods	N
1S/704/0.47 SBD	60	S		HOWE ST	201271488	8/06/2012	Fri	958	DA	CS14	386A 922	M	R	D	O	F	D	N	C	50	0	0	0			1407092	4918509	CAR1 SBD on SH 1S lost control turning right, CAR1 hit Parked Vehicle on right hand bend	CAR1 misjudged speed of own vehicle ENV: entering or leaving service station	N
1S/704/0.474 NBD	50	S		HOWE ST	2922945	8/10/2009	Thu	120	AA	CN1C	330A 372A 671A		R	D	DO	F			C	50	0	0	2			1406983	4918559	CAR1 NBD on SH 1S changing lanes/overtaking to right hit CAR2	CAR1 inattentive, didnt see/look behind when changing lanes, position or direction, blind spot	M
1S/704/0.474 NBD	50	S		HOWE ST	201070268	7/02/2010	Sun	1012	AA	CN1T	372A		R	W	O	L			C	50	0	0	0			1406983	4918559	CAR1 NBD on SH 1S changing lanes/overtaking to right hit TRUCK2	CAR2 didnt see/look behind when changing lanes, position or direction	N
1S/704/0.48 SBD	70	S		HOWE ST	201023254	16/12/2010	Thu	1045	GB	CS1C	372B 922		R	D	B	F	D	N	C	50	0	0	2			1407089	4918499	CAR1 SBD on SH 1S sideswiped by CAR2 turning left	CAR2 didnt see/look behind when changing lanes, position or direction ENV: entering or leaving service station	M
1S/704/0.484 NBD	60	S		HOWE ST	201370204	9/02/2013	Sat	2108	DA	CN1	101A 111A 927		S	D	DO	F	D	N	N	50	0	0	0			1406980	4918549	CAR1 NBD on SH 1S lost control turning right on right hand bend	CAR1 alcohol suspected, too fast entering corner ENV: entering or leaving other commercial	N
1S/704/0.504 NBD	80	S		HOWE ST	201171072	13/02/2011	Sun	725	EA	CN1C	101A 129A 404A	CM	R	W	O	L			C	50	0	0	0			1406973	4918530	CAR1 NBD on SH 1S hit parked veh, CAR1 hit Cliff Bank, Parked Vehicle	CAR1 alcohol suspected, too far left/right, overseas/migrant driver failed to adjust to NZ road rules and road conditions	N
1S/704/0.518 SBD			I	ELLIS ST	201357164	28/09/2013	Sat	1200	GD	4S1C	181A		E	D	B	F	T	N	C	50	0	0	0			1407077	4918464	SUV1 SBD on SH 1S hit rear of CAR2 turning right from centre line	SUV1 following too closely	N
1S/704/0.524 NBD	100	S		HOWE ST	201370483	7/04/2013	Sun	45	EA	CN1C	101A 129A	M	R	D	DO	F			C	50	0	0	0			1406967	4918512	CAR1 NBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 alcohol suspected, too far left/right	N
1S/704/0.524 NBD	100	S		HOWE ST	201170396	27/01/2011	Thu	1000	MO	CN1C	330A 386A 924	M	R	W	B	F	D	N	C	50	0	0	0			1406967	4918511	CAR1 NBD on SH 1S hit Parked Vehicle while manoeuvring	CAR1 inattentive, misjudged speed of own vehicle ENV: entering or leaving take away foods	N
1S/704/0.548 SBD	30	S		ELLIS ST	201071649	3/06/2010	Thu	835	MA	CS1C	312B 373B 401B		R	D	B	FF			C	50	0	0	0			1407067	4918435	CAR1 SBD on SH 1S CUMBERLAND ST NORTH hit CAR2 parking/unparking	CAR2 failed to give way entering roadway not from driveway or intersection, didnt see/look behind when pulling out from parked position, inexperience in driving in fast, complex or heavy traffic	N
1S/704/0.579 SBD	50	N		DUNDAS ST	201171799	23/05/2011	Mon	1050	AC	CS1C	159A 386A 671A	M	R	D	B	F			C	50	0	0	0			1407056	4918406	CAR1 SBD on SH 1S changing lanes to left hit CAR2 CAR1 hit Parked Vehicle	CAR1 cut in after overtaking, misjudged speed of own vehicle, blind spot	N
1S/704/0.59 NBD			I	TITAN ST	201021795	8/05/2010	Sat	1930	EA	CN1C	103A 129A	M	R	D	DO	F	T	G	C	50	0	0	1			1406944	4918449	CAR1 NBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 alcohol test above limit or test refused, too far left/right	M
CUMBERLAND ST NORT			I	DUNDAS ST	201073531	5/11/2010	Fri	920	HA	CW2C	322B 330B 801	P	R	W	O	L	X	T	C	50	0	0	0			1407039	4918359	CAR1 WBD on DUNDAS ST hit CAR2 crossing at right angle from right, CAR1 hit Post Or Pole	CAR2 did not stop at steady red light, inattentive ENV: road slippery (rain)	N
DUNDAS ST			I	1S/704/0.629 SBD	201022335	23/07/2010	Fri	1905	HA	4S1CC	322B 351B		R	W	DO	L	X	T	C	50	0	0	5			1407039	4918359	SUV1 SBD on DUNDAS ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, attention diverted by passengers	M
1S/704/0.629 SBD			I	DUNDAS ST	2971286	22/02/2009	Sun	2300	HA	CS1C	191A 322A 800		R	W	DO	L	X	T	C	50	0	0	0			1407039	4918359	CAR1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 suddenly braked, did not stop at steady red light ENV: slippery	N
1S/704/0.629 SBD			I	DUNDAS ST	201371349	14/05/2013	Thu	2045	HA	CS1C	322A		R	D	DO	F	X	T	C	50	0	0	0			1407039	4918359	CAR1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	N
1S/704/0.629 SBD			I	DUNDAS ST	201373001	28/09/2013	Sat	2345	FE	CS1C	181A 331A		R	D	DO	F	X	T	C	50	0	0	0			1407039	4918359	CAR1 SBD on SH 1S CUMBERLAND ST hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing	N
DUNDAS ST			I	1S/704/0.644	201221038	9/01/2012	Mon	1200	LB	CE1C	303B 375B		R	D	B	F	X	T	C	50	0	0	2			1406926	4918399	CAR2 turning right hit by oncoming CAR1 EBD on DUNDAS ST	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	M
DUNDAS ST			I	1S/704/0.644	201170279	3/03/2011	Thu	950	LB	ME1C	303B 404B		R	D	B	F	X	S	C	50	0	0	0			1406926	4918399	CAR2 turning right hit by oncoming MOTOR CYCLE1 EBD on DUNDAS ST	CAR2 failed to give way when turning to non-turning traffic, overseas/migrant driver failed to adjust to NZ road rules and road conditions	N

ROAD	DIST	FROM	INTN	SIDE	IDNO	DATE	DYWK	TIME	MVMT	VEHS	CSCD	OBJS	CURV	SURF	LITE	WTHR	JNTY	TRAF	MARK	SPDL	NFAT	NSER	NMIN	PEDA	CYCA	EAST	NORTH	MVMT DESCR	CAUSES	SEV
DUNDAS ST			I	1S/704/0.644	201021968	20/06/2010	Sun	1800	LB	CE1C	303B 402B 503B	T	R	W	DO	L	X	T	C	50	0	0	1			1406926	4918399	CAR2 turning right hit by oncoming CAR1 EBD on DUNDAS ST CAR1 hit Tree	CAR2 failed to give way when turning to non-turning traffic, new driver showed inexperience, defective vision	M
DUNDAS ST			I	1S/704/0.644	201170550	21/02/2011	Mon	1410	MO	CE1C	353A 371A 839		R	W	O	L	X	S	C	50	0	0	0			1406926	4918399	CAR1 EBD on DUNDAS ST hit CAR2 manoeuvring	CAR1 attention diverted by other traffic, didnt see/look behind when reversing/manoeuvering ENV: visibility limited by parked vehicle	N
1S/704/0.644 NBD			I	DUNDAS ST	201221901	5/06/2012	Tue	1840	ND	CN1E	307A		R	W	DO	H	X	T	C	50	0	0	1	20		1406926	4918399	CAR1 NBD on SH 1S turning right hit PEDESTRIAN crossing DUNDAS ST from right	CAR1 failed to give way when turning at signals to ped	M
1S/704/0.644 NBD			I	DUNDAS ST	201222259	28/07/2012	Sat	1732	ND	CN1E	307A		R	D	TO	F	X	T	C	50	0	1	0	23		1406926	4918399	CAR1 NBD on SH 1S turning right hit PEDESTRIAN crossing DUNDAS ST from right	CAR1 failed to give way when turning at signals to ped	H
1S/704/0.644 NBD			I	DUNDAS ST	201222312	16/08/2012	Thu	945	NF	CN1E	671A 718B		R	D	B	F	X	T	C	50	0	0	1	20		1406926	4918399	CAR1 NBD on SH 1S turning right hit PEDESTRIAN crossing DUNDAS ST from left	CAR1 blind spot PEDESTRIAN2 crossing road not complying with traffic signal or school patrol	M
1S/704/0.644			I	DUNDAS ST W	201321980	7/04/2013	Sun	2300	HA	CE24	103B 322B		R	D	DO	F	X	T	C	50	0	0	1			1406926	4918399	CAR1 EBD on DUNDAS ST W hit SUV2 crossing at right angle from right	SUV2 alcohol test above limit or test refused, did not stop at steady red light	M
1S/704/0.644			I	DUNDAS ST W	2922584	14/08/2009	Fri	1925	LB	CE2V	303B 330B 402B		R	D	DO	F	X	T	C	50	0	0	1			1406926	4918399	VAN2 turning right hit by oncoming CAR1 EBD on DUNDAS ST W	VAN2 failed to give way when turning to non-turning traffic, inattentive, new driver showed inexperience	M
1S/704/0.679 SBD	50	S		DUNDAS ST	2970989	28/03/2009	Sat	1300	FD	CS1C	181A 331A 352A 191B		R	D	B	F			C	50	0	0	0			1407022	4918312	CAR1 SBD on SH 1S CUMBERLAND ST NORTH hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing, attention diverted by scenery or persons outside vehicle CAR2 suddenly braked	N
1S/704/0.684 NBD	40	S		DUNDAS ST	201270688	14/03/2012	Wed	1643	FD	CN1C	181A		R	D	B	F			C	50	0	0	0			1406912	4918362	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely	N
1S/704/0.694 NBD	50	S		DUNDAS ST	2974776	31/10/2009	Sat	1430	AC	CN1C	177A 372A		R	D	B	F			C	50	0	0	0			1406909	4918352	CAR1 NBD on SH 1S changing lanes to left hit CAR2	CAR1 weaving or cut in on multi-lane road, didnt see/look behind when changing lanes, position or direction	N
1S/704/0.751 SBD	100	N		ST DAVID ST	201272092	3/08/2012	Fri	2337	AO	TS1C	386A 410A		R	W	DO	F			C	50	0	0	0			1406998	4918244	TRUCK1 SBD on SH 1S CUMBERLAND ST overtaking CAR2	TRUCK1 misjudged speed of own vehicle, fatigue (drowsy, tired, fell asleep)	N
1S/704/0.801 SBD	50	N		ST DAVID ST	201272558	11/09/2012	Tue	820	FD	CS1CC	181A 181B		R	W	O	H			C	50	0	0	0			1406981	4918197	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely CAR2 following too closely	N
1S/704/0.815 NBD	50	N		ST DAVID ST	201070781	20/03/2010	Sat	1320	FA	CN1C	181A 331A 352A		R	D	B	F			C	50	0	0	0			1406866	4918238	CAR1 NBD on SH 1S hit rear end of CAR2 stopped/moving slowly	CAR1 following too closely, failed to notice car slowing, attention diverted by scenery or persons outside vehicle	N
1S/704/0.815 NBD	50	N		ST DAVID ST	2973563	9/08/2009	Sun	320	NA	XN1E	105B 722B		R	D	DO	F			C	50	0	0	0			1406866	4918238	TAXI1 NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 Intoxicated non-driver, pedestrian playing on road or unnecessarily on road	N
1S/704/0.831 SBD	20	N		ST DAVID ST	201071084	19/04/2010	Mon	1200	AA	CS14	355A 404A		R	D	O	F			C	50	0	0	0			1406971	4918168	CAR1 SBD on SH 1S CUMBERLAND ST NORTH changing lanes/overtaking to right hit SUV2	CAR1 attention diverted while trying to find intersection, overseas/migrant driver failed to adjust to NZ road rules and road conditions	N
1S/704/0.851 SBD			I	ST DAVID ST	201072661	19/06/2010	Sat	2150	KB	CS1C	322A 330A 402A		R	D	DO	F	X	T	C	50	0	0	0			1406964	4918149	CAR1 SBD on SH 1S CUMBERLAND ST NORTH hit CAR2 merging from the right	CAR1 did not stop at steady red light, inattentive, new driver showed inexperience	N
1S/704/0.856 SBD	5	S		ST DAVID ST	201320019	18/04/2013	Thu	1030	NA	CS1E	352A 370A 503A 711B		R	D	B	F	X	T	C	50	1	0	0	79		1406962	4918145	CAR1 SBD on SH 1S CUMBERLAND ST NORTH hit PEDESTRIAN crossing road from left side	CAR1 attention diverted by scenery or persons outside vehicle, did not see or look for other party until too late, defective vision PEDESTRIAN2 crossing heedless of traffic	F
1S/704/0.865			I	ST DAVID ST	2921444	22/03/2009	Sun	305	HA	SE2V	105A 322A 602A		R	D	DO	F	X	G	N	50	0	1	0		21	1406849	4918191	CYCLIST1 (Age 21)EBD on ST DAVID ST hit VAN2 crossing at right angle from right	CYCLIST1 Intoxicated non-driver, did not stop at steady red light, headlights inadequate or no headlights	H
1S/704/0.965 NBD	100	S		ST DAVID ST	201022436	13/08/2010	Fri		AC	TN1C	177A 330A 671A		R	D	O	F			C	50	0	0	1			1406816	4918097	TRUCK1 NBD on SH 1S changing lanes to left hit CAR2	TRUCK1 weaving or cut in on multi-lane road, inattentive, blind spot	M
1S/704/0.995 NBD	130	S		ST DAVID ST	2970441	28/01/2009	Wed	1730	MO	CN1C	370A 385A 926		R	D	O	F	D	N	C	50	0	0	0			1406805	4918069	CAR1 NBD on SH 1S hit CAR2 manoeuvring	CAR1 did not see or look for other party until too late, misjudged size or position of fixed object or obstacle ENV: entering or leaving car parking building / area	N
1S/704/1.058 SBD	15	N		UNION PLACE	201371115	16/05/2013	Thu	940	GE	TS1C	372B 929		E	D	B	F	D	N	C	50	0	0	0			1406894	4917955	TRUCK1 SBD on SH 1S CUMBERLAND ST overtaking hit CAR2 turning right	CAR2 didnt see/look behind when changing lanes, position or direction ENV: entering or leaving private house / farm	N
1S/704/1.073 NBD			I	UNION PLACE	201173039	27/09/2011	Tue	1155	HA	CN1C	322B 334B		R	D	O	F	X	T	C	50	0	0	0			1406889	4917941	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, failed to notice traffic lights	N
1S/704/1.073 SBD			I	UNION ST WEST	2972099	20/06/2009	Sat	2030	DA	CS1	103A 111A 131A	KT	R	D	DO	F	X	T	N	50	0	0	0			1406889	4917941	CAR1 SBD on SH 1S lost control turning right, CAR1 hit Kerb, Tree on right hand bend	CAR1 alcohol test above limit or test refused, too fast entering corner, lost control when turning	N
UNION PLACE			I	1S/704/1.073 NBD	201222701	3/10/2012	Wed	2040	HA	CN2C	322B		R	D	DO	F	X	T	C	50	0	0	2			1406889	4917941	CAR1 NBD on SH 1S GT KING ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	M
1S/704/1.088 NBD			I	UNION ST WEST	2974618	20/12/2009	Sun	2305	AA	VN1C	372A		R	D	DO	F	X	T	C	50	0	0	0			1406775	4917981	VAN1 NBD on SH 1S changing lanes/overtaking to right hit CAR2	VAN1 didnt see/look behind when changing lanes, position or direction	N
1S/704/1.088 NBD			I	UNION ST WEST	201170361	7/03/2011	Mon	950	HA	CN1V	322A 334A		R	D	O	F	X	T	C	50	0	0	0			1406775	4917981	CAR1 NBD on SH 1S hit VAN2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	N
1S/704/1.088			I	UNION STREET WEST	201021162	4/02/2010	Thu	913	NE	CE2E	307A 363A 902		S	D	B	F	X	T	C	50	0	0	2	53		1406775	4917981	CAR1 EBD on UNION STREET WEST turning left hit PEDESTRIAN crossing SH 1S from right	CAR1 failed to give way when turning at signals to ped, attention diverted by driver dazzled by sun/lights ENV: dazzling sun	M
1S/704/1.088 SBD	15	S		UNION PLACE	201372906	1/11/2013	Fri	1421	MA	CS1C	371B		R	D	B	F			C	50	0	0	0			1406884	4917927	CAR1 SBD on SH 1S CUMBERLAND ST hit CAR2 parking/unparking	CAR2 didnt see/look behind when reversing/manoeuvering	N
UNION ST WEST			I	1S/704/1.088 NBD	201272640	20/09/2012	Thu	200	DB	CN1C	111A 131A	M	S	W	DO	L	X	T	C	50	0	0	0			1406774	4917981	CAR1 NBD on UNION ST WEST lost control turning left, CAR1 hit Parked Vehicle	CAR1 too fast entering corner, lost control when turning	N
UNION ST WEST			I	1S/704/1.088	201171412	12/05/2011	Thu	2140	EC	CE1	112A 357A 385A 515A	X	R	D	DO	F	X	T	C	50	0	0	0			1406775	4917981	CAR1 EBD on UNION ST WEST hit obstruction, CAR1 hit Other	CAR1 too fast on straight, emotionally upset/road rage, misjudged size or position of fixed object or obstacle, object deliberately thrown at or dropped on vehicle / shot at	N
1S/704/1.093 SBD	20	S		UNION PLACE	201272706	22/09/2012	Sat	1840	NB	VS1E	711B		R	D	TN	F			C	50	0	0	0			1406882	4917922	VAN1 SBD on SH 1S CUMBERLAND ST hit PEDESTRIAN crossing road from right side	PEDESTRIAN2 crossing heedless of traffic	N
1S/704/1.093 SBD	20	S		UNION ST WEST	2970314	8/02/2009	Sun	1545	MA	4S1C	373B		R	D	B	F			C	50	0	0	0			1406882	4917922	SUV1 SBD on SH 1S CUMBERLAND ST NORTH hit CAR2 parking/unparking	CAR2 didnt see/look behind when pulling out from parked position	N
1S/704/1.123 SBD	50	S		UNION ST WEST	201073287	1/10/2010	Fri	1340	FD	CS14	181A 330A 427A		R	D	B	F			C	50	0	0	0			1406872	4917894	CAR1 SBD on SH 1S hit rear end of SUV2 stop/slow for queue	CAR1 following too closely, inattentive, foot slipped or got caught under pedal	N
1S/704/1.144 SBD	150	N		ALBANY ST	201070906	25/02/2010	Thu	1350	FD	CS1C	181A 331A		R	D	B	F		N	C	50	0	0	0			1406865	4917875	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing	N
1S/704/1.144 SBD	150	N		ALBANY ST	201171020	10/04/2011	Sun	1857	MO	XS1M	357A 512A 930		R	D	DO	F	D	N	C	50	0	0	0			1406865	4917875	TAXI1 SBD on SH 1S hit MOTOR CYCLE2 manoeuvring	TAXI1 emotionally upset/road rage, intentional collision ENV: entering or leaving other non-commercial	N
1S/704/1.194 SBD	100	N		ALBANY ST	201272071	13/07/2012	Fri	1524	FD	CS14	181A 191B		R	W	O	L			C	50	0	0	0			1406848	4917827	CAR1 SBD on SH 1S hit rear end of SUV2 stop/slow for queue	CAR1 following too closely SUV2 suddenly braked	N
1S/704/1.21 NBD	100	N		ALBANY ST	2973715	20/10/2009	Tue	921	MO	TN1M	371A 671A 442B 830	M	R	D	B	F			C	50	0	0	0			1406734	4917867	TRUCK1 NBD on SH 1S hit Parked Vehicle while manoeuvring	TRUCK1 didnt see/look behind when reversing/manoeuvering, blind spot MOTOR CYCLE2 parked or stopped at point of limited visibility ENV: visibility limited	N
1S/704/1.214 SBD	80	N		ALBANY ST	2972989	8/06/2009	Mon	900	PO	BS1K	722B		R	D	B	F			C	50	0	0	0			1406842	4917808	BUS1 SBD on SH 1S hit PEDESTRIAN	SKATEBOARDER2 pedestrian playing on road or unnecessarily on road	N
1S/704/1.244 SBD	50	N		ALBANY ST	2970608	23/02/2009	Mon	2030	FE	CS1C	331A 800		R	W	DO	L		T	C	50	0	0	0			1406832	4917780	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for signals	CAR1 failed to notice car slowing ENV: slippery	N
1S/704/1.244 NBD	50	N		ALBANY ST	201273004	12/10/2012	Fri	2035	AG	CN1C	103A 177A		R	W	DO	L			C	50	0	0	0			1406832	4917780	CAR1 NBD on SH 1S CUMBERLAND ST weaving in heavy traffic hit CAR2	CAR1 alcohol test above limit or test refused, weaving or cut in on multi-lane road	N
1S/704/1.244 SBD	50	N		ALBANY ST	201222671	28/09/2012	Fri	1218	FC	CS1C4	181A 181B		R	D	B	F			X	50	0	0	1			1406832	4917780	CAR1 SBD on SH 1S CUMBERLAND ST hit rear end of CAR2 stop/slow for PEDESTRIAN	CAR1 following too closely CAR2 following too closely	M
1S/704/1.254 SBD	40	N		ALBANY ST	2970939	12/03/2009	Thu	1515	MO	CS1C	385A	M	R	D	O	F			C	50	0	0	0			1406828	4917771	CAR1 SBD on SH 1S hit Parked Vehicle while manoeuvring	CAR1 misjudged size or position of fixed object or obstacle	N
1S/704/1.26 NBD	50	N		ALBANY ST	2922417	17/03/2009	Tue	1523	EA	CN1C4(	129A 353A	M	R	D	B	F			C	50	0	0	1			1406717	4917820	CAR1 NBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 too far left/right, attention diverted by other traffic	M
1S/704/1.27 NBD	40	N		ALBANY ST	2922065	3/06/2009	Wed	1055	MF	CN1C	331A 352A		R	D	O	F			C	50	0	0	1			1406714	4917811	CAR1 NBD on SH 1S hit CAR2 angle parking	CAR1 failed to notice car slowing, attention diverted by scenery or persons outside vehicle	M
1S/704/1.279 NBD	30	N		ALBANY ST	201074393	24/12/2010	Fri	1055	AC	TN1C	372A		R	D	B	F			C	50	0	0	0			1406710	4917801	TRUCK1 NBD on SH 1S changing lanes to left hit CAR2	TRUCK1 didnt see/look behind when changing lanes, position or direction	N
1S/704/1.279 NBD	30	N		ALBANY ST	201074151	22/11/2010	Mon	1450	MG	CN1C	371B		R	D	B	F			C	50	0	0	0			1406710	4917801	CAR1 NBD on SH 1S hit CAR2 reversing along road	CAR2 didnt see/look behind when reversing/manoeuvering	N
1S/704/1.279 SBD	15	S		ALBANY ST	2971085	18/04/2009	Sat	1153	MO	BS1C	386A	M	R	D	B	F			C	50	0	0	0			1406820	4917747	BUS1 SBD on SH 1S CUMBERLAND ST NORTH hit Parked Vehicle while manoeuvring	BUS1 misjudged speed of own vehicle	N
1S/704/1.28 NBD	30	N		ALBANY ST	2921465	1/03/2009	Sun	1300	FD	CN14	331A		R	W	O	L			C	50	0	0	1			1406710	4917801	CAR1 NBD on SH 1S hit rear end of SUV2 stop/slow for queue	CAR1 failed to notice car slowing	M
1S/704/1.289 NBD	20	N		ALBANY ST	201321373	13/03/2013	Wed	1615	AA	CN1X	372A		R	D	B	F			C	50	0	0	1			1406707	4917792	CAR1 NBD on SH 1S changing lanes/overtaking to right hit TAXI2	CAR1 didnt see/look behind when changing lanes, position or direction	M
ALBANY ST			I	CUMBERLAND ST NORTH	2923013	9/09/2009	Wed	1310	JA	ME1C	124B 330B 402B		R	D	B	F	X	T	C	50	0	0	1			1406815	4917733	MOTOR CYCLE1 EBD on ALBANY ST hit CAR2 turning right onto ALBANY ST from the left	CAR2 cutting corner at intersection, inattentive, new driver showed inexperience	M
ALBANY ST			I	1S/704/1.294	201173285	17/10/2011	Mon	835	FE	CE1C	181A 357A 357B		R	D	B	F	X	T	C	50	0	0	0			1406815	4917733	CAR1 EBD on ALBANY ST hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, emotionally upset/road rage CAR2 emotionally upset/road rage	N
1S/704/1.294 SBD			I	ALBANY ST	201358599	18/11/2013	Mon	1400	KA	CS1C	322B		R		F		X	T	C	50	0	0	0			1406815	4917733	CAR1 SBD on SH 1S hit CAR2 merging from the left	CAR2 did not stop at steady red light	N
1S/704/1.3 NBD	10	N		ALBANY ST	2970555	25/02/2009	Wed	1650	FA	CN1C	181A 331A		R	D	O	F	X	S	C	50	0	0	0			1406703	4917782	CAR1 NBD on SH 1S hit rear end of CAR2 stopped/moving slowly	CAR1 following too closely, failed to notice car slowing	N
ALBANY ST			I	1S/704/1.309 NBD	2922199	29/06/2009	Mon	1115	HA	CN1CC	197A 322B 334B		R	D	O	F	X	T	C	50	0	0	1			1406700	4917773	CAR1 NBD on ALBANY ST hit CAR2 crossing at right angle from right	CAR1 suddenly swerved to avoid vehicle CAR2 did not stop at steady red light, failed to notice traffic lights	M
ALBANY ST			I	1S/704/1.309 NBD	201172264	7/07/2011	Thu	1820	HA	CN2C	322B 358B		R	W	DO	L	X	T	C	50	0	0	0			1406700	4917773	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, attention diverted by cigarette etc	N
ALBANY ST			I	1S/704/1.309	201270060	6/01/2012	Fri	1126	HA	CE1C	322B 334B		R	D	O	F	X	T	C	50	0	0	0			1406700	4917773	CAR1 EBD on ALBANY ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, failed to notice traffic lights	N
ALBANY ST			I	1S/704/1.309	201273654	9/12/2012	Sun	1127	HA	TW1C	322B		M	D	B	F	X	T	C	50	0	0	0			1406700	4917773	TRUCK1 WBD on ALBANY ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	N
1S/704/1.309 NBD			I	ALBANY ST	201122459	25/08/2011	Thu	2220	HA	4N1C	309A 334A		R	D	DO	F	X	T	C	50	0	0	1			1406700	4917773	SUV1 NBD on SH 1S hit CAR2 crossing at right angle from right	SUV1 failed to give way to traffic approaching/crossing from the right, failed to notice traffic lights	M
1S/704/1.309 NBD			I	ALBANY ST	201270895	25/03/2012	Sun	930	HA	CN1C	102A 322A		E	D	B	F	X	T	C	50	0	0	0			1406700	4917773	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 alcohol test below limit, did not stop at steady red light	N
1S/704/1.309 NBD			I	ALBANY ST	201321396	19/02/2013	Tue	1315	NA	SN1E	711B 718B		R	D	B	F	X	T	C	50	0	1	1	20	31	1406700	4917773	CYCLIST1 (Age 31)NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 crossing heedless of traffic, crossing road not complying with traffic signal or school patrol	H
1S/704/1.309 NBD			I	ALBANY ST	201071465	10/05/2010	Mon	845	GC	XN1C	171A 355A	PS	M	D	B	F	X	T	L	50	0	0	0			1406700	4917773	TAXI1 NBD on SH 1S MALCOLM hit rear of CAR2 turning right from left side, TAXI1 hit Post Or Pole, Traffic Sign	TAXI1 turned right from incorrect lane, attention diverted while trying to find intersection	N
1S/704/1.309			I	ALBANY ST	201221692	2/04/2012	Mon	1350	LB	PE2C	303B		R	D	B	F	X	T	C	50	0	0	1			1406700	4917773	CAR2 turning right hit by oncoming MOPED1 EBD on ALBANY ST	CAR2 failed to give way when turning to non-turning traffic	M
ALBANY ST			I	1S/704/1.31 NBD	2972687	3/08/2009	Mon	1430	NC	CN2E	307A		R	D	O	F	X	T	C	50	0	0	0			1406700	4917773	CAR1 NBD on SH 1S turning left hit PEDESTRIAN crossing ALBANY ST from left	CAR1 failed to give way when turning at signals to ped	N
1S/704/1.31 NBD			I	ALBANY ST	201070488	11/01/2010	Mon	1310	FA	CN1C	181A 331A		R	W	O	L	X	T	C	50	0	0	0			1406700	4917773	CAR1 NBD on SH 1S hit rear end of CAR2 stopped/moving slowly	CAR1 following too closely, failed to notice car slowing	N

ROAD	DIST	FROM	INTN	SIDE	IDNO	DATE	DYWK	TIME	MVMT	VEHS	CSCD	OBJS	CURV	SURF	LITE	WTHR	JNTY	TRAF	MARK	SPDL	NFAT	NSER	NMIN	PEDA	CYCA	EAST	NORTH	MVMT DESCR	CAUSES	SEV
1S/704/1.31 NBD			I	ALBANY ST	2921705	4/04/2009	Sat	2200	NA	CN1E	105B 713B		E	D	DO	F	X	T	C	50	0	1	0	18		1406700	4917773	CAR1 NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 Intoxicated non-driver, crossing road, running heedless of traffic	H
1S/704/1.515 NBD	60	N		FREDERICK ST	2974327	26/09/2009	Sat	1635	MO	VN1C	330A 923		E	D	O	F	D	N	C	50	0	0	0			1406757	4917580	VAN1 NBD on SH 1S hit CAR2 manoeuvring	VAN1 inattentive ENV: entering or leaving specialised liquor outlet	N
1S/704/1.525 NBD	50	N		FREDERICK ST	201321746	6/05/2013	Mon	1119	KB	CN1C	308B 929		E	D	O	F	D	N	C	50	0	0	1			1406755	4917570	CAR1 NBD on SH 1S hit CAR2 merging from the right	CAR2 failed to give way at driveway ENV: entering or leaving private house / farm	M
1S/704/1.526 SBD	30	N		FREDERICK ST	201221104	11/02/2012	Sat	2355	DA	CS1	101A 111A 131A	J	E	D	DO	F			C	50	0	0	3			1406859	4917512	CAR1 SBD on SH 1S lost control turning right, CAR1 hit Phone Box Etc. on right hand bend	CAR1 alcohol suspected, too fast entering corner, lost control when turning	M
FREDERICK ST			I	CASTLE ST	201122294	4/08/2011	Thu	1700	EA	SW1T	129A 330A	M	R	D	O	F	X	T	C	50	0	1	0		20	1406852	4917483	CYCLIST1 (Age 20)WBD on FREDERICK ST hit parked veh, CYCLIST1 hit Parked Vehicle	CYCLIST1 too far left/right, inattentive	H
FREDERICK ST			I	1S/704/1.556	2921189	18/02/2009	Wed	1100	HA	CW1C	322A 334A		R	D	B	F	X	T	C	50	0	0	1			1406852	4917483	CAR1 WBD on FREDERICK ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	M
1S/704/1.556 SBD			I	FREDERICK ST	201022523	20/08/2010	Fri	1945	FE	CS1C	103A 331A		E	D	DO	F	X	T	C	50	0	0	1			1406852	4917483	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for signals	CAR1 alcohol test above limit or test refused, failed to notice car slowing	M
1S/704/1.556 SBD			I	FREDERICK ST	201170610	17/03/2011	Thu	1210	DB	CS1C	111A 131A 402A		R	W	O	L	X	T	C	50	0	0	0			1406852	4917483	CAR1 SBD on SH 1S lost control turning left	CAR1 too fast entering corner, lost control when turning, new driver showed inexperience	N
1S/704/1.556 SBD			I	FREDERICK ST	201270599	12/03/2012	Mon	1526	MG	CS1V	371B		R	D	B	F	X	T	C	50	0	0	0			1406852	4917483	CAR1 SBD on SH 1S hit VAN2 reversing along road	VAN2 didnt see/look behind when reversing/manoeuvering	N
1S/704/1.556 SBD			I	FREDERICK ST	2921931	20/05/2009	Wed	1400	ND	CS1E	307A 376A 403A		E	W	O	S	X	T	C	50	0	0	1	31		1406852	4917483	CAR1 SBD on SH 1S CASTLE turning right hit PEDESTRIAN crossing FREDERICK ST from right	CAR1 failed to give way when turning at signals to ped, didnt see/look when required to give way to ped, driving unfamiliar vehicle	M
1S/704/1.556 SBD			I	FREDERICK ST	201074140	6/12/2010	Mon	745	HA	CS1V	322B 334B		R	D	O	F	X	T	C	50	0	0	0			1406852	4917483	CAR1 SBD on SH 1S CASTLE ST hit VAN2 crossing at right angle from right	VAN2 did not stop at steady red light, failed to notice traffic lights	N
1S/704/1.556 SBD			I	FREDERICK ST	201321237	3/02/2013	Sun	1822	HA	CS1C	322A		R	D	O	F	X	T	R	50	0	0	2			1406852	4917483	CAR1 SBD on SH 1S CASTLE ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	M
1S/704/1.556 SBD			I	FREDERICK ST	2972716	26/06/2009	Fri	655	HA	CS1C	322A 334A 322B 334B		R	D	DO	F	X	T	C	50	0	0	0			1406852	4917483	CAR1 SBD on SH 1S CASTLE ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights CAR2 did not stop at steady red light, failed to notice traffic lights	N
1S/704/1.571 SBD	15	S		FREDERICK ST	201372119	8/08/2013	Thu	1830	AC	CS1C	330A 381A		R	D	O	F	X	T	C	50	0	0	0			1406847	4917469	CAR1 SBD on SH 1S CASTLE ST changing lanes to left hit CAR2	CAR1 inattentive, misjudged speed, etc of vehicle coming from behind or alongside	N
FREDERICK ST			I	CUMBERLAND ST CENTRAL	2921875	9/02/2009	Mon	834	ND	CN1E	307A 330A 376A		R	W	O	L	X	T	C	50	0	0	1	68		1406739	4917523	CAR1 NBD on FREDERICK ST turning right hit PEDESTRIAN crossing CUMBERLAND ST CENTRAL from right	CAR1 failed to give way when turning at signals to ped, inattentive, didnt see/look when required to give way to ped	M
FREDERICK ST			I	MALCOLM ST	2973301	8/08/2009	Sat	230	HA	CW1C	322A 353A 375A		R	D	DO	F	X	T	C	50	0	0	0			1406739	4917523	CAR1 WBD on FREDERICK ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, attention diverted by other traffic, didnt see/look when required to give way to traffic from another direction	N
FREDERICK ST			I	1S/704/1.575	201070144	30/01/2010	Sat	1730	HA	CW2C	322B		R	D	O	F	X	T	C	50	0	0	0			1406739	4917523	CAR1 WBD on SH 1S CUMBERLAND ST CENTR hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	N
FREDERICK ST			I	1S/704/1.575 NBD	201371668	19/06/2013	Wed	1530	HA	CN2C	322B	CT	R	W	O	F	X	T	C	50	0	0	0			1406739	4917523	CAR1 NBD on SH 1S CUMBERLAND ST CENTR hit CAR2 crossing at right angle from right, CAR1 hit Cliff Bank, Tree	CAR2 did not stop at steady red light	N
1S/704/1.575 NBD			I	FREDERICK ST	201071523	21/05/2010	Fri	2237	HA	CN1C	322A 334A		R	D	DO	F	X	T	C	50	0	0	0			1406739	4917523	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	N
1S/704/1.575 NBD			I	FREDERICK ST	2974765	21/12/2009	Mon	1145	GF	TN1C	171A 381A		R	D	B	F	X	T	N	50	0	0	0			1406739	4917523	TRUCK1 and CAR2 both NBD on SH 1S and turning; collided	TRUCK1 turned right from incorrect lane, misjudged speed, etc of vehicle coming from behind or alongside	N
1S/704/1.575 NBD			I	FREDERICK ST	201021015	3/01/2010	Sun	2011	HA	CN1C	322B 351B 434B		R	D	B	F	X	T	C	50	0	1	4			1406739	4917523	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, attention diverted by passengers, intimidating driving	H
1S/704/1.575			I	FREDERICK ST	201022091	1/07/2010	Thu	1705	NC	CE2E	307A 330A		R	D	O	F	X	T	N	50	0	0	1	47		1406739	4917523	CAR1 EBD on FREDERICK ST turning left hit PEDESTRIAN crossing SH 1S MALCOLM ST from left	CAR1 failed to give way when turning at signals to ped, inattentive	M
1S/704/1.606 SBD	50	S		FREDERICK ST	2973971	22/10/2009	Thu	1142	QD	VS1C	611A	M	R	D	B	F			C	50	0	0	0			1406835	4917436	parked VAN1 SBD on SH 1S ran away, VAN1 hit Parked Vehicle	VAN1 parking brake failed	N
1S/704/1.625 NBD	50	S		FREDERICK ST	201220059	19/11/2012	Mon	957	EE	SN1CT	197A 374B	M	R	D	B	F			C	50	1	0	0		34	1406722	4917476	CAR2 NBD on SH 1S opened door into path of another party, CYCLIST1 hit Parked Vehicle	CYCLIST1 suddenly swerved to avoid vehicle CAR2 didnt see/look behind when opening door or leaving vehicle	F
1S/704/1.656 SBD	100	S		FREDERICK ST	201222431	25/08/2012	Sat	145	CB	CS14C	103A 112A 130A 194A	FMT	R	D	DO	F			C	50	0	0	1			1406819	4917389	CAR1 SBD on SH 1S lost control; went off road to left, CAR1 hit Fence, Parked Vehicle, Tree, SUV2 hit Parked Vehicle	CAR1 alcohol test above limit or test refused, too fast on straight, lost control, suddenly swerved to avoid pedestrian	M
1S/704/1.716 NBD	80	N		HANOVER ST	201371471	10/06/2013	Mon	1430	MO	CN1CV	371A		R	D	O	F			C	50	0	0	0			1406691	4917390	CAR1 NBD on SH 1S hit CAR2 manoeuvring	CAR1 didnt see/look behind when reversing/manoeuvering	N
1S/704/1.726 NBD	70	N		HANOVER ST	201122264	20/07/2011	Wed	1250	GB	SN1V	330B 372B 926		R	D	B	F	D	N	C	50	0	0	1		26	1406688	4917381	CYCLIST1 (Age 26)NBD on SH 1S sideswiped by VAN2 turning left	VAN2 inattentive, didnt see/look behind when changing lanes, position or direction ENV: entering or leaving car parking building / area	M
1S/704/1.746 NBD	50	N		HANOVER ST	201022045	24/06/2010	Thu	1720	FD	CN1CC	112A 331A 353A		R	D	DO	F			C	50	0	0	2			1406681	4917362	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 too fast on straight, failed to notice car slowing, attention diverted by other traffic	M
1S/704/1.752 SBD	25	N		HANOVER ST	201358203	17/12/2013	Tue	820	FD	CS1C	181A 353A		R	D	B	F	X	T	C	50	0	0	0			1406787	4917298	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, attention diverted by other traffic	N
1S/704/1.757 SBD	20	N		HANOVER ST	201072546	1/06/2010	Tue	1420	KA	CS1C	308B 330B 363B 902 927		R	D	B	F	D	N	C	50	0	0	0			1406785	4917293	CAR1 SBD on SH 1S hit CAR2 merging from the left	CAR2 failed to give way at driveway, inattentive, attention diverted by driver dazzled by sun/lights ENV: dazzling sun, entering or leaving other commercial	N
1S/704/1.762 SBD	15	N		HANOVER ST	201221235	7/02/2012	Tue	1715	FD	CS14C	181A 181B		R	D	B	F			C	50	0	0	3			1406784	4917288	CAR1 SBD on SH 1S hit rear end of SUV2 stop/slow for queue	CAR1 following too closely SUV2 following too closely	M
1S/704/1.766 NBD	30	N		HANOVER ST	201070457	12/02/2010	Fri	2020	FD	CN14C	181A 331A 181B 331B 191C		R	D	B	F			C	50	0	0	0			1406674	4917343	CAR1 NBD on SH 1S hit rear end of SUV2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing SUV2 following too closely, failed to notice car slowing CAR3 suddenly braked, inattentive, did not see or look for other party until too late	N
CASTLE ST			I	HANOVER ST	201021592	20/04/2010	Tue	1855	HA	CW2C	322B 330B		R	D	DO	F	X	T	C	50	0	0	1			1406779	4917274	CAR1 WBD on HANOVER ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, inattentive	M
HANOVER ST			I	1S/704/1.777 SBD	201171587	8/05/2011	Sun	105	HA	CS2C	322A		R	W	DO	H	X	T	C	50	0	0	0			1406779	4917274	CAR1 SBD on SH 1S CASTLE ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	N
HANOVER ST			I	1S/704/1.777	201372309	19/08/2013	Mon	1511	LB	CW1C	303B		R	D	O	M	X	T	C	50	0	0	0			1406779	4917274	CAR2 turning right hit by oncoming CAR1 WBD on HANOVER ST	CAR2 failed to give way when turning to non-turning traffic	N
HANOVER ST			I	1S/704/1.777 SBD	201321870	28/05/2013	Tue	1820	HA	CS2C	334A 334B		R	I	DO	L	X	T	N	50	0	0	2			1406779	4917274	CAR1 SBD on SH 1S CASTLE ST hit CAR2 crossing at right angle from right	CAR1 failed to notice traffic lights CAR2 failed to notice traffic lights	M
1S/704/1.777			I	HANOVER ST	2974191	2/12/2009	Wed	1508	KC	CW2V	176B 330B		R	D	O	F	X	T	C	50	0	0	0			1406779	4917274	CAR1 WBD on HANOVER ST merging hit VAN2 also merging	VAN2 turned into incorrect lane, inattentive	N
1S/704/1.777 SBD			I	HANOVER ST	201022648	30/08/2010	Mon	708	HA	CS1C	322A 334A		R	W	O	L	X	T	C	50	0	0	3			1406779	4917274	CAR1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	M
1S/704/1.777 SBD			I	HANOVER ST	201071219	19/04/2010	Mon	550	HA	4S14	322A 330A 412A		R	D	O	F	X	T	C	50	0	0	0			1406779	4917274	SUV1 SBD on SH 1S hit SUV2 crossing at right angle from right	SUV1 did not stop at steady red light, inattentive, fatigue due to lack of sleep	N
1S/704/1.777 SBD			I	HANOVER ST	201070907	12/03/2010	Fri	2030	HA	CS1V	322B 334B 358B		R	D	B	F	X	T	C	50	0	0	0			1406779	4917274	CAR1 SBD on SH 1S CASTLE hit VAN2 crossing at right angle from right	VAN2 did not stop at steady red light, failed to notice traffic lights, attention diverted by cigarette etc	N
1S/704/1.777 SBD			I	HANOVER ST	201322496	2/10/2013	Wed	2152	HA	CS1C	322A 355A		R	W	DO	L	X	T	C	50	0	1	0			1406779	4917274	CAR1 SBD on SH 1S CASTLE ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, attention diverted while trying to find intersection	H
1S/704/1.777 SBD			I	HANOVER ST	2973565	6/03/2009	Fri	1630	FB	CS1C	331A		R	D	B	F	X	T	C	50	0	0	0			1406779	4917274	CAR1 SBD on SH 1S CASTLE ST hit rear end of CAR2 stop/slow for cross traffic	CAR1 failed to notice car slowing	N
1S/704/1.777			I	HANOVER ST	201073429	9/10/2010	Sat	2140	JA	CE2C	322B 334B 351B		R	D	DO	F	X	T	C	50	0	0	0			1406779	4917274	CAR1 EBD on HANOVER ST hit CAR2 turning right onto HANOVER ST from the left	CAR2 did not stop at steady red light, failed to notice traffic lights, attention diverted by passengers	N
1S/704/1.781 NBD	15	N		HANOVER ST	201357641	10/12/2013	Tue	806	FD	CN1T	331A 353A		R	D	OF	F		N	C	50	0	0	0			1406670	4917329	CAR1 NBD on SH 1S hit rear end of TRUCK2 stop/slow for queue	CAR1 failed to notice car slowing, attention diverted by other traffic	N
1S/704/1.781 NBD	15	N		HANOVER ST	201172031	27/06/2011	Mon	740	FD	CN1CC	181A 181B 191C 800		R	W	TO	F			C	50	0	0	0			1406670	4917329	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely CAR2 following too closely CAR3 suddenly braked ENV: slippery	N
1S/704/1.792 SBD	15	S		HANOVER ST	201271794	7/07/2012	Sat	1002	FD	CS1C	181A		R	D	B	F			C	50	0	0	0			1406773	4917260	CAR1 SBD on SH 1S CASTLE ST hit rear end of CAR2 stop/slow for queue	CAR1 following too closely	N
CUMBERLAND ST CENT			I	HANOVER ST	2922008	12/05/2009	Tue	1345	NF	TW2E	307A 376A		S	D	O	F	X	T	C	50	0	0	1	57		1406664	4917315	TRUCK1 WBD on HANOVER ST turning right hit PEDESTRIAN crossing CUMBERLAND ST CENTRAL from left	TRUCK1 failed to give way when turning at signals to ped, didnt see/look when required to give way to ped	M
HANOVER ST			I	1S/704/1.796 NBD	201271374	2/06/2012	Sat	1230	KA	CN1C	322B 334B		E	D	O	F	X	T	C	50	0	0	0			1406664	4917315	CAR1 NBD on HANOVER ST hit CAR2 merging from the left	CAR2 did not stop at steady red light, failed to notice traffic lights	N
HANOVER ST			I	1S/704/1.796 NBD	201271781	22/06/2012	Fri	1400	HA	4N24	845		R	D	B	F	X	T	C	50	0	0	0			1406664	4917315	SUV1 NBD on SH 1S hit SUV2 crossing at right angle from right	ENV: traffic signals turned off	N
HANOVER ST			I	1S/704/1.796	201372466	22/07/2013	Mon	1530	LB	CE1C	303B		R	D	B	F	X	T	C	50	0	0	0			1406664	4917315	CAR2 turning right hit by oncoming CAR1 EBD on HANOVER ST	CAR2 failed to give way when turning to non-turning traffic	N
HANOVER ST			I	1S/704/1.796 NBD	201022476	17/08/2010	Tue	815	ND	BN2E	718B		R	D	O	F	X	T	C	50	0	0	1	21		1406664	4917315	BUS1 NBD on SH 1S CUMBERLAND ST CN turning right hit PEDESTRIAN crossing HANOVER ST from right	PEDESTRIAN2 crossing road not complying with traffic signal or school patrol	M
1S/704/1.796 NBD			I	HANOVER ST	2923134	3/10/2009	Sat	1251	AA	MN1C	372A 400A		R	D	B	F	X	T	C	50	0	1	0			1406665	4917315	MOTOR CYCLE1 NBD on SH 1S changing lanes/overtaking to right hit CAR2	MOTOR CYCLE1 didnt see/look behind when changing lanes, position or direction, inexperience	H
1S/704/1.796 NBD			I	HANOVER ST	201222800	29/10/2012	Mon	1445	ND	CN1E	307A		R	D	B	F	X	T	C	50	0	1	0	25		1406664	4917315	CAR1 NBD on SH 1S turning right hit PEDESTRIAN crossing HANOVER ST from right	CAR1 failed to give way when turning at signals to ped	H
1S/704/1.816 NBD	20	S		HANOVER ST	201023349	8/12/2010	Wed	1404	ND	CN1E	376A 711B 925		R	D	O	F	D	N	C	50	0	0	1	31		1406658	4917296	CAR1 NBD on SH 1S turning right hit PEDESTRIAN crossing HANOVER ST from right	CAR1 didnt see/look when required to give way to ped PEDESTRIAN2 crossing heedless of traffic ENV: entering or leaving shopping complex	M
1S/704/1.827 SBD	50	S		HANOVER ST	201121040	14/01/2011	Fri	1750	GE	MS1V	171B 404B 927		R	D	B	F	D	N	C	50	0	0	1			1406762	4917227	MOTOR CYCLE1 SBD on SH 1S CASTLE ST overtaking hit VAN2 turning right	VAN2 turned right from incorrect lane, overseas/migrant driver failed to adjust to NZ road rules and road conditions ENV: entering or leaving other commercial	M
1S/704/1.846 NBD	50	S		HANOVER ST	201372765	14/10/2013	Mon	1330	NA	CN1E	711B 732B		R	D	O	FS			C	50	0	0	0			1406648	4917268	CAR1 NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 crossing heedless of traffic, pedestrian attention diverted eg cigarette, cell phone, music player	N
1S/704/1.856 NBD	60	S		HANOVER ST	201121717	11/05/2011	Wed	1545	NA	CN1E	502B 711B		R	D	O	F			C	50	0	0	1	82		1406644	4917258	CAR1 NBD on SH 1S hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 physically disabled, crossing heedless of traffic	M
1S/704/1.95 SBD	50	N		ST ANDREW ST	201370679	13/03/2013	Wed	1356	AA	TS1C	372A 671A		R	D	B	F			C	50	0	0	0			1406720	4917112	TRUCK1 SBD on SH 1S changing lanes/overtaking to right hit CAR2	TRUCK1 didnt see/look behind when changing lanes, position or direction, blind spot	N
1S/704/1.95 SBD	50	N		ST ANDREW ST	2974011	9/11/2009	Mon	1709	FD	CS1C	181A 331A 350A		R	D	B	F		N	C	50	0	0	0			1406720	4917112	CAR1 SBD on SH 1S CASTLE hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing, attention diverted	N
1S/704/1.95 SBD	50	N		ST ANDREW ST	201371043	9/04/2013	Tue	1750	AA	CS1C	372A		R	D	TO	F			C	50	0	0	0			1406720	4917112	CAR1 SBD on SH 1S CASTLE ST changing lanes/overtaking to right hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction	N
1S/704/1.96 SBD	40	N		ST ANDREW ST	201372714	28/09/2013	Sat	1915	FD	CS1C	181A		R	W	O	L			C	50	0	0	0			1406716	4917103	CAR1 SBD on SH 1S CASTLE ST hit rear end of CAR2 stop/slow for queue	CAR1 following too closely	N
1S/704/1.968 NBD	50	N		SH 88	201071674	20/05/2010	Thu	1205	FD	CN1XX	181A 352A		R	D	B	F			C	50	0	0	0			1406607	4917153	CAR1 NBD on SH 1S hit rear end of TAXI2 stop/slow for queue	CAR1 following too closely, attention diverted by scenery or persons outside vehicle	N
1S/704/1.99 SBD	10	N		ST ANDREW ST	201372769	8/10/2013	Tue	2135	AC	CS1C	372A		R	D	DO	F	X	T	C	50	0	0	0			1406706	4917074	CAR1 SBD on SH 1S CASTLE ST changing lanes to left hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction	N

ROAD	DIST	FROM	INTN	SIDE	IDNO	DATE	DYWK	TIME	MVMT	VEHS	CSCD	OBJS	CURV	SURF	LITE	WTHR	JNTY	TRAF	MARK	SPDL	NFAT	NSER	NMIN	PEDA	CYCA	EAST	NORTH	MVMT DESCR	CAUSES	SEV
1S/704/2 SBD			I	ST ANDREW ST	201221272	4/02/2012	Sat	546	HA	TS1C	322B 427B		R	D	DO	F	X	T	C	50	0	0	1			1406703	4917065	TRUCK1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, foot slipped or got caught under pedal	M
1S/704/2 SBD			I	ST ANDREW ST	201021564	17/04/2010	Sat	1135	FE	CS1C	181A 331A 334A		R	D	B	FS	X	T	C	50	0	0	2			1406703	4917065	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing, failed to notice traffic lights	M
1S/704/2 SBD			I	ST ANDREW ST	201122227	24/07/2011	Sun	900	HA	CS1C	322B 351B		R	D	O	F	X	T	C	50	0	0	1			1406703	4917065	CAR1 SBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, attention diverted by passengers	M
1S/704/2 SBD			I	ST ANDREW ST	201073036	16/09/2010	Thu	1515	FA	CS1C	181A 331A 386A		R	D	O	F	X	T	C	50	0	0	0			1406703	4917065	CAR1 SBD on SH 1S CASTLE ST hit rear end of CAR2 stopped/moving slowly	CAR1 following too closely, failed to notice car slowing, misjudged speed of own vehicle	N
1S/704/2 SBD			I	ST ANDREW ST	201271389	27/05/2012	Sun	114	HA	CS14	322B 334B		R	W	DO	F	X	T	C	50	0	0	0			1406703	4917065	CAR1 SBD on SH 1S CASTLE ST hit SUV2 crossing at right angle from right	SUV2 did not stop at steady red light, failed to notice traffic lights	N
1S/704/2 SBD			I	ST ANDREW ST	201223008	3/12/2012	Mon	835	FE	TS1C	331A		R	D	B	F	X	T	C	50	0	0	1			1406703	4917065	TRUCK1 SBD on SH 1S CASTLE ST hit rear end of CAR2 stop/slow for signals	TRUCK1 failed to notice car slowing	M
1S/704/2 SBD			I	ST ANDREWS ST	201070904	25/03/2010	Thu	2300	HA	CS1C	322B 334B 358B 801		R	W	DO	L	X	T	C	50	0	0	0			1406703	4917065	CAR1 SBD on SH 1S CASTLE ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, failed to notice traffic lights, attention diverted by cigarette etc ENV: road slippery (rain)	N
SH 88			I	CASTLE ST	201170509	12/03/2011	Sat	2025	HA	CS2C	322B 330B		R	D	O	F	X	T	C	50	0	0	0			1406703	4917065	CAR1 SBD on CASTLE ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, inattentive	N
ST ANDREW ROAD			I	1S/704/2 SBD	201372766	25/10/2013	Fri	2200	HA	CS2V	322B 334B		R	D	DO	F	X	T	L	50	0	0	0			1406703	4917065	CAR1 SBD on SH 1S CASTLE ST hit VAN2 crossing at right angle from right	VAN2 did not stop at steady red light, failed to notice traffic lights	N
1S/704/2.005 SBD	5	S		ST ANDREWS ST	201122696	13/10/2011	Thu	1530	FA	VS1X	181A		R	D	B	F	T	T	C	50	0	0	1			1406701	4917060	VAN1 SBD on SH 1S hit rear end of TAXI2 stopped/moving slowly	VAN1 following too closely	M
1S/704/2.008 NBD	10	N		ST ANDREW ST	201372865	11/09/2013	Wed	1128	MO	CN1	420A 507A	T	R	D	B	F	X	T	C	50	0	0	0			1406593	4917115	CAR1 NBD on SH 1S hit VEHB manoeuvring, CAR1 hit Tree	CAR1 incorrect use of vehicle controls, impared ability due to old age	N
1S/704/2.018 NBD			I	ST ANDREW ST	201222989	18/11/2012	Sun	2042	HA	CN1C	322A		R	D	O	F	X	T	C	50	0	1	1			1406590	4917106	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	H
1S/704/2.018 NBD			I	ST ANDREW ST	201172573	1/09/2011	Thu	1055	MO	CN1T	330B 371B		R	D	O	F	X	T	C	50	0	0	0			1406590	4917106	CAR1 NBD on SH 1S hit TRUCK2 manoeuvring	TRUCK2 inattentive, didnt see/look behind when reversing/manoeuvering	N
1S/704/2.018 NBD			I	ST ANDREW ST	2973304	26/09/2009	Sat	1745	HA	CN14	322A 334A 322B 334B		R	D	O	F	X	T	C	50	0	0	0			1406590	4917106	CAR1 NBD on SH 1S hit SUV2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights SUV2 did not stop at steady red light, failed to notice traffic lights	N
1S/704/2.018			I	ST ANDREW ST	2972240	23/05/2009	Sat	1025	LB	CE2C	303B		R	W	O	L	X	T	L	50	0	0	0			1406590	4917106	CAR2 turning right hit by oncoming CAR1 EBD on ST ANDREW ST	CAR2 failed to give way when turning to non-turning traffic	N
SH 88			I	CUMBERLAND ST CENTRAL	201122273	17/04/2011	Sun	500	DA	CN2	111A 131A 357A 800	H	M	W	DO	L	X	T	C	50	0	0	1			1406590	4917106	CAR1 NBD on CUMBERLAND ST CENTRAL lost control turning right, CAR1 hit House Or Bldg on right hand bend	CAR1 too fast entering corner, lost control when turning, emotionally upset/road rage ENV: slippery	M
ST ANDREW ST			I	CUMBERLAND ST CENTRAL	201072556	8/08/2010	Sun	2015	HA	CN2C	322A 334A 353A		R	W	O	L	X	T	C	50	0	0	0			1406590	4917106	CAR1 NBD on CUMBERLAND ST CENTRAL hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights, attention diverted by other traffic	N
ST ANDREW ST			I	CUMBERLAND ST CENTRAL	201222017	8/06/2012	Fri	1355	ND	VN2E	307A		R	D	O	F	X	T	C	50	0	0	1	21		1406590	4917106	VAN1 NBD on CUMBERLAND ST CENTRAL turning right hit PEDESTRIAN crossing ST ANDREW ST from right	VAN1 failed to give way when turning at signals to ped	M
ST ANDREW ST			I	1S/704/2.018	201021890	22/05/2010	Sat	800	HA	CE14	322A 330A 197B		R	D	O	F	X	T	C	50	0	0	1			1406590	4917106	CAR1 EBD on ST ANDREW ST hit SUV2 crossing at right angle from right	CAR1 did not stop at steady red light, inattentive SUV2 suddenly swerved to avoid vehicle	M
1S/704/2.033 NBD	15	S		ST ANDREW ST	2970575	27/01/2009	Tue	1145	FE	4N1CC	181A 191A 181B 191C 800		R	W	O	L	X	T	C	50	0	0	0			1406585	4917092	SUV1 NBD on SH 1S hit rear end of CAR2 stop/slow for signals	SUV1 following too closely, suddenly braked CAR2 following too closely CAR3 suddenly braked ENV: slippery	N
1S/704/2.038 NBD	20	S		ST ANDREW ST	201270448	23/02/2012	Thu	850	FD	CN1V	181A		R	W	O	H			C	50	0	0	0			1406583	4917087	CAR1 NBD on SH 1S hit rear end of VAN2 stop/slow for queue	CAR1 following too closely	N
1S/704/2.068 NBD	50	S		ST ANDREW ST	201173436	26/11/2011	Sat	1425	AA	CN1C	372A		R	D	O	F			C	50	0	0	0			1406573	4917059	CAR1 NBD on SH 1S changing lanes/overtaking to right hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction	N
1S/704/2.095 NBD	220	N		STUART ST	201170338	8/02/2011	Tue	700	GB	CN1C	181A 927		R	D	O	F	D	N	C	50	0	0	0			1406564	4917034	CAR1 NBD on SH 1S sideswiped by CAR2 turning left	CAR1 following too closely ENV: entering or leaving other commercial	N
1S/704/2.096 NBD	300	S		HANOVER ST	201074270	21/12/2010	Tue	1040	MO	CN1C	371A 927		R	D	B	F	D	N	C	50	0	0	0			1406563	4917033	CAR1 NBD on SH 1S hit CAR2 manoeuvring	CAR1 didnt see/look behind when reversing/manoeuvering ENV: entering or leaving other commercial	N
1S/704/2.098 NBD	80	S		ST ANDREW ST	201270362	18/02/2012	Sat	1500	FD	CN1CC	181A 331A 352A 801		R	W	O	L			C	50	0	0	0			1406563	4917031	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing, attention diverted by scenery or persons outside vehicle ENV: road slippery (rain)	N
1S/704/2.108 NBD	90	S		ST ANDREW ST	201073339	13/10/2010	Wed	2055	CC	CN1C	103A 130A 501A	M	R	D	DO	F			C	50	0	0	0			1406559	4917021	CAR1 NBD on SH 1S lost control; went off road to right, CAR1 hit Parked Vehicle	CAR1 alcohol test above limit or test refused, lost control, illness with no warning (eg heart attack)	N
1S/704/2.115 NBD	200	N		STUART ST	201322785	19/10/2013	Sat	1723	FD	VN1CC	181A 181B		R	D	B	F			C	50	0	0	1			1406557	4917015	VAN1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	VAN1 following too closely CAR2 following too closely	M
1S/704/2.118 NBD	100	S		ST ANDREW ST	201173290	26/10/2011	Wed	926	MA	CN1V	373B		R	D	O	F			C	50	0	0	0			1406556	4917012	CAR1 NBD on SH 1S hit VAN2 parking/unparking	VAN2 didnt see/look behind when pulling out from parked position	N
1S/704/2.138 NBD	120	S		ST ANDREW ST	201272984	19/10/2012	Fri	1325	FD	CN1CC(	181A 181B 181C		R	D	O	F			C	50	0	0	0			1406549	4916993	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely CAR2 following too closely CAR3 following too closely	N
1S/704/2.165 NBD	150	N		STUART ST	201371129	14/05/2013	Tue	650	MO	TN1	371A 927		R	D	DO	F	D	N	C	50	0	0	0			1406540	4916968	TRUCK1 NBD on SH 1S hit VEHB manoeuvring	TRUCK1 didnt see/look behind when reversing/manoeuvering ENV: entering or leaving other commercial	N
1S/704/2.167 SBD	130	N		STUART ST	201071385	12/05/2010	Wed	1630	PO	TS1E	371A 671A		R	D	O	F		N	C	50	0	0	0			1406648	4916907	TRUCK1 SBD on SH 1S hit PEDESTRIAN	TRUCK1 didnt see/look behind when reversing/manoeuvering, blind spot	N
1S/704/2.168 NBD	150	S		ST ANDREW ST	201122731	4/11/2011	Fri	1635	FD	CN1CC	181A 331A 181B		R	D	B	M			C	50	0	0	1			1406539	4916965	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing CAR2 following too closely	M
1S/704/2.197 SBD	100	N		STUART ST	201325435	30/12/2013	Mon	1515	CC	SS1	130A 501A 801	K	R	W	O	L			C	50	0	0	1		30	1406639	4916879	CYCLIST1 (Age 30)SBD on SH 1S CASTLE lost control; went off road to right, CYCLIST1 hit Kerb	CYCLIST1 lost control, illness with no warning (eg heart attack) ENV: road slippery (rain)	M
1S/704/2.197 SBD	100	N		STUART ST	201271378	30/05/2012	Wed	1742	FD	VS1XC	181A 331A 181B		R	W	DO	L			C	50	0	0	0			1406639	4916879	VAN1 SBD on SH 1S CASTLE ST hit rear end of TAXI2 stop/slow for queue	VAN1 following too closely, failed to notice car slowing TAXI2 following too closely	N
1S/704/2.2 SBD	20	N		ANZAC AVENUE	201271993	21/07/2012	Sat	1148	FD	CS1CC(	181A 331A 181B 181C 181D		R	W	O	L			C	50	0	0	0			1406638	4916876	CAR1 SBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing CAR2 following too closely CAR3 following too closely CAR4 following too closely	N
1S/704/2.215 NBD	100	N		STUART ST	2921893	20/04/2009	Mon	2130	AC	TN1C	177A 381A 671A		R	D	DO	F			C	50	0	0	1			1406523	4916921	TRUCK1 NBD on SH 1S changing lanes to left hit CAR2	TRUCK1 weaving or cut in on multi-lane road, misjudged speed, etc of vehicle coming from behind or alongside, blind spot	M
ANZAC AVENUE			I	CASTLE ST	2973302	19/09/2009	Sat	1205	FB	CS1C	331A 377A		R	D	B	F	T	G	C	50	0	0	0			1406631	4916857	CAR1 SBD on ANZAC AVENUE hit rear end of CAR2 stop/slow for cross traffic	CAR1 failed to notice car slowing, didnt see/look when visibility obstructed by other vehicles	N
ANZAC AVENUE			I	1S/704/2.22	2922072	23/03/2009	Mon	1745	FB	CW1C	181A 387A		E	D	B	F	T	G	N	50	0	0	1			1406631	4916857	CAR1 WBD on ANZAC AVENUE hit rear end of CAR2 stop/slow for cross traffic	CAR1 following too closely, misjudged intentions of another party	M
ANZAC AVENUE			I	1S/704/2.22	2970347	23/01/2009	Fri	1500	FD	CW1TC	331A 387A		E	D	B	F	T	G	C	50	0	0	0			1406631	4916857	CAR1 WBD on ANZAC AVENUE hit rear end of TRUCK2 stop/slow for queue	CAR1 failed to notice car slowing, misjudged intentions of another party	N
ANZAC AVENUE			I	1S/704/2.22	201270258	3/02/2012	Fri	1322	FB	CW1T	181A		R	D	O	F	T	G	C	50	0	0	0			1406631	4916857	CAR1 WBD on ANZAC AVENUE hit rear end of TRUCK2 stop/slow for cross traffic	CAR1 following too closely	N
ANZAC AVENUE			I	1S/704/2.22	201170350	26/02/2011	Sat	1805	FB	CW1C	181A		R	D	O	F	T	G	P	50	0	0	0			1406631	4916857	CAR1 WBD on ANZAC AVENUE hit rear end of CAR2 stop/slow for cross traffic	CAR1 following too closely	N
1S/704/2.22 SBD			I	ANZAC AVENUE	201120050	14/11/2011	Mon	745	KA	SS1T	302B 375B		E	D	O	F	T	G	R	50	1	0	0		55	1406631	4916857	CYCLIST1 (Age 55)SBD on SH 1S hit TRUCK2 merging from the left	TRUCK2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	F
1S/704/2.22 SBD			I	ANZAC AVENUE	201121513	24/04/2011	Sun	2120	KA	SS1C	102B 302B 375B		R	W	DO	F	T	G	R	50	0	0	1		18	1406631	4916857	CYCLIST1 (Age 18)SBD on SH 1S hit CAR2 merging from the left	CAR2 alcohol test below limit, failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	M
1S/704/2.282 SBD	15	N		STUART ST	201372612	30/09/2013	Mon	1330	MO	CS1V	423A	M	R	D	B	F			C	50	0	0	0			1406612	4916798	CAR1 SBD on SH 1S hit Parked Vehicle while manoeuvring	CAR1 wrong pedal	N
1S/704/2.285 NBD	30	N		STUART ST	201072007	1/07/2010	Thu	1334	FA	CN1C	330A 331A		R	D	B	F	X	T	C	50	0	0	0			1406499	4916855	CAR1 NBD on SH 1S hit rear end of CAR2 stopped/moving slowly	CAR1 inattentive, failed to notice car slowing	N
1S/704/2.295 NBD	20	N		STUART ST	201170518	12/02/2011	Sat	1015	MO	CN1C	357A 371A 926		E	D	B	F	D	N	N	50	0	0	0			1406496	4916846	CAR1 NBD on SH 1S hit CAR2 manoeuvring	CAR1 emotionally upset/road rage, didnt see/look behind when reversing/manoeuvering ENV: entering or leaving car parking building / area	N
1S/704/2.315			I	STUART ST	201171413	14/05/2011	Sat	630	HA	CE2V	101A 112A 322A		R	D	TO	F	X	T	C	50	0	0	0			1406489	4916827	CAR1 EBD on STUART ST hit VAN2 crossing at right angle from right	CAR1 alcohol suspected, too fast on straight, did not stop at steady red light	N
1S/704/2.315 NBD			I	STUART ST	201221776	19/02/2012	Sun	1609	FE	CN1C	331A 351A		R	D	O	F	X	T	C	50	0	0	2			1406489	4916827	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for signals	CAR1 failed to notice car slowing, attention diverted by passengers	M
1S/704/2.315			I	STUART ST	201023348	28/11/2010	Sun	522	HA	CE2C	322A 330A		R	D	TO	F	X	T	C	50	0	0	1			1406489	4916827	CAR1 EBD on STUART ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, inattentive	M
STUART ST			I	CUMBERLAND ST CENTRAL	201270254	2/02/2012	Thu	1440	GA	CE1C	181A		R	D	B	F	X	T	C	50	0	0	0			1406489	4916827	CAR1 EBD on STUART ST hit rear of left turning CAR2	CAR1 following too closely	N
STUART ST			I	1S/704/2.315 NBD	201170389	7/02/2011	Mon	1730	HA	CN1C	322A 330A 412A 322B 330B		R	W	O	L	X	T	C	50	0	0	0			1406489	4916827	CAR1 NBD on STUART ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, inattentive, fatigue due to lack of sleep CAR2 did not stop at steady red light, inattentive	N
STUART ST			I	1S/704/2.315	201171221	15/04/2011	Fri	920	LB	CE14	303B 375B		R	W	O	L	X	T	C	50	0	0	0			1406489	4916827	SUV2 turning right hit by oncoming CAR1 EBD on STUART ST	SUV2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	N
STUART ST			I	1S/704/2.315	201371359	30/05/2013	Thu	1217	NF	CE1K	307A		R	D	B	F	X	T	C	50	0	0	0			1406489	4916827	CAR1 EBD on STUART ST turning right hit PEDESTRIAN crossing SH 1S CUMBERLAND ST CENTR from left	CAR1 failed to give way when turning at signals to ped	N
1S/706/0 NBD			I	STUART ST	201021204	5/02/2010	Fri	1950	GC	VN1C	103B 171B 330B 381B		R	D	B	F	X	T	C	50	0	0	1			1406489	4916827	VAN1 NBD on SH 1S hit rear of CAR2 turning right from left side	CAR2 alcohol test above limit or test refused, turned right from incorrect lane, inattentive, misjudged speed, etc of vehicle coming from behind or alongside	M
1S/706/0 NBD			I	STUART ST	201272525	6/07/2012	Fri	1723	AA	CN1C	372A	P	R	D	TO	F	X	T	C	50	0	0	0			1406489	4916827	CAR1 NBD on SH 1S changing lanes/overtaking to right hit CAR2 CAR1 hit Post Or Pole	CAR1 didnt see/look behind when changing lanes, position or direction	N
1S/706/0 NBD			I	STUART ST	201172899	2/10/2011	Sun	1320	GF	CN1C	372A		E	D	B	F	X	T	C	50	0	0	0			1406489	4916827	CAR1 and CAR2 both NBD on SH 1S and turning; collided	CAR1 didnt see/look behind when changing lanes, position or direction	N
1S/706/0 NBD			I	STUART ST	2971117	9/04/2009	Thu	1723	FE	CN1C	181A 331A		R	D	O	F	X	T	C	50	0	0	0			1406489	4916827	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing	N
1S/706/0 SBD			I	STUART ST	2970770	11/03/2009	Wed	803	FE	CS1V	181A 331A		R	W	O	H	X	T	C	50	0	0	0			1406607	4916784	CAR1 SBD on SH 1S hit rear end of VAN2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing	N
1S/706/0 NBD			I	STUART ST	201321110	29/01/2013	Tue	2250	HA	CN1C	102A 322B 334B		R	D	DO	F	X	T	C	50	0	0	1			1406489	4916827	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 alcohol test below limit CAR2 did not stop at steady red light, failed to notice traffic lights	M
1S/706/0 NBD			I	STUART ST	201021929	11/05/2010	Tue	1815	HA	CN1CC	322B 379B	MX	R	D	TO	F	X	T	C	50	0	0	1			1406489	4916827	CAR1 NBD on SH 1S hit CAR2 crossing at right angle from right, CAR1 hit Parked Vehicle, Other	CAR2 did not stop at steady red light, didnt see/look when first in queue on receiving green light	M
1S/706/0			I	STUART ST	201371203	30/04/2013	Tue	1900	LB	CE1V	303B		R	D	DO	F	X	T	C	50	0	0	0			1406489	4916827	VAN2 turning right hit by oncoming CAR1 EBD on SH 1S	VAN2 failed to give way when turning to non-turning traffic	N
1S/706/0 NBD			I	STUART ST	201021817	27/05/2010	Thu	840	GC	CN1X	171B 330B		R	W	O	L	X	T	C	50	0	0	1			1406489	4916827	CAR1 NBD on SH 1S hit rear of TAXI2 turning right from left side	TAXI2 turned right from incorrect lane, inattentive	M
1S/706/0 NBD			I	STUART ST	201321732	13/05/2013	Mon	845	FD	TN1CC(	181A 331A 352A		R	D	O	F	X	T	C	50	0	0	4			1406489	4916827	TRUCK1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	TRUCK1 following too closely, failed to notice car slowing, attention diverted by scenery or persons outside vehicle	M
1S/706/0 SBD			I	STUART ST	201171890	9/06/2011	Thu	1950	FE	CS1V	331A 352A		R	D	DO	F	T	T	C	50	0	0	0			1406607	4916784	CAR1 SBD on SH 1S CASTLE hit rear end of VAN2 stop/slow for signals	CAR1 failed to notice car slowing, attention diverted by scenery or persons outside vehicle	N
1S/706/0			I	STUART ST	201322068	17/06/2013	Mon	750	NF	VE2E	307A		E	W	DO	H	T	T	C	50	0	1	0	31		1406607	4916784	VAN1 EBD on STUART ST turning right hit PEDESTRIAN crossing SH 1S CASTLE ST from left	VAN1 failed to give way when turning at signals to ped	H

ROAD	DIST	FROM	INTN	SIDE	IDNO	DATE	DYWK	TIME	MVMT	VEHS	CSCD	OBJS	CURV	SURF	LITE	WTHR	JNTY	TRAF	MARK	SPDL	NFAT	NSER	NMIN	PEDA	CYCA	EAST	NORTH	MVMT DESCR	CAUSES	SEV
1S/706/0 SBD			I	STUART ST	201172808	20/09/2011	Tue	915	FE	4S1C	420A		R	D	B	F	T	T	C	50	0	0	0			1406607	4916784	SUV1 SBD on SH 1S CASTLE ST hit rear end of CAR2 stop/slow for signals	SUV1 incorrect use of vehicle controls	N
STUART ST			I	1S/706/0	201222437	28/08/2012	Tue	2012	LB	ME1C	303B		R	D	DO	F	X	T	C	50	0	1	0			1406607	4916784	CAR2 turning right hit by oncoming MOTOR CYCLE1 EBD on STUART ST	CAR2 failed to give way when turning to non-turning traffic	H
STUART ST			I	1S/706/0	201170382	15/03/2011	Tue	225	DC	CE1	103A 335A 402A 901	P	R	W	DO	H	X	T	C	50	0	0	0			1406607	4916784	CAR1 EBD on STUART ST missed inters or end of road, CAR1 hit Post Or Pole	CAR1 alcohol test above limit or test refused, inattentive: failed to notice intersection or its stop/give way control, new driver showed inexperience ENV: heavy rain	N
STUART ST			I	1S/706/0	201171451	5/05/2011	Thu	2355	EA	CW1C	129A 904	M	R	W	DO	M	T	T	C	50	0	0	0			1406607	4916784	CAR1 WBD on STUART ST hit parked veh, CAR1 hit Parked Vehicle	CAR1 too far left/right ENV: fog or mist	N
1S/706/0.015 NBD	15	S		STUART ST	201355790	1/12/2013	Sun	1410	EC	TN1	385A	H	R	D	B	F			C	50	0	0	0			1406485	4916812	TRUCK1 NBD on SH 1S hit obstruction, TRUCK1 hit House Or Bldg	TRUCK1 misjudged size or position of fixed object or obstacle	N
1S/706/0.02 NBD	20	S		STUART ST	201370839	16/02/2013	Sat	1305	FD	CN1C	181A 331A 351A		R	D	B	F			C	50	0	0	0			1406483	4916808	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing, attention diverted by passengers	N
1S/706/0.03 NBD	30	S		STUART ST	201173221	26/10/2011	Wed	831	AC	TN1C	691A		R	D	O	F			C	50	0	0	0			1406480	4916798	TRUCK1 NBD on SH 1S changing lanes to left hit CAR2	TRUCK1 emergency vehicle attending emergency	N
1S/706/0.06 NBD	60	S		STUART ST	201221416	10/03/2012	Sat	1645	EE	SN1C	350B 374B	M	R	D	O	F			C	50	0	0	1		23	1406471	4916770	CAR2 NBD on SH 1S opened door into path of another party, CYCLIST1 hit Parked Vehicle	CAR2 attention diverted, didnt see/look behind when opening door or leaving vehicle	M
1S/706/0.1 NBD	100	S		STUART ST	201172320	3/09/2011	Sat	1230	FA	CN1C	181A 331A		R	D	B	F			C	50	0	0	0			1406459	4916732	CAR1 NBD on SH 1S hit rear end of CAR2 stopped/moving slowly	CAR1 following too closely, failed to notice car slowing	N
1S/706/0.1 NBD	100	S		STUART ST	2974187	30/11/2009	Mon	1540	FD	CN1CC	181A 331A 181B 331B		R	D	O	F			C	50	0	0	0			1406458	4916732	CAR1 NBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing CAR2 following too closely, failed to notice car slowing	N
1S/706/0.13 NBD	130	S		STUART ST	201173642	10/12/2011	Sat	1500	AC	CN1C	372A		R	D	B	F			C	50	0	0	0			1406449	4916703	CAR1 NBD on SH 1S changing lanes to left hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction	N
1S/706/0.14 NBD	140	S		STUART ST	201122342	24/08/2011	Wed	820	FA	CN1C	112A 181A 330A		R	D	B	F			C	50	0	0	1			1406446	4916693	CAR1 NBD on SH 1S hit rear end of CAR2 stopped/moving slowly	CAR1 too fast on straight, following too closely, inattentive	M
1S/706/0.171 SBD	30	N		DUNBAR ST	201170470	4/03/2011	Fri	2300	DB	CS1	103A 111A 431A	P	E	D	DO	F			C	50	0	0	0			1406500	4916662	CAR1 SBD on SH 1S lost control turning left, CAR1 hit Post Or Pole	CAR1 alcohol test above limit or test refused, too fast entering corner, showing off racing	N
1S/706/0.19 NBD	110	N		BURLINGTON ST	201223447	17/11/2012	Sat	920	NF	CN1E	341A 353A 927		M	D	O	L			C	50	0	1	0	68		1406431	4916646	CAR1 NBD on SH 1S turning right hit PEDESTRIAN crossing BURLINGTON ST from left	CAR1 obstruction on roadway, attention diverted by other traffic ENV: entering or leaving other commercial	H
1S/706/0.2	100	E		BURLINGTON ST	201071130	11/04/2010	Sun	40	DB	CE1C	103A 131A 524A		M	D	DO	F			C	50	0	0	0			1406427	4916637	CAR1 EBD on SH 1S lost control turning left	CAR1 alcohol test above limit or test refused, lost control when turning, interferred with driver	N
DUNBAR ST			I	HIGH ST	201370680	20/03/2013	Wed	1330	FB	CS1V	181A 331A		R	D	B	F	T	G	N	50	0	0	0			1406474	4916647	CAR1 SBD on DUNBAR ST hit rear end of VAN2 stop/slow for cross traffic	CAR1 following too closely, failed to notice car slowing	N
DUNBAR ST			I	HIGH ST	201070991	25/03/2010	Thu	1535	FB	XS1C	331A 386A		R	D	O	F	T	G	N	50	0	0	0			1406475	4916648	TAXI1 SBD on DUNBAR ST hit rear end of CAR2 stop/slow for cross traffic	TAXI1 failed to notice car slowing, misjudged speed of own vehicle	N
DUNBAR ST			I	1S/706/0.201 SBD	201172217	24/07/2011	Sun	1230	FB	CS1C	181A 331A		R	W	B	F	T	G	N	50	0	0	0			1406474	4916647	CAR1 SBD on DUNBAR ST hit rear end of CAR2 stop/slow for cross traffic	CAR1 following too closely, failed to notice car slowing	N
DUNBAR ST			I	1S/706/0.201 SBD	201222672	7/09/2012	Fri	1055	FD	4S1V	181A 387A		R	D	B	F	T	G	C	50	0	0	1			1406474	4916647	SUV1 SBD on DUNBAR ST hit rear end of VAN2 stop/slow for queue	SUV1 following too closely, misjudged intentions of another party	M
1S/706/0.201			I	DUNBAR ST	201321304	11/03/2013	Mon	2305	HA	CW1C	302B 377B		E	D	DO	F	T	G	C	50	0	0	2			1406474	4916647	CAR1 WBD on SH 1S hit CAR2 crossing at right angle from right	CAR2 failed to give way at give way sign, didnt see/look when visibility obstructed by other vehicles	M
1S/706/0.201 SBD			I	DUNBAR ST	201122277	17/07/2011	Sun	1012	KB	CS1C	302B 330B 386B		R	D	O	F	T	G	C	50	0	0	1			1406474	4916647	CAR1 SBD on SH 1S CASTLE ST hit CAR2 merging from the right	CAR2 failed to give way at give way sign, inattentive, misjudged speed of own vehicle	M
1S/706/0.259 SBD	90	N		BURLINGTON ST	2922814	19/09/2009	Sat	450	DB	CS1	102A 111A 131A 431A	P	M	D	DO	F			C	50	0	2	0			1406429	4916614	CAR1 SBD on SH 1S lost control turning left, CAR1 hit Post Or Pole	CAR1 alcohol test below limit, too fast entering corner, lost control when turning, showing off racing	H
SH 1S CUMBERLAND S			I	ST ANDREW ST	2971009	18/03/2009	Wed	1441	FE	CW2T	420A 507A		R	W	O	L	X	T	C	50	0	0	0			1406590	4917106	CAR1 WBD on ST ANDREW ST hit rear end of TRUCK2 stop/slow for signals	CAR1 incorrect use of vehicle controls, impared ability due to old age	N
SH 1S CUMBERLAND S			I	ST ANDREW ST	201072804	10/09/2010	Fri	2326	HA	CE2C	322A		R	D	DO	F	X	T	C	50	0	0	0			1406590	4917106	CAR1 EBD on ST ANDREW ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	N
88/0/0.11	10	W		SH 1S CASTLE ST	201070931	7/04/2010	Wed	1250	GD	CE1CC	181A 331A 181B		R	D	B	F	X	T	C	50	0	0	0			1406693	4917068	CAR1 EBD on SH 88 hit rear of CAR2 turning right from centre line	CAR1 following too closely, failed to notice car slowing CAR2 following too closely	N
SH 1S CASTLE			I	ST ANDREW ST	2921178	5/02/2009	Thu	652	HA	CW2C	322A 334A 322B 334B		R	D	B	F	X	T	C	50	0	0	1			1406703	4917065	CAR1 WBD on ST ANDREW ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights CAR2 did not stop at steady red light, failed to notice traffic lights	M
SH 1S CASTLE ST			I	ST ANDREW ST	201121722	2/05/2011	Mon	840	HA	CW24	322B 351B		R	D	O	F	X	T	C	50	0	0	1			1406703	4917065	CAR1 WBD on ST ANDREW ST hit SUV2 crossing at right angle from right	SUV2 did not stop at steady red light, attention diverted by passengers	M
SH 1S CASTLE ST			I	ST ANDREWS ST	201172539	8/08/2011	Mon	1122	HA	CW2C	322A 334A		R	W	O	M	X	T	C	50	0	0	0			1406703	4917065	CAR1 WBD on ST ANDREWS ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	N
SH 1S CASTLE ST			I	ST ANDREWS ST	201071146	13/04/2010	Tue	1915	LB	VW2C	101A 303B 387B		R	W	DO	F	X	T	C	50	0	0	0			1406703	4917065	CAR2 turning right hit by oncoming VAN1 WBD on ST ANDREWS ST	VAN1 alcohol suspected CAR2 failed to give way when turning to non-turning traffic, misjudged intentions of another party	N
88/0/0.12			I	CASTLE ST	201022349	30/07/2010	Fri	2003	HA	CW1C	322A 334A 322B 334B	P	R	D	DO	F	X	T	C	50	0	0	1			1406703	4917065	CAR1 WBD on SH 88 hit CAR2 crossing at right angle from right, CAR1 hit Post Or Pole	CAR1 did not stop at steady red light, failed to notice traffic lights CAR2 did not stop at steady red light, failed to notice traffic lights	M
88/0/0.12			I	CASTLE ST	2974069	12/11/2009	Thu	1714	LB	VW1C	303A 314A 324B 330B		R	D	O	F	X	T	C	50	0	0	0			1406703	4917065	CAR2 turning right hit by oncoming VAN1 WBD on SH 88	VAN1 failed to give way when turning to non-turning traffic, failed to give way when waved through by other driver CAR2 did not stop at steady amber light, inattentive	N
88/0/0.12			I	SH 1S CASTLE ST	201272368	23/08/2012	Thu	1645	LB	CW1C	303B		R	D	B	F	X	T	C	50	0	0	0			1406703	4917065	CAR2 turning right hit by oncoming CAR1 WBD on SH 88	CAR2 failed to give way when turning to non-turning traffic	N
88/0/0.12			I	SH 1S CASTLE ST	201170349	22/02/2011	Tue	935	HA	CW1C	322A 334A		R	W	O	L	X	T	C	50	0	0	0			1406703	4917065	CAR1 WBD on SH 88 hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	N
88/0/0.12			I	SH 1S CASTLE ST	201070874	3/04/2010	Sat	1400	AA	BE1C	671A 173B		R	D	O	F	X	T	C	50	0	0	0			1406703	4917065	BUS1 EBD on SH 88 changing lanes/overtaking to right hit CAR2	BUS1 blind spot CAR2 travelled straight ahead from turning lane or flush median	N
88/0/0.12			I	SH 1S CASTLE ST	201222479	5/09/2012	Wed	2255	LB	CW1C	303B		R	D	DO	F	X	T	C	50	0	0	1			1406703	4917065	CAR2 turning right hit by oncoming CAR1 WBD on SH 88	CAR2 failed to give way when turning to non-turning traffic	M
88/0/0.12			I	SH 1S CASTLE ST	201270789	9/03/2012	Fri	1111	FE	TW1C	181A 387A		R	D	B	F	X	T	C	50	0	0	0			1406703	4917065	TRUCK1 WBD on SH 88 ST ANDREW ST hit rear end of CAR2 stop/slow for signals	TRUCK1 following too closely, misjudged intentions of another party	N
88/0/0.14	20	E		CASTLE ST	201073768	1/11/2010	Mon	855	AC	CW1V	372A		R	D	B	F			C	50	0	0	0			1406722	4917059	CAR1 WBD on SH 88 changing lanes to left hit VAN2	CAR1 didnt see/look behind when changing lanes, position or direction	N
88/0/0.15	30	E		SH 1S	201221582	17/04/2012	Tue	1550	FD	CE1C	331A 352A		R	D	B	F			C	50	0	0	1			1406731	4917055	CAR1 EBD on SH 88 hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing, attention diverted by scenery or persons outside vehicle	M
88/0/0.15	30	E		SH 1S CASTLE ST	201222439	27/08/2012	Mon	1513	FD	CE1CC(	181A 331A 181B 181C		R	D	O	F			R	50	0	0	2			1406731	4917055	CAR1 EBD on SH 88 hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing CAR2 following too closely CAR3 following too closely	M

Pedestrians

	09-13	10-14
F	1	1
S	8	11
M	14	16
N	5	6
T	28	34
L	2.7	km

09-13 8.5 Pedestrian injury crashes/kn > 3 inj/km :. Method A is suitable.
10-14 10.4 Pedestrian injury crashes/kn > 3 inj/km :. Method A is suitable.

Cyclists

	09-13	10-14
F	2	2
S	4	2
M	6	9
N	1	1
T	13	14
L	2.7	km

09-13 4.4 cyclist injury crashes/km > 3 inj/km :. Method A is suitable.
10-14 4.8 cyclist injury crashes/km > 3 inj/km :. Method A is suitable.

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 1 - Evaluation summary

Worksheet 1 provides a summary of the general data used for the evaluation as well as the results of the analysis. The information required is a subset of the information required for assessment in terms of the NZTA's *Planning and Investment Knowledge Base* .

1	Evaluator(s)	Kelly Blackie (MWH) & Dhimantha Ranatunga (MWH)		
	Reviewer(s)	Prasad Tala (MWH)		
2	Activity details			
	Approved organisation name	NZTA		
	Activity name	Dunedin One Way Separated Cycle Lanes (SCL)		
	Your reference	80507429		
	Activity description	**Option 2: Construction of a bi-directional SCLon Cumberland St**		
	Describe the issues to be addressed	Improve the safety of commuter and recreational cyclists		
3	Location			
	Brief description of location	SH1 Dunedin, one-way pair, 01S RP 704/0.0 to RP 706/0.44		
4	Alternatives and options			
	Describe the do-minimum	Retain existing on-road cycle lanes		
	Summarise the options assessed	Option 1: Uni-directional SCL, Option 2: Bi-directional SCL		
5	Timing			
	Time zero (assumed construction start date)	1 July	2016	
	Expected duration of construction (months)		12	
	Period of analysis		40	
6	Economic efficiency			
	Date economic evaluation completed (mm/yyyy)		Feb-15	
	Base date for costs and benefits	1 July	2014	
	Land designation required		no	
7	Data (only fill the applicable data)			
	Existing pedestrian/cycling volumes		363	AADT in year 2014
	Estimated new pedestrian/cyclist volume	(from WS SP11-7)	215	AADT
	Estimated motor vehicle volumes		9,200-15,050 per direction	AADT
	Estimated motor vehicle speed		45.00	km/h
	Pedestrian/cyclist growth rate		4.0	%
	Width available for walking/cycling before		2.40	m
	Width available for walking/cycling after		2.60	m
	Length walked/cycled after works		2.70	km
	Length walked/cycled before works		2.70	km
	Expected reduction in private vehicle travel			km per year
8	PV cost of do-minimum		$ 4,370,486	**A**
9	PV cost of the preferred option		$ 8,439,963	**B**

10	Benefit values from worksheet 4, 5, 6					
	PV travel time cost savings	$ 1,467,050	**C** x Update factor TTC	1.42	= $ 2,083,211	**X**
	PV facility benefits	$ 7,378,211	**D** x Update factor WCB	1.14	= $ 8,411,160	**Y**
	PV crash cost savings	$ 3,338,625	**E** x Update factor AC	1.24	= $ 4,139,895	**Z**

11 $$BCR_N = \frac{\text{PV net benefits}}{\text{PV economic costs}} = \frac{X + Y + Z}{B - A} = \frac{14,634,266}{4,069,476} = 3.6$$

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 2 - Cost of do-minimum

Worksheet 2 is used for calculating the PV cost of the do-minimum. The do-minimum is the minimum level of expenditure necessary to keep a facility open and generally consists of maintenance work.

1 Historic maintenance cost data (indicate whether assessed or actual)

Maintenance costs for the site over last three years

Year 1	2013	Actual	$	29,314
Year 2	2014	Actual	$	61,803
Year 3	2015	Actual	$	128,846
Maintenance costs for the site this year	2016	Assessed	$	73,321
Future annual maintenance costs		Assessed	$	0

2 PV of annual maintenance and inspection costs following the work

Annual cost = $ 1,000 x 15.49 = $ 15,490 **(a)**

3 PV of periodic maintenance costs (including any capital work)

Time zero — 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present value
	THSRA (14/15)	39,360		
	AC (15/16)	72,416		
1	UTA/AC/THSRA (16/17)	634,144	0.94	598,249
2	UTA/AC (17/18)	361,472	0.89	321,709
3	AC (18/19)	87,392	0.84	73,376
4	AC (19/20)	133,984	0.79	106,128
6	AC (21/22/23)	205,312	0.70	144,737
8	AC(23/24/25)	753,440	0.63	472,718
10	THSRA (25/26)	52,160	0.56	29,126
15	AC Reseal	1,456,000	0.42	607,538
23	Rehab	1,820,000	0.26	476,471
31	AC Reseal	1,456,000	0.16	239,155
39	AC Reseal	1,456,000	0.10	150,049

Sum of PV of periodic maintenance $ 3,219,255 **(b)**

4 PV of annual operating costs

Annual cost = $ 73,321 x 15.49 = $ 1,135,741 **(c)**

5 PV cost of the do-minimum

(a) + **(b)** + **(C)** = $ 4,370,486 **A**

Transfer the PV cost of do minimum **A**, to **A** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 3 - Cost of the option(s)

Worksheet 3 is used for calculating the PV cost of the walking or cycling facility.

1 PV of estimated cost of proposed work (as per attached estimate sheet)

$ 5,584,789 x 0.94 = $ 5,249,702 **(a)**

2 PV of maintenance in year 1 $ 1,000 **(b)**

3 PV of annual maintenance costs following the work

(years 2 to 40 inclusive) $ 1,000 x 14.52 = $ 14,520 **(c)**

4 PV of periodic maintenance costs

Time zero 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present Value
10	Reseal	1,456,000	0.56	813,023
18	Reseal	1,456,000	0.35	510,101
26	Reseal	1,456,000	0.22	320,043
34	Reseal	1,456,000	0.14	200,799
42	Rehab		0.09	0

Sum of PV of periodic maintenance costs = $ 1,843,966 **(d)**

5 PV cost of additional annual maintenance

$ 91,651 x 14.52 = $ 1,330,775 **(e)**

6 PV of total cost of option

PV total costs **(a)** + **(b)** + **(c)** + **(d)** + **(e)** = $ 8,439,963 **B**

Transfer the PV total cost for the preferred option **B**, to **B** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 3 - Cost of the option(s)

Worksheet 3 is used for calculating the PV cost of the walking or cycling facility.

1 PV of estimated cost of proposed work (as per attached estimate sheet)

$ 4,885,719 x 0.94 = $ 4,592,576 **(a)**

2 PV of maintenance in year 1 $ 1,000 **(b)**

3 PV of annual maintenance costs following the work

(years 2 to 40 inclusive) $ 1,000 x 14.52 = $ 14,520 **(c)**

4 PV of periodic maintenance costs

Time zero 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present Value
10	Reseal	1,456,000	0.56	813,023
18	Reseal	1,456,000	0.35	510,101
26	Reseal	1,456,000	0.22	320,043
34	Reseal	1,456,000	0.14	200,799
42	Rehab		0.09	0

Sum of PV of periodic maintenance costs = $ 1,843,966 **(d)**

5 PV cost of additional annual maintenance

$ 91,651 x 14.52 = $ 1,330,775 **(e)**

6 PV of total cost of option

PV total costs **(a)** + **(b)** + **(c)** + **(d)** + **(e)** = $ 7,782,837 **B**

Transfer the PV total cost for the preferred option **B**, to **B** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 3 - Cost of the option(s)

Worksheet 3 is used for calculating the PV cost of the walking or cycling facility.

1 PV of estimated cost of proposed work (as per attached estimate sheet)

$ 7,497,179 x 0.94 = $ 7,047,348 **(a)**

2 PV of maintenance in year 1 $ 1,000 **(b)**

3 PV of annual maintenance costs following the work

(years 2 to 40 inclusive) $ 1,000 x 14.52 = $ 14,520 **(c)**

4 PV of periodic maintenance costs

Time zero 1st July in the year 2016

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount $	SPPWF	Present Value
10	Reseal	1,456,000	0.56	813,023
18	Reseal	1,456,000	0.35	510,101
26	Reseal	1,456,000	0.22	320,043
34	Reseal	1,456,000	0.14	200,799
42	Rehab		0.09	0

Sum of PV of periodic maintenance costs = $ 1,843,966 **(d)**

5 PV cost of additional annual maintenance

$ 91,651 x 14.52 = $ 1,330,775 **(e)**

6 PV of total cost of option

PV total costs **(a)** + **(b)** + **(c)** + **(d)** + **(e)** = $ 10,237,609 **B**

Transfer the PV total cost for the preferred option **B**, to **B** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 4 - Travel time cost savings

Worksheet 4 is used for calculating pedestrian and cyclist travel time cost savings.

1 Road category (Select) — Urban arterial

2 Travel time data

Walkers and/or cyclists average annual daily traffic current (AADT) (or volumes affected by the improvement)		363
Walking or Cycling growth rate (per annum)		4.0%
Travel time cost (TTC)	(Table 4.1b)	$ 7.80

	Do-minimum		Option	
Length of route (km)	L^{dm}	2.70	L^{opt}	2.70
Mean speed	VS^{dm}	15.00	VS^{opt}	22.00
Relative attractiveness	(Table SP11.1)			1.05

3 Annual TTC for the do-minimum

$$\frac{AADT \times 365 \times L^{dm} \times TTC}{VS^{dm}} = \$ \ 185{,}988 \quad \textbf{(a)}$$

4 Annual TTC for the option

$$\frac{AADT \times 365 \times L^{opt} \times TTC}{VS^{opt} \times RA} = \$ \ 120{,}470 \quad \textbf{(b)}$$

5 Value of annual TTC savings **(a) - (b)** = $ 65,519 **(c)**

6 PV of travel time cost savings DF 22.39 **(c)** x DF = $ 1,467,050 **C**

Transfer the PV of travel time cost savings for the preferred option **C**, to **C** on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-

Worksheet 5 - Benefits for walking and cycling facilities

Worksheet 5 is used to calculate the walking and cycling facility benefits for the various options. Only one category for walking and one category for cycling may be used in an evaluation of a proposal. If an activity contains more categories, they must be submitted as separate evaluations.

Activities that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional crash costs these must be accounted for in worksheet 6. Make sure the estimates of the new number of pedestrians and/or cyclists generated by the facility are realistic.

Required information:
L Length of new facility in kilometres
NPD Number of additional pedestrians per day
NTD Number of additional cycle trips per day
NSD Number of additional and existing cycle trips per day
DF Discount factor. The discount factor may differ by mode depending on the growth rate

Health and environment benefits for walking facility

Pedestrian growth rate (per annum) 0.04%

1 Health and environment benefits for footpaths and other pedestrian facilities

Benefit = number of additional pedestrians/day x length of new facility in km x 365 x $2.70

L	2.70	x NPD		x 365 x $2.70 x DF	14.61	= $	0 **(a)**

2 Health and environment benefits from improvements at hazardous sites (provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

Benefit = number of additional pedestrians/day x 365 x $2.70

NPD		x 365 x $2.70 x DF	14.61	= $	0 **(b)**

Transfer total **(a)** or **(b)** to **D** on worksheet 1.

Health and environment benefits for cycling facility

Cyclist growth rate (per annum) 4.0%

3 Health and environment benefits for cycle lanes, cycleways or increased road shoulder widths

Benefit = number of additional cycle trips/day x length of new facility in km x 365 x $1.40

L	2.70	x NTD	215	x 365 x $1.40 x DF	22.39	= $	6,640,390 **(c)**

4 Health and environment benefits from improvements at hazardous sites (provision of overbridges, underpasses, bridge widening or intersection improvements for cyclists)

Benefit = number of additional cycle trips/day x 365 x $4.20

NTD	215	x 365 x $4.20 x DF	22.39	= $	7,378,211 **(d)**

Transfer total **(c)** or **(d)** to **D** on worksheet 1.

Safety benefits for cycling facility

5 Safety benefit for cycle lanes, cycleways or increased road shoulder widths in the absence of a specific crash analysis

Benefit = number of new and existing cycle trips/day x length of new facility in km x 365 x $0.05

L	2.70	x NSD	363	x 365 x $0.05 x DF	22.39	= $	400,435 **(e)**

6 Safety benefit from improvements at hazardous sites in the absence of a specific crash analysis (provision of overbridges, underpasses, bridge widening or intersection improvements for cyclists)

Benefit = number of new and existing cycle trips/day x 365 x $0.15

NSD	578	x 365 x $0.15 x DF	22.39	= $	708,436 **(f)**

Transfer total **(e)** or **(f)** to **E** on worksheet 1.

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Hit object	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity				
		Fatal	Serious	Minor	Non- injury	
3	Number of years of typical crash rate records	5				
4	Number of reported crashes over period	1	1	2	0	
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.04	0.96	1	1	
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.08	1.92	2	0	
7	Crashes per year = **(6)**/**(3)**	0.02	0.38	0.40	0.00	
8	Adjustment factor for crash trend (table A6.1(a))	0.83				
9	Adjusted crashes per year = **(7)** x **(8)**	0.013	0.319	0.332	0.000	
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7	
11	Total estimated crashes per year = **(9)** x **(10)**	0.013	0.478	0.913	0.000	
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
14	Mean speed adjustment = ((**1**) - 50)/50	-0.1				
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980	
16	Crash cost per year = **(11)** x **(15)**	41,168	152,508	14,425	-	
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$208,101				
	Option					
18	Percentage crash reduction	70	70	70	70	
19	Percentage of crashes 'remaining' [100 - **(18)**]	30	30	30	30	
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.14	0.27	0.00	
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
23	Mean speed adjustment = ((**2**) - 50)/50	-0.1				
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980	
25	Crash cost per year = **(20)** x **(24)**	12,350	45,752	4,328	-	
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$62,430				
27	Annual crash cost savings = **(17)** - **(26)**	$145,671				
28	PV crash cost savings = **(27)** x DF	$1,247,192				**E**
	Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1					

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Crossing, turning	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity				
		Fatal	Serious	Minor	Non- injury	
3	Number of years of typical crash rate records	5				
4	Number of reported crashes over period	1	1	2	1	
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.03	0.97	1	1	
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.06	1.94	2	1	
7	Crashes per year = **(6)**/**(3)**	0.01	0.39	0.40	0.20	
8	Adjustment factor for crash trend (table A6.1(a))	0.83				
9	Adjusted crashes per year = **(7)** x **(8)**	0.010	0.322	0.332	0.166	
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7	
11	Total estimated crashes per year = **(9)** x **(10)**	0.010	0.483	0.913	1.162	
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1				
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980	
16	Crash cost per year = **(11)** x **(15)**	30,876	154,096	14,425	1,139	
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$200,536				
	Option					
18	Percentage crash reduction	0	0	-30	-30	
19	Percentage of crashes 'remaining' [100 - **(18)**]	100	100	130	130	
20	Predicted crashes per year **(11)** x **(19)**	0.01	0.48	1.19	1.51	
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1				
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980	
25	Crash cost per year = **(20)** x **(24)**	30,876	154,096	18,753	1,480	
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$205,206				
27	Annual crash cost savings = **(17)** - **(26)**	-$4,669				
28	PV crash cost savings = **(27)** x DF	-$39,977				E
	Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1					

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Crossing, direct	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	0	2	0	0
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.07	0.93	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.14	1.86	0	0
7	Crashes per year = **(6)**/**(3)**	0.03	0.37	0.00	0.00
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.023	0.309	0.000	0.000
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.023	0.463	0.000	0.000
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	72,044	147,742	-	-
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$219,786			
	Option				
18	Percentage crash reduction	0	0	-30	-30
19	Percentage of crashes 'remaining' [100 - **(18)**]	100	100	130	130
20	Predicted crashes per year **(11)** x **(19)**	0.02	0.46	0.00	0.00
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	72,044	147,742	-	-
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$219,786			
27	Annual crash cost savings = **(17)** - **(26)**	$0			
28	PV crash cost savings = **(27)** x DF	$0			E

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Rear end, slow vehicle	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	0	0	1	0
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.06	0.94	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0	0	1	0
7	Crashes per year = **(6)**/**(3)**	0.00	0.00	0.20	0.00
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.000	0.000	0.166	0.000
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.000	0.000	0.457	0.000
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	-	-	7,213	-
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$7,213			
	Option				
18	Percentage crash reduction	0	0	0	0
19	Percentage of crashes 'remaining' [100 - **(18)**]	100	100	100	100
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.00	0.46	0.00
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	-	-	7,213	-
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$7,213			
27	Annual crash cost savings = **(17)** - **(26)**	$0			
28	PV crash cost savings = **(27)** x DF	$0			E

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Lost control off road	Vehicle involvement	Push cycle
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	0	0	1	0
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.11	0.89	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0	0	1	0
7	Crashes per year = **(6)**/**(3)**	0.00	0.00	0.20	0.00
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.000	0.000	0.166	0.000
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.000	0.000	0.457	0.000
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = ((**1**) - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	-	-	7,213	-
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$7,213			
	Option				
18	Percentage crash reduction	0	0	0	0
19	Percentage of crashes 'remaining' [100 - **(18)**]	100	100	100	100
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.00	0.46	0.00
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = ((**2**) - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	-	-	7,213	-
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$7,213			
27	Annual crash cost savings = **(17)** - **(26)**	$0			
28	PV crash cost savings = **(27)** x DF	$0			**E**

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Pedestrian	Vehicle involvement	All vehicles
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity				
		Fatal	Serious	Minor	Non- injury	
3	Number of years of typical crash rate records	5				
4	Number of reported crashes over period	0	4	8	0	
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.1	0.9	1	1	
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.4	3.6	8	0	
7	Crashes per year = **(6)**/**(3)**	0.08	0.72	1.60	0.00	
8	Adjustment factor for crash trend (table A6.1(a))	0.83				
9	Adjusted crashes per year = **(7)** x **(8)**	0.066	0.598	1.328	0.000	
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	4.5	7	
11	Total estimated crashes per year = **(9)** x **(10)**	0.066	0.896	5.976	0.000	
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
14	Mean speed adjustment = ((**1**) - 50)/50	-0.1				
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980	
16	Crash cost per year = **(11)** x **(15)**	205,840	285,952	94,421	-	
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$586,212				
	Option					
18	Percentage crash reduction	25	25	25	25	
19	Percentage of crashes 'remaining' [100 - **(18)**]	75	75	75	75	
20	Predicted crashes per year **(11)** x **(19)**	0.05	0.67	4.48	0.00	
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200	
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000	
23	Mean speed adjustment = ((**2**) - 50)/50	-0.1				
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980	
25	Crash cost per year = **(20)** x **(24)**	154,380	214,464	70,816	-	
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$439,659				
27	Annual crash cost savings = **(17)** - **(26)**	$146,553				
28	PV crash cost savings = **(27)** x DF	$1,254,747				**E**

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Pedestrian	Vehicle involvement	All vehicles
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	1	4	5	4
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.1	0.9	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.5	4.5	5	4
7	Crashes per year = **(6)**/**(3)**	0.10	0.90	1.00	0.80
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.083	0.747	0.830	0.664
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	4.5	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.083	1.121	3.735	4.648
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	257,300	357,440	59,013	4,555
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$678,308			
	Option				
18	Percentage crash reduction	15	15	15	15
19	Percentage of crashes 'remaining' [100 - **(18)**]	85	85	85	85
20	Predicted crashes per year **(11)** x **(19)**	0.07	0.95	3.17	3.95
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	218,705	303,824	50,161	3,872
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$576,561			
27	Annual crash cost savings = **(17)** - **(26)**	$101,746			
28	PV crash cost savings = **(27)** x DF	$871,122			**E**

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.2 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	Pedestrian	Vehicle involvement	All vehicles
1	Do-minimum mean speed	45	Road category	Urban arterial
	Posted speed limit	50	Traffic growth rate	0.00%
2	Option mean speed	45		

	Do-minimum	**Severity**			
		Fatal	**Serious**	**Minor**	**Non- injury**
3	Number of years of typical crash rate records	5			
4	Number of reported crashes over period	0	0	1	1
5	Fatal/serious severity ratio (tables A6.19(a) to (c))	0.1	0.9	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0	0	1	1
7	Crashes per year = **(6)**/**(3)**	0.00	0.00	0.20	0.20
8	Adjustment factor for crash trend (table A6.1(a))	0.83			
9	Adjusted crashes per year = **(7)** x **(8)**	0.000	0.000	0.166	0.166
10	Under-reporting factors (tables A6.20(a) to (b))	1	1.5	4.5	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.000	0.000	0.747	1.162
12	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
13	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
14	Mean speed adjustment = (**(1)** - 50)/50	-0.1			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	3,100,000	319,000	15,800	980
16	Crash cost per year = **(11)** x **(15)**	-	-	11,803	1,139
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$12,941			
	Option				
18	Percentage crash reduction	5	5	5	5
19	Percentage of crashes 'remaining' [100 - **(18)**]	95	95	95	95
20	Predicted crashes per year **(11)** x **(19)**	0.00	0.00	0.71	1.10
21	Crash cost, 100km/h limit (tables A6.21(e) to (h))	3,100,000	330,000	18,000	1,200
22	Crash cost, 50km/h limit (tables A6.21(a) to (d))	3,100,000	320,000	16,000	1,000
23	Mean speed adjustment = (**(2)** - 50)/50	-0.1			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	3,100,000	319,000	15,800	980
25	Crash cost per year = **(20)** x **(24)**	-	-	11,212	1,082
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$12,294			
27	Annual crash cost savings = **(17)** - **(26)**	$647			
28	PV crash cost savings = **(27)** x DF	$5,540.02			**E**

Transfer PV of crash cost savings, E for the preferred option to E on worksheet 1

SP11 Walking and cycling facilities

Spreadsheet v 3 (27-March-14)

Worksheet 7 – Cycle demand

This worksheet is used to calculate cycle demand for a new cycle facility. The new commuters section of the worksheet calculates the total new daily cyclist commuters. The new other section calculates the total daily new other cyclists. Finally the overall new cyclists is devised.

New and Existing cyclists

	Buffers (km)	<0.4	0.4 to <0.8	0.8 to ≤ 1.6
1	Area (km^2)			
2	Density per square kilometre			
3	Population in each buffer **(3)** = **(1)** x **(2)**	8,169	4,989	8,887
4	Total population in all buffers (Sum of **(3)**)	22,045.00		
5	Commute share (single value for all)	2.57%		
6	Likelihood of new cyclist multiplier	1.04	0.54	0.21
7	Row **(7)** = **(3)** x **(6)**	8,495.76	2,694.06	1,866.27
8	Sum of row **(7)**	13,056.09		
9	Cyclist rate **(9)** = (**(5)** x 0.96) + 0.32%	2.79%		
10	Total existing daily cyclists **(10)** = **(4)** x **(9)**	614.69		
11	Total new daily cyclists **(11)** = **(8)** x **(9)**	364.05		

Appendix B – Capital Cost Estimates

Project Estimate - Form C

Project Name: Dunedin One Way SCL Option 1 DBC

SE

Scheme Estimate

Item	Description		Base Estimate	Contingency	Funding Risk
A	**Nett Project Property Cost**		15,000	2,300	3,800
	Investigation and Reporting				
	- Consultancy Fees		Nil	Nil	Nil
	- NZTA-Managed Costs		Nil	Nil	Nil
B	**Total Investigation and Reporting**		Nil	Nil	Nil
	Design and Project Documentation				
	- Consultancy Fees		347,077	52,060	86,800
	- NZTA-Managed Costs		31,000	4,650	7,800
C	**Total Design and Project Documentation**		378,077	56,710	94,600
	Construction				
	MSQA				
	- Consultancy Fees		349,335	52,400	87,300
	- NZTA-Managed Costs		25,000	3,750	6,300
	- Consent Monitoring Fees		10,000	1,500	2,500
	Sub Total Base MSQA		384,335	57,650	96,100
	Physical Works				
D1	Environmental Compliance		50,000	7,500	12,500
D2	Earthworks		50,178	7,500	17,600
D3	Ground Improvements		0	0	0
D4	Drainage		349,238	0	544,490
D5	Pavement and Surfacing		3,370,300	505,500	842,600
D6	Bridges / Structures		0	0	0
D7	Retaining Walls		0	0	0
D8	Traffic Services		1,287,883	193,200	322,000
D9	Service Relocations		562,500	84,400	140,600
D10	Landscaping		12,830	1,900	3,200
D11	Traffic Management and Temporary Works		100,000	15,000	25,000
D12	Preliminary and General		400,000	60,000	100,000
D13	Extraordinary Construction Costs		0	0	200,000
	Sub Total Base Physical Works		6,182,929	875,000	2,207,990
D	**Total Construction & MSQA**		6,567,264	932,650	2,304,090
E	**Project Base Estimate**	(A+B+C+D)	6,960,341		
F	**Contingency** (Assessed / Analysed)		(A+B+C+D)	991,660	
G	**Project Expected Estimate**		(E+F)	7,952,001	
	Project Property Cost Expected Estimate			17,300	
	Investigation and Reporting Expected Estimate			Nil	
	Design and Project Documentation Expected Estimate			434,787	
	Construction Expected Estimate			7,499,914	
H	**Funding Risk** (Assessed / Analysed)			(A+B+C+D)	2,402,490
I	**95th Percentile Project Estimate**			(G+H)	10,354,491
	Project Property Cost 95th Percentile Estimate				21,100
	Investigation and Reporting 95th Percentile Estimate				Nil
	Design and Project Documentation 95th Percentile Estimate				529,387
	Construction 95th Percentile Estimate				9,804,004

Base Date of Estimate	19 Feb 2015	**Cost Index**
Estimate prepared by:	MH	**Signed**
Estimate internal peer review by:	AI	**Signed**
Estimate external peer review by:		**Signed**
Estimate approved by NZTA Project Manager:		**Signed**

Note: (1) These estimates are exclusive of escalation and GST.
(2) I&R Project Phase Estimates are set to Nil as these are now sunk costs.

Project Estimate - Form C

Project Name: Dunedin One Way SCL Option 2
DBC

SE

Scheme Estimate

Item	Description	Base Estimate	Contingency	Funding Risk
A	**Nett Project Property Cost**	15,000	2,300	3,800
	Investigation and Reporting			
	- Consultancy Fees	Nil	Nil	Nil
	- NZTA-Managed Costs	Nil	Nil	Nil
B	**Total Investigation and Reporting**	Nil	Nil	Nil
	Design and Project Documentation			
	- Consultancy Fees	248,152	37,220	62,000
	- NZTA-Managed Costs	31,000	4,650	7,800
C	**Total Design and Project Documentation**	279,152	41,870	69,800
	Construction			
	MSQA			
	- Consultancy Fees	243,678	36,550	60,900
	- NZTA-Managed Costs	25,000	3,750	6,300
	- Consent Monitoring Fees	10,000	1,500	2,500
	Sub Total Base MSQA	278,678	41,800	69,700
	Physical Works			
D1	Environmental Compliance	30,000	4,500	7,500
D2	Earthworks	26,808	4,000	9,400
D3	Ground Improvements	0	0	0
D4	Drainage	225,538	0	544,490
D5	Pavement and Surfacing	1,825,050	273,800	456,300
D6	Bridges / Structures	0	0	0
D7	Retaining Walls	0	0	0
D8	Traffic Services	883,623	132,500	220,900
D9	Service Relocations	911,250	136,700	227,800
D10	Landscaping	10,621	1,600	2,700
D11	Traffic Management and Temporary Works	100,000	15,000	25,000
D12	Preliminary and General	300,000	45,000	75,000
D13	Extraordinary Construction Costs	0	0	200,000
	Sub Total Base Physical Works	4,312,889	613,100	1,769,090
D	**Total Construction & MSQA**	4,591,567	654,900	1,838,790
E	**Project Base Estimate** (A+B+C+D)	4,885,719		
F	**Contingency** (Assessed / Analysed) (A+B+C+D)		699,070	
G	**Project Expected Estimate** (E+F)		5,584,789	
	Project Property Cost Expected Estimate		17,300	
	Investigation and Reporting Expected Estimate		Nil	
	Design and Project Documentation Expected Estimate		321,022	
	Construction Expected Estimate		5,246,467	
H	**Funding Risk** (Assessed / Analysed) (A+B+C+D)			1,912,390
I	**95th Percentile Project Estimate** (G+H)			7,497,179
	Project Property Cost 95th Percentile Estimate			21,100
	Investigation and Reporting 95th Percentile Estimate			Nil
	Design and Project Documentation 95th Percentile Estimate			390,822
	Construction 95th Percentile Estimate			7,085,257

Base Date of Estimate	19 Feb 2015	**Cost Index**
Estimate prepared by:	MH	**Signed**
Estimate internal peer review by:	AI	**Signed**
Estimate external peer review by:		**Signed**
Estimate approved by NZTA Project Manager:		**Signed**

Note: (1) These estimates are exclusive of escalation and GST.
(2) I&R Project Phase Estimates are set to Nil as these are now sunk costs.

Appendix C – Crash History Information

1.1 Crash History

1.1.1 Crash Data

A review of the NZTA's CAS database over the five-year period from January 2009 to December 2013 revealed a total of 359 crashes (26 high severity crashes resulting in 28 DSi) occurred on SH1 along the approximately 2.5 km project length[1] (RP 704/0.0 to RP 706/0.44).

Of the total reported crashes, only 11% involved pedestrians and cyclists. However, pedestrian and cyclist crashes accounted for approximately 60% of the high severity crashes (15 high severity crashes resulting in 15 DSi). This shows that pedestrians and cyclists are over-represented in high severity crashes along the project length.

An additional fatal injury, five serious injury, 21 minor injury and 36 non-injury crashes have occurred in 2014 to date. Of these crashes, four serious injury, seven minor injury and four non-injury involved pedestrians and cyclists.

The following tables provide a summary of the CAS output data for the study area.

Table 1-1: Annual Distribution of Pedestrian and Cyclist Crashes

Year	Fatal	Serious	Minor	Non-Injury	Total	DSi*
2009	-	3	3	3	**9**	**3**
2010	-	1	7	1	**9**	**1**
2011	1	1	4	-	**6**	**2**
2012	1	5	5	1	**12**	**6**
2013	1	2	1	1	**5**	**3**
Total	**3**	**12**	**20**	**6**	**41**	**15**
2014	-	4	7	4	15	4

* Death and serious injury casualties

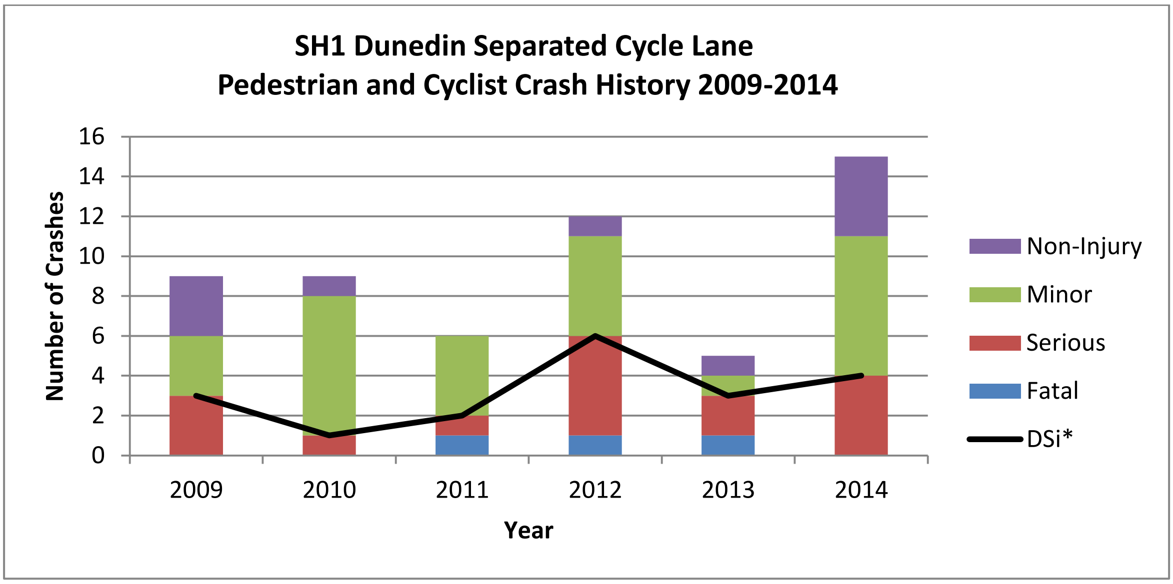


Figure 1-1: SH1 / Dunedin Separated Cycle Lane Pedestrian and Cyclist Crash History 2009-2014

[1] This includes crashes on all intersections within a 30 m radius of the intersection with SH1.

Table1 -2: CAS Crash Type (Pedestrian and Cyclist Crashes 2009 – 2013)

Crash Type	Number of Reported Crashes	Injury Crashes	DSi	Percentage of All Reported Crashes
Overtaking	1	1	-	**2%**
Straight Lost Control / Head on	1	1	-	**2%**
Bend Lost Control / Head on	-	-	-	-
Rear End / Obstruction	5	4	2	**13%**
Crossing / Turning	6	6	4	**15%**
Pedestrian Crashes	28	23	9	**68%**
Miscellaneous Crashes	-	-	-	-
Total	**41**	**35**	**15**	**100%**

Table1 -2 shows 28 (68%) of the reported pedestrian and cyclist crashes resulted from pedestrian crashes with the remaining crash types all involving cyclists.

Table 1-3: Environmental Factors (Pedestrian and Cyclist Crashes 2009 – 2013)

	Wet/ Icy	Dry		Night	Day		Weekend (Fri 6:00PM to Monday 5:59AM)	Weekday
Count	9	32		12	29		9	32
%	22%	78%		29%	71%		22%	78%

There were nine (22%) crashes occurring when the road surface was wet resulting in three serious and seven minor injury crashes. Of these crashes, three involved cyclists resulting in one serious injury from a vehicle failing to giveway to the cyclist.

All five hit object crashes included cyclists colliding with an opening door of a parked motor vehicle, colliding with a parked truck and trailer and hit kerb due to medical event. These crashes resulted in one fatality, one serious injury and three minor injury crashes.

Table 1-4: Crash Causation Factors of Reported Injury Crashes

Causation	Number of Reported Crash Causation Factors	Number of Reported Injury Crash Causation Factors	Number of Reported High Severity Crash Causation Factors
Poor observation	20	18	7
Failed Give Way/Stop	17	16	7
Pedestrian factors	13	10	4
Alcohol	5	4	3
Enter/exit land use	5	5	2
Disabled/old/ill	4	4	2
Vehicle factors	4	3	1
Incorrect lane/position	2	2	1
Road factors	2	2	1
Other	2	2	1
Poor handling	1	1	-
Poor judgement	1	1	-
Weather	1	1	-
Cyclist factors	-	-	-

1.1.2 Crash Summary

Of the 359 crashes which occurred in the study area for the 5 year period from 2009 – 2013, three were fatal, 23 were serious, 102 were minor and 234 were non-injury. Of these crashes, 28 involved pedestrians and 13 involved cyclists.

Of the 13 cyclist crashes occurring on this 2.5 km section of SH1 (from 2009 to 2013):

- Two were fatal, four were serious, six were minor and one was non-injury.
  - This relates to an injury ratio of 92% and a high severity ratio of 50%.
- Five crashes involved rear end / obstruction crash types with cyclists colliding into motor vehicles resulting in one fatal and one serious injury crashes (2 DSi).
  - The fatal crash involved a cyclist manoeuvring to miss a door opening from a parked vehicle into the path of a truck.
  - The serious injury crash involved a cyclist colliding into the back of a parked truck and trailer.
  - Two minor injury crashes involved a cyclist colliding with a door opening from a parked vehicle.
- Six crashes involved crossing / turning crash types with cyclists impacting motor vehicles resulting in one fatal, three serious injury crashes (4 DSi) as well as two minor injury crashes.
  - The fatal crash occurred due truck failing to giveway to cyclist and colliding with cyclist resulting in cyclist run over at Anzac / SH1S intersection.
  - The three serious injury crashes involved motor vehicle drivers failing to giveway to cyclists and a cyclist failing to stop at a red light running into motor vehicle.
- All five hit object crashes included cyclists colliding with an opening door of a parked motor vehicle, colliding with a parked truck and trailer and hit kerb due to medical event. These crashes resulted in one fatality, one serious injury and three minor injury crashes.
- Six crashes involved 'failed giveway / stop' as the crash causation factor resulting in one fatal, three serious injury and two minor injury cyclist crashes. The fatal crash involved a motor vehicle failing to giveway to a cyclist travelling along SH1 at Anzac Avenue / SH1 intersection.

- Three cyclist crashes occurred at the fault of the cyclist. The cyclist crashes resulted from running red light at signal controlled intersection, mechanical failure and failure to stop colliding with truck and trailer. Resulting in two serious and one minor injury crash.

Of the 28 pedestrian crashes occurring on the 2.5 km section of SH1 (from 2009 to 2013):

- One was fatal, eight were serious (9 DSi), 14 were minor and five non-injury.
  - This relates to an injury ratio of 82% and a high severity ratio of 39%.
- The fatal pedestrian crash involved a motor vehicle colliding with an elderly pedestrian crossing at the St David Street / SH1S Cumberland Street intersection.
- Thirteen crashes involved 'pedestrian factors' resulting in one fatal, three serious and six minor injury crashes. These are outlined below:
  - A runner crosses road and collides with motor vehicle resulting in a minor injury.
  - A pedestrian stepped out into path of oncoming motor vehicle resulting in a collision.
  - A group of pedestrians ran out into the path of oncoming vehicle causing a collision.
  - A pedestrian crossed at traffic lights not looking for traffic and colliding with turning motor vehicle.
  - An elderly pedestrian crossing road in incorrect location (close proximity to traffic signals) resulted in the fatal crash.
- Eleven crashes involved 'failed giveway / stop' resulting in three serious injury and six minor injury pedestrian crashes. Three of the 'failed giveway / stop' crashes occurred with motor vehicles failing to give way to pedestrians resulting in three serious injuries.
- Fifteen (54%) pedestrian crashes occurred at the fault of the pedestrian. The pedestrian crashes resulted from incorrect crossing location, stepping into path of on-coming vehicle and inattention when crossing road. Four of these pedestrian crosses occurred with the pedestrian under the influence of alcohol.

1.1.3 Crash Risk

The project area has been assessed using the High Risk Intersections Guide[2] (HRIG). Refer to this Appendix for detailed crash risk calculations.

Twenty three intersections were analysed according to the HRIG, refer Table 1-5 below for a summary of crash risk performance.

As all these intersections are on the one-way main route of State Highway 1S with local roads all two-way (except for St David Street and Dunbar Street) the comparison with all crossroads priority or signals controlled may not be entirely valid. We would expect an intersection on one way route to perform more safely than if all approaches were two-way.

In terms of collective risk for the intersections there are two methods of calculation:

- **Reported total F&S Crashes:** Over the five year assessment period there has only been more than three high severity crashes reported for Howe Street / SH1S northbound within 30 m of the intersection.

- **Estimated DSI equivalent:** The second method involves using DSi equivalents estimated from all injury crashes. This method takes into account the crash movement type, intersection form and control, and collision speed on crash severity outcomes. The estimated collective risk is presented in the Table 1-5 below for all applicable intersections.

[2] High Risk Intersection Guide (HRIG), NZTA, July 2013

According to the HRIG[3], the intersections are considered a certain risk dependent on the collective risk and are summarised for each intersection in Table 1-5 below.

When considering personal risk; a calculation is performed which considers the major and minor road traffic volumes to determine the product of flow to standardise the number of potential conflicts that could occur at an intersection.

According to the HRIG[4], the intersections are considered a certain risk dependent on the personal risk level and are summarised for each intersection in Table 1-5 below.

The Level of Safety Service (LoSS)[5] for each intersections are summarised in Table 1-5 below with the LoSS category[6].

---

[3] HRIG, Table 4-1

[4] HRIG, Table 4-2

[5] Level of Safety Service, as defined by HRIG, is a method of categorising the safety performance of an intersection compared to other intersections of that type.

[6] LoSS categories range from I (one) to V (five) where intersections classified as LoSS I have a safety performance that is better than other intersections of that type, in the same speed environment with similar traffic flows. For intersections of Category V, the converse is true.

Table 1-5: Summary of Intersection Analysis

Intersection	SH1S Location	Type of Urban Intersection	Total Injury Crashes	Estimated DSi Equivalent	Collective Risk Band	Personal Risk Band	Level of Safety Service (LoSS) Band
Great King St North / SH1S	SH1S / 704 / 0.0	Priority X-Roads	14	2.67	High	High	V
Howe Street / SH1S NBD	SH1S / 704 / 0.404	Priority X-Roads	10	1.92	High	Medium High	V
Howe Street / SH1S SBD	SH1S / 704 / 0.41	Priority X-Roads	3	0.51	Low Medium	Medium High	IV
Albany Street / SH1S NBD	SH1S / 704 / 1.310	Signalised X-Roads	8	1.44	Medium High	High	IV
St Andrew Street / SH1S SBD	SH1S / 704 / 2.000	Signalised X-Roads	11	1.40	Medium High	High	IV
Anzac Street / SH1S SBD	SH1S / 704 / 2.220	Priority T-Intersection	3	0.49	Low Medium	High	IV
Duke Street / SH1S NBD	SH1S / 704 / 0.202	Priority X-Roads	2	0.39	Low Medium	Medium High	III
Dundas Street / SH1S NBD	SH1S / 704 / 0.644	Signalised X-Roads	5	1.03	Medium	High	III
Frederick Street / SH1S SBD	SH1S / 704 / 1.556	Signalised X-Roads	6	1.05	Medium	High	III
Hanover Street / SH1S SBD	SH1S / 704 / 1.777	Signalised X-Roads	5	0.82	Medium	High	III
Hanover Street / SH1S NBD	SH1S / 704 / 1.796	Signalised X-Roads	5	1.22	Medium High	High	III
St Andrew Street / SH1S NBD	SH1S / 704 / 2.018	Signalised X-Roads	4	0.78	Medium	High	III
Stuart Street / SH1S NBD	SH1S / 706 / 0.000	Signalised X-Roads	7	0.89	Medium	High	III
Dunbar Street / SH1S SBD	SH1S / 706 / 0.201	Priority T-Intersection	3	0.38	Low Medium	High	III

Intersection	SH1S Location	Type of Urban Intersection	Total Injury Crashes	Estimated DSi Equivalent	Collective Risk Band	Personal Risk Band	Level of Safety Service (LoSS) Band
Duke Street / SH1S SBD	SH1S / 704 / 0.185	Priority X-Roads	1	0.21	Low	Medium High	II
Dundas Street / SH1S SBD	SH1S / 704 / 0.644	Signalised X-Roads	3	0.49	Low Medium	High	II
Frederick Street / SH1S NBD	SH1S / 704 / 1.575	Signalised X-Roads	3	0.65	Medium	High	II
Stuart Street / SH1S SBD	SH1S / 706 / 0.000	Signalised T-Intersection	2	0.54	Low Medium	High	II
Albany Street / SH1S SBD	SH1S / 704 / 1.294	Signalised X-Roads	2	0.51	Low Medium	High	I
St David Street / SH1S SBD	SH1S / 704 / 0.851	Signalised X-Roads	1	0.23	Low	High	I
St David Street / SH1S NBD	SH1S / 704 / 0.865	Signalised X-Roads	1	0.21	Low	High	I
Union Street / SH1S SBD	SH1S / 704 / 1.073	Signalised X-Roads	1	0.19	Low	High	I
Union Street / SH1S NBD	SH1S / 704 / 1.088	Signalised X-Roads	1	0.23	Low	High	I

Of the total crashes occurring for each intersection (within 30m of intersection) occurring on the 2.5 km section of SH1 (from 2009 to 2013):

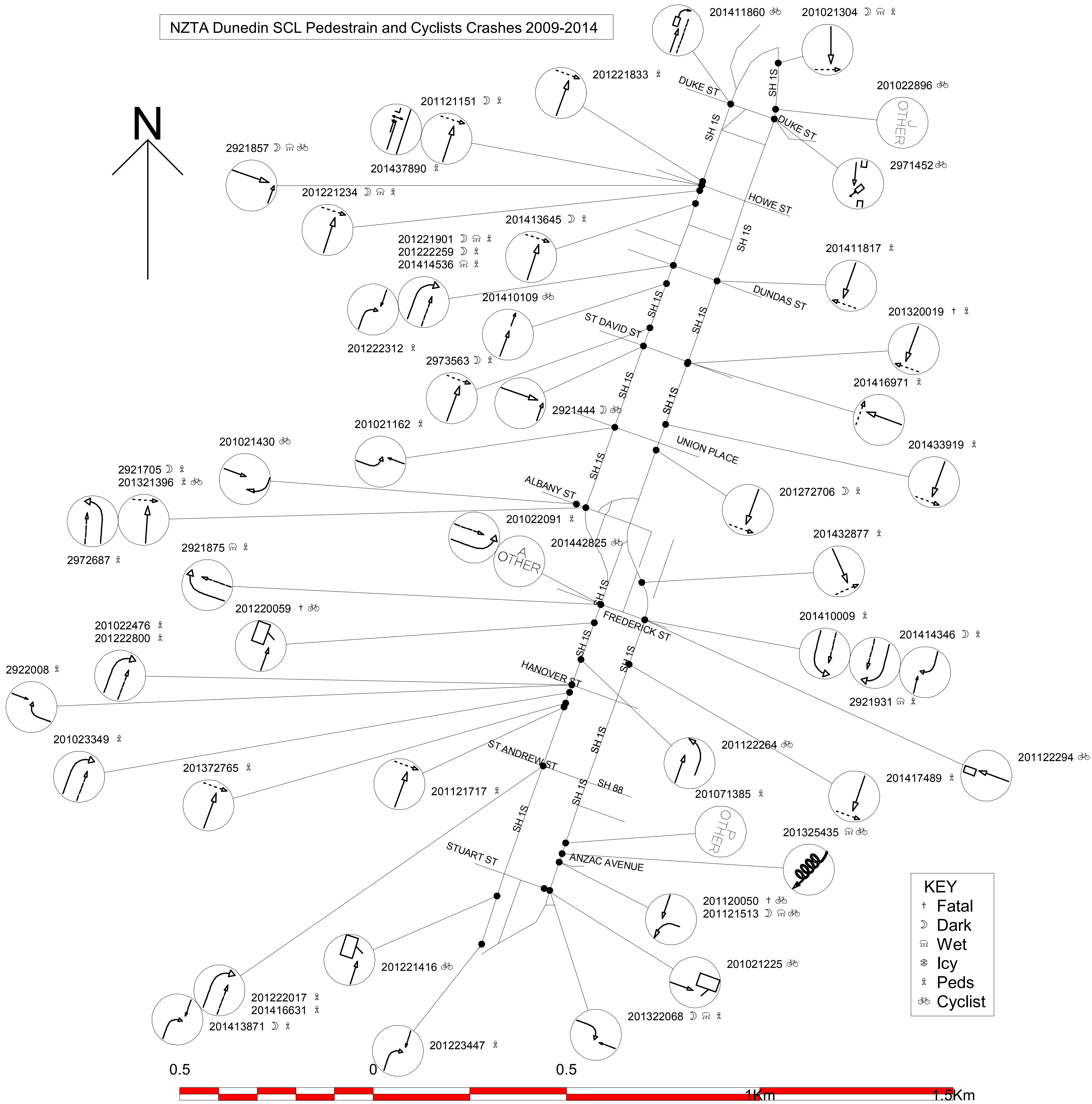
- Great King St North / SH1S and Howe St / SH1S NBD both have a LoSS V. These intersections are the worst performing with an observed injury rate higher than 90% of similar intersections.
- There are four intersections; Howe St / SH1S SBD, Albany St / SH1S NBD, St Andrew St / SH1S SBD and Anzac St / SH1S SBD which have a LoSS of IV. These intersections have an observed injury crash rate higher than 70% of similar intersections
- There are eight intersections that have LoSS III; corresponding to an observed injury crash rate higher than 50% of similar intersections.
- There are four intersections that have LoSS II; corresponding to an observed injury crash rate higher than 30% of similar intersections.
- There are five intersections that have LoSS I, this corresponds to an observed injury crash rate less than 30% of similar intersections.

1.1.4 Crash Risk Summary

It is clear from the crash analysis that the majority of cyclist crashes which result in high severity resulted from drivers failing to giveway or parked cars opening doors in cyclist's path. Separating the cyclists and motor vehicles will help address these crashes.

The crash data, including a collision diagram found in this Appendix.

NZTA Dunedin SCL Pedestrain and Cyclists Crashes 2009-2014



High Risk Intersection Guide			Urban X-Roads		Urban X-Roads		Urban X-Roads		Urban X-Roads		Urban X-Roads	
Period 5 years			GREAT KING ST NORTH / SH1S		DUKE STREET / SH1 SBD		DUKE STREET / SH1S NBD		HOWE STREET / SH1S NBD		HOWE STREET / SH1S SBD	
	Table A3-3				<>M		<>M		<>M		<>M	
		Urban Priority X-Roads	<>N	<>M	<>N		<>N		<>N		<>N	
	TYPE	Adjusted FS Rate	Injury	Estimated DSI eqv	Injury	Estimated DSI eqv	Injury	Estimated DSI eqv	Injury	Estimated DSI eqv	Injury	Estimated DSI eqv
Overtaking/lane change	A	0.25	0	0	0	0	0	0	0	0	0	0
Head-on	B	0.25	0	0	0	0	0	0	0	0	0	0
Loss of control or off road (straight)	C	0.19	0	0	0	0	0	0	1	0.19	0	0
Cornering	D	0.21	0	0	0	0	0	0	0	0	0	0
Hit Object	E	0.11	0	0	0	0	0	0	0	0	0	0
Rear-end	F	0.08	0	0	0	0	0	0	0	0	0	0
Turning versus same direction	G	0.2	0	0	0	0	0	0	0	0	0	0
Crossing (no turning)	H	0.17	11	1.87	0	0	1	0.17	2	0.34	3	0.51
Crossing (turning)	J	0.16	0	0	0	0	0	0	1	0.16	0	0
Merging	K	0.13	0	0	0	0	0	0	0	0	0	0
Right turn against	L	0.18	0	0	0	0	0	0	2	0.36	0	0
Manoeuvring	M	0.19	1	0.19	0	0	0	0	0	0	0	0
Pedestrian crossing road	N	0.22	0	0	0	0	1	0.22	3	0.66	0	0
Pedestrian other	P	0.31	1	0.31	0	0	0	0	0	0	0	0
Misc	Q	0.25	0	0	0	0	0	0	0	0	0	0
Motorcyclist	Y	0.3	1	0.3	0	0	0	0	0	0	0	0
Cyclist	Z	0.21	0	0	1	0.21	0	0	1	0.21	0	0
Estimated FS Crashes/Collective Risk	Total		**14**	**2.67**	**1**	**0.21**	**2**	**0.39**	**10**	**1.92**	**3**	**0.51**
Actual FS Crashes				1		1		1		5		0
Collective Risk Band			5	**High**	5	**Low**	5	**Low medium**	5	**High**	5	**Low medium**
Qmajor 1 (Highest Main Road flow)			SH1S Cumberland Street	9312	SH1S	9312	SH1S	9234	SH1S	11173	SH1S	10709
Qmajor 2 (Second Main Road flow)			SH1 Pine Hill Road	9002								
Qminor 1 (Highest Side Road flow)			Great King Street North	11070	Duke St West	2060	Howe St West	2540	Howe St West	1512	Howe St West	2233
Qminor 2 (Second Side Road flow if appl.)			SH1S Great King St	9234	Duke St East	767	Howe St East	2107	Howe St East	2233	Howe St East	1495
Daily Product of Flow (PoF)				1539		704		856		848		832
			Adjusted to 365 days * number of years	2,809,214		1285282		1562701		1547033		1518241
EEM high speed priority T junction model												
Predicted Injury Crashes	B0	B1	B2									
Predicted Injury Crashes per year	0.000125	0.51	0.21	**0.09**		0.07		0.07		0.07		0.07
Personal Risk Metric				56		23		19		73		20
Personal Risk Band				**High**		**Medium high**		**Medium high**		**Medium high**		**Medium high**
Injury Crashes Per Year				2.8		0.20		0.40		2.00		0.60
Level of Safety Service (LoSS) Band		Refer HRIG_LOSS Graphs		**V**		**II**		**III**		**V**		
LoSS Safety Performance				The observed injury crash rate is in the worst 10% band – higher (worse) than that expected of 90% of similar intersections.		The observed injury crash rate is lower (better) than that expected of 50% of similar intersections, and higher than that of 30%		The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.		The observed injury crash rate is in the worst 10% band – higher (worse) than that expected of 90% of similar intersections.		The observed injury crash rate is in the worst 30%, lower (better) than that expected of 90% of similar intersections, and higher (worse) than that of 70%.
High Risk Intersection?				No, insufficient crashes		No, insufficient crashes		No, insufficient crashes		Yes, High-Risk Intersection		No, insufficient crashes
Transformation Potential		Refer Section 6.6.2 Graphs										

			Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads	
			HANOVER STREET / SH1S SBD		HANOVER STREET / SH1S NBD		ST ANDREW STREET / SH1S SBD		ST ANDREW STREET / SH1S NBD		STUART STREET / SH1S NBD	
	Table A3-2 HRIG		<>M		<>M		<>M		<>M		<>M	
	Urban signalised X-roads		<>N		<>N		<>N		<>N		<>N	
	TYPE	**Adjusted FS Rate**	**Injury**		**Injury**		**Injury**		**Injury**		**Injury**	
Overtaking/lane change	A	0.11	0	0	0	0	0	0	0	0	0	0
Head-on	B	0.12	0	0	0	0	0	0	0	0	0	0
Loss of control or off road (straight)	C	0.18	0	0	0	0	0	0	0	0	0	0
Cornering	D	0.17	0	0	0	0	0	0	1	0.17	0	0
Hit Object	E	0.13	0	0	0	0	0	0	0	0	0	0
Rear-end	F	0.06	1	0.06	0	0	5	0.3	0	0	2	0.12
Turning versus same direction	G	0.1	0	0	0	0	0	0	0	0	2	0.2
Crossing (no turning)	H	0.19	4	0.76	0	0	5	0.95	2	0.38	3	0.57
Crossing (turning)	J	0.1	0	0	0	0	0	0	0	0	0	0
Merging	K	0.15	0	0	0	0	0	0	0	0	0	0
Right turn against	L	0.15	0	0	0	0	1	0.15	0	0	0	0
Manoeuvring	M	0.19	0	0	0	0	0	0	0	0	0	0
Pedestrian crossing road	N	0.23	0	0	4	0.92	0	0	1	0.23	0	0
Pedestrian other	P	0.31	0	0	0	0	0	0	0	0	0	0
Misc	Q	0.25	0	0	0	0	0	0	0	0	0	0
Motorcyclist	Y	0.3	0	0	1	0.3	0	0	0	0	0	0
Cyclist	Z	0.21	0	0	0	0	0	0	0	0	0	0
Estimated FS Crashes/Collective Risk	Total		5	**0.82**	5	**1.22**	11	**1.4**	4	**0.78**	7	**0.89**
Actual FS Crashes				**1**		**2**		**0**		**1**		**0**
Collective Risk Band			5	**Medium**	5	**Medium high**	5	**Medium high**	5	**Medium**	5	**Medium**
Qmajor 1			SH1S	14529	SH1S	15046	SH1S	19143	SH1S	16583	SH1S	16583
Qmajor 2												
Qminor 1			Hanover St West	6476	Hanover St West	7972	St Andrew St West	9206	St Andrew St West	7860	Stuart St West	3171
Qminor 2			Hanover St East	4282	Hanover St East	6476	St Andrew St East	9206	St Andrew St East	9206	Stuart St East	9206
Daily Product of Flow (PoF)				1436		1639		1988		1821		1601
				2620824		2990490		3628234		3323294		2922552
Predicted Injury Crashes	B0	B1										
Per year	0.000325	0.14		0		0		0		0		0
Personal Risk Metric				**18.4**		**24.0**		**22.7**		**13.8**		**17.9**
Personal Risk Band				**High**		**High**		**High**		**High**		**High**
Injury Crashes Per Year				1		1		2.2		0.8		1.4
Level of Safety Service (LoSS) Band		Refer HRIG_LOSS Graphs		**III**		**III**		**IV**		**III**		**III**
LoSS Safety Performance				The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.		The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.		The observed injury crash rate is in the worst 30%, lower (better) than that expected of 90% of similar intersections, and higher (worse) than that of 70%.		The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.		The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.
High Risk Intersection?				No, insufficient crashes		No, insufficient crashes		No, insufficient crashes		No, insufficient crashes		No, insufficient crashes
Transformation Potential		Refer Section 6.6.2 Graphs										

				Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads	
				ST DAVID STREET / SH1S NBD		UNION STREET / SH1S SBD		UNION STREET / SH1S NBD		FREDERICK STREET / SH1S SBD		FREDERICK STREET / SH1S NBD	
		Table A3-2 HRIG		<>M		<>M		<>M		<>M		<>M	
		Urban signalised X-roads		<>N		<>N		<>N		<>N		<>N	
	TYPE	**Adjusted FS Rate**		Injury		Injury		Injury		Injury		Injury	
Overtaking/lane change	A		0.11	0	0	0	0	0	0	0	0	0	0
Head-on	B		0.12	0	0	0	0	0	0	0	0	0	0
Loss of control or off road (straight)	C		0.18	0	0	0	0	0	0	0	0	0	0
Cornering	D		0.17	0	0	0	0	0	0	1	0.17	0	0
Hit Object	E		0.13	0	0	0	0	0	0	0	0	0	0
Rear-end	F		0.06	0	0	0	0	0	0	1	0.06	0	0
Turning versus same direction	G		0.1	0	0	0	0	0	0	0	0	0	0
Crossing (no turning)	H		0.19	0	0	1	0.19	0	0	2	0.38	1	0.19
Crossing (turning)	J		0.1	0	0	0	0	0	0	0	0	0	0
Merging	K		0.15	0	0	0	0	0	0	0	0	0	0
Right turn against	L		0.15	0	0	0	0	0	0	0	0	0	0
Manoeuvring	M		0.19	0	0	0	0	0	0	0	0	0	0
Pedestrian crossing road	N		0.23	0	0	0	0	1	0.23	1	0.23	2	0.46
Pedestrian other	P		0.31	0	0	0	0	0	0	0	0	0	0
Misc	Q		0.25	0	0	0	0	0	0	0	0	0	0
Motorcyclist	Y		0.3	0	0	0	0	0	0	0	0	0	0
Cyclist	Z		0.21	1	0.21	0	0	0	0	1	0.21	0	0
Estimated FS Crashes/Collective Risk		Total		**1**	**0.21**	**1**	**0.19**	**1**	**0.23**	**6**	**1.05**	**3**	**0.65**
Actual FS Crashes					**1**		**0**		**0**		**1**		**1**
Collective Risk Band				5	**Low**	5	**Low**	5	**Low**	5	**Medium**	5	**Medium**
Qmajor 1				SH1S	12496	SH1S	13067	SH1S	13986	SH1S	14530	SH1S	15028
Qmajor 2													
Qminor 1				St David St West	1274	Union St West	2000	Union St West	1460	Frederick St West	6695	Frederick St West	8017
Qminor 2				St David St East	1760	Union St East	0	Union St East	2000	Frederick St East	5308	Frederick St East	6720
Daily Product of Flow (PoF)					815		702		898		1500		1651
					1487187		1281543		1639679		2738250		3012832
Predicted Injury Crashes	B0	B1											
Per year	0.000325		0.14		0		0		0		0		0
Personal Risk Metric					**19.8**		**8.7**		**8.3**		**22.6**		**12.7**
Personal Risk Band					**High**		**High**		**High**		**High**		**High**
Injury Crashes Per Year					0.2		0.2		0.2		1.2		0.6
Level of Safety Service (LoSS) Band		Refer HRIG_LOSS Graphs			**I**		**I**		**I**		**III**		**II**
LoSS Safety Performance					The observed injury crash rate is lower (better) than that expected of 30% of similar intersections.		The observed injury crash rate is lower (better) than that expected of 30% of similar intersections.		The observed injury crash rate is lower (better) than that expected of 30% of similar intersections.		The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.		The observed injury crash rate is lower (better) than that expected of 50% of similar intersections, and higher than that of 30%
High Risk Intersection?					**No, insufficient crashes**		**No, insufficient crashes**		**No, insufficient crashes**		**No, insufficient crashes**		**No, insufficient crashes**
Transformation Potential		Refer Section 6.6.2 Graphs											

				Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads		Urban Signalised X roads	
				ALBANY STREET / SH1S SBD		ALBANY STREET / SH1S NBD		DUNDAS STREET / SH1S NBD		DUNDAS STREET / SH1S SBD		ST DAVID STREET / SH1S SBD	
		Table A3-2 HRIG		<>M		<>M		<>M		<>M		<>M	
		Urban signalised X-roads		<>N		<>N		<>N		<>N		<>N	
	TYPE	**Adjusted FS Rate**		Injury	Estimated DSI eqv	Injury		Injury		Injury		Injury	
Overtaking/lane change	A		0.11	0	0	1	0.11	0	0	0	0	0	0
Head-on	B		0.12	0	0	0	0	0	0	0	0	0	0
Loss of control or off road (straight)	C		0.18	0	0	0	0	0	0	0	0	0	0
Cornering	D		0.17	0	0	0	0	0	0	0	0	0	0
Hit Object	E		0.13	0	0	0	0	0	0	0	0	0	0
Rear-end	F		0.06	0	0	1	0.06	0	0	0	0	0	0
Turning versus same direction	G		0.1	0	0	0	0	0	0	0	0	0	0
Crossing (no turning)	H		0.19	0	0	2	0.38	1	0.19	1	0.19	0	0
Crossing (turning)	J		0.1	0	0	0	0	0	0	0	0	0	0
Merging	K		0.15	0	0	0	0	0	0	0	0	0	0
Right turn against	L		0.15	0	0	1	0.15	1	0.15	2	0.3	0	0
Manoeuvring	M		0.19	0	0	0	0	0	0	0	0	0	0
Pedestrian crossing road	N		0.23	0	0	1	0.23	3	0.69	0	0	1	0.23
Pedestrian other	P		0.31	0	0	0	0	0	0	0	0	0	0
Misc	Q		0.25	0	0	0	0	0	0	0	0	0	0
Motorcyclist	Y		0.3	1	0.3	1	0.3	0	0	0	0	0	0
Cyclist	Z		0.21	1	0.21	1	0.21	0	0	0	0	0	0
Estimated FS Crashes/Collective Risk		Total		**2**	**0.51**	**8**	**1.44**	**5**	**1.03**	**3**	**0.49**	**1**	**0.23**
Actual FS Crashes					**1**		**2**		**1**		**0**		**1**
Collective Risk Band				5	**Low medium**	5	**Medium high**	5	**Medium**	5	**Low medium**	5	**Low**
Qmajor 1				SH1S	13672	SH1S	15028	SH1S	12323	SH1S	14530	SH1S	13986
Qmajor 2													
Qminor 1				Albany St West	4434	Albany St West	4633	Dundas St West	2944	Dundas St West	4896	St David St West	1760
Qminor 2				Albany St East	5500	Albany St East	4440	Dundas St East	3459	Dundas St East	4633	St David St East	0
Daily Product of Flow (PoF)					1358		1360		1093		1368		686
				Adjusted to 365 days * number of years	2477612		2481485		1993843		2496756		1251219
Predicted Injury Crashes	B0	B1		B2									
Per year	0.000325		0.14	0.46	0.058671321		0		0		0		0
Personal Risk Metric					**12.1**		**34.1**		**30.4**		**11.8**		**10.8**
Personal Risk Band					**High**		**High**		**High**		**High**		**High**
Injury Crashes Per Year					0.4		1.6		1		0.6		0.2
Level of Safety Service (LoSS) Band		Refer HRIG_LOSS Graphs			**I**		**IV**		**III**		**II**		**I**
LoSS Safety Performance					The observed injury crash rate is lower (better) than that expected of 30% of similar intersections.		The observed injury crash rate is in the worst 30%, lower (better) than that expected of 90% of similar intersections, and higher (worse) than that of 70%.		The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.		The observed injury crash rate is lower (better) than that expected of 50% of similar intersections, and higher than that of 30%		The observed injury crash rate is lower (better) than that expected of 30% of similar intersections.
High Risk Intersection?					**No, insufficient crashes**		**No, insufficient crashes**		**No, insufficient crashes**		**No, insufficient crashes**		**No, insufficient crashes**
Transformation Potential		Refer Section 6.6.2 Graphs											

	TYPE	Table A3-5 HRIG Urban T intersection Adjusted FS Rate	Urban T intersection ANZAC STREET / SH1S SBD <>M <>N Injury	Estimated DSI eqv	Urban T intersection DUNBAR STREET / SH1S SBD <>M <>N Injury	Estimated DSI eqv
Overtaking/lane change	A	0.25	0	0	0	0
Head-on	B	0.21	0	0	0	0
Loss of control or off road (straight)	**C**	0.25	0	**0**	0	**0**
Cornering	D	0.24	0	0	0	0
Hit Object	E	0.1	0	0	0	0
Rear-end	F	0.07	1	0.07	1	0.07
Turning versus same direction	G	0.11	0	0	0	0
Crossing (no turning)	H	0.18	0	0	1	0.18
Crossing (turning)	J	0.15	0	0	0	0
Merging	K	0.13	0	0	1	0.13
Right turn against	**L**	0.18	0	**0**	0	**0**
Manoeuvring	M	0.14	0	0	0	0
Pedestrian crossing road	N	0.24	0	0	0	0
Pedestrian other	P	0.31	0	0	0	0
Misc	Q	0.25	0	0	0	0
Motorcyclist	Y	0.3	0	0	0	0
Cyclist	Z	0.21	2	0.42	0	0
Estimated FS Crashes/Collective Risk		Total	**3**	**0.49**	**3**	**0.38**
Actual FS Crashes				**1**		**0**
Collective Risk Band			0	**Low medium**	0	**Low medium**
Qmajor 1			SH1S	20599	SH1S	24818
Qmajor 2						
Qminor 1			Anzac St West	1032	Dunbar Street	1456
Qminor 2						
Daily Product of Flow (PoF)				853		1055
			Adjusted to 365 days * number of years	1556945	Adjusted to 365 days * number of years	1925015
Predicted Injury Crashes	B0	B1	B2		B2	
Per year	0.000565	0.2	0.76	2.242743369	0.76	2.363110518
Personal Risk Metric				**18.5**		**11.6**
Personal Risk Band				**High**		**High**
Injury Crashes Per Year				0.6		0.6
Level of Safety Service (LoSS) Band		Refer HRIG_LOSS Graphs		**IV**		**III**
LoSS Safety Performance				The observed injury crash rate is in the worst 30%, lower (better) than that expected of 90% of similar intersections, and higher (worse) than that of 70%.		The observed injury crash rate is lower (better) than that expected of 70% of similar intersections, and higher (worse) than that of 50%.
High Risk Intersection?				**No, insufficient crashes**		**No, insufficient crashes**
Transformation Potential		Refer Section 6.6.2 Graphs				

	TYPE	Table A3-5 HRIG Urban signalised T intersection Adjusted FS Rate	Urban signalised T intersection STUART STREET / SH1S SBD <>M <>N Injury	Estimated DSI eqv
Overtaking/lane change	A	0.11	0	0
Head-on	B	0.12	0	0
Loss of control or off road (straight)	**C**	0.18	0	**0**
Cornering	D	0.17	0	0
Hit Object	E	0.11	0	0
Rear-end	F	0.06	0	0
Turning versus same direction	G	0.07	0	0
Crossing (no turning)	H	0.1	0	0
Crossing (turning)	J	0.1	0	0
Merging	K	0.1	0	0
Right turn against	**L**	0.18	0	**0**
Manoeuvring	M	0.19	0	0
Pedestrian crossing road	N	0.24	1	0.24
Pedestrian other	P	0.31	0	0
Misc	Q	0.25	0	0
Motorcyclist	Y	0.3	1	0.3
Cyclist	Z	0.21	0	0
Estimated FS Crashes/Collective Risk		Total	**2**	**0.54**
Actual FS Crashes				**2**
Collective Risk Band			0	**Low medium**
Qmajor 1			SH1S	20599
Qmajor 2				
Qminor 1			Stuart St East	3016
Qminor 2				
Daily Product of Flow (PoF)				1310
			Adjusted to 365 days * number of years	2390969
Predicted Injury Crashes	B0	B1	B2	
Per year	0.000565	0.2	0.76	2.242743369
Personal Risk Metric				**13.3**
Personal Risk Band				**High**
Injury Crashes Per Year				0.4
Level of Safety Service (LoSS) Band		Refer HRIG_LOSS Graphs		**II**
LoSS Safety Performance				The observed injury crash rate is lower (better) than that expected of 50% of similar intersections, and higher than that of 30%
High Risk Intersection?				**No, insufficient crashes**
Transformation Potential		Refer Section 6.6.2 Graphs		

Appendix D – Project Risk Analysis

Risk Analysis Process

The Risk Analysis for the Dunedin Separated Cycle Lanes project has evolved over the development of the Detail Business Case process. The formal risk identification process started with the project initiation meeting and the risks identified were incorporated into the project's PQP in November 2014.

The risks have been reviewed internally based on the developing scheme-level plans, and a more in-depth awareness of the project's local environment and social context (for example the number of articles and letters to the editor over the concepts and options). An updated Risk File has been developed for the Detail Business Case. The Risk File conforms to the qualitative level assessment using the Z/44 framework – a General approach has been taken.

Key Project Risks

The project risk file is included in this Appendix. The top four "Live – Treat" project risks, with HNO Risk Level of "High Threat" or "Extreme Threat" (risk score above 16) are identified as:

- ***Risk Rank 1: Lack of topographical and services location survey: Untreated Risk = Extreme Threat. Treated Risk = High Threat***.

  The project scope at this stage does not include a topographical nor services location survey. The highest risk element here is that the services are damaged during construction as they have not been properly located, and there are high costs associated with repair. Routine mitigation will be scrutiny of service-providers routing plans, and pot-holing (included in pre-Implementation/detaild design phase fees), however the residual risk (likelihood) remains higher than if a full services location survey is completed. A fee for this is estimated at $100,000 which currently stands outside the project's agreed and provisional pricing schedules.

- ***Risk Rank 2: Stakeholder pressure compromises design standards: Untreated Risk = Extreme Threat. Treated Risk = High Threat.***

  There are a number of key stakeholders in this project, and a vocal lobby to not have cycle facilities on SH 1. There is a risk that, in order to respond to the pressures of the key stakeholders and local lobby, that the cycle facility design is compromised to the point where it is not used by cyclists. Subsequently cyclists may be at risk through use of the normal road environment, and the image of all parties suffer. Mitigation approaches are three fold; maintain an uncompromising approach on minimum standards; use the consultation process to reflect the benefits of appropriately designed facilities; and outline the potential consequences of poorly designed facilities. It should be noted that there will continue to be some local opposition to these facilities, regardless of how positive or convincing the consultation message.

- ***Risk Rank 3=: Incomplete consultation process leading to confusion over project scope and outcomes: Untreated Risk = High Threat; Treated Risk = Moderate Threat***.

  This risk relates to the integrity of the consultation process. For a project with such a high public profile, the consultation process needs to ensure the issues are clearly laid out, reach all affected parties, are appropriately analysed and responded to. Failure to do so will have an impact on NZTA's public profile and may mean some positive (consultation initiated) design features are not included in the facility. The mitigation approach is to create and review a consulation plan in light of the known public awareness of the project; update as necessary; and deliver according to the plan.

- ***Risk Rank 3=: Differing expectations of design standards: Untreated Risk = High Threat; Treated Risk = Low Threat.***

  It is acknowledged that different key stakeholders have different expectations of the project – in particular NZTA is seeking a high standard facility, whereas DCC has expectations around removal (or retention) of on-road parking. Unresolved differing expectations could slow the decision making and implementation process for this project, affect public perceptions of both organisations, and may compromise design standards. The primary action for mitigation is for NZTA and DCC to engage early, recognise the points of difference, and work to resolutions; ideally before a public engagement process.

It can be seen that the latter three risks above are interconnected, relating to the conduct of engagement with stakeholders, and the decision making process that sits behind the consideration of inputs from other parties. NZTA is the Road Controlling Authority, and ultimately has responsibility for the design decisions made. However, how these decisions are seen to be made will have an impact on how well this project is used and received.

The next three risks of High Threat are Parked. They relate to:

- Cyclist use of the Facilities: Whatever the final form of the facilities, there is the possibility that some cyclists may still choose not to use them, and put themselves at risk on the road network. There is no effective mitigation for this behaviour.

- Construction operations put cyclists at risk: Cyclists are diverted from low-risk facilities during construction. Mitigation is to consider construction effects during detailed design/pre-implementation and specify effective TTM requirements.

- Higher than expected construction costs: Estimated construction costs will be advised at the DBC delivery, and potential mitigation addressed during detail design phase.

Risk Quantification

Only one of the four live risks above has had a mitigation costing considered. :

- Topographical and services location survey: Estimated costs between $50,000 to $100,000 depending on survey method and time to accurately locate services through pot-holing. Balanced against the potential costs incurred from construction damage to a high value service (e.g. fibre optic cable), costs are worthwhile.

Ian Rich – HNO Risk Advisor (Tel: 04 894 6287)
Ian.Rich@nzta.govt.nz
August 2013

Risk Register - Dunedin Separated Cycle Lanes

NZ TRANSPORT AGENCY
WAKA KOTAHI

Project/Contract:	Dunedin One Way Separated Cycle Lanes	**Document Date:**	17/02/2015	
Project/Contract ID:	PS O/211	**Supplier Lead 1:**	Andrew Quigley	MWH
NZTA Office:	Dunedin	**Supplier Lead 2:**	Jamie Povall	MHW
NZTA Lead:	Simon Underwood	**Supplier RM Specialist:**	Alix Newman	MWH

										Current Exposure			**Treatment Strategy**	**Residual (Target) Exposure**			
										Semi-Quantitative				Semi-Quantitative			
Rank	**RID**	**Risk Title**	**Description/ Cause/ Consequence**	**Risk Owner**	**Risk Owning Org**	**Date Raised**	**Risk Status**	**Phase**	**Established Controls**	**Consq.**	**Prob**	**Risk Score**	**(refer to Actions Register for detail)**	**Consq.**	**Prob**	**Risk Score**	**Commentary & Closure Statement**
1	SSR10	Design	Description: There is the threat for services damage and/or design rework due to the lack of topographical and services survey. Cause: The lack of topographical, features and services survey, Consequence: 1. damage to services during construction as service location unknown 2. additional delay to completion if unidentified services need to be moved and/or design needs to change 3. negative pubilicity, design and delay costs if unaccounted for accesses are identified late 4. design details may be compromised if design widths are inaccurate (based on aerial photos and site measurements).	Andrew Quigley	NZTA	16/02/2015	Live - Treat	Detailed Business Case	Nil	Very High	Medium	23	Further on-site measurement, complete a detail survey and seek services info from providers.	Very High	Very Low	13	Potholing will be an automatic part of the detail design phase. It would be less costly process if if follows full survey.
2	SSR09	Consultation	Description: There is a threat that the function and quality of the designed facilities is compromised due to pressure from stakeholders. Cause: The cause is that stakeholders have competing demands for available/usable road space. Consequence: 1. cycle facility standards are too low, so cyclists choose to use existing carriageway, which has less room (safety) 2. perception of MWH design capability is poor (reputation) 3. perception of NZTA cycle capabilities is poor (reputation) 4. capital expenditure is considered wasted (cost)	Andrew Quigley	MWH	16/02/2015	Live - Treat	Detailed Business Case	Cycle Facilities design standards (NZTA, Austroads, CCC and AT)	High	High	21	Reference to minimum standards: Reference to project purpose: Review consequences of poor facilities to client.	High	Low	16	Needs to be considered in reference to Risk SSR04 and
3	SSR04	Consultation	Description: There is a threat that the consultation process is not completed thorougly leading to confusion over the project scope and its outcomes, Cause: Communcations with the large number of Stakeholders are not managed properly Consequences: 1. The project meets resistance to its implementation -> increased costs and delays 2. loss of reputation of NZTA 3. safety benefits not realised	Andrew Quigley	MWH	22/10/2014	Live - Treat	Detailed Business Case	Consultation plan	High	Medium	19	Establish a consultation plan detail who, when and how at project start. Update plan in response to feedback and issues, Focus on pontential concerns as identified.	Medium	Low	11	
3	SSR11	Stakeholders	Description: There is a threat that NZTA, DCC and other major stakeholders have differing expectations of design standards. Cause: The cause of the risk is that major stakeholders are driven by different imperatives for facilities design (in particular related to parking considerations for NZTA and DCC) Consequence: 1. protracted discussion and delay to reach agreement 2. compromise of design standards leading to cyclists not using the facilities (see SSR04, 06, 09).	Simon Underwood	NZTA	16/02/2015	Live - Treat	Detailed Business Case	NZTA - Road Controlling Authority	High	Medium	19	NZTA and DCC to engage early, stay engaged, and agree points that work toward design reqts.	Low	Very Low	2	
5	SSR05	Construction	Description: There is the threat that the safety of cyclists is put at risk where they are diverted temporarily whilst the new scheme is constructed. Cause: The construction of the scheme will require the temporary diversion of cyclists as existing facilities are removed and the SCL is constructed. Consequences: 1. Increased safety risk to cyclists 2. Damage to reputation of MWH and NZTA	Andrew Quigley	MWH	22/10/2014	Live - Parked	Implementation	Effective traffic control and methodology	High	Low	16	Consider the method of construction during the pre-implementation/ detail design phase.	High	Low	16	

Ian Rich – HNO Risk Advisor (Tel: 04 894 6287)
Ian.Rich@nzta.govt.nz
August 2013

Risk Register - Dunedin Separated Cycle Lanes

Rank	RID	Risk Title	Description/ Cause/ Consequence	Risk Owner	Risk Owning Org	Date Raised	Risk Status	Phase	Established Controls	Current Exposure (Semi-Quantitative) Consq.	Current Exposure (Semi-Quantitative) Prob	Current Exposure (Semi-Quantitative) Risk Score	Treatment Strategy (refer to Actions Register for detail)	Residual (Target) Exposure (Semi-Quantitative) Consq.	Residual (Target) Exposure (Semi-Quantitative) Prob	Residual (Target) Exposure (Semi-Quantitative) Risk Score	Commentary & Closure Statement
5	SSR06	Operational Issues	Description: There is the threat that cyclists won't use the facility once constructed Cause: The facility does not offer continuity or efficiency in their journeys leading them to opt to use the main carriageway Consequences: 1. Safety benefits are not realised. 2. Damage to reputation of NZTA	Simon Underwood	NZTA	22/10/2014	Live - Parked	Operation	Design standards	High	Low	16	Review the DBC against the project aims. Get the views of user groups and ensure adequate publicity	High	Low	16	
7	SSR09	Financial	Description: There is a threat that the cost of providing the facility exceeds expectations Cause: The scope of the design increases and adds superfluous detail leading to increased construction costs. Consequences: 1. Scheme is no longer financially viable 2. Loss of reputation to NZTA 3. Increased expenditure leads to lower BCR	Simon Underwood	NZTA	22/10/2014	Live - Parked	Detailed Business Case	Effective communications	Medium	Medium	15	Manage the expectations of those who will be consulted. Agree scope with MWH	Medium	Medium	15	
8	SSR13	Design	Description: There is the threat of design changes required if the bus exchange is located where it will impact on the cycle facilities. Cause: The bus exchange position in the city has yet to be determined. One proposed site could impact on cycle facilities. Consequences: 1. redesign of cycle facility in proximity to bus exchange access	Simon Underwood	NZTA	17/02/2015	Live - Parked	Pre Implementation	No established controls	Medium	Low	11	Respond with design modification if occurs during design/ construction phase.	Medium	Low	11	
9	SSR12	Design	Description: There is a threat that not all high-use accesses have been correctly identified. Cause: The cause of the risk is that high-use accesses have been determined through observation and second-hand information. Consequence: 1. upset property owner during consultation 2. design will need updating after consultation when more information on high-use accesses known.	Jamie Povall	MWH	16/02/2015	Live - Parked	Detailed Business Case	No established controls	Low	Medium	10	High use accesses to be confirmed and/or identified during consultation phase.	Low	Medium	10	
10	SSR03	Deliverables	Description: there is a threat that the Detailed Business Case does not address the issues fully nor meet NZTA's desired outcomes. Cause: The cause is that MWH have not fully understood the project deliverables. The terms DBC and SAR are used interchangeably in project scope, but it is noted they are different format and content documents. Consequence: 1. loss of reputation to MWH 2. additional cost to MWH whilst the deliverables are corrected 3. delay to the programme	Andrew Quigley	MWH	22/10/2014	Live - Treat	Detailed Business Case	Methodology and communications	Low	Low	6	Follow agreed methodology and ensure clear communications during the project	Low	Very Low	2	The DBC has been produced with regular discussion with the Client and Dunedin CC.
11	SSR01	Operational Issues	Description: There is a threat that the project outcomes could have a negative effect on traffic congestion Cause: The cause of the risk is that insufficient data is collected about the proposed changes Consequence: 1. delays to traffic: 2. damage to the reputation of those involved 3. increased costs whilst remediative action is undertaken	Jamie Povall	MWH	22/10/2014	Closed	Detailed Business Case	No established controls	Very Low	Very Low	1	Obtain traffic signal data and undertake basic modelling of the proposals before the design is progressed	Very Low	Very Low	1	The Traffic Signal Operations Report has verified that a viable solution can be achieved which does not have a negative impact on traffic congestions.
11	SSR07	Operational Issues	Description: There is a threat of poor integration of cyclists and traffic at intersections, particularly right turning cyclists. Cause: Design does not cater for this movement adequately. Consequences: 1. Movement is difficult leading to frustration amongst cyclists. 2. Safety risk to cyclists 3. Increased traffic delay and congestion	Andrew Quigley	MWH	22/10/2014	Closed	Operation	Design reviews and traffic impact modelling	Very Low	Very Low	1	Review the DBC and assess the impact upon all road users.	Very Low	Very Low	1	The impact on other users has been considered during the DBC. The intersections have been developed with full cognisance of their requirements
11	SSR08	Political	Description: There is the threat of the loss of amenities (parking and trees in particular) Cause: Design does not take into due consideration these factors. Consequences: 1. Increased political scrutiny leads to the project falling out of favour 2. Negative press leads to damage to reputation of NZTA.	Andrew Quigley	NZTA	22/10/2014	Closed	Detailed Business Case	Robust consultation and planning to ensure the project minimises the impact on amenities	Very Low	Very Low	1	Produce a consultation plan and review scheme scope against amenity provision.	Very Low	Very Low	1	Note that the loss of some parking and an effect on street amenity is a foregone conclusion with this project, and therefore not a risk. There are no specific treatment actions, but street amenity is one of the project's design criteria.

Ian Rich – HNO Risk Advisor (Tel: 04 894 6287)
Ian.Rich@nzta.govt.nz
August 2013

Action Register

NZ TRANSPORT AGENCY WAKA KOTAHI

Contract / Project:	Dunedin One Way Separated Cycle Lanes	NZTA Lead:	Simon Underwood	Document Date:	17/02/2015
	PS O/211	NZTA Office:	Dunedin		

Risk Rank	RID	Risk Title	Threat/Opp	Risk Owner	Action ID	Action Description	Status	Start Date	Completion Date	Treatment Cost ($)	Comment
1	SSR10	Design	Threat	Andrew Quigley	SA07	As a minimum confirm existing information through on-site measurements and observation. Complete detailed topographic survey prior to commencing detail design. Seek service information from providers.	Live	16/02/2015		100,000	Pot holing costs will be included as part of the D&PD scope update.
2	SSR09	Consultation	Threat	Andrew Quigley	SA02	Continue to emphasise with the client and all parties the possible failure of the project should standards be excessively compromised. Continue to reflect the positivity and support for the project from the consultation parties that want it and refer back to initial purpose, and standards required to meet it. Uncompromising position on minimum standards	Live	16/02/2015		-	Treatment costs are part of the client liaison, design and consultation process.
3	SSR04	Consultation	Threat	Andrew Quigley	SA04	Arrange an early meeting to discuss and agree the consultation process. Follow up with a consultation plan / communication plan	Live	9/10/2014		-	
3	SSR11	Stakeholders	Threat	Simon Underwood	SA06	Major stakeholder key threat is DCC, as their position and that of NZTA for on-street parking, differs. NZTA to lead constructive engagement targeting reaching common ground. Ideally engagement should proceed as soon as possible. Clear set of project objectives (or hierarchy of objectives).	Live	16/02/2015			Treatment costs included in NZTA's internal budgets.
5	SSR05	Construction	Threat	Andrew Quigley	SA05	During design, the likely impacts of construction on cyclists to be considered. If necessary, some additional design elements to be included to accommodate safety concerns. Additionally, contract documents to specify TTM to specifically consider cyclist safety during construction. Engagement with cycle advocacy groups may be worthwhile.	Proposed	1/04/2015			Costs associated with design and contract documentation are part of project delivery cost. TTM costs to be included in contractor's tender. Mitigation actions can reduce likelihood of event, however any crash will have high consequences.
8	SSR13	Design	Threat	Simon Underwood	SA08	Bus exchange location not yet known. Once confirmed, likely treatment will be design of additional set of traffic signals as access crosses facility.	Proposed	1/04/2015			Note. Timeframe for exchange decision making not known. A medium likelihood has been ascribed to it occuring during pre-implementation design. Would expect that physical fees associated with additional signals, will be borne by exchange costs.
10	SSR03	Deliverables	Threat	Andrew Quigley	SA03	Review the methodology and ensure that the development of the DBC follows this and discuss with the client where scope is unclear around SAR/DBC. Regular communication with the client will help deliver the right results first time	Live	9/10/2014		-	
11	SSR01	Operational Issues	Threat	Jamie Povall	SA01	Obtain existing traffic signal data and use to inform the development of the new proposals. Apply modelling techniques and review to ensure propals do not adversely impact the network	Completed - successful	5/11/2014		-	Included in methodolgy and highlighted in the programme

Appendix E – Reviews and Audits

Economic Peer Review

The economic peer review, and response, is attached.

Safety Audits

The DBC phase independent safety audit has been undertaken and is currently being responded to.

ConnectBetter

Dunedin One Way System Cycleway Economic Peer Review

Prepared for: NZ Transport Agency

Job Number: 4643-00

Revision: 0

Issue Date: 14 July 2015

Prepared by: Courtney Groundwater, Senior Transportation Engineer

Reviewed by: Dave Smith and Jeanette Ward, Associates

1. Background and scope

1.1 Background

The Dunedin One-Way System Separated Cycle Lanes project is a partnership between the NZ Transport Agency (the Agency) and Dunedin City Council, with the Agency taking the lead role. The project is necessary to appropriately protect cyclists who travel on the existing SH 1 cycle lanes from fatal or serious injury crashes. The recommended option is the implementation of a separated one-directional cycle lane on each of the one-way streets (between Pine Hill Road and Rattray Street).

The design is now complete and a Detailed Business Case (DBC) to proceed from Initiation to Implementation has been prepared by MWH on behalf of the Agency. The project has been categorised as having a HHM assessment profile. The Economic analysis calculates the Benefit Cost ratio (BCR) to be 3.1. This puts the project in the 3-5 band (medium) for benefit and cost appraisal.

The Agency have commissioned Abley to undertake a peer review of the cost benefit analysis to ensure the robustness of the resulting BCR. The findings of this peer review are presented in this technical note.

1.2 Scope

This document presents a review of the cost benefit analysis conducted for the cycleways. The information provided to inform this review includes:

- Detailed Business Case to proceed from initiation to implementation – Report body only dated 15 June 2015
- Appendix C to the Detailed Business Case – Economic Worksheets for option 1
- Dunedin Cycle lanes cross sections – Draft rev 2
- Project estimate – Form C and elemental breakdown for Option 1 dated February 2015
- A conference call with MWH staff (9 July 2015)

It should be noted that the scope of this review does not extend to include a review of the Strategic Fit or Effectiveness ratings assigned to the project or a detailed review of the cost estimates.

T +64 9 974 9820 (Akld))
T +64 3 377 4703 (Chch)
F +64 3 377 4700
E office@abley.com

Auckland
Level 8, 57 Fort Street
PO Box 911336
Auckland 1142
New Zealand

Christchurch
30a Carlyle Street
PO Box 25350
Christchurch 8144
New Zealand

www.abley.com

1.3 Format

For ease of reference the section headings of this report broadly follow the benefit and cost categories included in the analysis. It is emphasised that this report focuses on potential problem areas of the analysis. Generally the analysis is of a high quality.

This peer review identifies a number of issues/recommendations of varying levels of significance. These have been differentiated as shown in **Table 1.1** below.

Table 1.1 *Comment significance*

Colour	Status
(green)	Minor issue or observation – explanation or comment requested.
(yellow)	Moderate issue – review and correction recommended, changes may impact on BCR
(red)	Significant issue – review and correction required, changes expected to impact on BCR

Appendix A summarises the issues identified and provides space for a response from the analyst.

2. Evaluation methodology

The cost benefit analysis of the cycle ways follows the methodology set out in Simplified Procedure 11 (SP11) of the Economic Evaluation Manual (EEM). The analysis is supplemented with a full crash-by-crash analysis. The analysis uses a modified version of the SP11 worksheets. A 6% discount rate over a 40 year analysis period is used as required by the EEM.

The methodology used in the analysis considers all necessary walking and cycling user benefits and externalities. However benefits/disbenefits to motor vehicles are not considered. It is noted that page 3-50 of the EEM sets out guidelines for where the use of SP11 is appropriate. These include:

- The undiscounted capital cost of the project is less than $5 million
- The activity does not include signalised crossings over roads

As the proposed activity includes changes to signal phasing at intersections, it would be helpful to provide clear evidence that these operational changes do not result in disbenefits to motor vehicles which would necessitate the application of full procedures as a more appropriate evaluation method.

It is understood that an assessment has been undertaken of the impact on the intersections and that there may be some benefits for traffic due to the introduction of exclusive left and right turn lanes. There are also potential disbenefits for turning and side road traffic arising from the introduction of exclusive phases for cyclists. Some evidence that the net effect of these changes will not result in an overall disbenefit to general traffic would be helpful in understanding whether these may be significant to the evaluation.

Issue/recommendation	
2a	Provide evidence as to whether the impact of the proposed operational changes at signalised intersections is likely to result in a disbenefit or not.

3. Costs

Costs considered in the analysis include capital costs, annual maintenance costs, operational costs and periodic maintenance. This review does not include a detailed peer review of the make-up of the costs. A brief review the commentary in the DBC and costs transferred to the economic analysis is provided below.

A notable item in the construction estimate is 'pavement and surfacing', which contributes to approximately 50% of the base physical works estimate. The reviewers understand that this cost is a conservative estimate that includes for shaping the carriageway given the island separator is likely to change the profile and also to provide a clean surface for road marking. It is understood that this cost may reduce during detailed design. Given the conservative nature of this estimate it is recommended that further commentary to explain this in the analysis section of the DBC is considered. As shown in the sensitivity testing results a lower cost has the potential to improve the overall BCR.

The reviewers note that the periodic maintenance costs assume that the cycleway will be resealed every eight years, at the same time as the remainder of the carriageway. It is unlikely that this will be necessary however it is not considered that any changes need to be made to the analysis.

Issue/recommendation	
3a	Consider including further commentary regarding the conservative nature of the pavement and surfacing costs in the DBC.

4. Cyclist travel time cost savings

The analysis uses the calculations in SP11 worksheet 4 to quantify travel time cost savings for existing cyclists. A cyclist growth rate of 4.0% is used, this is discussed in section 5 of this review.

Existing cyclist numbers are based on peak hour counts during the summer holiday period, scaled to represent cyclist AADT using factors from the Cycle Network and Route Planning Guide. The reviewers agree with this approach.

The reviewers agree with the use of Table A4.1(b) to determine the appropriate travel time cost. However, it is considered that a weighted average travel time cost may be more appropriate. It is likely that many of the cycle trip purposes will be for 'other non-work' and some work travel in addition to commuting cyclists. Household travel survey, Census Journey to Work and other Dunedin specific data could be considered to understand what the likely split between travel purposes is. The reviewers note that it is unlikely that this will have a significant impact on the overall benefit cost ratio.

A large (~50%) increase in mean travel speed for cyclists is predicted in the analysis. It is understood from the conference call with MWH that this is predominantly based on improvements to traffic signal phasing for cyclists. The DBC report also references the reduced risk of travelling alongside motorised traffic as another factor in the increased mean speed. The reviewers note that no change in speed would be a conservative assumption and consider that further justification of the change in travel speed is required. This is particularly important given that the large increase in speed for cyclists is likely only achievable with increased priority for cyclists (i.e. through providing cyclists with priority over general traffic by altering signal phasings) and any such initiatives may result in reduced travel times and level of service for general traffic. No disbenefits of this nature have been considered.

The reviewers agree with the approximation that the relative attractiveness of the separated facility is synonymous with an off road path. As noted in the working, the assumption that the 'do minimum attractiveness value' is 1.9 is conservative due to the fact that on-street parking exists along parts of the route. The reviewers consider that a weighted average between 1.8 and 1.9 could be used. It is unlikely that this will have a significant effect on the overall benefit cost ratio.

Issue/recommendation	
4a	A weighted average travel time cost would be more robust than assuming 100% commute trips.
4b	Provide further justification for significant decrease in bicycle travel time with no increase in motor vehicle travel time.
4c	A slightly higher relative attractiveness value may be justifiable if the existing parking in the do-minimum is considered.

5. Health and environment benefits

Health and environment benefits form the largest portion of the overall benefits, this is consistent with most cost benefit analyses of walking and cycling activities. Due to their significance to the overall benefit cost ratio it is important to ensure that assumptions used to calculate health and environment benefits are robust. Key inputs to this part of the analysis are: cyclist growth, the step change in cyclist numbers (new cyclists) and the average trip distance.

A growth rate of 4% has been used throughout the analysis. The reviewers consider that a 4% growth rate is a high rate to be sustained over a 40 year period and note that this is the maximum growth rate that SP11 allows. As explained in the DBC report, the long term growth rate observed from Census Journey to Work data (2001-2013) is much lower (0.4%). The reviewers recommend that further information to support such a high growth rate sustained across a 40 year period is provided. Supporting information may include Dunedin population growth, especially growth within the mesh blocks used to calculate the number of new cyclists, growth of key attractors in the city centre including the university and the hospital, other Dunedin growth projections. Furthermore it is noted that if the higher, shorter term growth rate (2006-2013) is extrapolated forwards using 2013 as a base year from which the geometric growth rate were recalculated, this would be equivalent to a 4.2% growth rate only.

In order to calculate the number of new cyclists, worksheet 7 has been used to calculate a ratio of new to existing cyclists. This ratio has been applied to the SH1 cycle counts to determine the number of new cyclists used in the analysis. The reviewers consider that this is an appropriate use of Worksheet 7 however this may underestimate the short-term uptake of cycling that could be achieved. While worksheet 7 is recommended for use in the EEM, it should be noted that the methodology within worksheet 7 does not consider facility type and was developed before separated cycleways were commonly designed in New Zealand. Based on experience from the coastal walkway in New Plymouth an increase of 80 – 120% in cumulative kilometres travelled per annum by cycle has been experienced in the 4-5 years following the implementation of the Te Rewa Rewa bridge. The proposed facility is different in nature than the New Plymouth example, however it is addressing a route that is currently perceived as very unsafe by local residents. Stated preference surveys (if available) and other New Zealand implementation examples could be used to understand the likely new cyclists generated by this facility. The reviewers note that simultaneously decreasing the assumed growth rate and increasing the number of new cyclists is likely to have very little effect on the overall benefit cost ratio. However this approach is considered a more defendable estimate of actual demand for the facility.

Section 4 of worksheet 5 for “improvements at hazardous sites” has been used to calculate the health benefits of the facility. The use of section 3 “benefits for cycle lanes, cycleways or increased shoulder widths” is considered more appropriate for the proposed activity. It is however noted that the use of section 3 versus section 4 is unlikely to have a significant impact on the overall value of health benefits. Section 4 (used currently) assumes a 3km average trip distance for cyclists.

Currently the trip length for health benefits in Section 3 is entered as 2.7km, the facility length. This is considered to potentially underestimate the likely average trip length as this is lower than national average cycle trip lengths. Given that the facility is addressing safety issues along a key part of the network it is likely to attract trips that begin and end on the local road network which in some instances may be some distance from the cycle way. This assumption also underlies the demand calculations in worksheet 7. It is recommended that an average for the total trip lengths for new users of the proposed facilities is developed.

Issue/recommendation	
5a	Provide further explanation or consider use of a lower growth rate and higher number of new cyclists as a more robust approach to predicting demand.
5b	Use section 3 instead of section 4 to calculate health and environment benefits.
5c	Average trip distance of 2.7km may be low, consideration could be given to average trip distance for new users including the likely length of each end of the trip to access the cycleway.

6. Crash cost savings

A crash-by-crash analysis has been used to quantify expected crash cost savings. Crash cost savings make up 42% of the overall benefits quantified in the analysis. Given the high number of crashes involving cyclists and pedestrians it is considered that the application of the crash-by crash analysis method is valid, provided that caution is exercised when applying crash reduction factors to individual crash types where a low number of crashes have occurred.

It is noted that the crash history has been exported from CAS for the five year period 2009-2013. It is understood that improvements to the existing cycle lanes have occurred over the past two years including widening and some improvements at intersections. The reviewers consider that the improved cycle lanes form the do-minimum scenario. No consideration of changes to the safety performance of the existing facilities following the improvements is considered in the analysis. Further evidence is requested to show how the improvements have or haven't changed the safety performance of the facilities. This may result in crash cost savings calculations being revisited. Given the significance of crash costs savings within the overall analysis, this could have an impact on the overall benefit cost ratio.

Crash reduction factors from Table A6.18(c) of the EEM and advice from a safety expert have been applied to the crash history by crash type. The reviewers agree with this approach in general, however request further information to support some of the assumptions as follows:

- A 90% reduction in cyclist-hit object crashes is assumed. Further information is requested to show that consideration has been given to cyclists who continue to use the narrower carriageway as discussed in Section 8.3.2 of the DBC.
- A 30% reduction in mid-block pedestrian crossing crashes is assumed. This is based on the suggested range of 15-35% for kerb buildouts in Table A6.18(c) in the EEM. The reviewers note that the pedestrian planning and design guide (NZ Transport Agency, 2009), Table 6.3, suggests a 30% reduction in pedestrian crossing crashes where cycle lanes are provided. Given that wide cycle lanes already exist along the route, further evidence to support the assumed additional 30% reduction is requested. The crash cost savings for mid-block pedestrian crossing crashes make up 30% of the overall crash cost savings, therefore this value has the potential to impact upon the overall benefit cost ratio.

Issue/recommendation	
6a	Consider existing improved cycle lanes as do-minimum scenario. Provide evidence of how crash trends have/haven't changed since improvements were made and update the analysis if necessary.
6b	Provide further supporting information to justify crash reduction potential of facility and revise factors where necessary.

7. Sensitivity testing

The reviewers consider that the sensitivity testing considers the most significant inputs to the analysis. It is noted that the lower bound benefit cost ratio for all sensitivity tests except one falls within the low 1-3 band for benefit and cost appraisal. This indicates that the medium rating for benefit and cost appraisal may not be realised if the performance of the facility does not meet all assumptions made in the base case.

8. Summary

Overall the reviewers agree with the general approach taken to value the benefits and costs of the proposed Dunedin one-way System separated cycle lanes. However the reviewers consider that the analysis should be supplemented with consideration of disbenefits to motor vehicles that may arise through providing priority to cyclists over general traffic. This would ensure a more robust benefit cost ratio and make this analysis consistent with other analyses across the country. Furthermore, the omission of potential disbenefits to motor vehicles creates inconsistency within the analysis where crash cost savings and travel time savings for cyclists are reliant upon these disbenefits.

Issues/recommendations of varying levels of significance have been identified. These are summarised in Appendix A to this technical note.

Appendix A Summary of issues

Issue/recommendation		Action taken/comment
2a	Provide evidence as to whether the impact of the proposed operational changes at signalised intersections is likely to result in a disbenefit or not.	
3a	Consider including further commentary regarding the conservative nature of the pavement and surfacing costs in the DBC.	
4a	A weighted average travel time cost would be more robust than assuming 100% commute trips.	
4b	Provide further justification for significant decrease in bicycle travel time with no increase in motor vehicle travel time.	
4c	A slightly higher relative attractiveness value may be justifiable if the existing parking in the do-minimum is considered.	
5a	Provide further explanation or consider use of a lower growth rate and higher number of new cyclists as a more robust approach to predicting demand.	
5b	Use section 3 instead of section 4 to calculate health and environment benefits.	
5c	Average trip distance of 2.7km may be low, consideration could be given to average trip distance for new users including the likely length of each end of the trip to access the cycle way.	
6a	Consider existing improved cycle lanes as do-minimum scenario. Provide evidence of how crash trends have/haven't changed since improvements were made and update the analysis if necessary.	
6b	Provide further supporting information to justify crash reduction potential of facility and revise factors where necessary.	

Abley Report Reference	Abley Report Issue	Client/Project Manager Direction (to authors of the Detailed Business Case)	Economic Analyst/ MWH Position
2a	Evidence of traffic signal/ traffic operation impact	No action required – Traffic Signal Operations report at hand. Note, the background to the issue really highlights the design premise that the introduction of the SCLs cannot be at detriment to the operation of the corridor for other road users – with the exception of the split/sharing of right turn green time.	**No action undertaken.** The economic evaluation procedure to be followed was agreed with the client. The design philosophy in terms of network impacts and traffic signal operation was that the introduction of the SCLs should not have negative operational impacts on other road users - other than for right turning traffic from the highway (due to the additional green time for cyclist progression). This has been the approach taken to traffic signal operation. The assessment undertaken has demonstrated no negative impact to through and left turning highway traffic, side road traffic and pedestrians.
3a	Conservancy in cost estimation	The nature of this project in many respects is one of – "give us a budget and we'll work to it" There is a sense of conservancy in terms of both pavement works and the extent of kerb separation (as opposed to lesser means of spatial separation). Upon commence of detailed design, the expectation is that there will be a value for money workshop/ interrogation process. This will be to really flesh out what needs to be done, what should also be done, and what could be done to achieve a high quality outcome. At this time, rather than re-scoping of the physical works and revision of the cost estimate; I'd rather draw upon the BCR cost sensitivity analysis as set out there-in [BCR 3.1 – 3.6 (with cost reduction)].	**No action undertaken.** It is acknowledged that the cost estimate is conservative at this stage, but this is considered reasonable and will be refined in due course when final decisions on pavement works and separation have been made, together with greater definition of impacts on services. Fluctuations in the cost estimate are adequately covered in the sensitivity analysis, covering a range of scenarios, but with a suitably conservative expected estimate presented in the DBC for the stated BCR, representing the 'worst case'. **BCR (DBC: base): 3.1** **BCR (DBC: low cost): 3.6**
4a	Use of weighted average travel time cost as opposed to assuming 100%	On one hand give consideration to this, and change if in agreement; particularly if the EEM intent is to separate worker based	**Sensitivity testing undertaken.** Assuming 5% work trips and an even split of commuter and other non-work travel purposes, the weighted

Abley Report Reference	Abley Report Issue	Client/Project Manager Direction (to authors of the Detailed Business Case)	Economic Analyst/ MWH Position
	commute trips	travel and tertiary student based travel demand. There is however, no inferred compulsion that such a change must be made. Cycle count survey undertaken over 2013/14, showed a very strong correlation to general traffic commute tidal flows; and the context of these SCLs is that they would appeal to distinct 'destination' based travel demand (i.e. central city based travel purpose) as opposed to recreational.	average TTC is approx. $8.2, slightly higher than the commuter only base of $7.80. This does not have any real effect on the BCR, which remains at 3.1. It is not proposed to adopt the weighted average travel time cost due to lack of available data to confirm these weightings. **BCR (base) + 4a (sens): 3.1**
4b	Justify reduction in cyclist travel time	I also wouldn't expect the introduction of the SCLs to result in a net reduction in travel time for cyclists. Suggest the economics are adjusted to not accrue benefits in this regard.	**Agree - Removed cyclist travel time benefits.** The mean speed has been reduced to match the do-minimum. It is noted that this assumption may be conservative. **BCR (base) + 4b: 2.8**
4c	Higher attractiveness value	Agree, the SCLs are new to New Zealand, and overseas case studies (e.g. Portland) have shown considerable success in attracting cyclists to these facilities.	**Agree – adopted the do-minimum as having an attractiveness of 1.85 rather than 1.9.** No real effect on the BCR. **BCR (base) + 4b, 4c : 2.8**
5a	Use of 4% growth rate	No change. 4% means doubling in 20 years, and again (plus) in 40 years. For general traffic flows, this would be very high, but because we are dealing with very low 'before' volumes of cyclists, it is very reasonable. I have every expectation that we would double cycle volumes in a much shorter time frame (e.g. 5 years). This is evident from overseas experience with SCLs (e.g. Calgary 3 fold increase in morning commute cycling 1991, and are forecasting a further 3 fold increase out to 2034; as they implement their inner-city cycle infrastructure).	**Sensitivity testing undertaken.** Sensitivity testing was undertaken on: A) A 1% low growth rate with a higher number of new cyclists (full sp11-7 estimate). B) A 4% medium/high growth rate with a reduced estimate of new cyclists (as per DBC assumption) Sensitivity testing showed: **A)** BCR (base) + 4b, 4c, 5a = **3.0** **B)** BCR (base) + 4b, 4c **= 2.8** The sensitivity testing shows that although the two scenarios outlined above result in a similar BCR, the DBC assumption was found to be conservative and is therefore retained.

Abley Report Reference	Abley Report Issue	Client/Project Manager Direction (to authors of the Detailed Business Case)	Economic Analyst/ MWH Position
5b	Use of Section 3 , as opposed to Section 4 (procedures)	Change if considered worthwhile.	See below.
5c	Average trip distance – suggestion 2.7km is low	This can be subjective, given the inner city, while a distinct 'destination' is not the centroid of the journey origins. I'd suggest an extension up to a 4km maximum is appropriate (University to Caversham).	**Agree – an extension to 4km was adopted.** The extension was based on the following: • Review of the North Dunedin Neighbourhood Accessibility Plan – Existing use survey report, (Beca, 2012). This contained a map of identified cycle routes, based on survey data, which clearly shows the route extends beyond the 2.7km project extent *(attached).* • Key route from the University to Caversham of over 4km **BCR (base) + 4b, 4c, 5b, 5c: 3.3**
6a	Adopt existing as a 'do-minimum' improvement option	No action, but I'll highlight this view internally; so further comment may follow. This approach is taken, as when embarking on the wider cycle lanes, it was clearly on the basis of doing so as short term measure. It has resulted in the application of bollards (high maintenance, unsightly, and potential to damage vehicles); loss of weaving opportunity in key locations (good for cycle lane protection, but now awkward for motorist lane changing needs); and very now right hand side shoulder to parked vehicles (with loss of car park manoeuvre space, more difficult for passengers to access/alight from vehicles). The very nature of cycle crashes detracts from such an approach, as they tend to occur at inconsistent frequency and with an extremely fine line between near- miss and fatality.	**No action undertaken, refer client comments.** However, the crash history was investigated between February 2013 (widening of cycle lanes) and April 2015. This showed that there have been 7 cyclist crashes (1S, 5M, 1NI) in the approx. two year period (both intersection and midblock – *Collision Diagram attached*). The cyclist injury crash rate has slightly increased since Feb 2013. Cyclist injury crash rate comparison: **2009-2013**: 2.4 inj/year **Feb 13 – April 15**: 2.8 inj/year In addition, it is noted that: • The ~2year period is too short for crash trend analysis purposes. • Following the previous fatal crashes, there has been a reduction in cyclist numbers (and resulting increase in latent demand). • For example, University of Otago survey data (*attached*) shows there has

Abley Report Reference	Abley Report Issue	Client/Project Manager Direction (to authors of the Detailed Business Case)	Economic Analyst/ MWH Position
		Whilst there have be no fatalities in the short period since the widening of the cycle lanes, over the same period the project manager is aware of: a) a cycle fatality, Lincoln Rd, Christchurch, involving a left hand side cyclist and a left turning truck (blind spot issue) b) A mobility scooter fatality, Gordon Rd, Mosgiel, involving a left turning vehicle (blind spot issue) c) An alert from a Dunedin truck driver, who came very close to 'taking out a cyclist' when attempting to turn left off the one-way system (due to blind spot issue). A fundamental benefit of the SCL project is to remove cyclists from the 'left hand side' blind spot. To defer and take a monitoring approach would be a seemingly risky proposition; it would also be at odds with the programme of higher standard cycle network infrastructure that the Dunedin City Council is implementing on their networks (which feed into the inner city).	been a reduction of 122 staff members cycling to work over the period 08-14. *"The 'free entry' comments made it clear that safety concerns were the biggest discouragement from people cycling, especially given the SH1 cyclist deaths over that period."*
6b	Extent of crash rate reduction (pedestrians and cyclists)	It would be worth reviewing the crash rate reductions used, or providing additional basis for such. It is appreciated however, that for cyclists even though the access risks remain, the critical crash risk potential: involving 'dooring , 'left hand side blind side', and interaction with car park and bus-stops manoeuvres is removed. Further, at intersections the conflict with	**No change to the cyclist hit-object crash reduction (A).** **Pedestrian crossing crash reductions – Agree, reduced from 30% to 20% (B).** **A) Cyclist Hit Object Crashes:** A 90% crash reduction in cyclist hit-object crashes is retained noting that the 5% of cyclists who choose to not use the SCL will be very experienced and likely to 'own the road' when required. As a result, they are

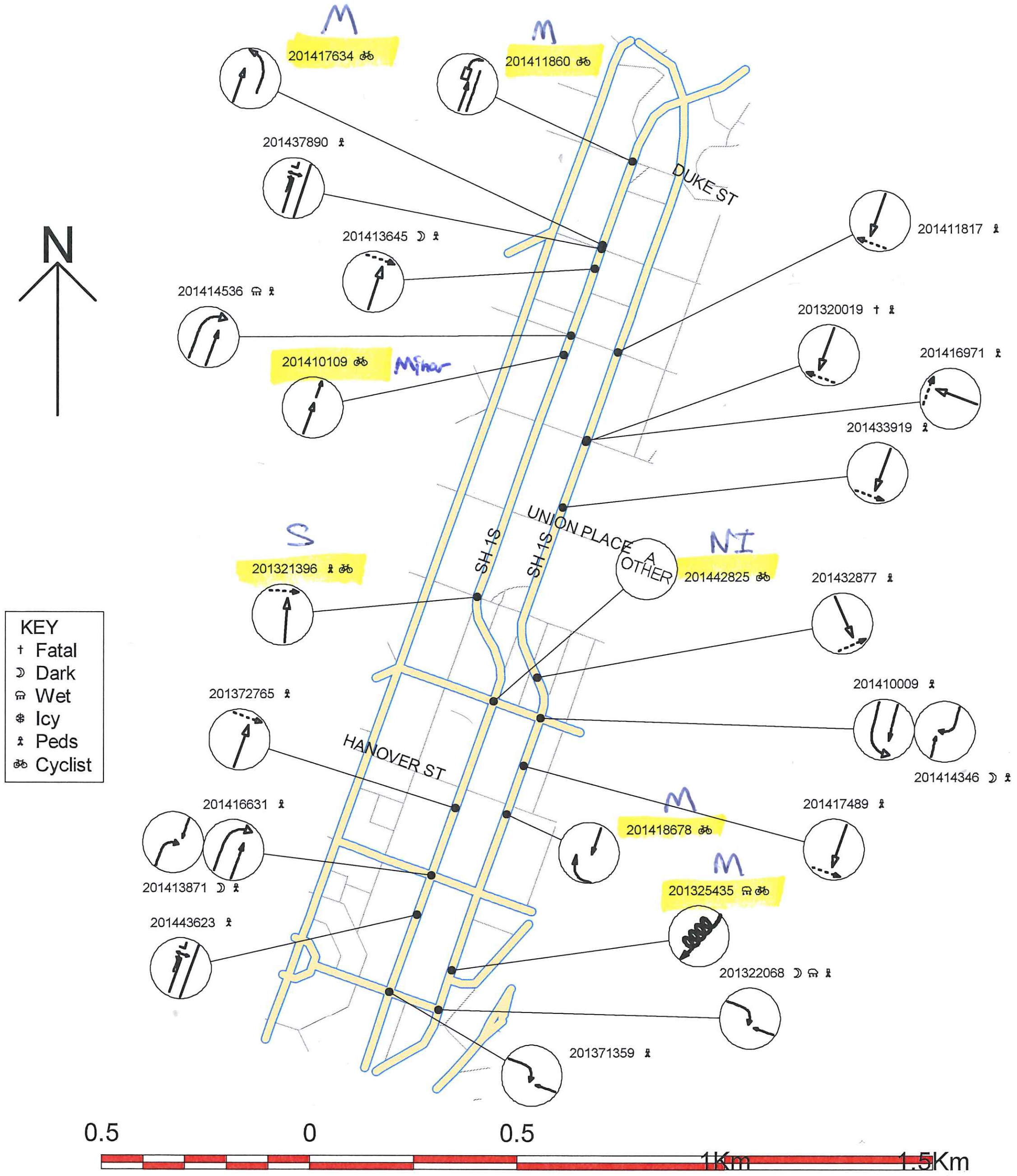
Abley Report Reference	Abley Report Issue	Client/Project Manager Direction (to authors of the Detailed Business Case)	Economic Analyst/ MWH Position
		turning vehicles is now managed by traffic signals. So there are fundamental changes. For pedestrians, it is similarly appreciated that any physical separation treatments will afford a higher level of security than the painted cycle lane (in terms of net carriageway narrowing).	unlikely to be involved in 'dooring' crashes. In addition, as per the client comments, a number of high severity conflicts have been removed. **B) Pedestrian Crossing Crash Reduction: Adopted 20%** Table 6.3 of the NZTA's pedestrian and planning design guide notes that kerb extensions only =36% while cycle lanes = 30%. Based on the do-minimum at 30%, and using the multiplicative diminishing returns method for combining multiple treatments, the option net ped crossing crash reduction is 25%[1] at the mid-block crossings (and area of capture of the crossing ~50m). Away from the crossings, the option will create the benefits of narrowing the crossing distance (as peds can generally use the separator) and retain a buffer (like cycle lane) for walking out between cars. This situation has a lower level of pedestrian benefits than the full kerb extensions – but will be better than with just the cycle lane. A value of 15% over current situation was determined in discussions with Shane Turner. In summary, the option provides the following benefits over the do-minimum (i.e. cycle lanes only) in terms of pedestrian crossing crashes: • Reduced crossing distance • Removal of parking • Physical barrier (vs. paint) • Formalised pedestrian crossing facilities at identified desire lines For the purposes of economic analysis, an overall crash reduction of 20% was adopted with a sensitivity test undertaken at 15%. **BCR (base) + 4b, 4c, 5b, 5c, 6b: 3.2** **BCR (base) + 4b, 4c, 5b, 5c, 6b (15% sensitivity): 3.1**

---

[1] Existing (on-road cycle lanes) = 30%
Option (SCL + kerb extensions) = 1-((1-0.36)*(1-0.30)) = 0.552, 55%
Option net = 25%

Sensitivity Testing Post Peer Review								
Variable	**Post Peer Review Base Case Changes: 4b, 4c, 5b, 5c, 6b)** **BCR = 3.2**		**Lower Bound**			**Upper Bound**		
	Value	**Note**	**Value**	**Note**	**BCR**	**Value**	**Note**	**BCR**
Cost Variability								
Construction / Implementation	$8.0m	Expected Estimate	$9.9m	95th %tile Estimate	2.5	$7.0 m	Base Estimate	3.7
Benefit Variability								
Cyclist Growth Rate & Estimated new cyclists	4% cyclist growth and SP11-7 ratio of new cyclists (240)	Medium/High growth, low/medium new cyclists	1% cyclist growth and and SP11-7 ratio of new cyclists (240)	Low growth, low/medium new cyclists	2.6	1% cyclist growth and full SP11-7 new cyclists (364)	low growth, high new cyclists	3.4
Overall Crash Reduction: Hit object	90%	Base Estimate	50%	Low Estimate	3.0	100%	Estimate	3.2
High Sev. Crash Reduction: Crossing/ Turning	30%	Base Estimate	0%	Low Estimate	3.1	50%	High estimate	3.2
Crash Cost Savings Methodology	$7.8m	Full procedures	$0.8m	SP-11 simplified crash benefits	2.1			
Pedestrian Crossing Benefits	20%	Based on the overall crossing benefit of SCL provision and kerb crossings	15%	Based on the likely minimum option crossing benefit	3.1			
Pedestrian Benefits	Included	Cyclists and Ped benefits	excluded	Cyclist benefits only	2.5			
Discount Rate	6%	EEM July '13	8%	Lower long term benefits	2.6	4%	Higher long term benefits	4.0

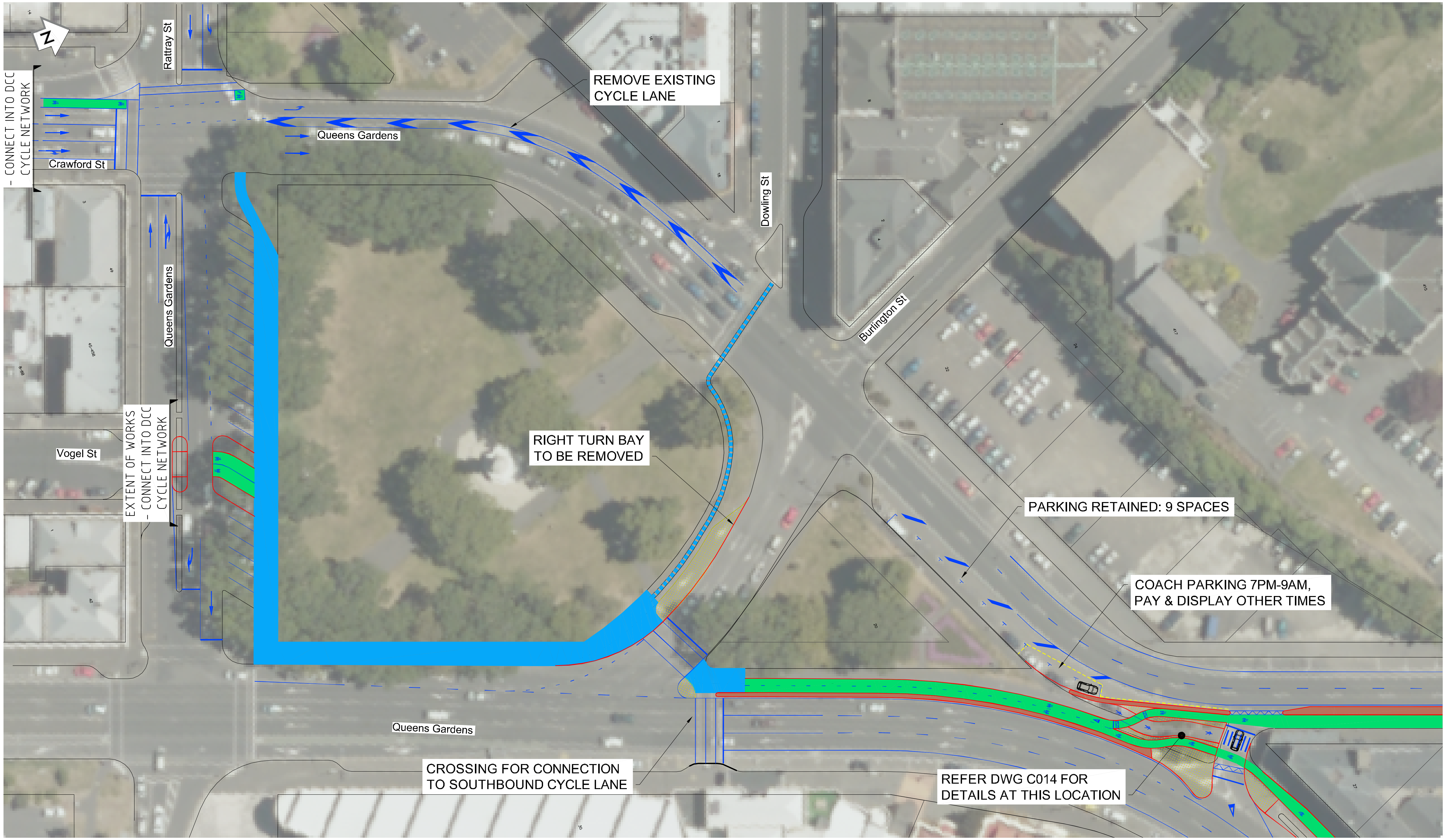
NZTA Dunedin SCL Pedestrian and Cyclists Crashes
Feb 2013 to Apr 2015



Appendix F – Project Drawings

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3



Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

NOT FOR CONSTRUCTION

A	CLIENT REVIEW	JP	02/15	
REV	REVISIONS	APP	DATE	

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	**NOT APPROVED**	
PROF REGISTRATION:		

MWH.

NZTA

DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES

OPTION ONE - RECOMMENDED OPTION

QUEENS GARDENS TO LEVIATHAN CORNER

Status Stamp: **WORKING PLOT**

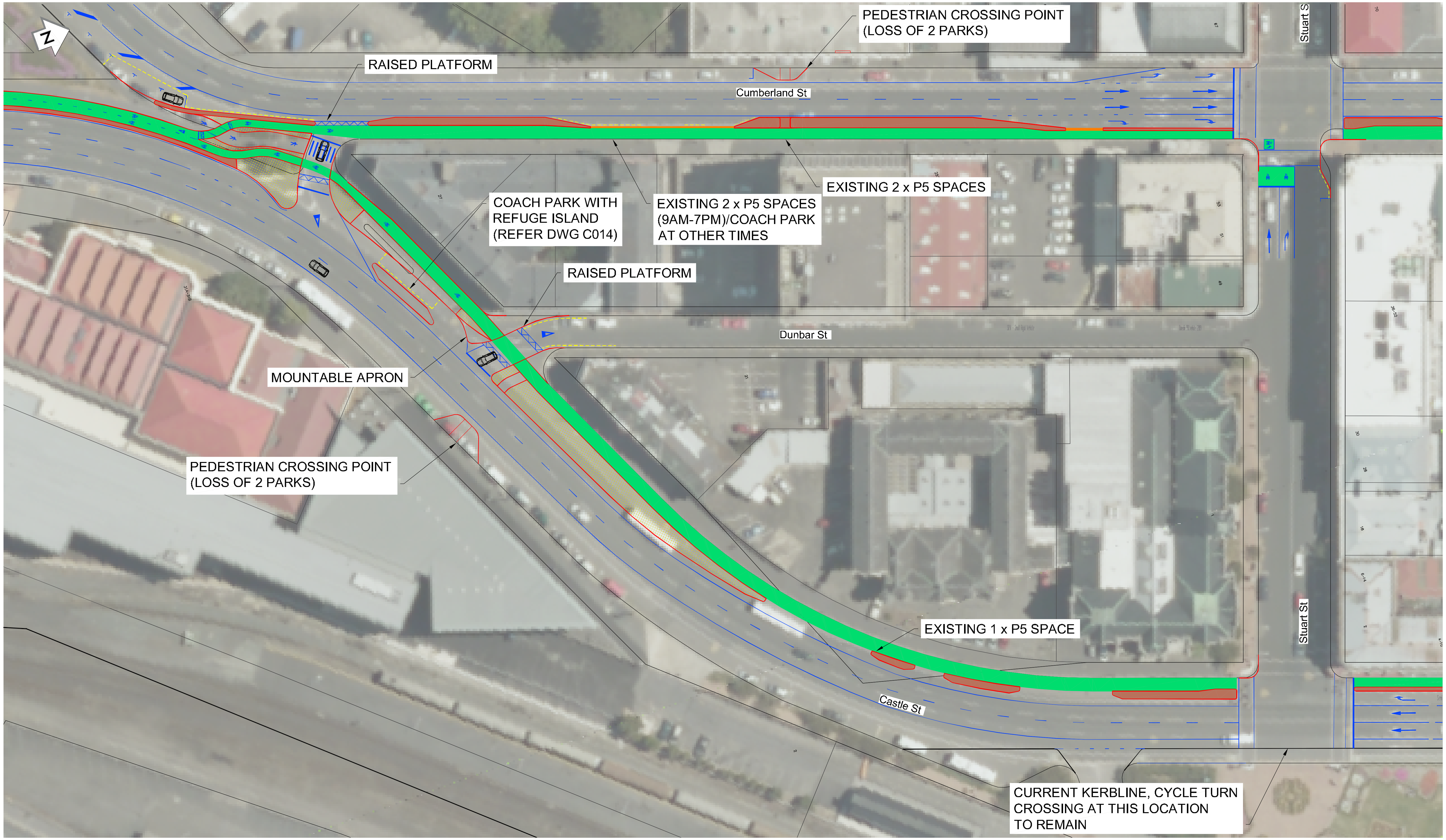
Date Stamp

Scales 1:750

Drawing No. 80507429-01-001-C001

Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

Legend

Cycle lane	Mountable separator	Sightlines
Kerbed physical separator	New kerbing	Landscaping
Shared path	New road markings	
Shared path - alternative	New no stopping markings	

NOT FOR CONSTRUCTION

A	CLIENT REVIEW	JP	02/15	DESIGNED	VIASTRADA/MWH	02.15
REV	REVISIONS	APP	DATE	DRAWN	BEN DODGSHUN	02.15
				CAD REVIEW		
				DES CHECK		
				REVIEWED		
				APPROVED	NOT APPROVED	
				PROF REGISTRATION:		

MWH

NZTA

DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES

OPTION ONE - RECOMMENDED OPTION

LEVIATHAN CORNER TO STUART STREET

Status Stamp: **WORKING PLOT**

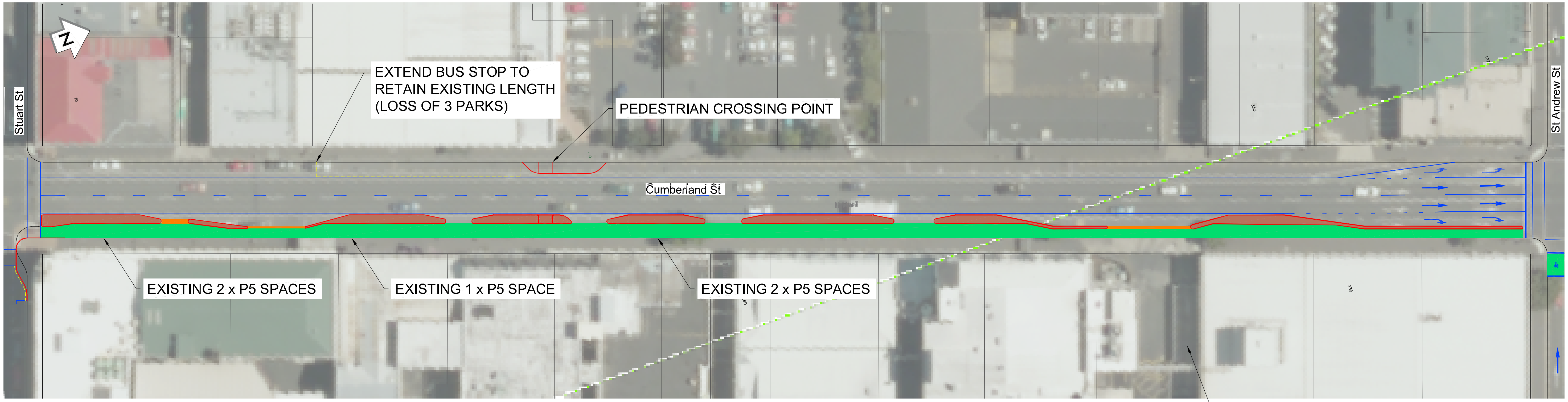
Date Stamp

Scales 1:750

Drawing No. 80507429-01-001-C002

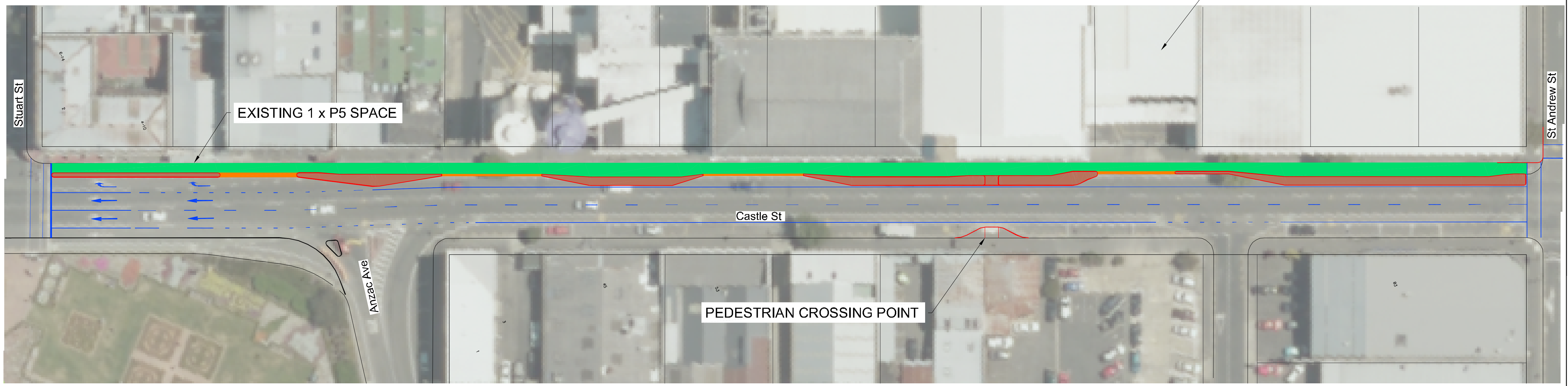
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



Cumberland St - Northbound

CADBURY LOADING AREA



Castle St - Southbound

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

NOT FOR CONSTRUCTION

A	CLIENT REVIEW	JP	02/15
REV	REVISIONS	APP	DATE

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED		
PROF REGISTRATION:		

NOT APPROVED

MWH

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION

STUART STREET TO ST ANDREW STREET

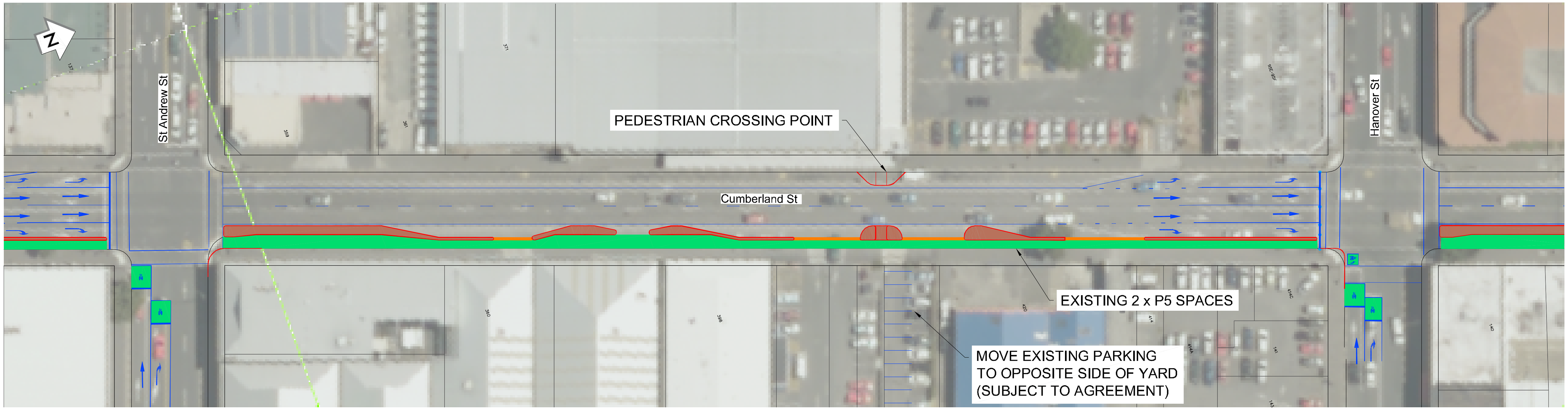
Status Stamp **WORKING PLOT**

Date Stamp

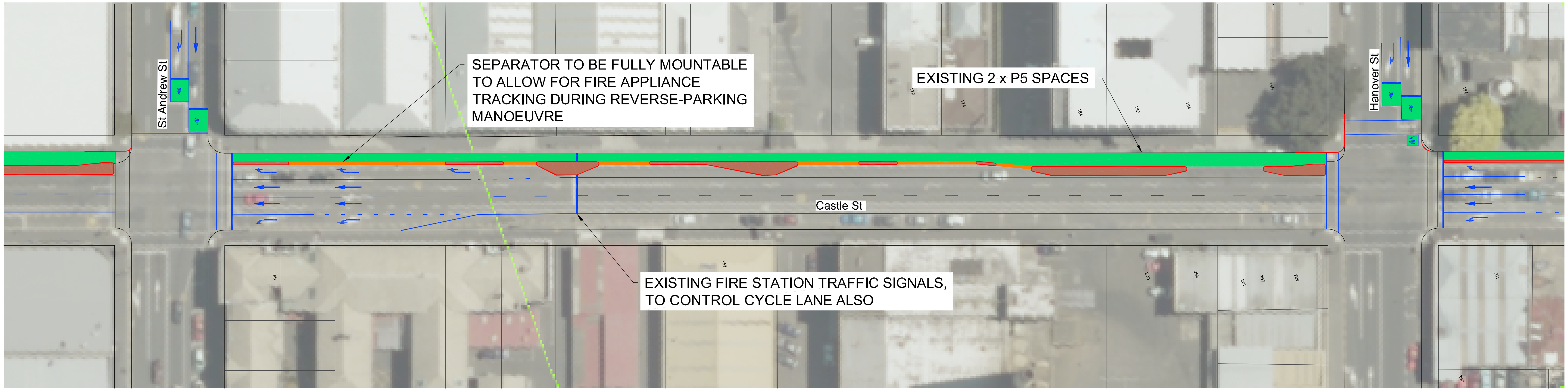
Scales 1:750

Drawing No. 80507429-01-001-C003 Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



Cumberland St - Northbound



Castle St - Southbound

Legend
- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	NOT APPROVED	
PROF REGISTRATION:		

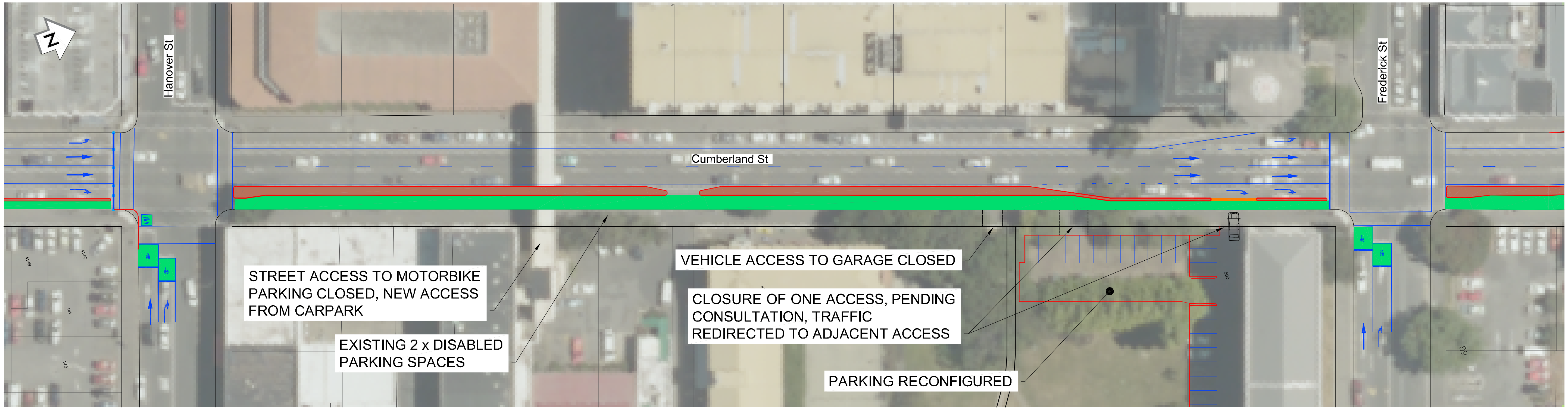
MWH

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION

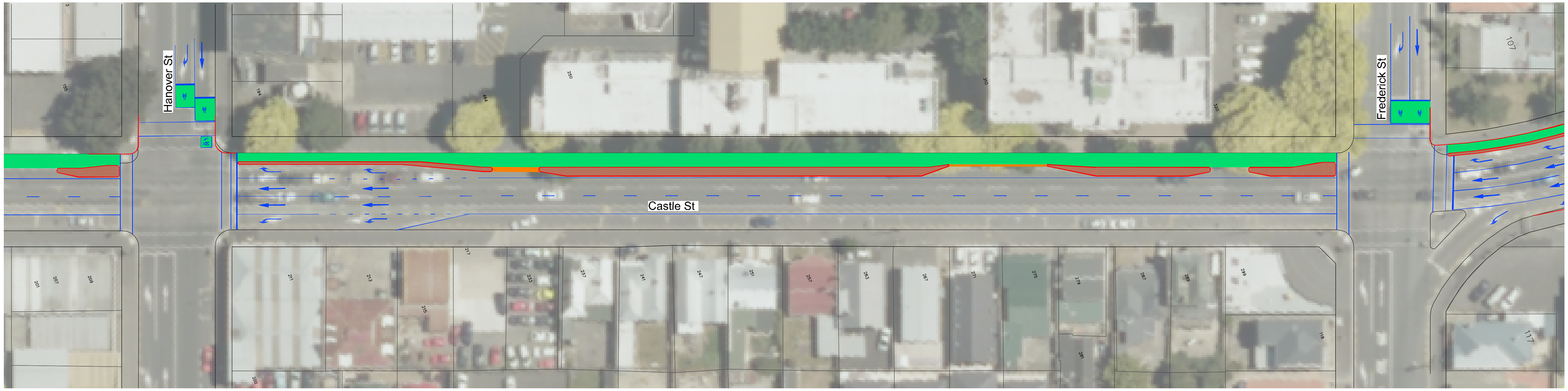
ST ANDREW STREET TO HANOVER STREET

Status Stamp: **WORKING PLOT**
Date Stamp
Scales 1:750
Drawing No. 80507429-01-001-C004
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



Cumberland St - Northbound



Castle St - Southbound

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

0 10 20 30 40 50 60 70 80 90 100

Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

NOT FOR CONSTRUCTION

A	CLIENT REVIEW	JP	02/15	DESIGNED	VIASTRADA/MWH	02.15
				DRAWN	BEN DODGSHUN	02.15
				CAD REVIEW		
				DES CHECK		
				REVIEWED	NOT APPROVED	
				APPROVED		
REV	REVISIONS	APP	DATE	PROF REGISTRATION:		

MWH

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION

HANOVER STREET TO FREDERICK STREET

Status Stamp: **WORKING PLOT**

Date Stamp

Scales 1:750

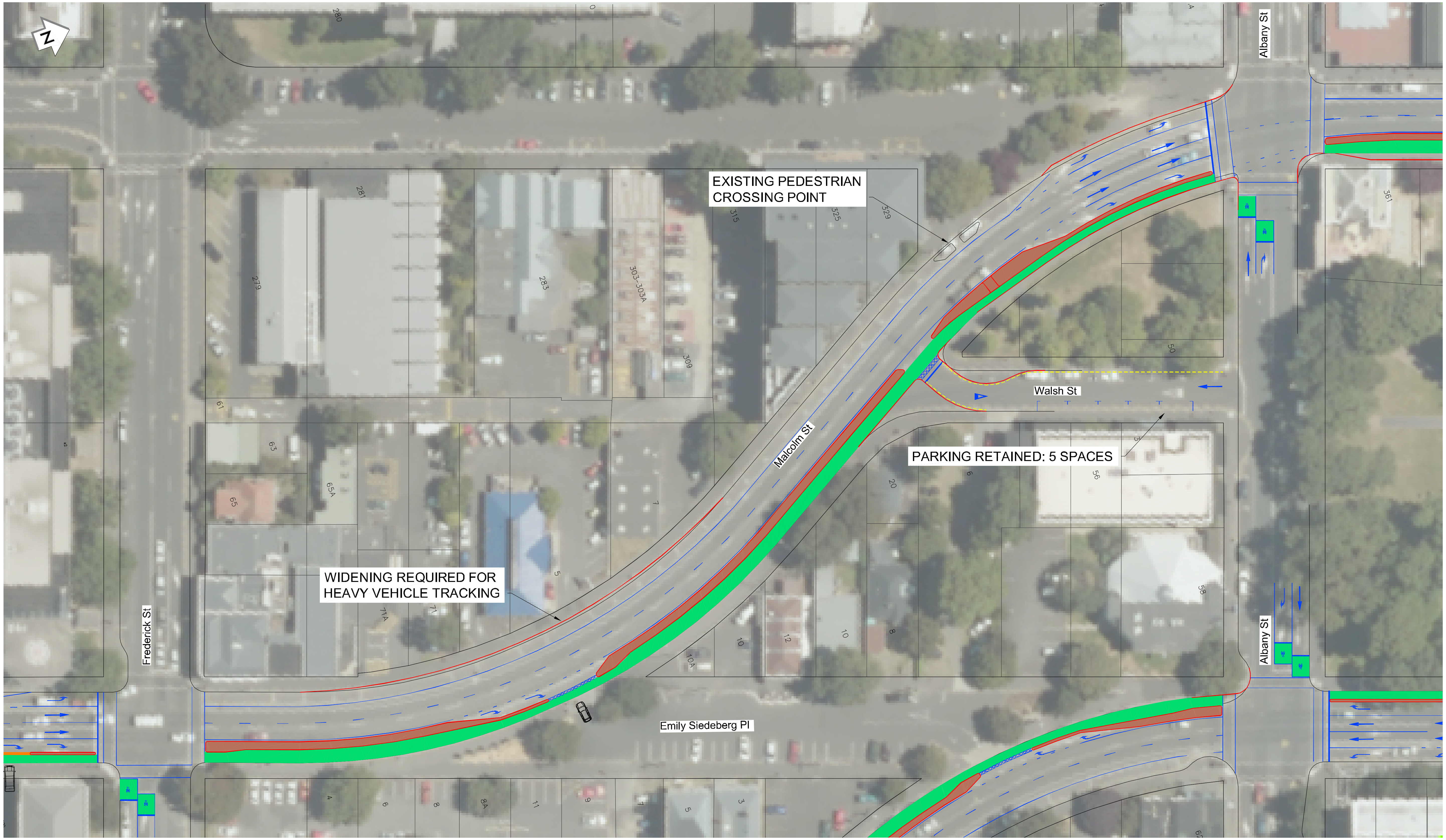
Drawing No. 80507429-01-001-C005

Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3



Legend

Cycle lane	Mountable separator	Sightlines
Kerbed physical separator	New kerbing	Landscaping
Shared path	New road markings	
Shared path - alternative	New no stopping markings	

Malcolm St - Northbound

NOT FOR CONSTRUCTION

DESIGNED	VIASTRADA/MWH	02.15	
DRAWN	BEN DODGSHUN	02.15	
CAD REVIEW			
DES CHECK			
REVIEWED			
APPROVED	NOT APPROVED		
PROF REGISTRATION:			

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

MWH.

NZTA

DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES

OPTION ONE - RECOMMENDED OPTION

FREDERICK STREET TO ALBANY STREET (NORTHBOUND)

Status Stamp **WORKING PLOT**

Date Stamp

Scales 1:750

Drawing No. 80507429-01-001-C006 Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\

Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

Gowland St - Southbound

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	**NOT APPROVED**	
PROF REGISTRATION:		

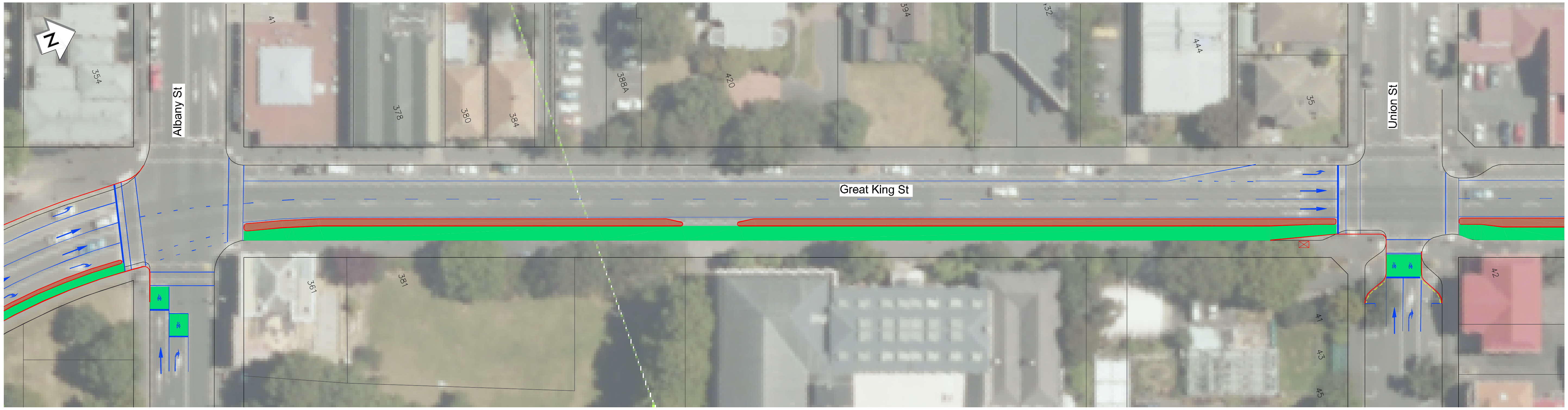
MWH

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION
FREDERICK STREET TO ALBANY STREET (SOUTHBOUND)

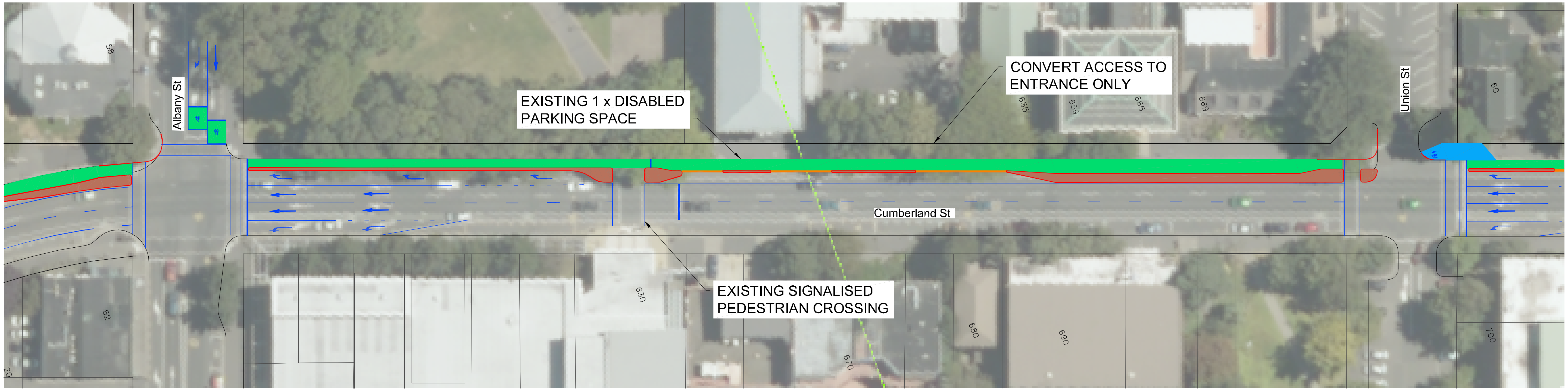
Status Stamp **WORKING PLOT**
Date Stamp
Scales 1:750
Drawing No. 80507429-01-001-C007
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\

DO NOT SCALE - IF IN DOUBT, ASK



Great King St - Northbound



Cumberland St - Southbound

Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

ORIGINAL SIZE A3

NOT FOR CONSTRUCTION

DESIGNED	VIASTRADA/MWH	02.15	
DRAWN	BEN DODGSHUN	02.15	
CAD REVIEW			
DES CHECK			
REVIEWED			
APPROVED	NOT APPROVED		
PROF REGISTRATION:			

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

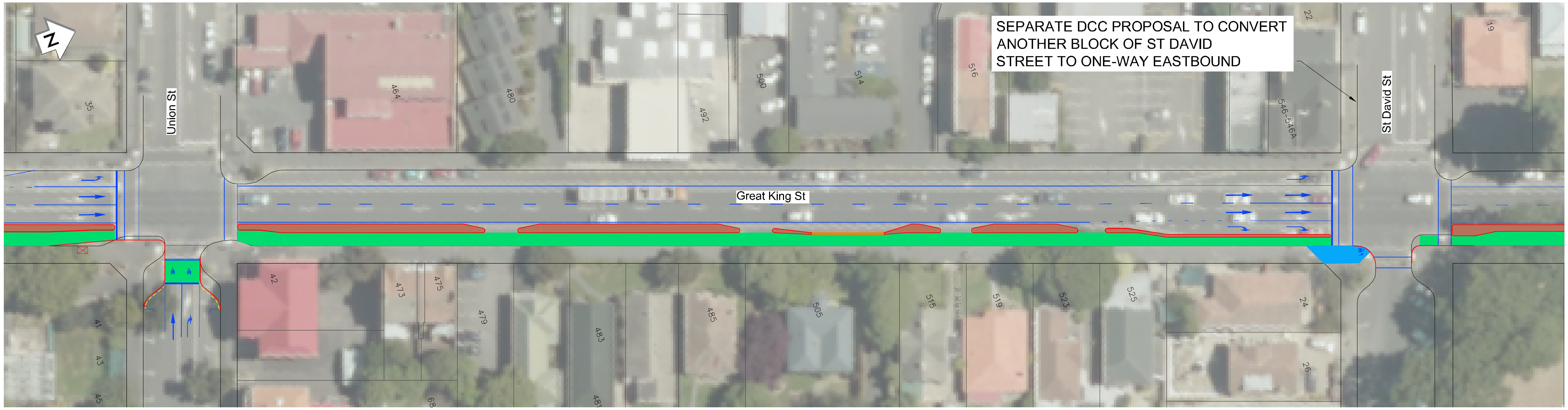
MWH.

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION

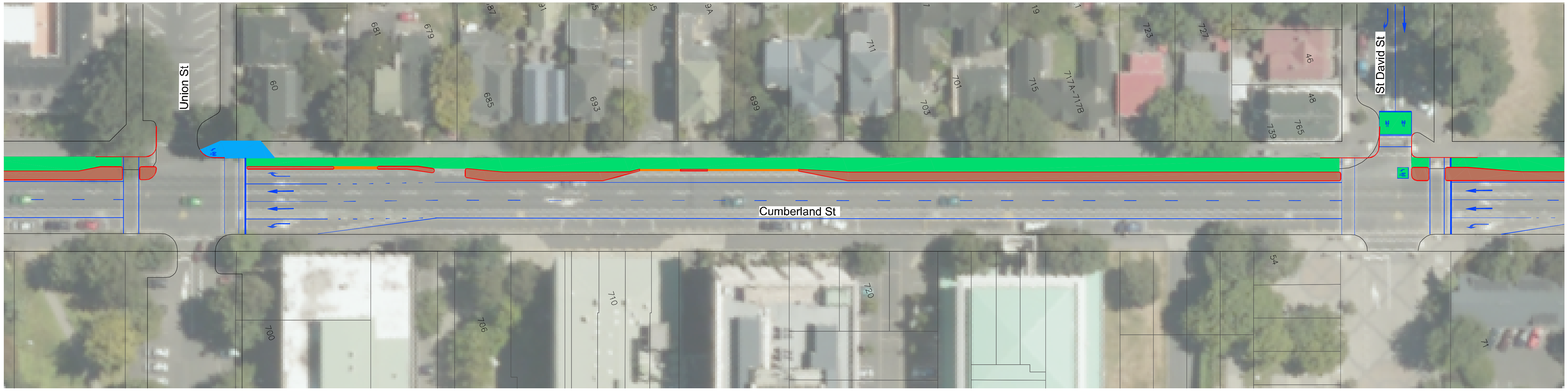
ALBANY STREET TO UNION STREET

Status Stamp **WORKING PLOT**
Date Stamp
Scales 1:750
Drawing No. 80507429-01-001-C008
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



Great King St - Northbound



Cumberland St - Southbound

Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	NOT APPROVED	
PROF REGISTRATION:		

MWH

NZTA

DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES

OPTION ONE - RECOMMENDED OPTION

UNION STREET TO ST DAVID STREET

Status Stamp: **WORKING PLOT**

Date Stamp

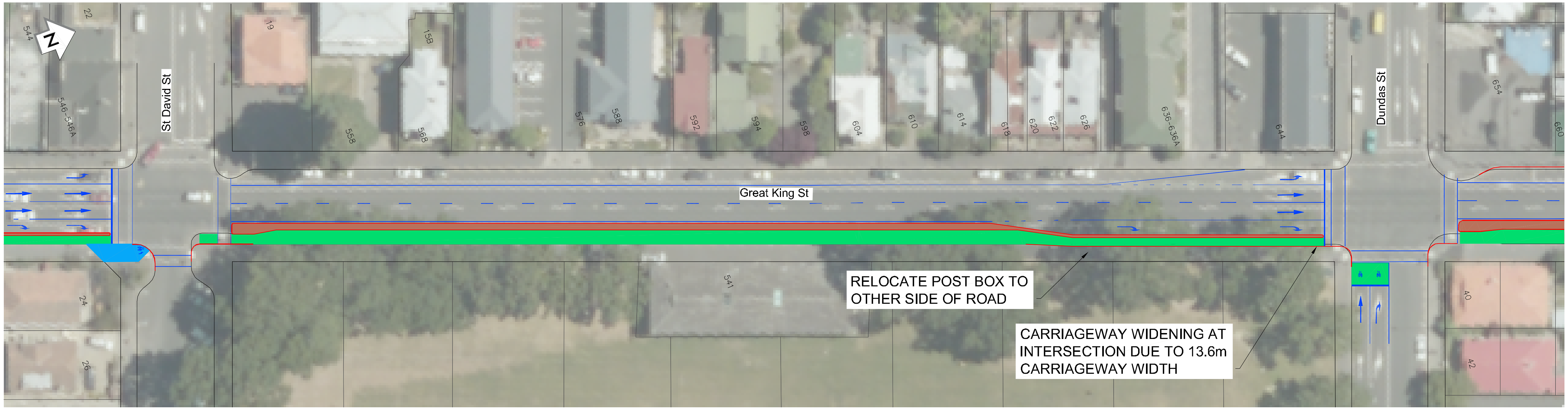
Scales 1:750

Drawing No. 80507429-01-001-C009

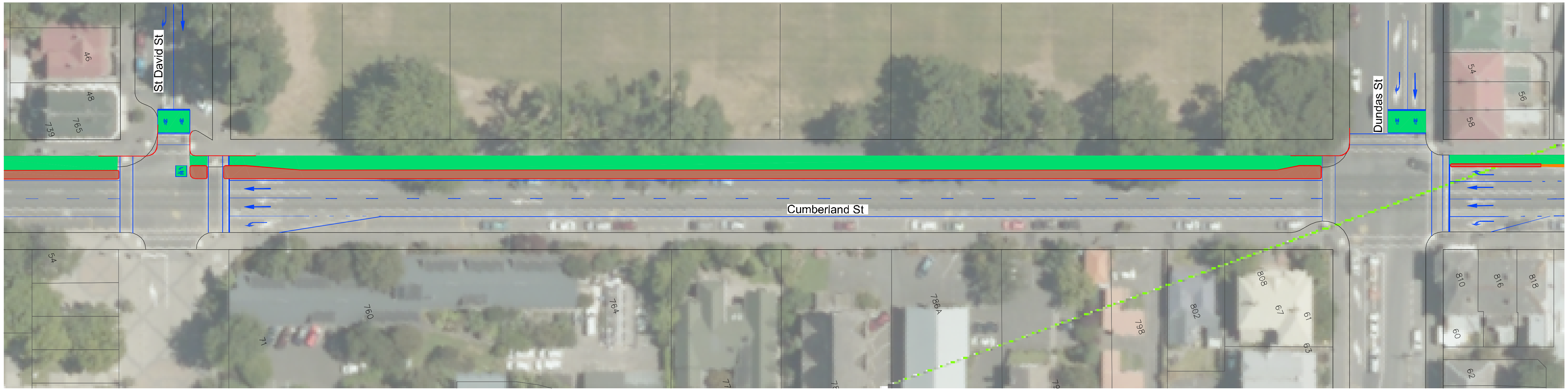
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\

DO NOT SCALE - IF IN DOUBT, ASK



Great King St - Northbound



Cumberland St - Southbound

ORIGINAL SIZE A3

Legend
- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED		
PROF REGISTRATION:		

NOT APPROVED

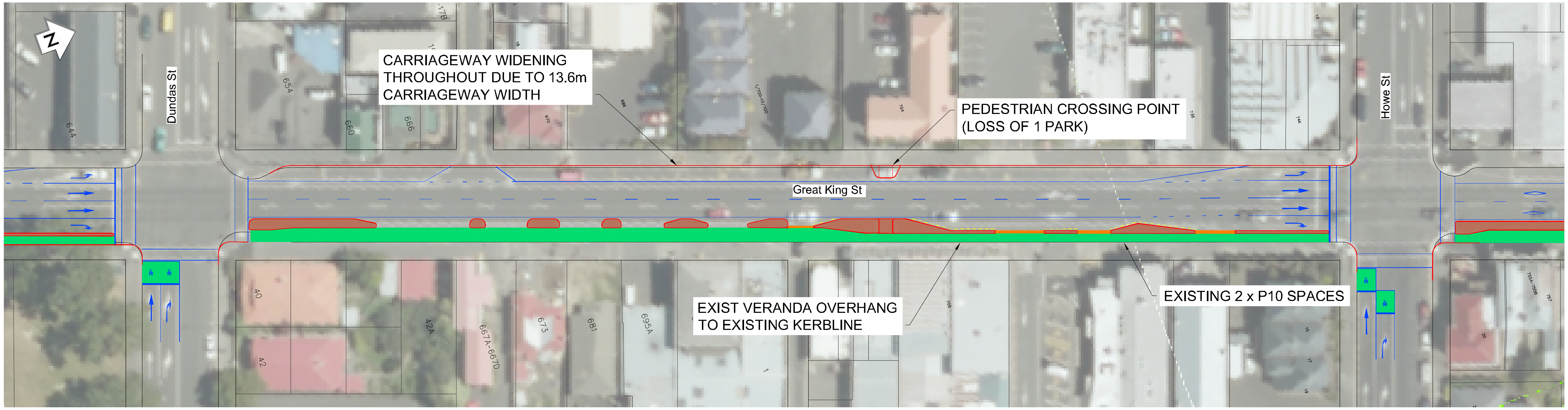
MWH.

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION

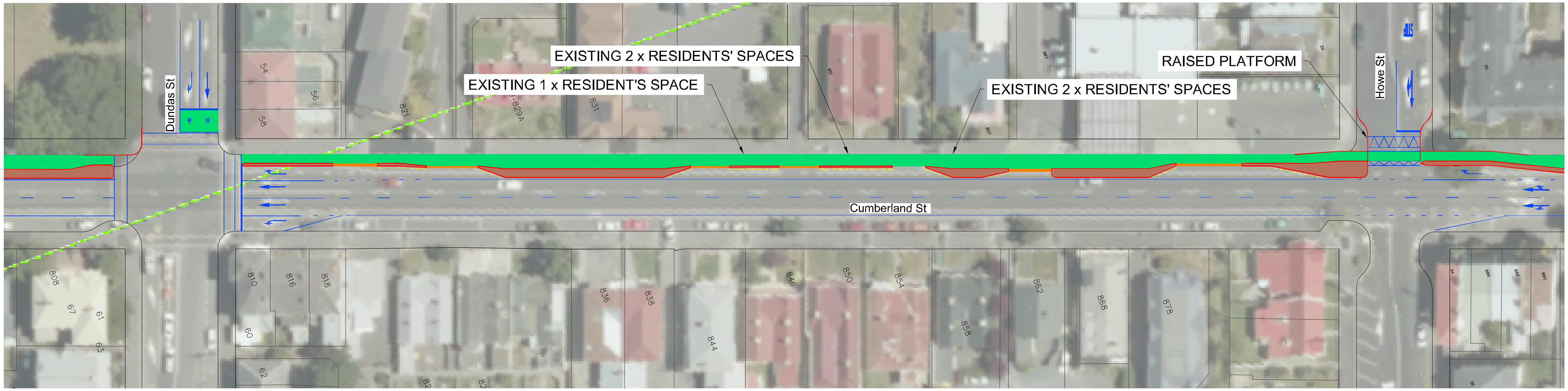
ST DAVID STREET TO DUNDAS STREET

Status Stamp **WORKING PLOT**
Date Stamp
Scales 1:750
Drawing No. 80507429-01-001-C010
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



Great King St - Northbound



Cumberland St - Southbound

Legend
- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	NOT APPROVED	
PROF REGISTRATION:		

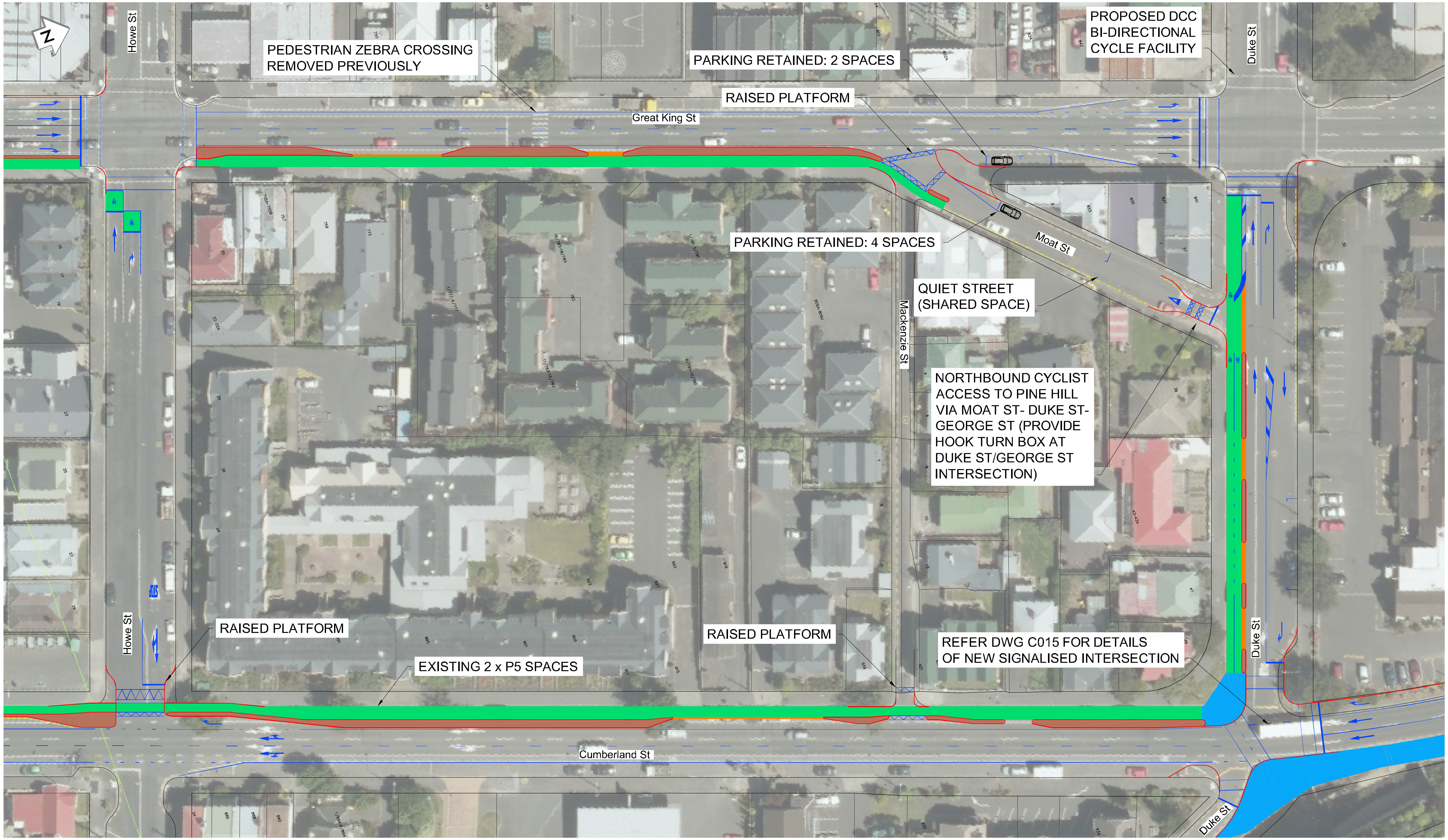
MWH

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION

DUNDAS STREET TO HOWE STREET

Status Stamp: **WORKING PLOT**
Date Stamp
Scales 1:750
Drawing No. 80507429-01-001-C011
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	NOT APPROVED	
PROF REGISTRATION:		

MWH

NZTA

DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES

OPTION ONE - RECOMMENDED OPTION

HOWE STREET TO DUKE STREET

Status Stamp: **WORKING PLOT**

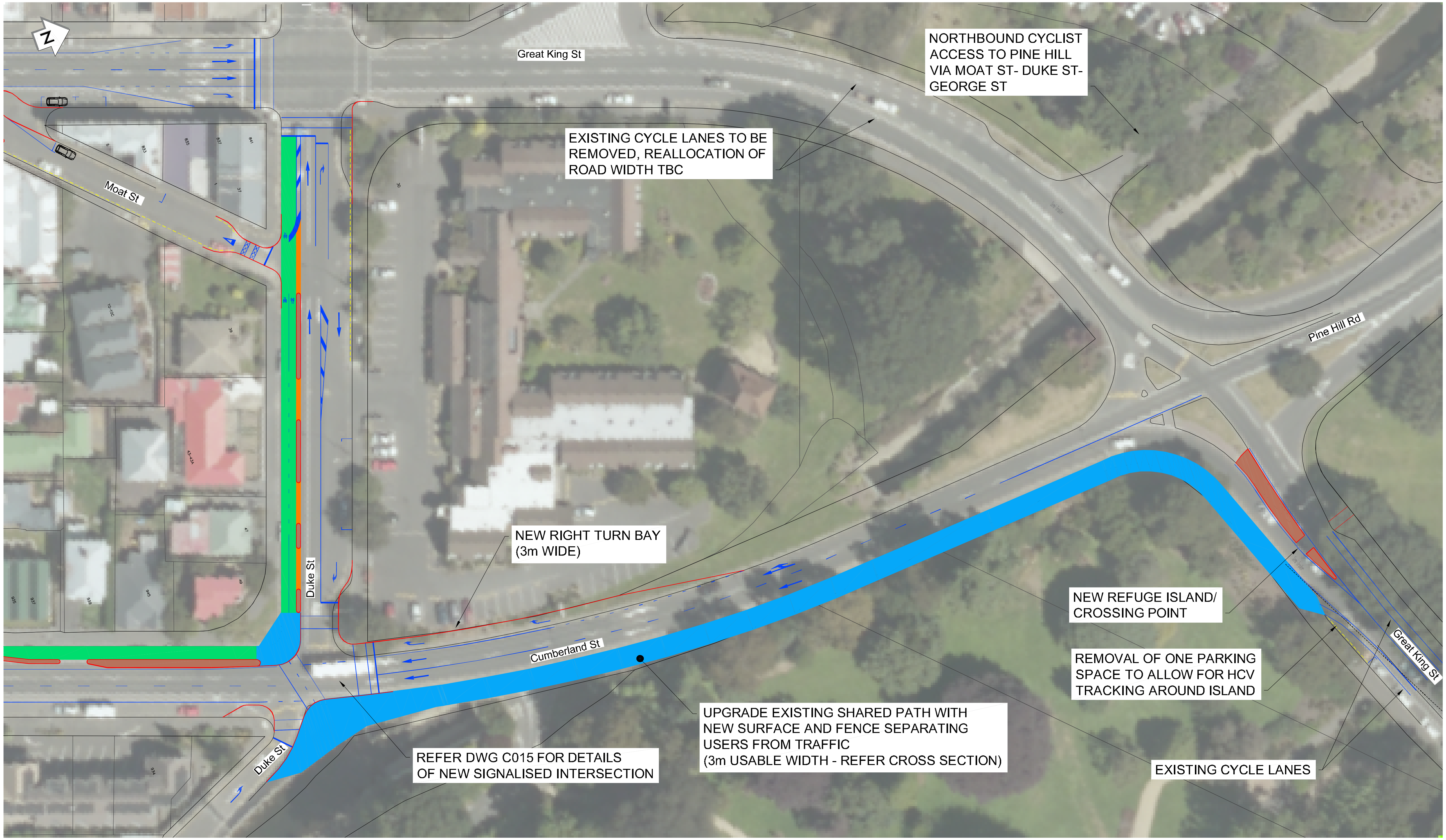
Date Stamp

Scales 1:750

Drawing No. 80507429-01-001-C012

Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

Legend

Cycle lane	Mountable separator	Sightlines
Kerbed physical separator	New kerbing	Landscaping
Shared path	New road markings	
Shared path - alternative	New no stopping markings	

NOT FOR CONSTRUCTION

A	CLIENT REVIEW	JP	02/15
REV	REVISIONS	APP	DATE

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED		
PROF REGISTRATION:		

NOT APPROVED

MWH

NZTA

DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES

OPTION ONE - RECOMMENDED OPTION

DUKE STREET TO NORTHERN END (GREAT KING STREET)

Status Stamp **WORKING PLOT**

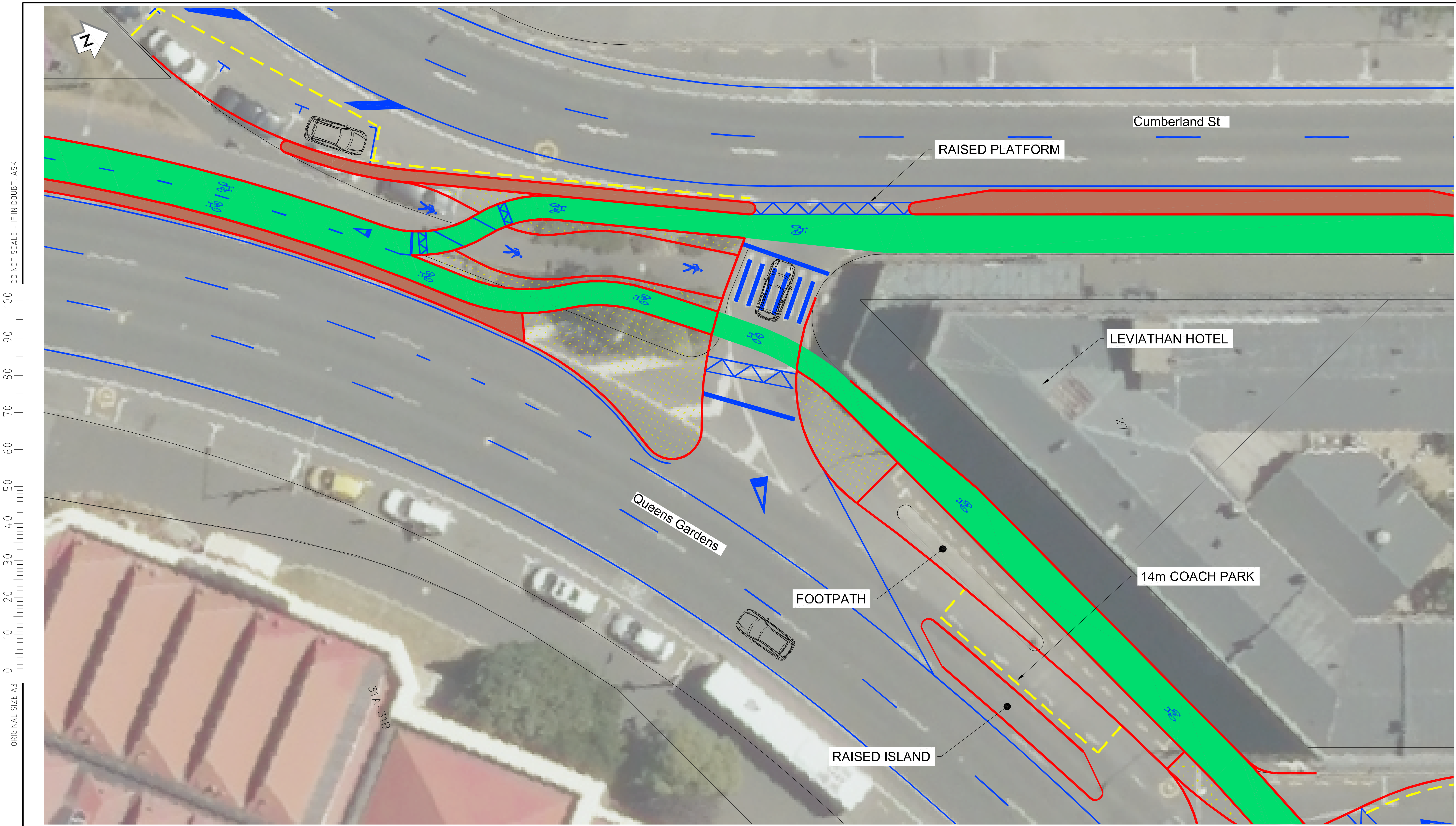
Date Stamp

Scales 1:750

Drawing No. 80507429-01-001-C013

Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\



Legend

Cycle lane	Mountable separator
Kerbed physical separator	New kerbing
Shared path	New road markings
Shared path - alternative	New no stopping markings
Sightlines	Landscaping

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

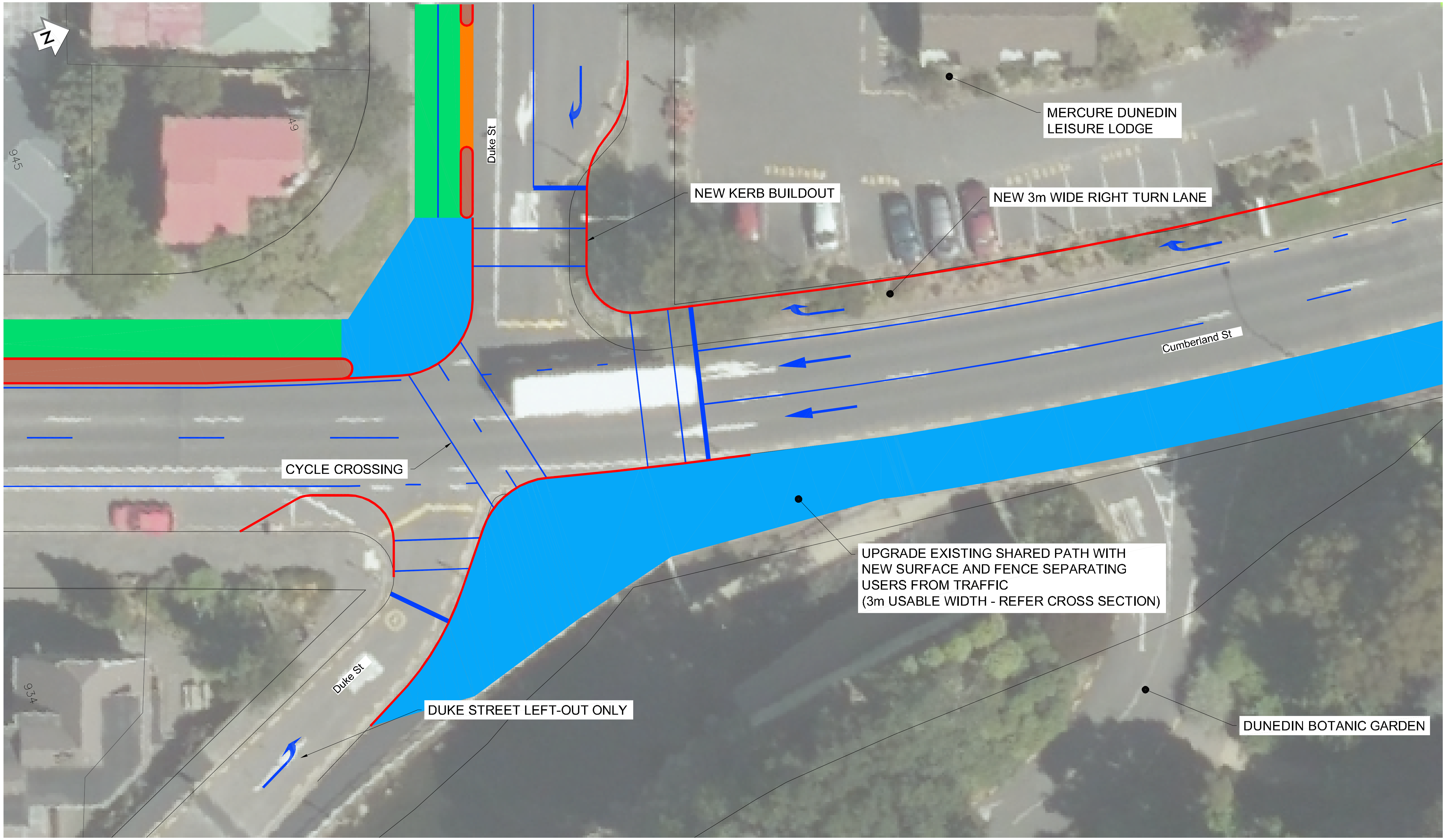
DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	NOT APPROVED	
PROF REGISTRATION:		

MWH

NZTA
DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES
OPTION ONE - RECOMMENDED OPTION

LEVIATHAN CORNER

Status Stamp: WORKING PLOT
Date Stamp
Scales 1 : 250
Drawing No. 80507429-01-001-C014
Rev. B



DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A3

Legend

- Cycle lane
- Kerbed physical separator
- Shared path
- Shared path - alternative
- Mountable separator
- New kerbing
- New road markings
- New no stopping markings
- Sightlines
- Landscaping

NOT FOR CONSTRUCTION

REV	REVISIONS	APP	DATE
A	CLIENT REVIEW	JP	02/15

DESIGNED	VIASTRADA/MWH	02.15
DRAWN	BEN DODGSHUN	02.15
CAD REVIEW		
DES CHECK		
REVIEWED		
APPROVED	**NOT APPROVED**	
PROF REGISTRATION:		

MWH

NZTA

DUNEDIN ONE-WAY SYSTEM SEPARATED CYCLE LANES

OPTION ONE - RECOMMENDED OPTION

CUMBERLAND ST/DUKE ST TRAFFIC SIGNALS

Status Stamp: **WORKING PLOT**

Date Stamp

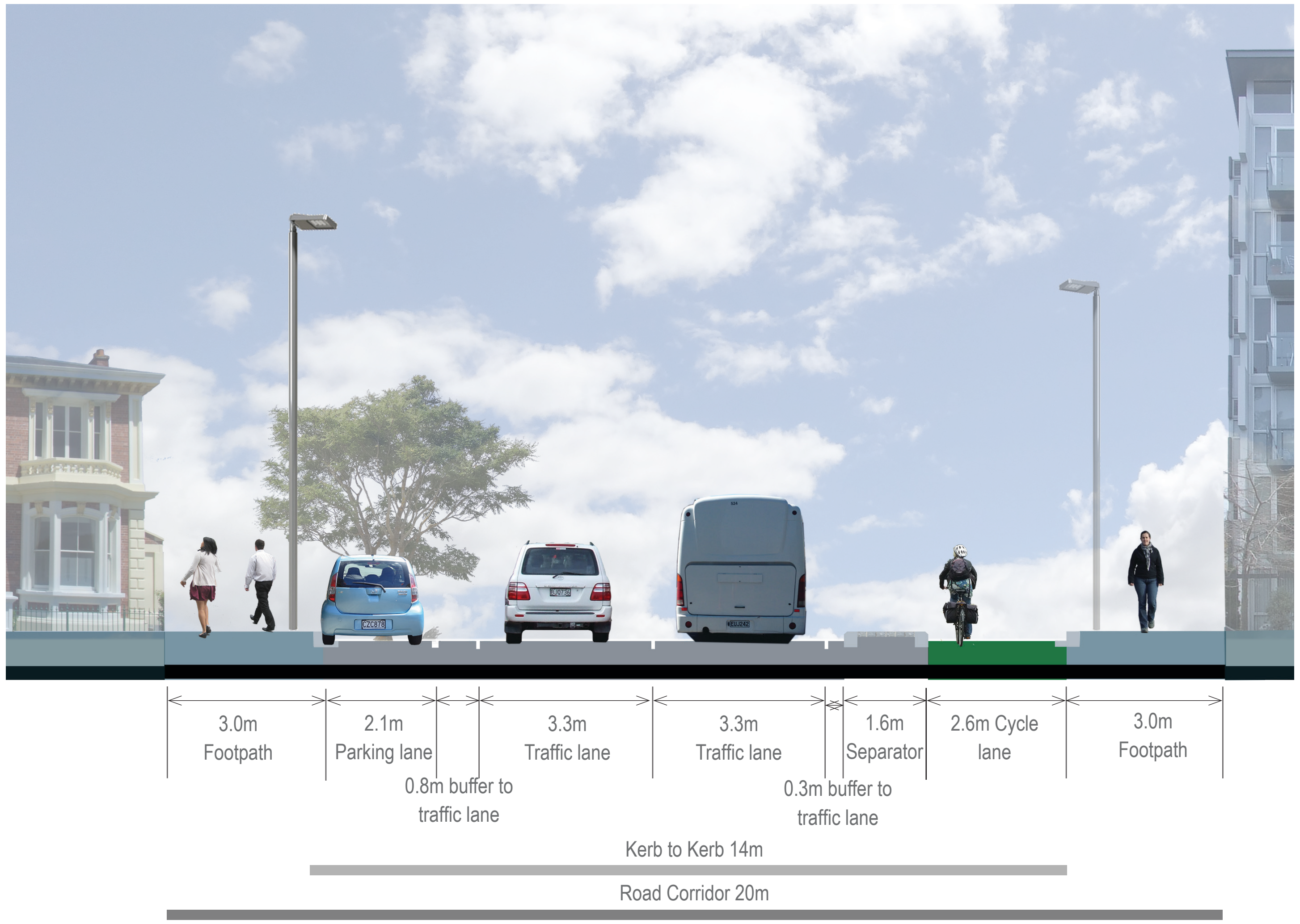
Scales 1 : 250

Drawing No. 80507429-01-001-C015

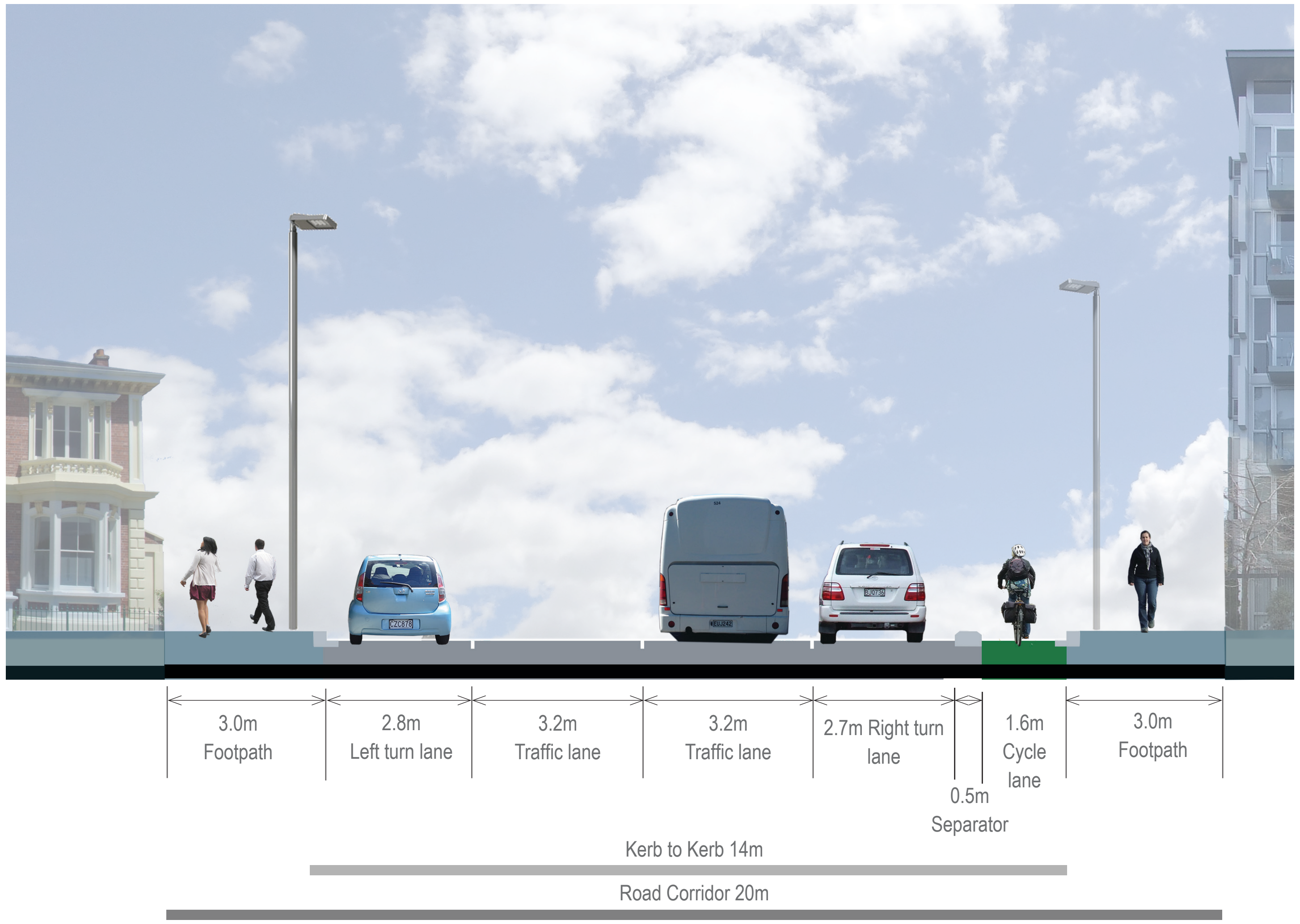
Rev. B

pw:\\asiavpwint04.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\NZTA (New Zealand Transport Agency)\

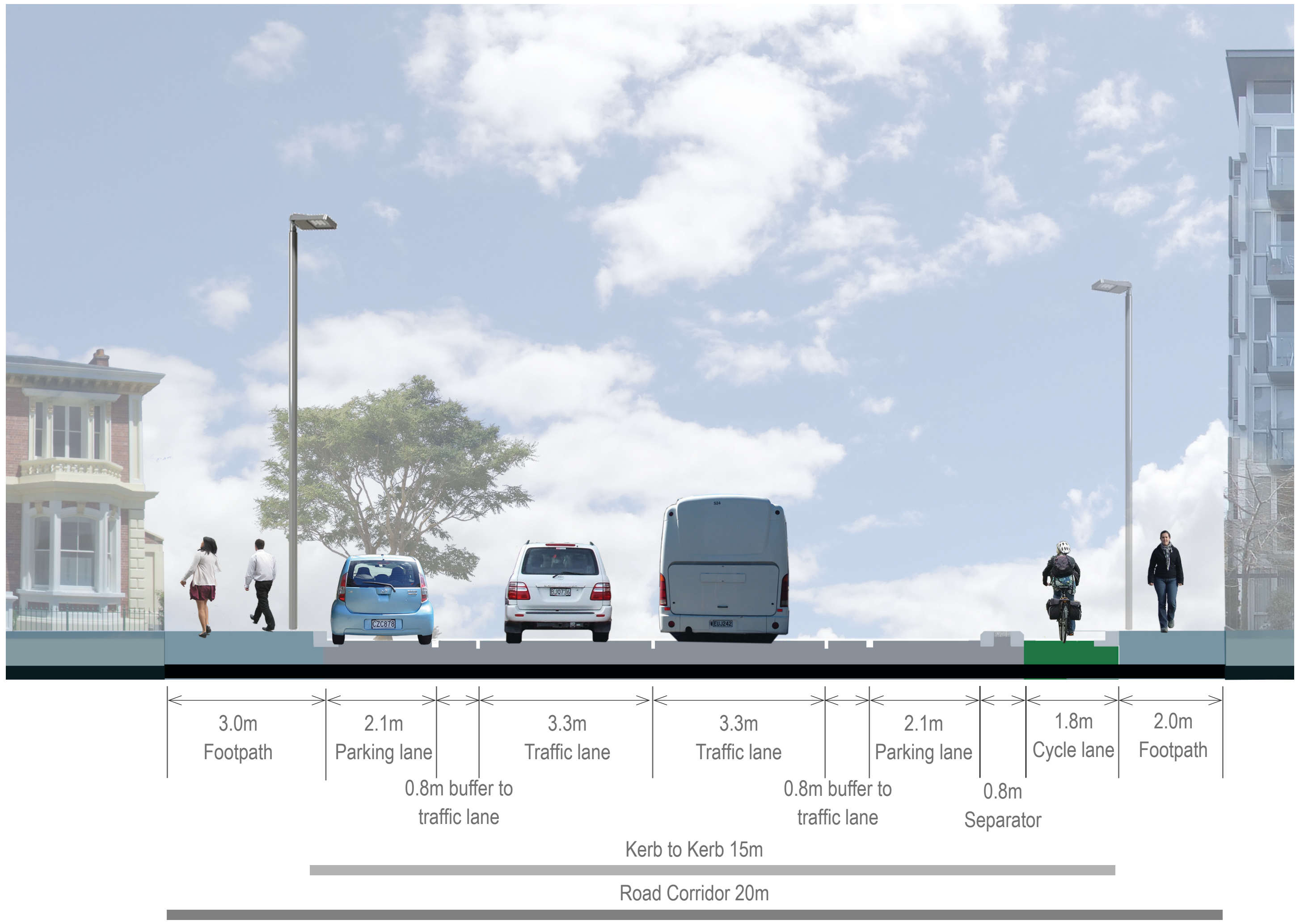
TYPE 1: SEPARATED CYCLE LANE MID - BLOCK, STANDARD



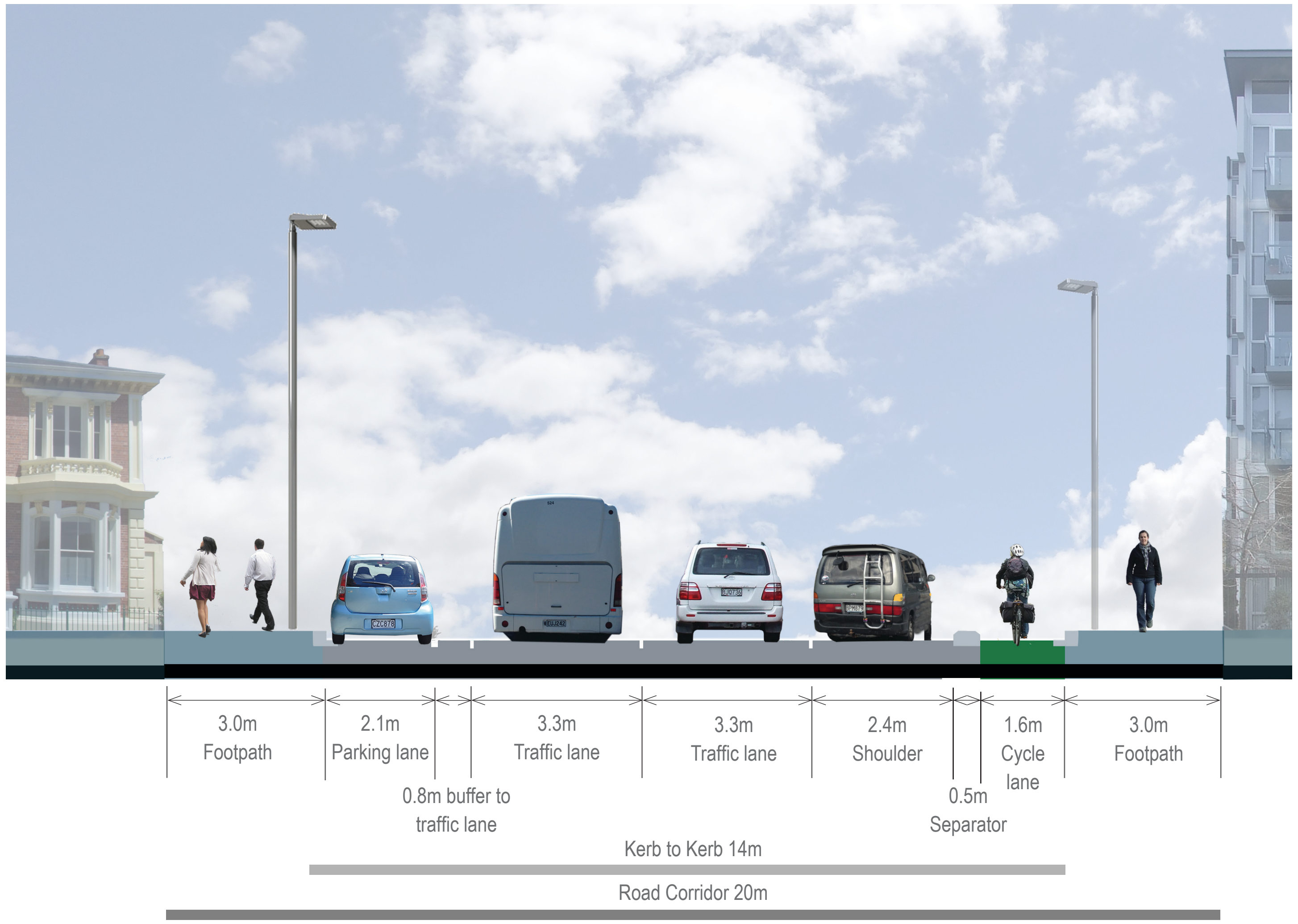
TYPE 2: SEPARATED CYCLE LANE AT INTERSECTIONS



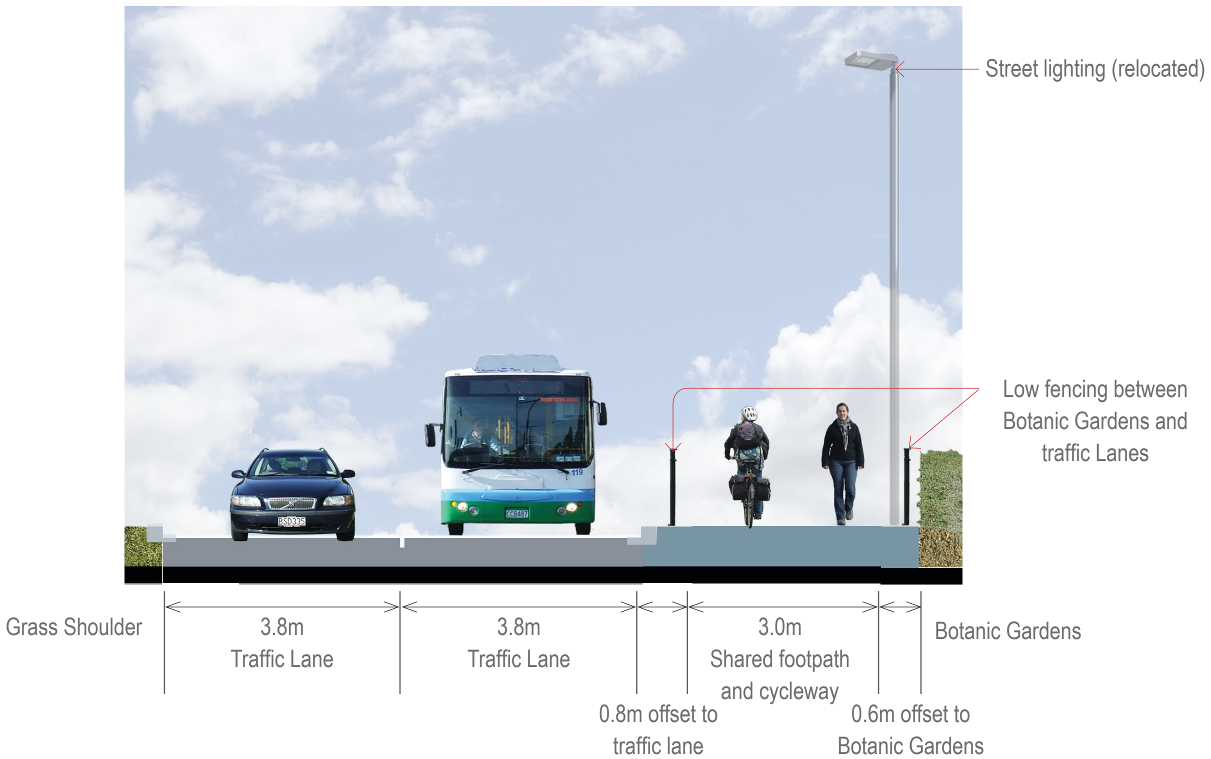
TYPE 3: SEPARATED CYCLE LANE MID - BLOCK WITH PARKING



TYPE 4: SEPARATED CYCLE LANE AT BUSY DRIVEWAYS



OFF ROAD SHARED PATH - CUMBERLAND STREET, OUTSIDE BOTANIC GARDENS



Appendix G – Planning Information

ENVIRONMENTAL AND SOCIAL RESPONSIBILITY SCREEN JUNE 2014

The purpose of the screen is to identify opportunities, inform the risk management process and ensure the environmental and social matters of a highway project have been addressed. The questions below have been categorised into five areas for ease of reference, however a number of the questions relate to multiple categories. Refer to the Environmental and Social Responsibility Screen Explanation for further detail.

PROJECT: Dunedin Single Lane Cycleway
OPTION: 1 and 2
DATE: 4 February 2015

NZ TRANSPORT AGENCY
WAKA KOTAHI

CATEGORY OF EFFECT	QUESTION	INFORMATION SOURCE	ANSWER (CIRCLE)	RESPONSE/NOTE
SOCIAL	Where is the project located?	NZTA GIS, Stats NZ	Urban	Central Dunedin in built up, urban area.
	What is the construction timeframe?	Project Team	< 18 months	
	What are the designation requirements?	Resource Planner	Existing SH Designations Option 2 – Road	DCDP - Designation 453 (South) and 454 (North) – No conditions Option 2 – road between Cumberland Street North and South
	Does the option enhance cycling infrastructure and improve access for cyclists?	Project Team, Regional Land Transport Plan	Yes	Refer Otago Regional Land Transport Strategy (2011).
	Does the option affect community facilities i.e. libraries, open space etc?	District Plan	Yes	Project will provide improved access into and through Central City.
NATURAL ENVIRONMENT	Are there any significant natural features/landscapes?	District and Regional Plan and Policy Statement	No	Urban environment.
	Will the project affect the coastal marine area, wetlands, lakes, rivers or their margins?	District and Regional Plan and Policy Statement	No	
	Will the project affect areas of significant native vegetation or significant habitats of native fauna?	District and Regional Plan and Policy Statement	No	
	Are there any natural hazards e.g. fault lines, significant erosion, flooding etc?	District and Regional Plan and Policy Statement	No	
	Is the project located on a scenic route?	Tourism NZ	No	Southern Scenic Route starts in the Octagon and goes South.
	Will more than 0.5 hectares of vegetation be removed?	Project Team, NZTA GIS	No	
HUMAN HEALTH	What is the One Network Road classification?	State Highway, Asset Management Plan	National or Regional Regional or Collector	
	Is the area of interest designated as a non-compliant airshed?	NZTA GIS, MfE Website	No	
	Are there educational sites in the area of interest?	NZTA GIS, District Plan	Yes	University of Otago and Otago Museum.
	Are there medical sites in the area of interest?	NZTA GIS, District Plan	Yes	Dunedin Hospital
	Are there HAIL (contaminated) sites within 200m of the area of interest?	Regional Council	Yes	There are records associated with nine sites adjacent to the SH1 corridor on the Otago Regional Council's "Database of Selected Landuses".
CULTURE AND HERITAGE	Are there listed heritage sites/areas within 200m of the area of interest?	NZTA GIS, Heritage New Zealand Register, NZ Archaeological Association, District Plan	Yes	The DCDP maps show heritage trees and buildings adjoining.
	Are there sites/areas of significance to Maori within 200m of the area of interest?	Iwi	Y N	To be confirmed.
URBAN DESIGN	Does the option enhance pedestrian infrastructure and improve access for pedestrians?	Project Team, Regional Land Transport Plan	Yes	
	Does the option enhance public transport infrastructure?	Project Team, Regional Land Transport Plan	Yes	
	Does the option enhance the development potential of adjacent land where appropriate?	Project Team, Strategies & District Plan	Yes	
	Does the option enhance community cohesion and accessibility including vehicular connectivity on the local road network?	Project Team, Strategies & District Plan	Yes	

	Does the option enhance the built environment, character and amenity?	Project Team	Yes	The provision of separated cycle lanes will have a positive effect on the built environment, character and amenity of Central Dunedin.

SUMMARY	Analyse and summarise the Environmental and Social Responsibility Screen using the information from page 1 and discuss the risks and opportunities and any necessary actions to be taken to meet the NZTA Environmental and Social Requirements. Note - any significant risks should be recorded in the relevant risk register in accordance with Z/44.

No significant risks to be recorded in accordance with Z/44.

Social

Under the Dunedin City District Plan the corridor is designated "State Highway Purposes (SH 1)"[1]:

Designation Number	Requiring Authority	Designation Name and "purpose"	Location	Legal Description	Conditions
D453	NZ Transport Agency	SH 1 - South Bound One-Way System (Cumberland Street - Gowland Street - Castle Street - Lower High Street - Cumberland Street - Andersons Bay Road) - "State Highway Purposes (SH 1)"	SH 1 - South Bound One-Way System through Dunedin City Centre, Dunedin	Lots 1 and 2 DP 25488, and Pt Road Reserve	No
D454	NZ Transport Agency	SH 1 - North Bound One-Way System (Andersons Bay Road - Crawford Street - Lower High Street – Cumberland Street - Malcolm Street - Great King Street) - "State Highway Purposes (SH 1)"	SH 1 - North Bound One-Way System through Dunedin City Centre, Dunedin	Sec 1 Blk LIV, Sec 1 Blk XLV, Pt Reserve No 4, Pt Town Belt and Pt Blk L Town of Dunedin, and Pt Road Reserve	No.

In addition, Option 2 has a short stretch of road approximately m long between Cumberland Street North and South as shown on the planning maps as "road". The cycleway works (for both Option 1 and 2) will be fully contained within the designated state highway and road corridor. There are no conditions on the NZ Transport Authority designations, south or north bound. An outline plan under Section 176A of the RMA will need to be submitted to Dunedin City Council once the detailed design has been progressed to sufficiently indicate the detail of the proposed works. The territorial authority may request changes. Outline plan applications are processed on a "non-notified" basis within 20 working days.

Natural Environment

The Otago Regional Council's two relevant statutory plans are the Regional Plan: Water and Regional Plan: Air. The cycleway does not involve any works in a water body or streambed. The majority of the hard surface areas already exist and stormwater from the existing road and footpaths will be collected and discharged via Council stormwater infrastructure. No new or additional discharges of stormwater are proposed for the new cycle lanes. Under the Regional Plan: Air the discharge of contaminants into air from road construction activities is a permitted activity[2].

Human Health

The cycleway will improve connections to Dunedin Hospital and Otago University.

There are no records of soil contamination within the road corridor but nine known sites adjacent to the SH1 corridor on the Otago Regional Council's "Database of Selected Land uses." The NES for Assessing and Managing Contaminants in Soil to Protect Human Health ('NES Soil Contamination') small-scale soil disturbance activities which disturb no more than 25 cubic metres per 500 square metres of affected land, and are of temporary (up to two months') duration are a permitted activity. The cycleway construction is not anticipated to exceed these thresholds and the disturbance of soil would be permitted under Regulation 9 of the NES Soil Contamination.

Culture and Heritage

Adjoining the designated state highway corridor are a number of different district plan zones including the Central Activity Zone (CA), Large Scale Retail Zone (LSR), Campus Zone, Residential 3 (R3) and Residential 1 (R1). The corridor passes through three Townscape Precincts (TH12, TH10 and TH01) and an Urban Landscape Conservation Area (ULCA 1). The District Plan maps also identify a number of protected buildings and trees adjacent to the designated state highway and road corridor.

There are **13** listed heritage trees on sites adjoining the state highway designations for Option 1, and **seven** listed heritage tees on sites adjoining the Option 2 route[3]. Under the Dunedin City District Plan the removal or modification of any tree or pruning, trimming or any other modification or activity within the canopy spread of any listed tree is a discretionary activity[4]. If the physical works impact on the adjoining heritage trees, resource consent may be required prior to works commencing. Given the minimal earthworks proposed, re-using existing paved surfaces and connection to existing stormwater infrastructure modification is unlikely.

Urban Design

Provision of separated cycleway lanes will enhance the urban environment in Central Dunedin. NZTA and DCC are signatories to The Urban Design Protocol (2005). The Urban Design Protocol identifies seven essential design qualities that create quality urban design: the seven Cs: Context, Character, Choice, Connections, Creativity, Custodianship and Collaboration. A high priority is placed on transport modal choice including cycling. The addition of the cycleway is consistent with these urban design principles.

	Shirley Ferguson Senior Planner MWH
Reviewed by NZTA Project Manager	

[1] Dunedin City District Plan, Schedule 25.5 – Designations.
[2] Otago Regional Council Air Plan, Rule 16.3.13.1.
[3] Dunedin City District Plan, Planning maps 34, 35, 36, 49 and Schedule 25.3 – Option 1 – T362, T360, T531, T533, T028, T532, T534, T363, T364, T366, T365, T295, T294, Option 2 – T362, T360, T363, T364, T360, T365 and T419 (connecting road).
[4] Dunedin City District Plan, Chapter 15 Trees, Rule 5.5.1.

LEGEND FOR ZONE MAPS
NOTES

Volume Two of the District Plan contains the Schedules and Maps. These should be read in conjunction with the relevant sections or provisions in Volume One of the District Plan.
All zone boundaries adjoining a legal road, railway or other positional feature, for example, a fence or a stream, are deemed to follow the centre line of any such feature, except where the feature adjoins the coast where the boundary shall be the mark of mean high water springs.
The underlying zone for all designated sites shall apply in terms of section 176(2) of the Resource Management Act 1991.
Recreation areas are not shown on the Maps, and recreation activities are provided for in the zone rules.

ZONES

- R1 - Residential 1 Zone
- R2 - Residential 2 Zone
- R3 - Residential 3 Zone
- R4 - Residential 4 Zone
- R5 - Residential 5 Zone
- R6 - Residential 6 Zone
- Campus Zone
- Airport Zone
- Stadium Zone
- CA -Central Activity Zone
- LSR - Large Scale Retail Zone
- LA1 - Local Activity Zone 1
- LA2 - Local Activity Zone 2
- In1 - Industrial 1 Zone
- In2 or SD - Industrial 2 or Special Development Zone
- Port 1 Zone
- Port 2 Zone
- Rural Zone
- RR - Rural Residential Zone
- H - Harbourside Zone
- MH - Mercy Hospital
- Formed Road Corridor in Road Reserve
- Unformed Road in Road Reserve
- Formed Road Corridor outside Road Reserve

AREAS WITH SPECIAL CONTROLS

RESIDENTIAL

- Restricted Water Supply Area Boundary

ACTIVITY ZONES

- Identified Pedestrian Frontage
- Verandah Required
- Central Parking Area

TOWNSCAPE

- TH99 Townscape and Heritage Precinct Boundary
- Townscape and Heritage Precinct Boundary - Internal
- B999 Heritage Structure (refer Schedule 25.1)
- B999 Heritage Facade (refer Schedule 25.1)
- A999 Archaeological Site (refer Schedule 25.2)
- ULCA99 Urban Landscape Conservation Area Boundary

LANDSCAPE

- Landscape Management Area Outside Boundary (refer Map78)
- Landscape Management Boundary Between Areas
- VPA VRA Visually Prominent Area Boundary

TREES

- T999 Significant Single Tree (refer Schedule 25.3)
- G999 Significant Group of Trees (refer Schedule 25.3)

AREAS OF SIGNIFICANT CONSERVATION VALUE (ASCV)

- C999 ASCV Boundary (refer Schedule 25.4)
- ASCV Boundary - Internal
- C999 ASCV Estuarine Edge - WERI Database (refer Schedule 25.4)
- C999 ASCV Wetland - WERI Database (refer Schedule 25.4)

SUBDIVISION ACTIVITY

- Esplanade Reserve Required
- Esplanade Strip Required

ENVIRONMENTAL ISSUES

- Air Noise and Port Noise Boundary
- Airport Outer Control and Port Outer Control Boundary
- Ground Water Protection Zone A
- Ground Water Protection Zone B
- Transpower Support Structure
- Transpower Line

DESIGNATIONS

- D999 Designation Area Boundary (refer Schedule 25.5)

Townscape Precincts

TH01	North Dunedin Residental Townscape Precinct
TH02	The Octagon Townscape Precinct
TH03	North Princes Street/Moray Place/Exchange Townscape Precinct
TH04	South Princes Street Townscape Precinct
TH05	Crawford Street Townscape Precinct
TH06	South Dunedin Townscape Precinct
TH17	St Clair Esplanade Townscape Precinct

Heritage Precincts

TH07	Campus Heritage Precinct
TH08	Royal Terrace/Pitt Street/Heriot Row Heritage Precinct
TH09	George Street Commercial Heritage Precinct
TH10	Lower Stuart Street Heritage Precinct
TH11	Anzac Square/Railway Station Heritage Precinct
TH12	Queens Gardens Heritage Precinct
TH13	Vogel Street Heritage Precinct
TH14	High Street Heritage Precinct
TH15	Port Chalmers Heritage Precinct
TH16	Willowbank Heritage Precinct

Urban Landscape Conservation Areas

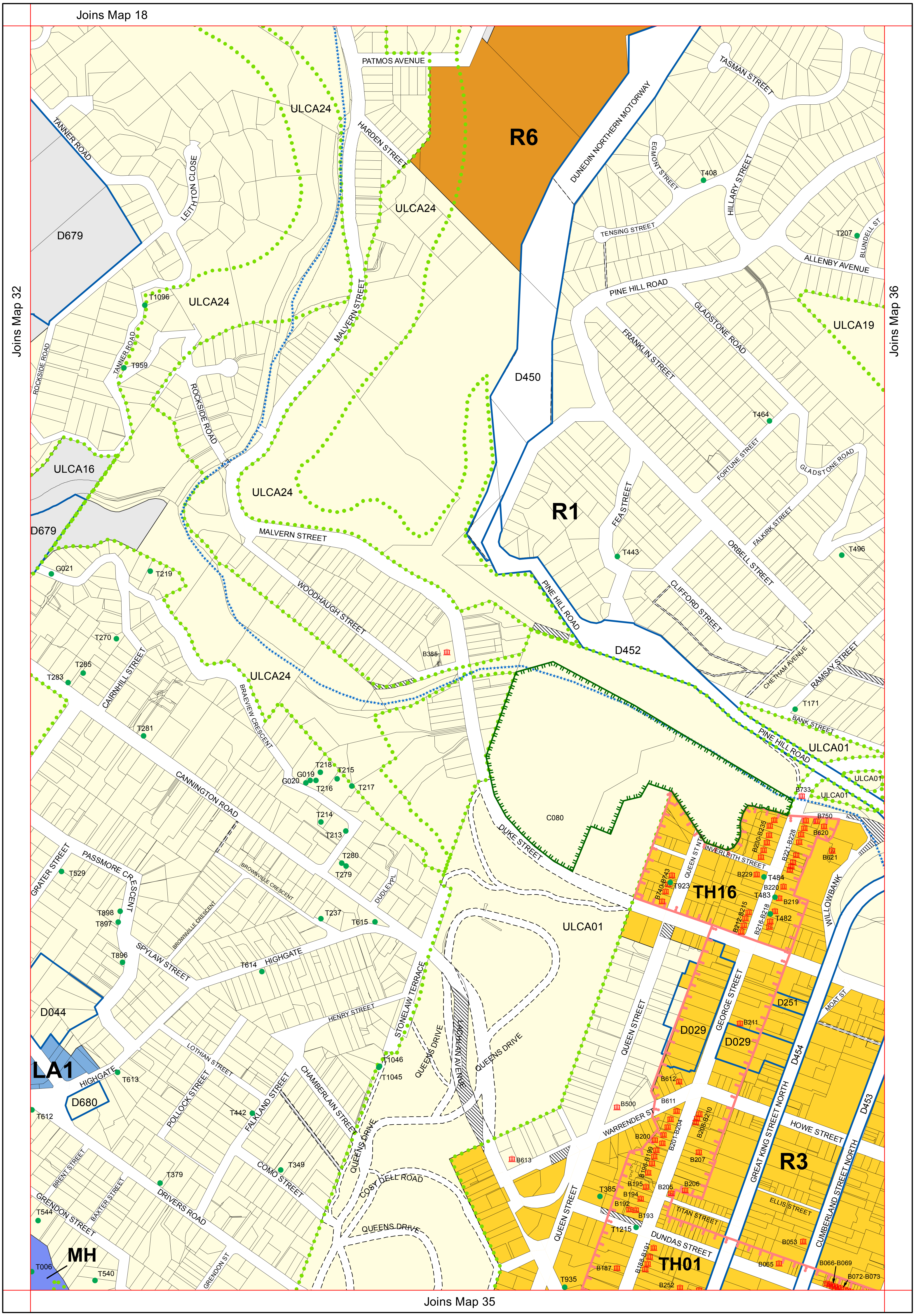
- ULCA 01 Dunedin Town Belt
- ULCA 02 Harbourside Areas, Dunedin
- ULCA 03 Leith Edge, North Dunedin
- ULCA 04 Port Chalmers Town Belt
- ULCA 05 Back Beach, Port Chalmers
- ULCA 06 Watson Park, Port Chalmers
- ULCA 07 Woodland Road, Mosgiel
- ULCA 08 Owhiro Stream, Mosgiel
- ULCA 09 Silverstream Banks and Adjoining Parks, Mosgiel
- ULCA 10 Kaikorai Estuary, Fairfield
- ULCA 11 Frasers Gully, Dunedin
- ULCA 12 Wakari Reserve, Dunedin
- ULCA 13 Kaikorai Valley, Dunedin
- ULCA 14 Caversham Valley Slopes, Dunedin
- ULCA 15 Concord/Corstophine, Dunedin
- ULCA 16 Ross Creek/Balmacewen, Dunedin
- ULCA 17 Ocean Beach Domain, Dunedin
- ULCA 18 Chingford Park, North East Valley
- ULCA 19 Buccleugh Street, North East Valley
- ULCA 20 Somerville Street/Marne Street, Dunedin
- ULCA 21 Upper St Clair, Dunedin
- ULCA 22 Walton Park, Fairfield
- ULCA 23 Brockville, Dunedin
- ULCA 24 Leith Valley, Dunedin

Landscape Management Areas (refer Map 78)

OLA	Outstanding Landscape Area
CLPA	Coastal Landscape Preservation Area
LCA	Landscape Conservation Area
VPA	Visually Prominent Area
VRA	Visually Recessive Area

DUNEDIN CITY COUNCIL

Printed in August 2013



Contains Data Derived from LINZ's DCDB
Crown Copyright Reserved

Map Printed: May 2014

Legend

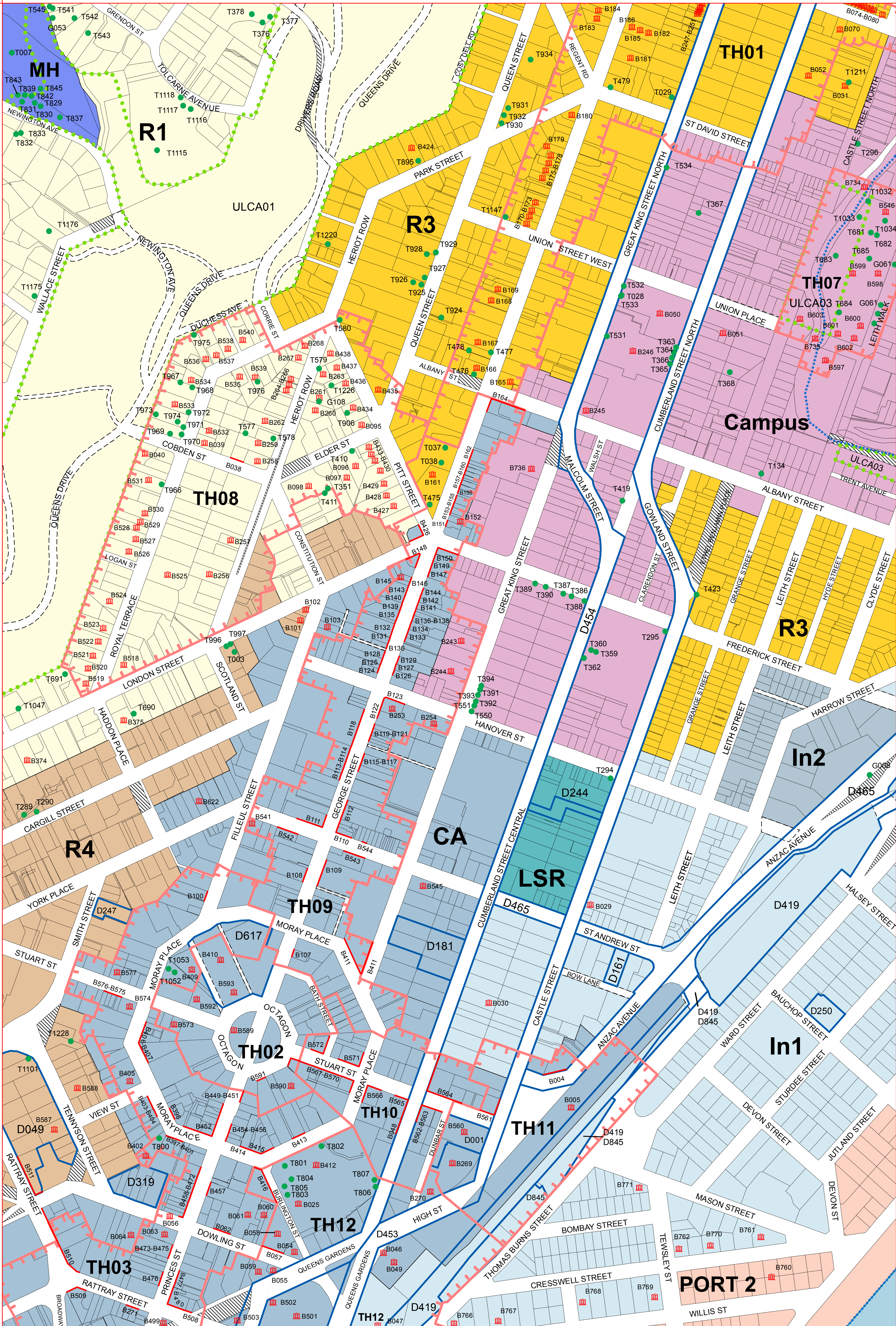
Woodhaugh

0 50 100 150 Meters

Map 34
Scale 1:5000

Joins Map 34

Joins Map 33



Joins Map 37

Joins Map 49

DUNEDIN CITY COUNCIL

Kaunihera-a-rohe o Ōtepoti

Map Printed: May 2014

Legend

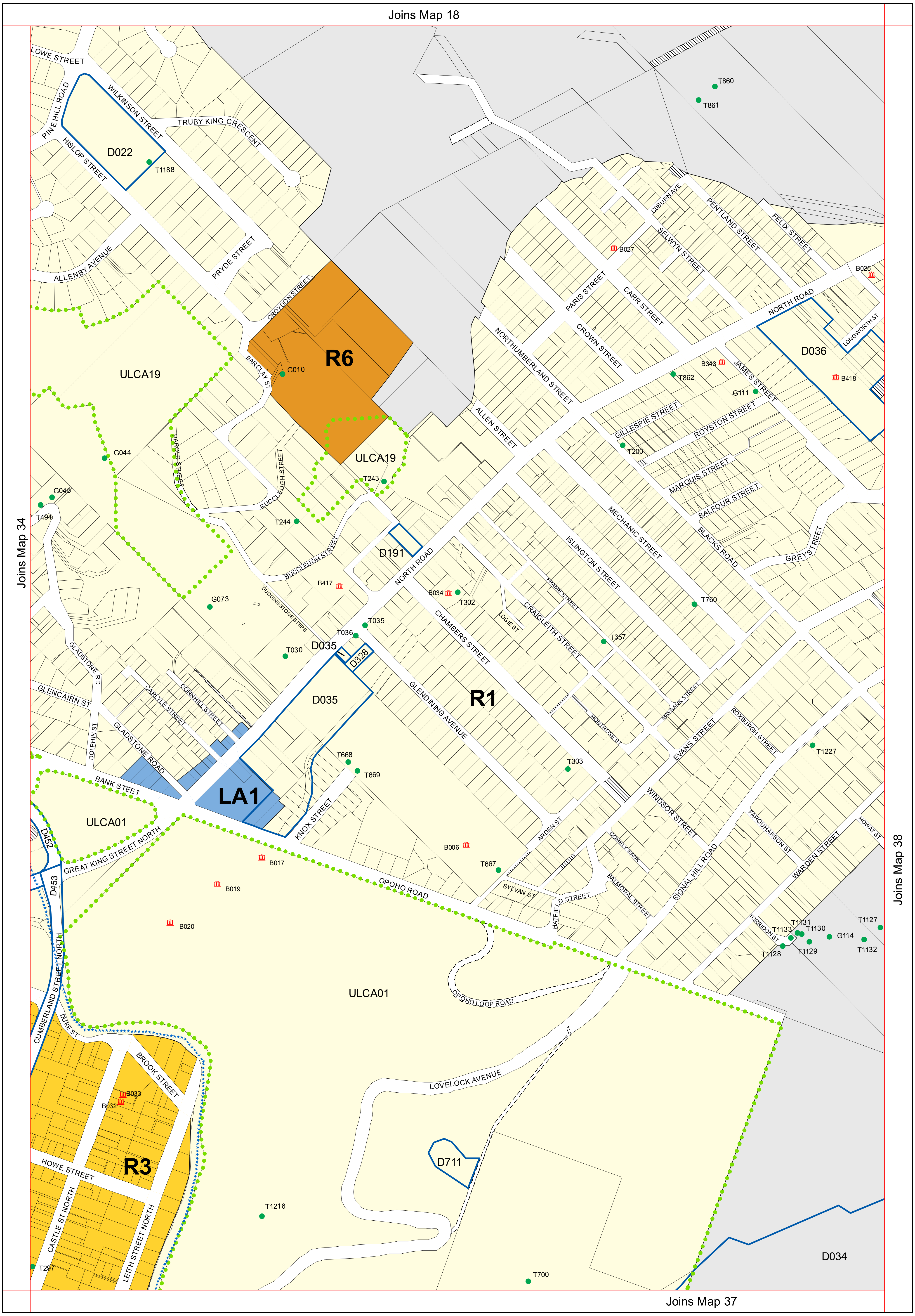
N

Centre City

0 50 100 150 Meters

Map 35

Scale 1:5000



Contains Data Derived from LINZ's DCDB
Crown Copyright Reserved

N

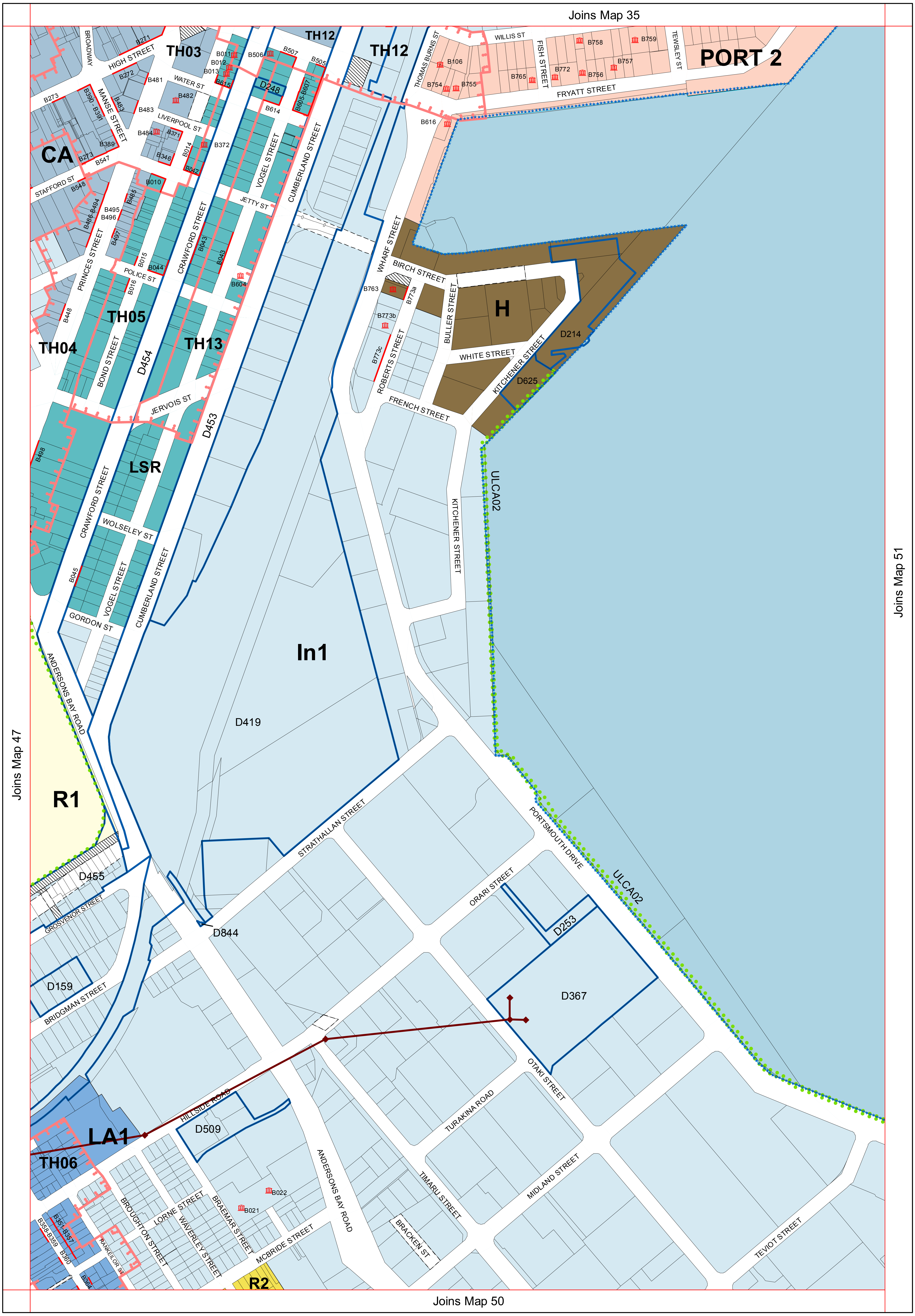
North East Valley

0 50 100 150 Meters

Map 36
Scale 1:5000

Map Printed: January 2013

Legend



Contains Data Derived from LINZ's DCDB
Crown Copyright Reserved

Map Printed: May 2012

Legend

Portsmouth Drive

0 25 50 100 150 Meters

Map 49

Scale 1:5000

25.3 Significant Trees *[Amended by Variation 11: 26/7/ 2003 and by Consent Order: 24/10/03 and 7/5/04]*

Schedule 25.3 contains a list of trees that have been identified as being particularly worthy of protection from modification and removal because of their contribution to the maintenance or enhancement of amenity and the quality of the environment. Trees listed in Schedule 25.3 are subject to Rule 15.5.1 as contained in the Trees Section of the District Plan. The procedure for amending Schedule 25.3 is set out in Method 15.4.1 of the Trees Section of the District Plan.

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
G001	46	23a Milburn Street	Mixed native/exotic group			Lot 2 DP 24719
G002	32	4 Carnarvon Street	Native group			Lot 3 DP 5014
G003	32	Burma Road, Ross Creek	*Sequoia sempervirens* (group)	Californian redwood		Sec 86 Wakari SD
G004	42	125 Gladstone Road	Exotic group			Lot 3 DP 19408
G005	54	Stevenson property, Main South Road, East Taieri	*Sophora microphylla* (group)	Kowhai	Kowhai	Pt Sec 9 Irreg Blk East Taieri SD
G006	27	12 Oaks Golf Course, Dukes Road Mosgiel	*Quercus robur* (12)	English oak		Lot 3 DP 12838
G007	13	Waitati	*Eucalyptus regens* (group)	Mountain ash		Sec 78 Blk I North Harbour and Blueskin SD
G008	35	Anzac Avenue (Road Reserve)	*Ulmus sp* (avenue)	Elm avenue		ANZAC AVENUE
G009	25	365 Aramoana Road	*Eucalyptus sp* (group)	Gum		Sec 28 Blk I LOWER HARBOUR WEST SD
G010	36	36 Barclay Street	Cupressus macrocarpa (group)	Monterey cypress		Lot 3 DP 23072
G011	46	18 Barr Street	Eucalyptus globulus (group)	Gum		Lot 9 Blk IV DP 111
G012	51	66 Bayfield Road	*Eucalyptus sp* (group)	Gum		Pt Lot 4 DP 5450
G013	24	22 Beaconsfield Road	*Podocarpus totara* (group)	Totara	Totara	Lot 136 DP 193
G014	60	89 Bedford Street (Road Reserve)	*Quercus robur* (group)	Oak		Road Reserve (BEDFORD STREET)
G015	23	11 Bellevue Place	*Eucalyptus sp.* (group)	Eucalyptus		Sec 220 TN OF PORT CHALMERS
G016	51	23 Belmont Lane	*Quercus robur* (group)	Oak		Pt Lot 2 DP 15122
G017	38	49 Birchfield Avenue	*Cupressus macrocarpa* (group)	Monterey cypress		Pt Sec 38 NORTH EAST VALLEY SD
G018	42	35 Braeside Road	*Quercus robur* (group)	Oak		Lot 2 DP 16866
G019	34	24 Braeview Crescent	*Nothofagus fusca* (group)	Red beech	Tawhairaunui	Lot 32 DP 394
G020	34	24 Braeview Crescent	*Nothofagus fusca* (group)	Red beech	Tawhairaunui	Lot 32 DP 394
G021	34	Braeview Crescent (Road Reserve)	*Sophora microphylla* (group)	Kowhai	Kowhai	Road Reserve (BRAEVIEW CRESCENT)
G022	61A	895 Brighton Road	*Metrosideros excelsa* (group)	Pohutukawa	Pohutukawa	Lot 6 DP 2228
G023	32	123 Brockville Road	*Cupressus macrocarpa* (group)	Macrocarpa		Pt Lot 1 DP 27
G024	32	108 Brockville Road	*Pseudotsuga menziesii* (group)	Douglas fir		Lot 11 DP 9626
G025	32	118 Brockville Road	*Nothofagus menziesii* (group)	Silver beech	Tawhai	Pt Lot 7 DP 27
G026	32	31 Burwood Avenue	*Podocarpus totara* (group)	Totara	Totara	Pt Lot 7 DEEDS 152
G027	40	145 Camp Road	*Eucalyptus sp* (group)	Gum		Lot 18 DP 1453
G028	40	Camp Road (Road Reserve)	*Cupressus macrocarpa / Pinus radiata* (avenue)	Monterey cypress / Monterey pine		Road Reserve (CAMP ROAD)
G029	43	81 Chain Hills Road	*Eucalyptus sp* (group)	Gum		Lot 2 DP 21107
G030	60	111 Cliffs Road	*Cupressus macrocarpa* (group)	Monterey cypress		Lot 1 DP 9130
G031	9	348 Coast Road	*Sophora microphylla* (group)	Kowhai	Kowhai	Pt Sec 2 Sec 52 Blk I WAIKOUAITI SD
G032	1	Conical Hill, Moonlight Road	*Populus nigra var. Italica* (group)	Lombardy poplar		Sec 13 Blk X STRATH TAIERI SD
G033	31	Dalziel Road	*Cupressus macrocarpa / Pinus radiata* (avenue)	Monterey cypress/ Monterey Pine		Road Reserve (DALZIEL ROAD)
G034	14	145 Doctors Point Road	*Quercus robur* (group)	Oak		Pt Sec 1 Sec 5 Blk I NORTH HARBOUR & BLUESKIN SD
G035	14	186 Doctors Point Road	*Pseudopanax crassifolium* (group)	Lancewood	Horoeka	Lot 18 DP 5365
G036	54	opp 643 East Taieri-Allanton Rd (Road Reserve)	*Eucalyptus globulus* (group)	Blue gum		Road Reserve (EAST TAIERI-ALLANTON ROAD)
G037	47	79 Eglinton Rd	*Ulmus procera* (group)	Elm		Lot 2 DP 2628
G038	29	289 Factory Road	*Fagus sylvatica 'Riversii'* (group)	Copper beech		Lot 5 DP 23060
G039	32	Fern Tree Drive (Road Reserve)	*Larix decidua* (group)	Larch		Road Reserve (FERNTREE DRIVE)
G040	33	12 Fifield Street	*Ulmus procera* (group)	Elm		Lot 1 DP 11596
G041	17	47a Fulton Road	*Acacia melanoxylon* (group)	Blackwood		Lot 4 DP 23588
G042	1	862 Gladbrook Road	*Fraxinus excelsior* (group)	Ash		Sec 10 Blk V SUTTON SD
G043	1	Gladbrook Station, Gladbrook Road	*Sequoiadendron giganteum* (group)	Wellingtonia		Sec 10 Blk V SUTTON SD
G044	36	74 Gladstone Road, Dunedin	*Eucalyptus sp* (group)	Gum		Lot 1 DP 18056
G045	36	82 Gladstone Road, Dunedin	*Nothofagus fusca* (group)	Red beech	Tawhairaunui	Lot 8 DP 608
G047	41	171 Gladstone Road, Mosgiel	*Sequoiadendron giganteum* (group)	Wellingtonia		Lot 1 DP 5537
G048	51	54 Glendevon Place	*Hoheria sp* (group)	Lacebark	Houhere	Lot 1 DP 20460
G049	31	89 Glenelg Street	*Pseudotsuga menziesii* (group)	Douglas fir		Pt Sec 124 WAKARI SD
G050	31	89 Glenelg Street	*Sequoiadendron giganteum* (group)	Wellingtonia		Pt Sec 124 WAKARI SD
G051	51	opp 19 Glengyle Street (Road Reserve)	*Pinus radiata* (group)	Monterey pine		Road Reserve (GLENGYLE STREET)
G052	59	116 Green Island Bush Road	*Eucalyptus sp* (group)	Gum		Lot 3 DP 26594
G053	35	58 Grendon Street	*Sequoiadendron giganteum* (group)	Wellingtonia		Lot 14 DP 2602
G054	24	1711 Highcliff Road	*Eucalyptus globulus* (group)	Blue gum		Pt Sec 37 Blk VII PORTOBELLO SD
G055	24	1711 Highcliff Road	*Quercus robur* (group)	Oak		Pt Sec 37 Blk VII PORTOBELLO SD
G056	24	Quarantine (St Martins) Island	*Cupressus macrocarpa* (group)	Monterey cypress		Sec 31 Blk VI PORTOBELLO SD
G057	24	Quarantine (St Martins) Island	*Pinus sylvestris* (group)	Scots Pine		Sec 32 Blk VI PORTOBELLO SD
G058	32	190 Kaikorai Valley Road	*Rhododendron sp* (group)	Rhododendron		Lot 4 DP 342
G059	45	616 Kaikorai Valley Road (Townleys Road)	*Eucalyptus sp* (group)	Gum		Lot 1 DP 303329
G060	1	Kelvin Grove, Gladbrook Road	*Quercus robur* (group)	Oak		Sec 2 Sec 3S GLADBROOK SETT
G061	35	364 Leith Walk	*Fagus sylvatica* (group)	English beech		Sec 4 Blk LXXI TN OF DUNEDIN
G062	48	154 Macandrew Road, Dunedin	*Betula pendula* (group)	Silver birch		Lot 5 DP 7190
G063	47	101 Maryhill Terrace	*Sequoia sempervirens* (group)	Sequoia		Lot 2 DP 4865
G064	9	197 McGrath Road	*Tilia x europaea* (group)	Lime		Lot 1 DP 22525
G065	9	197 McGrath Road	*Corylus avellana*(group)	Hazelnut		Lot 1 DP 22525
G066	6	130 McKendry Road	*Corylus avellana* (group)	Hazelnut		Sec 20 Blk IX MAUNGATUA SD
G067	31	Rapid 5 McMeakin Road	*Eucalyptus sp* (group)	Eucalyptus		Lot B DP 1169
G068	46	41 Milburn Street	*Eucalyptus globulus* (group)	Blue gum		Lot 16 DP 10755
G069	2	73 Mold Street	*Ulmus sp.* (group)	Elm		Sec 17 Blk XIV STRATH TAIERI SD
G070	2	86 Mold Street	*Quercus robur* (group)	Oak		Lot 118 Blk VI DP 825
G071	1	Cottesbrook, 105 Moonlight Road	*Quercus robur* (group)	Oak		Sec 25 Blk X STRATH TAIERI SD
G072	13	1011 Mount Cargill Road	*Eucalyptus globulus (group)*	Blue gum		Pt Sec 43 Blk I NORTH HARBOUR & BLUESKIN SD

G073	36	61 North Road	*Sequoia sempervirens* (group)	Sequoia		Pt Sec 3 NORTH EAST VALLEY SD
G074	44	188 North Taieri Road	*Pinus radiata / Cupressus macrocarpa* (group)	Monterey pine / Monterey cypress		Pt Lot 1 DP 19351
G075	44	123 North Taieri Road	*Rhododendron sp.* (group)	Rhododendron		Lot 8 DP 25192
G076	44	123 North Taieri Road	*Metrosideros robusta* (group)	Northern rata	Rata	Lot 8 DP 25192
G077	19	95 Norwood Street	*Eucalyptus sp./*(group)	Gums/conifer group		Pt Sec 45 NORTH EAST VALLEY SD
G078	25A	105 Poto Street	*Cupressus macrocarpa* (group)	Monterey cypress		Lot 51 DP 25124
G079	16	41 Purakanui Road	*Pinus radiata* (group)	Pine		Sec 84 Blk VI NORTH HARBOUR & BLUESKIN SD
G080	16	41 Purakanui Road	*Cupressus macrocarpa* (group)	Monterey cypress		Sec 84 Blk VI NORTH HARBOUR & BLUESKIN SD
G081	16	39 Purakanui Station Road	*Fraxinus excelsior* (group)	Ash		Lot 1 DP 8777
G082	9	Railway South of Waikouaiti	*Quercus robur* (group)	Oak		Pt Lot 2 DEEDS 413
G083	41	Railway, Gladstone Road to Gladfield Road	*Quercus robur* (group)	Oak		Railway Reserve (MAIN SOUTH LINE RAILWAY)
G084	16	186 Reservoir Road, Sawyers Bay	*Sequoiadendron giganteum* (group)	Wellingtonia		Pt Sec 1 Sec 81 Blk VII NORTH HARBOUR & BLUESKIN SD
G085	51	16 Rewa Street	*Pinus radiata* (group)	Pine		Lot 12 DP 2087
G086	6	225 Riverside Road	*Quercus robur / Fraxinus excelsior* (avenue)	Oak / Ash		Pt Sec 34 River Sections EAST TAIERI SD
G087	31	15 Sanda Road	*Pseudotsuga menziesii* (group)	Douglas fir		Sec 55 Blk VI DUNEDIN & EAST TAIERI SD
G088	10	7 Scotia Street (Road Reserve), Waikouaiti	*Eucalyptus sp* (group)	Gum		Road Reserve (SCOTIA STREET)
G089	10	8 Scotia Street, Waikouaiti	*Eucalyptus sp* (group)	Gum		Lot 10 Blk IV DEEDS 51
G090	10	2 Seddon Street, Waikouaiti	*Quercus robur* (group)	Oak		Sec 13 Blk XIV TN OF HAWKSBURY
G091	60	St Clair Golf Club, Isadore Road	*Pinus radiata* (group)	Monterey pine		Sec 40 OCEAN BEACH SD
G093	46	53 Stone Street	*Cupressus macrocarpa* (group)	Monterey cypress		Pt Sec 12 Blk V LOWER KAIKORAI SD
G094	2	33 Swansea Street (Middlemarch School)	*Quercus robur* (group)	Oak		Pt Sec 3 Blk XXIV TN OF ARDEN
G095	51	24 Tahuna Road	*Pinus radiata* (group)	Monterey pine		Pt Sec 28 Blk VII OTAGO PENINSULA SD
G096	31	496 Taieri Road	*Fraxinus excelsior* (group)	Ash		Lot 1 DP 25915
G097	31	496 Taieri Road	*Sequoiadendron giganteum* (group)	Wellingtonia		Lot 1 DP 25915
G098	31	496 Taieri Road	*Pseudotsuga menziesii* (group)	Douglas fir		Lot 1 DP 25915
G099	16A	475 Tomahawk Road	*Cupressus macrocarpa* (group)	Monterey cypress		Lot 2 DP 4353
G100	16A	856 Tomahawk Road (Road Reserve)	*Cupressus macrocarpa* (group)	Monterey cypress		Road Reserve (TOMAHAWK ROAD)
G101	12	1737 Waikouaiti-Waitati Road	*Pinus sylvestris* (group)	Scots Pine		Sec 52 Blk II NORTH HARBOUR & BLUESKIN SD
G102	8	138 Wairongoa Road	*Podocarpus totara* (group)	Totara	Totara	Lot 2 DP 8649
G103	8	183 Wairongoa Road	*Sequoiadendron giganteum (group)*	Wellingtonia		Pt Sec 7 Blk XV EAST TAIERI SD
G104	13	SH1 Waitati	*Sophora microphylla* (group)	Kowhai	Kowhai	Pt Sec 44 Blk I NORTH HARBOUR & BLUESKIN SD
G105	1	149 Watson Road, Middlemarch	*Populus sp. / Quercus robur* (group)	Poplar - Oak		Lot 1 DP 23869
G106	6	Rapid 98 Woodside Road	*Quercus robur* (group)	Oak		Lot 3 DP 23646
T001	32	11 Ettrick Street	*Cordyline australis*	Cabbage tree	Ti Kouka	Lot 19 DP 8513
T003	35	15 Scotland Street	*Cordyline australis*	Cabbage tree	Ti Kouka	Pt Sec 30 Blk XX Town of Dunedin
T004	33	17 Littlebourne Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 19 DP 308
T005	33	17 Littlebourne Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 19 DP 308
T006	33	2 Burwood Avenue	*Quercus suber*	Cork oak		Lot 1 DP 1767
T007	35	2 Burwood Avenue	*Metrosideros excelsa*	NZ Christmas tree	Pohutukawa	Pt Sec 9 Blk I Upper Kaikorai SD
T009	32	21 Gilmore Street	*Betula pendula*	Silver birch		Lot 1 DP 6201
T010	18	273 Malvern Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 5 DP 2383
T011	18	293 Malvern Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 11626
T012	33	32 Littlebourne Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 28 DP 308
T013	33	32 Littlebourne Road	*Cedrus deodara*	Deodar		Pt Lot 29 DP 308
T014	46	33 Preston Crescent	*Nothofagus menziesii*	Silver beech		Pt Lot 8 Blk IV DP 444
T015	33	360 Highgate (outside)	*Tilia x europaea*	European lime		Highgate adj Lot1 DP 3637
T016	47	367 High Street	*Cedrus atlantica*	Atlas cedar		Lot 1 DP 5964
T017	47	367 High Street	*Fagus sylvatica Cuprea*	Copper beech		Lot 1 DP 5964
T018	47	367 High Street	*Metrosideros excelsa*	NZ Christmas tree	Pohutukawa	Lot 1 DP 5964
T019	47	367 High Street	*Pseudopanax arboreus*	Five-finger	Whawhaupaku	Lot 1 DP 5964
T020	47	367 High Street	*Ulmus procera*	English elm		Lot 2 DP 5964
T021	37	385 Leith Street	*Magnolia x soulangeana*	Magnolia		Sec 10 Blk XXXVII Town of Dunedin
T022	37	385 Leith Street	*Podocarpus totara*	Totara	Totara	Sec 9 Blk XXXVII Town of Dunedin
T023	33	40 Littlebourne Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 3 DP 16631
T024	33	43 Ross Street	*Podocarpus totara*	Totara	Totara	Lot 1 DP 6574
T025	33	45 Garfield Avenue	*Nothofagus menziesii*	Silver beech		Lot 3 DP 5215
T026	33	47 Garfield Avenue	*Sequoia sempervirens*	Wellingtonia		Lot 4 DP 5215
T027	48	47a Middleton Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 17608
T028	35	55 Union Street	*Tilia x europaea*	European lime		Lot 4 DP 10554
T029	35	558 Great King Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 5 Deeds 393
T030	36	61 North Road	*Eucalyptus sp.*	Gum		Lot 1 DP 17939
T031	31	8 Fenwick Street	*Nothofagus solandri Cliffortioides*	Mountain beech	Tawhairauriki	Lot 9 DP 9215
T032	33	8 Lundie Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 1 DP 4948
T033	60	97 Bedford Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 2 DP 10349
T034	33	Arthur Street Reserve	*Cedrus atlantica Glauca*	Blue Atlas cedar		Sec 88 Blk XIX Town of Dunedin
T035	36	Cnr Glendining/North Road	*Tilia x europaea*	European lime		Glendining Avenue adj Lot 3 DP 5143
T036	36	Cnr Glendining/North Road	*Quercus robur*	English oak		Glendining Avenue adj Lot 4 DP 5143
T037	35	Knox Church	*Fagus sylvatica Purpurea*	Purple beech		Lot 2 DP 12040
T038	35	Knox Church	*Metrosideros umbellata*	Southern rata	Rata	Lot 2 DP 12040
T039	42	109 Gladstone Road South	*Eucalyptus sp.*	Gum		Lot 9 DP 2294
T040	42	109 Gladstone Road South	*Eucalyptus sp.*	Gum		Lot 9 DP 2294
T041	41	155 Gladstone Road	*Cordyline australis*	Cabbage tree	Ti Kouka	Lot 2 DP 10246
T042	41	155 Gladstone Road	*Quercus robur*	English oak		Lot 1 DP 11716
T043	41	167 Gladstone Road	*Sophora microphylla*	Kowhai	Kowhai	Lot 2 DP 5537
T044	41	17 Riccarton Road	*Quercus coccinea*	Scarlet oak		Lot 7 Deeds 379
T045	41	171 Gladstone Road	*Ulmus procera*	English elm		Lot 1 DP 5537
T046	41	175 Gladstone Road	*Quercus robur*	English oak		Pt Lot 2 Deeds 379
T047	41	38 Riccarton Road	*Quercus robur*	English oak		Lot 5 DP 7572
T048	41	Barker Property, Riccarton Road East Taieri	*Cupressus corneyana*	Bhutan cypress		Lot 1 DP 10041
T049	41	Barker property, Riccarton Road East Taieri	*Cupressus corneyana*	Bhutan cypress		Lot 1 DP 10041
T050	42	East Taieri Presbyterian Church 12a Cemetery Road, East Taieri	*Fraxinus excelsior*	European ash		Pt Sec 22 Irreg Blk East Taieri SD
T051	42	East Taieri Presbyterian Church 12a Cemetery Road, East Taieri	*Podocarpus totara*	Totara	Totara	Pt Sec 22 Irreg Blk East Taieri SD
T052	42	East Taieri Presbyterian Church 12a Cemetery Road, East Taieri	*Quercus robur*	English oak		Pt Sec 22 Irreg Blk East Taieri SD
T053	42	East Taieri Presbyterian Church 12a Cemetery Road, East Taieri	*Quercus robur*	English oak		Pt Sec 22 Irreg Blk East Taieri SD

T054	42	East Taieri Presbyterian Church 12a Cemetery Road, East Taieri	*Quercus robur*	English oak		Pt Sec 22 Irreg Blk East Taieri SD
T055	42	East Taieri Presbyterian Church 12a Cemetery Road, East Taieri	*Cedrus deodara*	Deodar		Pt Sec 22 Irreg Blk East Taieri SD
T057	56	Scurr Property, Saddle Hill Road East Taieri	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 29 Blk VIII Dunedin and East Taieri SD
T058	41	Wallis Nursery, Riccarton Road East Taieri	*Sequoiadendron giganteum*	Wellingtonia		Sec 11 Blk III East Taieri SD
T060	42	1 Duke Street	*Dacrycarpus dacrydioides*	White pine	Kahikatea	Lot 2 DP 8722
T062	42	12 Church Street	*Podocarpus totara*	Totara	Totara	Pt Sec 12 Blk II East Taieri SD
T063	41	155 Gladstone Road	*Cupressus corneyana*	Bhutan cypress		Lot 1 DP 11716
T064	42	16 Berwick Street	*Podocarpus totara*	Totara	Totara	Lot 3 DP 3812
T065	42	2 Cargill Street Mosgiel	*Cordyline australis*	Cabbage tree	Ti Kouka	Lot 1 DP 16634
T066	42	2 Gordon Road Mosgiel	*Ulmus glabra Horizontalis*	Weeping wych elm		Lot 1 DP 15215
T068	42	23 Church Street	*Ulmus procera*	English elm		Lot 1 DP 9558
T069	42	24 Irvine Street	*Magnolia grandiflora*	Bull bay		Lot 1 DP 9559
T070	42	33 Lanark Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 17075
T071	42	34 Gordon Road	*Metrosideros umbellata*	Southern rata	Rata	Lot 14 Blk IV Deeds 183
T072	28	4 Thames Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 42 Deeds 233
T073	42	46 Gordon Road	*Fagus sylvatica Purpurea*	Purple beech		Lot 20 Blk IV Deeds 183
T074	42	55 Forfar Street	*Fagus sylvatica Purpurea*	Purple beech		Lot 43 Blk IV DP 471
T075	28	7 Dey Street	*Juglans regia*	Common walnut		Lot 2 DP 5635
T076	42	7 Inglis Street	*Prumnopitys ferruginea*	Miro	Miro	Lot 3 Blk XIII Deeds 267
T077	42	74 Church Street	*Pseudopanax crassifolius*	Lancewood	Horoeka	Lot 15 Blk I Deeds 195
T079	42	94 Gordon Road	*Cordyline australis*	Cabbage tree	Ti Kouka	Pt Lot 8 Blk V DP 471
T080	28	Cnr Factory/Gordon Road	*Fagus sylvatica Zlatia*	Golden beech		Pt Sec 12 Blk II East Taieri SD
T081	29	Factory Road - Otago University Animal Breeding Station	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 6164
T082	29	Factory Road - Otago University Animal Breeding Station	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 6164
T083	29	Factory Road - Otago University Animal Breeding Station	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 6164
T084	29	Factory Road - Otago University Animal Breeding Station	*Cedrus deodara*	Deodar		Lot 1 DP 6164
T085	29	Factory Road - Otago University Animal Breeding Station	*Hoheria angustifolia*	Narrow leaved lacebark	Houhere	Lot 1 DP 6164
T086	29	Factory Road - Otago University Animal Breeding Station	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 6164
T087	42	Gordon Road (Anzac Park)	*Quercus robur*	English oak		Pt Sec 12 Blk II East Taieri SD
T088	42	Green Street Taieri High School	*Fagus sylvatica Riversii*	Purple beech		Pt Sec 12 Blk II East Taieri SD
T089	42	Green Street Taieri High School	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 12 Blk II East Taieri SD
T090	42	Green Street Taieri High School	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 12 Blk II East Taieri SD
T091	42	Green Street Taieri High School	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 12 Blk II East Taieri SD
T092	42	Green Street Taieri High School	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 12 Blk II East Taieri SD
T093	42	Green Street Taieri High School	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 12 Blk II East Taieri SD
T094	42	Green Street Taieri High School	*Podocarpus totara*	Totara	Totara	Pt Sec 12 Blk II East Taieri SD
T095	42	Johnstone Farm, Ashton Street Mosgiel	*Juglans regia*	Common walnut		Pt Sec 3 Blk III East Taieri SD
T096	42	Johnstone Farm, Ashton Street Mosgiel	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 3 Blk III East Taieri SD
T097	42	Johnstone Farm, Ashton Street Mosgiel	*Pyrus` Williams Bon Cretien`*	Pear		Pt Sec 3 Blk III East Taieri SD
T098	42	Johnstone Farm, Ashton Street Mosgiel	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 3 Blk III East Taieri SD
T099	42	Johnstone Farm, Ashton Street Mosgiel	*Fraxinus excelsior Jaspidaea*	Golden ash		Pt Sec 3 Blk III East Taieri SD
T101	7	31 Holyhead Street Outram	*Magnolia grandiflora*	Bull bay		Sec 3 Blk II Town of Outram
T102	7	Beardsmore property, Woodside Manor, Woodside	*Podocarpus totara*	Totara	Totara	Lot 1 DP 23654
T103	7	Beardsmore property, Woodside Manor, Woodside	*Podocarpus totara*	Totara	Totara	Lot 1 DP 23654
T104	7	Della-Rocca property, McDonald Road Woodside	*Podocarpus totara*	Totara	Totara	Pt Sec 23 Irreg Blk West Taieri SD
T105	7	Della-Rocca property, McDonald Road Woodside	*Podocarpus totara*	Totara	Totara	Pt Sec 23 Irreg Blk West Taieri SD
T106	6	Earth Farm, Outram Bridge, Outram	*Juglans regia*	Common walnut		Pt Sec 49 River Sections East Taieri SD
T107	7	Fogo property Mountfort Street Outram.	*Fagus sylvatica Riversii*	Purple beech		Pt Sec 38 River Sections West Taieri SD
T108	7	Four Square Store, Holyhead Street Outram	*Ulmus procera*	English elm		Lot 1 DP 21850
T111	7	Hayes Richards property, Ravensburn Street Woodside	*Cordyline australis*	Cabbage tree	Ti Kouka	Sec 39 Town of Maungatua
T112	6	Reid property (The Downs) SH87 Outram	*Quercus robur*	English oak		Pt Sec 12 Irreg Blk West Taieri SD
T113	6	West Taieri Cemetery	*Sequoiadendron giganteum*	Wellingtonia		Sec 42 Irreg Blk West Taieri SD
T114	6	West Taieri Manse, SH 87, Outram	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 7711
T115	21	3 Prospect Row	*Sequoiadendron giganteum*	Wellingtonia		Lot 20 DP 98
T116	28	100 School Road Nth, North Taieri	*Agathis australis*	Kauri	Kauri	Lot 1 DP 339372
T117	28	100 School Road Nth, North Taieri	*Juglans regia*	Common walnut		Lot 1 DP 339372
T118	28	100 School Road Nth, North Taieri	*Quercus robur*	English oak		Lot 1 DP 339372
T119	28	100 School Road Nth, North Taieri	*Quercus robur*	English oak		Lot 1 DP 339372
T120	28	100 School Road Nth, North Taieri	*Quercus robur*	English oak		Lot 1 DP 339372
T121	6	Eaton property, Huntly Road West Taieri	*Cordyline australis*	Cabbage tree	Ti Kouka	Lot 1 DP 22420
T122	28	145 Hazlett Road	*Quercus robur*	English oak		Lot 2 DP 386907
T123	44	1 Abbots Hill Road	*Hoheria angustifolia*	Hoheria	Houhere	Lot 2 DP 26344
T124	44	1 Abbots Hill Road	*Podocarpus totara*	Totara	Totara	Lot 2 DP 26344
T125	44	1 Abbots Hill Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 2 DP 26344
T126	44	28 Abbots Hill Road	*Cupressus macrocarpa*	Monterey cypress		Lot 41 Blk II DEEDS 140
T127	10	20 Aberdeen Street	*Quercus robur*	Oak		Sec 1 Blk XVII TN OF HAWKSBURY
T128	10	20 Aberdeen Street	*Quercus robur*	Oak		Sec 1 Blk XVII TN OF HAWKSBURY
T129	10	20 Aberdeen Street	*Ulmus glabra*	Elm		Sec 1 Blk XVII TN OF HAWKSBURY
T130	10	20 Aberdeen Street	*Acer pseudoplatanus*	Sycamore		Sec 1 Blk XVII TN OF HAWKSBURY
T131	10	Aberdeen Street (Road Reserve)	*Eucalyptus globulus*	Blue gum		Road Reserve (ABERDEEN STREET)
T132	47	4 Airedale Street	*Chaemycyparis lawsoniana*	Lawsons cypress		Lot 5 DP 76
T133	37	180 Albany Street	*Paulownia tomentosa*	Paulownia		Lot 2 DP 21290
T134	35	65 Albany Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 16 DEEDS 278
T135	48	53 Albert Street	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 107 DP 1282
T136	48	39 Allandale Road	*Griselinia littoralis*	Broadleaf	Papauma	Pt Lot 1 DP 3428
T137	6	404 Allanton Road	*Cedrus atlantica*	Atlas Cedar		Lot 1 DP 9342
T138	54	1074 Allanton-Waihola Road (SH1)	*Quercus robur*	Oak		Pt Sec 11 River Sections EAST TAIERI SD
T139	58	45 Allen Road	*Podocarpus totara*	Totara	Totara	Lot 2 DP 4550
T140	58	45 Allen Road	*Podocarpus totara*	Totara	Totara	Lot 2 DP 4550
T141	33	14 Allison Crescent	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 28 DEEDS 264

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T142	33	14 Allison Crescent	*Tilia x europaea*	Lime		Lot 27 DEEDS 264
T143	47	7 Alva Street	*Cupressus sempervirens Swane's Gold*	Mediterranean cypress		Lot 2 DP 27740
T144	47	7 Alva Street	*Cupressus sempervirens Swane's Gold*	Mediterranean cypress		Lot 2 DP 27740
T145	47	34 Alva Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 27638
T146	33	52 Anne Street	*Araucaria araucana*	Monkey puzzle		Pt Lot 10 DEEDS 9
T147	37	90 Anzac Avenue	*Taxus baccata*	Yew		Sec 1 Blk LXXVI TN OF DUNEDIN
T148	37	90 Anzac Avenue	*Taxus baccata*	Yew		Sec 1 Blk LXXVI TN OF DUNEDIN
T149	25	365 Aramoana Road	*Cupressus macrocarpa*	Monterey cypress		Sec 26 Blk I LOWER HARBOUR WEST SD
T150	25	365 Aramoana Road	*Pinus radiata*	Monterey pine		Sec 26 Blk I LOWER HARBOUR WEST SD
T151	42	28 Argyle Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 11 DP 6044
T152	46	43 Argyle Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 3 DEEDS 38
T153	42	50 Argyle Street	*Pinus ponderosa*	Western Yellow Pine		Lot 1 DP 7558
T154	42	74 Argyle Street	*Metasequoia glyptostroboides*	Dawn redwood		Lot 14 Blk VIII DP 471
T155	42	74 Argyle Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 16 Blk VIII DP 471
T156	42	74 Argyle Street	*Tilia x europaea*	Lime		Lot 16 Blk VIII DP 471
T157	46	57 Argyle Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 4 DP 681
T158	33	2 Arthur Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 86 Blk XIX TN OF DUNEDIN
T160	33	21 Arthur Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 2667
T161	33	26 Arthur Street	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 86 Blk XIX TN OF DUNEDIN
T162	51	16 Auld Street	*Phoenix caneriensis*	Phoenix palm		Lot 5 DP 2662
T163	48	57 Baker Street	*Quercus robur*	Oak		Pt Lot 41 DP 1689
T164	48	57 Baker Street	*Quercus robur*	Oak		Pt Lot 41 DP 1689
T165	32	30 Balmacewen Road	*Cedrus atlantica*	Cedar		Lot 9 DP 1383
T166	32	30 Balmacewen Road	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 8 DP 1383
T167	32	50 Balmacewen Road	*Metrosideros umbellata*	Southern rata	Rata	Lot 2 DP 5104
T168	32	125 Balmacewen Road	*Pseudotsuga menziesii*	Douglas fir		Pt Lot 3 DP 5056
T170	32	125 Balmacewen Road	*Pinus radiata 'Aurea'*	Golden monterey pine		Pt Lot 3 DP 5056
T171	34	68 Bank Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 21 DEEDS 234
T172	53B	3 Bardsley Street	*Eucalyptus globulus*	Blue gum		Pt Sec 1 Blk XXI TN OF ALLANTON
T174	46	29 Barr Street (Road Reserve)	*Pseudotsuga menziesii*	Douglas fir		Road Reserve (BARR STREET)
T175	61	37 Bath Street	*Podocarpus totara*	Totara	Totara	Lot 6 DP 4253
T176	48	378 Bay View Road	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 6 DP 2231
T183	51	66 Bayfield Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Lot 4 DP 5450
T184	51	66 Bayfield Road	*Magnolia sp.*	Magnolia		Pt Lot 4 DP 5450
T185	7A	2 Beaumaris Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Sec 21 Blk VII TN OF OUTRAM
T186	50	34 Begg Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 12064
T187	52	89 Belford Street	*Eucalyptus globulus*	Blue gum		Lot 20 Blk II DP 289
T188	32	27 Belgrave Crescent	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 7 DP 1217
T189	33	28 Bellevue Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 19 DEEDS 262
T190	51	20 Belmont Lane	*Fagus sylvatica*	English beech		Lot 1 DP 11934
T191	51	21 Belmont Lane	*Cedrus atlantica*	Atlantic cedar		Lot 1 DP 11934
T192	51	26 Belmont Lane	*Fagus sylvatica*	English beech		Lot 6 DP 9619
T193	51	26 Belmont Lane	*Fagus sylvatica*	English beech		Pt Lot 2 DP 15122
T194	51	33 Belmont Lane	*Metrosideros umbellata*	Southern rata	Rata	Pt Lot 3 DP 9619
T195	51	34 Belmont Lane	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Pt Lot 3 DP 9619
T196	23	1 Bernicia Street	*Rhopalostylis sapida*	Nikau	Nikau	Pt Sec 221 TN OF PORT CHALMERS
T197	32	3 Berwick Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 15800
T198	32	4 Berwick Street, Dunedin	*Cedrus sp*	Cedar		Lot 3 DP 4601
T200	36	17 Blacks Road	*Cedrus atlantica*	Atlantic cedar		Lot 1 Blk II DP 398
T201	38	200 Blacks Road	*Prumnopitys taxofolia*	Black pine		Sec 71 Blk IX NORTH HARBOUR & BLUESKIN SD
T202	20	23 Blanket Bay Road	*Populus nigra var. Italica*	Lombardy poplar		Lot 1 DP 16835
T203	16	Blueskin Road	*Dacrydium cupressinum*	Red pine	Rimu	Pt Sec 86 Blk VI NORTH HARBOUR & BLUESKIN SD
T204	16	Blueskin Road	*Dacrydium cupressinum*	Red pine	Rimu	Pt Sec 87 Blk VI NORTH HARBOUR & BLUESKIN SD
T205	16	Blueskin Road	*Dacrydium cupressinum*	Red pine	Rimu	Pt Sec 88 Blk VI NORTH HARBOUR & BLUESKIN SD
T206	23	Blueskin Road (Road Reserve)	*Cupressus macrocarpa*	Macrocarpa		Road Reserve (BLUESKIN ROAD)
T207	34	5 Blundell Street	*Pseudotsuga menziesii*	Douglas fir		Lot 3 DP 18137
T208	21	97 Borlases Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 15 DEEDS 342
T209	21	97 Borlases Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 15 DEEDS 342
T211	38	4 Bouverie Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 1 Blk VI DEEDS 191
T212	42	38 Braeside Road	*Quercus robur*	Oak		Lot 5 DP 23502
T213	34	11 Braeview Crescent	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 6091
T214	34	23 Braeview Crescent	*Sequoia sempervirens*	Sequoia		Lot 2 DP 9397
T215	34	24 Braeview Crescent	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 15 DP 394
T216	34	24 Braeview Crescent	*Araucaria heterophylla*	Norfolk pine		Lot 32 DP 394
T217	34	24 Braeview Crescent	*Ginkgo biloba*	Maidenhair tree		Pt Lot 15 DP 394
T218	34	24 Braeview Crescent	*Juglans ailantifolia*	Japanese walnut		Lot 32 DP 394
T219	34	78 Braeview Crescent	*Eucalyptus sp*	Eucalyptus		Lot 2 DP 396346
T221	58	114 Brighton Road	*Eucalyptus sp*	Eucalyptus		Pt Lot 4 DP 4550
T222	31	19 Brinsdon Road	*Prumnopitys ferruginea*	Miro	Miro	Lot 1 DP 15886

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T223	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T224	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T225	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T226	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T227	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T228	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T229	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T230	31	19 Brinsdon Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 1 DP 15886
T231	31	19 Brinsdon Road	*Podocarpus totara*	Totara	Totara	Lot 1 DP 15886
T232	32	89 Brockville Road	*Tilia x europaea*	Lime		Lot 2 DP 25028
T233	32	101 Brockville Road	*Araucaria araucana*	Monkey puzzle		Pt Lot 1 DP 18200
T234	32	118 Brockville Road	*Metrosideros umbellata*	Southern rata	Rata	Pt Lot 7 DP 27
T235	31	223 Brockville Road	*Betula pendula*	Silver birch		Lot 78 DP 10064
T237	34	59 Brownville Crescent	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 4 DP 15361
T238	54	2 Bruce Road	*Quercus robur*	Oak		Sec 41 RIVER SECTIONS WEST TAIERI SD
T239	54	95 Bruce Road	*Quercus robur*	Oak		LOT 1 DP 300983
T240	54	95 Bruce Road (Road Reserve)	*Quercus robur*	Oak		Road Reserve (BRUCE ROAD)
T241	33	2 Bruce Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Lot 1 Blk II DEEDS 15
T243	36	30 Buccleugh Street	*Populus nigra var. Italica*	Lombardy poplar		Lot 5 DP 3152
T244	36	104 Buccleugh Street	*Fraxinus excelsior 'Aurea'*	Golden ash		Lot 18 DP 75
T245	39	Burkes Drive (Road Reserve)	*Eucalyptus globulus*	Blue gum		Road Reserve (BURKES DRIVE)
T246	32	197 Burt Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 41 DP 7051
T247	32	9 Burwood Avenue	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DEEDS 332
T248	32	20 Burwood Avenue	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 16 DEEDS 152
T249	32	31 Burwood Avenue	*Pseudopanax crassifolium*	Lancewood	Horoeka	Pt Lot 7 DEEDS 152
T250	32	34 Burwood Avenue	*Metrosideros umbellata*	Southern rata	Rata	Pt Lot 20 DEEDS 152
T251	41	218 Bush Road	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 2 Blk VIII EAST TAIERI SD
T252	41	218 Bush Road	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 2 Blk VIII EAST TAIERI SD
T253	41	218 Bush Road	*Tilia x europaea*	Lime		Pt Sec 2 Blk VIII EAST TAIERI SD
T254	41	218 Bush Road	*Tilia x europaea*	Lime		Pt Sec 2 Blk VIII EAST TAIERI SD
T255	41	218 Bush Road	*Aesculus hippocastanum*	Horse chestnut		Pt Sec 2 Blk VIII EAST TAIERI SD
T256	41	218 Bush Road	*Ulmus glabra*	Elm		Pt Sec 2 Blk VIII EAST TAIERI SD
T257	41	218 Bush Road	*Araucaria araucana*	Monkey puzzle		Pt Sec 2 Blk VIII EAST TAIERI SD
T258	41	218 Bush Road	*Juglans regia*	Walnut		Pt Sec 2 Blk VIII EAST TAIERI SD
T259	41	218 Bush Road	*Sequoia sempervirens*	Sequoia		Pt Sec 2 Blk VIII EAST TAIERI SD
T260	41	218 Bush Road	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 2 Blk VIII EAST TAIERI SD
T261	41	218 Bush Road	*Betula pendula*	Silver birch		Pt Sec 2 Blk VIII EAST TAIERI SD
T262	41	218 Bush Road	*Magnolia grandifolia*	Magnolia		Pt Sec 2 Blk VIII EAST TAIERI SD
T263	41	218 Bush Road	*Ulmus glabra 'Horizontalis'*	Spreading elm		Pt Sec 2 Blk VIII EAST TAIERI SD
T264	41	291 Bush Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 10 Blk IV EAST TAIERI SD
T265	41	291 Bush Road	*Pseudopanax crassifolium*	Lancewood	Horoeka	Lot 2 DP 16261
T266	6	390 Bush Road	*Eucalyptus globulus*	Blue gum		Sec 66 Irreg Blk EAST TAIERI SD
T267	6	390 Bush Road	*Araucaria araucana*	Monkey puzzle		Sec 66 Irreg Blk EAST TAIERI SD
T268	41	Rapid 275 Bush Road	*Quercus robur*	Oak		Sec 9 Blk IV EAST TAIERI SD
T269	41	Rapid 275 Bush Road	*Quercus robur*	Oak		Sec 9 Blk IV EAST TAIERI SD
T270	34	13 Cairnhill Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 21668
T271	18	53 Cambells Road	*Metrosideros umbellata*	Southern rata	Rata	Lot 7 DP 6227
T272	40	145 Camp Road	*Metrosideros robusta*	Northern rata	Rata	Lot 18 DP 1453
T273	40	145 Camp Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 18 DP 1453
T274	40	145 Camp Road	*Nothofagus fusca*	Red beech		Lot 18 DP 1453
T275	40	145 Camp Road	*Taxus baccata*	Yew		Lot 18 DP 1453
T276	40	145 Camp Road	*Cedrus atlantica*	Atlantic cedar		Lot 18 DP 1453
T277	40	145 Camp Road	*Cedrus deodara*	Deodar		Lot 18 DP 1453
T278	40	145 Camp Road	*Taxus baccata*	Yew		Lot 18 DP 1453
T279	34	22 Cannington Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 4 DP 16031
T280	34	22 Cannington Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 4 DP 16031
T281	34	84 Cannington Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 3 DP 1777
T283	34	106 Cannington Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 5921
T284	32	124 Cannington Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 5271
T285	34	100a Cannington Road	*Podocarpus totara*	Totara	Totara	Lot 2 DP 24382
T286	2	Cardigan Street	*Sequoiadendron giganteum*	Wellingtonia		Sec 12 Blk IX TN OF ARDEN
T287	2	Cardigan Street, Middlemarch	*Pseudotsuga menziesii*	Douglas fir		Sec 11 Blk IX TN OF ARDEN
T288	2	Cardigan Street, Middlemarch	*Sequoiadendron giganteum*	Wellingtonia		Sec 12 Blk IX TN OF ARDEN
T289	35	123 Cargill Street, Dunedin	*Populus nigra var. Italica*	Lombardy poplar		Lot 1 DEEDS 436
T290	35	123 Cargill Street, Dunedin	*Populus nigra var. Italica*	Lombardy poplar		Lot 1 DEEDS 436
T291	27	55 Carlyle Street	*Podocarpus totara*	Totara	Totara	Lot 1 DP 15213
T292	47	50 Carsons Street	*Quercus robur*	Oak		Pt Lot 132 DEEDS 253
T294	35	192 Castle Street	*Fraxinus oxycarpa Raywood.*	Raywood Ash		Sec 10 SO 24898
T295	35	304 Castle Street	*Ulmus glabra "Lutescens"*	Golden elm		Lot 1 DP 25534
T296	35	527 Castle Street	*Eucalyptus sp*	Eucalyptus		Pt Sec 62 Blk XXXI TN OF DUNEDIN
T297	36	598 Castle Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 307951
T298	42	12a Cemetery Road, Mosgiel	*Cedrus atlantica*	Atlantic cedar		Pt Sec 22 Irreg Blk EAST TAIERI SD
T299	45	Cemetery, District Road, Green Island	*Quercus robur*	Oak		Lot 1 DP 20152
T300	11	Cemetery, Harris Street	*Eucalyptus globulus*	Blue gum		Sec 30 Blk XXVI TN OF WAIKOUAITI
T301	43	81 Chain Hills Road	*Eucalyptus sp*	Eucalyptus		Lot 2 DP 21107
T302	36	7 Chambers Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 9 DP 1590
T303	36	62 Chambers Street	*Ulmus glabra "Lutescens"*	Golden elm		Lot 56 DP 1590
T304	32	22 Chapman Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 17 DEEDS 182
T305	32	120 Chapman Street	*Betula pendula*	Silver birch		Lot 40 DP 7051
T307	32	141 Chapman Street	*Cedrus deodara*	Cedar		Lot 14 DP 7051
T308	6	95 Church Road East, Outram	*Quercus robur*	Oak		Sec 6 Blk I WEST TAIERI SD

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T309	6	95 Church Road East, Outram	*Quercus robur*	Oak		Sec 6 Blk I WEST TAIERI SD
T311	44	19 Church Street, Green Island	*Araucaria heterophylla*	Norfolk pine		Lot 80 Blk III DP 44
T314	33	14 Claremont Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 50 DP 2191
T315	33	49 Claremont Street	*Fagus sylvatica*	English beech		Pt Lot 2 DP 3906
T316	33	51 Claremont Street	*Quercus robur*	Oak		Lot 79 DP 2191
T317	33	51 Claremont Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 79 DP 2191
T318	20	21 Cleghorn Street	*Pseudopanax macintyrei*	Lancewood		Lot 1 DP 24285
T319	60	17 Cliffs Road	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 3 Blk II DP 477
T320	60	17 Cliffs Road	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 3 Blk II DP 477
T321	21	38 Clyde Street	*Pinus radiata*	Monterey pine		Lot 15 DP 3039
T322	37	124 Clyde Street	*Cedrus sp.*	Cedar		Pt Sec 18 Blk XXXVII TN OF DUNEDIN
T323	37	124 Clyde Street	*Cedrus sp.*	Cedar		Pt Sec 18 Blk XXXVII TN OF DUNEDIN
T324	37	124 Clyde Street	*Quercus robur*	Oak		Lot 1 DP 2971
T325	37	125 Clyde Street	*Aesculus hippocastanum*	Horse chestnut		Lot 15 DP 1901
T326	37	127 Clyde Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 18 DP 1901
T327	37	127 Clyde Street	*Tilia x europaea*	Lime		Lot 18 DP 1901
T328	37	127 Clyde Street	*Tilia x europaea*	Lime		Lot 18 DP 1901
T329	37	127 Clyde Street	*Quercus robur*	Oak		Lot 18 DP 1901
T330	43	29 Coach Road	*Pseudotsuga menziesii*	Douglas fir		Lot 1 DP 6901
T331	42	43 Coal Stage Road	*Eucalyptus sp*	Eucalyptus		Lot 8 DP 23529
T332	12	89 Coast Road	*Quercus robur*	Oak		Lot 1 DP 5636
T333	12	115 Coast Road	*Eucalyptus globulus*	Blue gum		Lot 17 DP 2137
T334	12	225 Coast Road	*Metrosideros umbellata*	Southern rata	Rata	Pt Lot 6 DP 710
T335	12	225 Coast Road	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Pt Lot 6 DP 710
T336	12	225 Coast Road	*Chiranthodendron pentadactylon*	Monkey hand tree		Pt Lot 6 DP 710
T337	12	266 Coast Road	*Quercus robur*	Oak		Pt Sec 73 Blk I WAIKOUAITI SD
T338	12	266 Coast Road	*Quercus robur*	Oak		Pt Sec 73 Blk I WAIKOUAITI SD
T339	12	284 Coast Road	*Quercus robur*	Oak		Lot 14 DP 2917
T340	9	392 Coast Road	*Cupressus macrocarpa*	Monterey cypress		Pt Sec 77 Blk I WAIKOUAITI SD
T341	9	481 Coast Road	*Cupressus sempervirens*	Italian cypress		Lot C DP 723
T342	9A	774 Coast Road	*Juglans regia*	Walnut		Railway Reserve (MAIN SOUTH LINE RAILWAY)
T343	9	1182 Coast Road	*Ulmus glabra 'Horizontalis'*	Spreading elm		Sec 7C Blk XII WAIKOUAITI SD
T344	11	27 Coast Road, Karitane	*Quercus robur*	Oak		Lot 14 DP 2288
T345	32	5 Cohen Place	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 3 DP 8947
T346	32	5 Cohen Place	*Sophora microphylla*	Kowhai	Kowhai	Lot 3 DP 8947
T347	46	25 College Street	*Acer pseudoplatanus*	Sycamore		Lot 51 DEEDS 46
T348	32	6 Colquhoun Street	*Dacrydium cupressinum*	Red pine	Rimu	Lot 2 DP 9998
T349	34	18 Como Street	*Nothofagus solandri var Solandri*	Black beech	Tawhairauriki	Lot 31 DEEDS 345
T350	1	Conical Hill, Moonlight Road	*Pinus radiata*	Monterey pine		Sec 13 Blk X STRATH TAIERI SD
T351	35	21 Constitution Street, Dunedin	*Laurus nobilis*	Bay		Lot 2 DP 4202
T352	22	27 Coombe Hay Terrace	*Juglans regia*	Walnut		Lot 102 DEEDS 57
T353	46	35 Corstorphine Road	*Populus sp*	Poplar		Sec 1 CORSTORPHINE NO 1 SETT
T354	32	53 County Road	*Nothofagus menziesii*	Silver beech	Tawhai	Lot 2 DP 11018
T355	32	12 Craighall Crescent	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 27652
T356	32	37 Craighall Crescent	*Cedrus atlantica*	Cedar		Lot 1 DP 27653
T357	36	51 Craigleith Street	*Picea glauca*	White spruce		Lot 36 DP 43
T358	51	27 Cranston Street	*Tilia x europaea*	Lime		Pt Sec 3 Blk II ANDERSONS BAY SD
T359	35	464 Cumberland Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 25534
T360	35	464 Cumberland Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 25534
T362	35	464 Cumberland Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 25534
T363	35	630 Cumberland Street	*Fagus sylvatica*	English beech		Lot 2 DP 8361
T364	35	630 Cumberland Street	*Tilia x europaea*	Lime		Lot 2 DP 8361
T365	35	630 Cumberland Street	*Acer pseudoplatanus*	Sycamore		Lot 2 DP 8361
T366	35	630 Cumberland Street	*Ulmus glabra*	Elm		Lot 2 DP 8361
T367	35	729 Cumberland Street	*Metasequoia glyptostroboides*	Dawn redwood		Pt Sec 36 Blk XXX TN OF DUNEDIN
T368	35	660 Cumberland Street (Union Square)	*Juglans regia*	Walnut		Sec 54B Blk XXIX TN OF DUNEDIN
T369	44	1 Dall Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 3 Blk XXV DP 587
T370	47	31 Dalry Street	*Eucalyptus sp*	Eucalyptus		Lot 2 DP 9926
T371	31	114 Dalziel Road	*Pinus radiata*	Monterey Pine		Lot 4 DP 23697
T372	51	3 Danube Street	*Quercus robur*	Oak		Lot 1 DP 10834
T373	32	37 Derwent Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 10 DP 7863
T374	14	213 Doctors Point Road	*Eucalyptus sp*	Eucalyptus		Lot 8 DP 2460
T375	52	97 Doon Street, Dunedin	*Quercus robur*	Oak		Lot 1 DP 10370
T376	35	7 Drivers Road	*Cedrus atlantica*	Atlantic cedar		Lot 1 DP 23233
T377	35	7 Drivers Road	*Quercus robur*	Oak		Lot 1 DP 23233
T378	35	7 Drivers Road	*Ulmus glabra*	Weeping Elm		Lot 1 DP 23233
T379	34	42 Drivers Road	*Magnolia campbellii*	Magnolia		Lot 1 DP 4483
T380	15	30a Drivers Road	*Populus nigra var. Italica*	Lombardy poplar		Lot 48 DP 3168
T383	29	347 Dukes Road North (Milners Road frontage)	*Eucalyptus sp*	Eucalyptus		Sec 16 Blk IX EAST TAIERI SD
T384	33	15 Dunblane Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 8069
T385	34	4c Dundas Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 40 Blk XXXII TN OF DUNEDIN
T386	35	Dunedin Public Hospital, Frederick Street	*Platanus sp*	Plane tree		Sec 31 Blk XXIII TN OF DUNEDIN
T387	35	Dunedin Public Hospital, Frederick Street	*Platanus sp*	Plane tree		Sec 31 Blk XXIII TN OF DUNEDIN
T388	35	Dunedin Public Hospital, Frederick Street	*Platanus sp*	Plane tree		Sec 31 Blk XXIII TN OF DUNEDIN
T389	35	Dunedin Public Hospital, Frederick Street	*Platanus sp*	Plane tree		Sec 30 Blk XXIII TN OF DUNEDIN
T390	35	Dunedin Public Hospital, Frederick Street	*Platanus sp*	Plane tree		Sec 30 Blk XXIII TN OF DUNEDIN
T391	35	Dunedin Public Hospital, Great King Street	*Quercus robur*	Oak		Sec 22 Blk XXIII TN OF DUNEDIN
T392	35	Dunedin Public Hospital, Great King/ Hanover Streets	*Quercus robur*	Oak		Sec 21 Blk XXIII TN OF DUNEDIN

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T393	35	Dunedin Public Hospital, Great King/ Hanover Streets	*Quercus robur*	Oak		Sec 22 Blk XXIII TN OF DUNEDIN
T394	35	Dunedin Public Hospital, Hanover Street	*Aesculus hippocastanum*	Horse chestnut		Sec 22 Blk XXIII TN OF DUNEDIN
T395	46	13 Durham Street	*Fraxinus excelsior*	Ash		Lot 32 Blk III DEEDS 26
T396	46	13 Durham Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 32 Blk III DEEDS 26
T397	54	481 East Taieri-Allanton Road	*Quercus robur*	Oak		Lot 6 DP 21906
T398	32	41 Edgar Street	*Podocarpus totara*	Totara	Totara	Lot 1 DP 7048
T399	47	144 Eglinton Rd	*Quercus robur*	Oak		Lot 1 DP 4047
T400	47	34 Eglinton Road	*Cupressus macrocarpa*	Macrocarpa		Lot 14 DP 224
T401	47	79 Eglinton Road	*Sequoia sempervirens*	Sequoia		Lot 2 DP 2628
T402	47	79 Eglinton Road	*Quercus robur*	Oak		Lot 2 DP 2628
T403	47	79 Eglinton Road	*Sequoia sempervirens*	Sequoia		Lot 2 DP 2628
T404	47	99 Eglinton Road	*Betula pendula*	Silver birch		Lot 45 DP 41
T405	47	115 Eglinton Road	*Araucaria heterophylla*	Norfolk pine		Lot 4 DP 5497
T406	47	79 Eglinton Road	*Quercus robur*	Oak		Lot 2 DP 2628
T407	47	79 Eglinton Road	*Nothofagus menziesii*	Silver beech	Tawhai	Lot 2 DP 2628
T408	34	2 Egmont Street	*Pseudotsuga menziesii*	Douglas fir		Lot 27 DP 8273
T410	35	7 Elder Street	*Quercus palustris*	Pin oak		Pt Sec 80 Blk XXIV TN OF DUNEDIN
T411	35	17 Elder Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 2 DEEDS 355
T412	46	34 Elgin Road	*Quercus robur*	Oak		Lot 12 Blk I DEEDS 42
T414	33	48 Elm Row	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 70 Blk XII TN OF DUNEDIN
T416	58	41 Elwyn Crescent	*Ulmus glabra*	Elm		Lot 24 DP 9683
T417	46	25 Embo Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 18 Blk III DP 2088
T418	45	31 Emerson Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 1 DP 15478
T419	35	10 Emily Siedeberg Place	*Fraxinus excelsior*	Ash		Pt Sec 34 Blk XXVI TN OF DUNEDIN
T420	33	22 Erin Street	*Juglans regia*	Walnut		Pt Lot 27 DEEDS 99
T422	13	3 Erne Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Sec 10 Blk II TN OF BLUESKIN
T423	35	27 Ethel Benjamin Place	*Fraxinus oxycarpa Raywood*	Raywood Ash		Pt Lot 1 DP 16947
T425	32	25 Ettrick Street	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 117 WAKARI SD
T426	32	25 Ettrick Street	*Podocarpus totara*	Totara	Totara	Pt Sec 118 WAKARI SD
T427	32	25 Ettrick Street	*Dacrydium cupressinum*	Red pine	Rimu	Pt Sec 118 WAKARI SD
T428	32	25 Ettrick Street	*Fagus sylvatica*	English beech		Pt Sec 117 WAKARI SD
T429	32	41 Ettrick Street	*Dacrycarpus dacrydioides*	White pine		Pt Sec 118 Wakari SD
T430	32	41 Ettrick Street	*Cupressus torulosa*	Bhutan cypress		Pt Sec 118 WAKARI SD
T431	32	41 Ettrick Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Pt Sec 118 WAKARI SD
T432	52	55 Every Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 8787
T433	52	86 Every Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 1 DP 8770
T435	52	55a Every Street	*Eucalyptus globulus*	Blue gum		Lot 1 DP 8787
T437	1	9 Exeter Street, Sutton	*Sequoiadendron giganteum*	Wellingtonia		Sec 1 Blk XII TN OF SUTTON
T438	1	9 Exeter Street, Sutton	*Quercus robur*	Oak		Sec 2 Blk XII TN OF SUTTON
T439	29	289 Factory Road	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 5 DP 23060
T440	33	10 Falcon Street	*Leucodendron argenteum*	Silver tree		Lot 2 DP 11802
T441	33	12 Falcon Street	*Sophora tetraptera*	Kowhai	Kowhai	Lot 1 DP 11802
T442	34	27 Falkland Street	*Cedrus sp.*	Cedar		Lot 20 DP 3652
T443	34	8 Fea Street	*Araucaria araucana*	Monkey puzzle		Lot 17 Blk III DP 1793
T444	32	3 Fern Tree Drive	*Abies alba*	European silver fir		Lot 4 DP 19517
T445	32	14 Fern Tree Drive	*Cupressus macrocarpa*	Macrocarpa		Lot 2 DP 19517
T446	32	14 Fern Tree Drive	*Cordyline australis*	Cabbage tree	Ti kouka	Lot 2 DP 19517
T447	32	14 Fern Tree Drive	*Sophora microphylla*	Kowhai	Kowhai	Lot 2 DP 19517
T448	32	14 Fern Tree Drive	*Metrosideros robusta*	Northern rata		Lot 2 DP 19517
T449	32	14 Fern Tree Drive	*Dacrydium cupressinum*	Red pine	Rimu	Lot 2 DP 19517
T450	32	14 Fern Tree Drive	*Prumnopitys taxifolia*	Black pine		Lot 2 DP 19517
T451	32	22 Fern Tree Drive	*Nothofagus dombeyii*	Coigue		Lot 11 DP 22582
T453	33	2 Fifield Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 308
T454	33	2 Fifield Street	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 2 DP 308
T455	33	12 Fifield Street	*Ulmus glabra Pendula*	Spreading elm		Lot 1 DP 11596
T456	48	11 Forbury Road	*Sophora tetraptera*	Kowhai	Kowhai	Pt Lot 7 Blk I DP 990
T457	48	16 Forbury Road	*Fraxinus excelsior*	Ash		Lot 5 DP 1273
T458	48	18 Forbury Road	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 1 DP 4674
T459	48	54 Forbury Road	*Phoenix caneriensis*	Phoenix palm		Pt Lot 4 DP 10060
T460	48	70 Forbury Road	*Eucalyptus globulus*	Blue gum		Lot 6 DP 3848
T461	28	65 Forfar Street, Mosgiel	*Ginkgo biloba*	Maidenhair tree		Lot 2 DP 16600
T463	18	13 Forrester Avenue	*Abies procera*	Noble fir		Lot 19 DP 7319
T464	34	29 Fortune Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 3 DP 3534
T466	33	43 Garfield Avenue	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 5215
T467	33	43 Garfield Avenue	*Nothofagus solandri*	Black beech	Tawhairauriki	Lot 1 DP 5215
T468	33	43 Garfield Avenue	*Pittosporum eugenioides*	Lemonwood	Tarata	Lot 2 DP 5215
T469	33	43 Garfield Avenue	*Sophora microphylla*	Kowhai	Kowhai	Lot 2 DP 5215
T470	33	43 Garfield Avenue	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 5215
T471	33	43 Garfield Avenue	*Nothofagus solandri*	Black beech	Tawhairauriki	Lot 2 DP 5215
T472	33	43 Garfield Avenue	*Griselinia littoralis*	Broadleaf	Papauma	Lot 2 DP 5215
T473	33	43 Garfield Avenue	*Arbutus unedo*	Strawberry tree		Lot 2 DP 5215
T474	33	43 Garfield Avenue	*Betula pendula*	Silver birch		Lot 2 DP 5215
T475	35	449 George Street, Dunedin	*Fraxinus excelsior "Pendula"*	Weeping ash		Lot 1 DP 12040
T476	35	509 George Street, Dunedin	*Fraxinus excelsior "Pendula"*	Weeping ash		Lot B DP 1080
T477	35	521 George Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 65 Blk XXV TN OF DUNEDIN
T478	35	521 George Street, Dunedin	*Metrosideros robusta*	Northern rata	Rata	Pt Sec 65 Blk XXV TN OF DUNEDIN
T479	35	704 George Street, Dunedin	*Ginkgo biloba*	Maidenhair tree		Pt Sec 1 Blk XXXI TN OF DUNEDIN

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T482	34	1020 George Street, Dunedin	*Sophora microphylla*	Kowhai	Kowhai	Sec 13 Blk XXXIV TN OF DUNEDIN
T483	34	1028 George Street, Dunedin	*Quercus coccinea*	Oak		Pt Sec 14 Blk XXXIV TN OF DUNEDIN
T484	34	1037 George Street, Dunedin	*Tilia x europaea*	Lime		Pt Sec 78 Blk XXXII TN OF DUNEDIN
T485	31	6 Gilkison Street	*Araucaria araucana*	Monkey puzzle		Lot 24 DP 9748
T486	1	862 Gladbrook Road	*Quercus robur*	Oak		Sec 10 Blk V SUTTON SD
T487	1	862 Gladbrook Road	*Quercus coccinea*	Scarlet Oak		Sec 10 Blk V SUTTON SD
T488	1	862 Gladbrook Road	*Sequoia sempervirens*	Sequoia		Sec 10 Blk V SUTTON SD
T489	1	862 Gladbrook Road	*Juglans regia*	Walnut		Sec 10 Blk V SUTTON SD
T490	41	33 Gladfield Road	*Eucalyptus globulus*	Blue gum		Sec 12 Irreg Blk EAST TAIERI SD
T491	41	33 Gladfield Road	*Eucalyptus globulus*	Blue gum		Sec 12 Irreg Blk EAST TAIERI SD
T492	41	33 Gladfield Road	*Eucalyptus globulus*	Blue gum		Sec 12 Irreg Blk EAST TAIERI SD
T493	42	118 Gladstone Road North (Road Reserve), Mosgiel	*Sequoiadendron giganteum*	Wellingtonia		Road Reserve (GLADSTONE ROAD NORTH)
T494	36	82 Gladstone Road, Dunedin	*Abies procera*	Noble fir		Lot 8 DP 608
T496	34	67a Gladstone Road, Dunedin	*Juglans regia*	Walnut		Lot 2 DP 608
T499	42	110 Gladstone Road North, Mosgiel	*Sequoiadendron giganteum*	Wellingtonia		Lot 3 DEEDS 327
T500	42	116 Gladstone Road North, Mosgiel	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 15473
T501	42	116 Gladstone Road North, Mosgiel	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 15473
T502	41	309 Gladstone Road South, Mosgiel	*Juglans regia*	Walnut		Pt Sec 14 Irreg Blk EAST TAIERI SD
T503	50	88 Glasgow Street, Dunedin	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Pt Lot 19 DP 16
T504	47	34 Glen Road	*Betula pendula*	Silver birch		Pt Lot 287 DEEDS 253
T506	47	55 Glen Road (Road Reserve)	*Fagus sylvatica*	English beech		Road Reserve (GLEN ROAD)
T507	28	15 Glenbrook Drive	*Quercus robur*	Oak		Lot 1 DP 15303
T508	51	26 Glendevon Place	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 2 DP 15042
T509	51	44 Glendevon Place	*Sequoia sempervirens*	Sequoia		Lot 3 DP 10711
T510	51	44 Glendevon Place	*Podocarpus totara*	Totara	Totara	Lot 3 DP 10711
T511	31	89 Glenelg Street	*Eucalyptus globulus*	Blue gum		Pt Sec 125 WAKARI SD
T512	31	89 Glenelg Street	*Araucaria araucana*	Monkey puzzle		Pt Sec 124 WAKARI SD
T513	17	21 Glenmore Street	*Podocarpus totara*	Totara	Totara	Lot 7 Blk II DP 170
T514	17	21 Glenmore Street	*Knightia excelsa*	NZ Honeysuckle	Rewarewa	Pt Lot 6 Blk II DP 170
T515	17	21 Glenmore Street	*Beilschmiedia tawa*	Tawa	Tawa	Pt Lot 6 Blk II DP 170
T516	17	21 Glenmore Street	*Chordospartium stevensonii*	Chord broom		Lot 8 Blk II DP 170
T517	17	21 Glenmore Street	*Elaeocarpus dentatus*	Hinau	Hinau	Pt Lot 4 Blk II DP 170
T518	46	93 Glenpark Avenue	*Araucaria heterophylla*	Norfolk pine		Lot 4 DP 4925
T519	46	93 Glenpark Avenue	*Fraxinus excelsior*	Ash		Lot 4 DP 4925
T520	46	104 Glenpark Avenue	*Cedrus deodara*	Cedar		Pt Lot 143 DEEDS 253
T521	42	55 Gordon Road	*Taxus baccata*	Yew		Lot 2 DP 17757
T522	42	55 Gordon Road	*Taxus baccata*	Yew		Lot 2 DP 17757
T523	38	44 Grandview Crescent	*Agathis australis*	Kauri	Kauri	Lot 22 DP 3580
T524	32	12 Granville Terrace	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 18 Blk I DP 444
T525	32	12 Granville Terrace	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 19 Blk I DP 444
T526	32	13 Granville Terrace	*Pseudopanax linearis*	Lancewood		Lot 1 DP 19446
T527	33	16 Granville Terrace	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 16 Blk I DP 444
T528	32	3 Grater Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 64 DP 1824
T529	34	14 Grater Street	*Ulmus glabra*	Elm		Pt Lot 28 DP 1824
T530	35	310 Great King Street	*Metasequoia glyptostroboides*	Dawn redwood		Sec 1 SO 20250
T531	35	419 Great King Street	*Knightia excelsa*	NZ Honeysuckle	Rewarewa	Lot 2 DP 8361
T532	35	456 Great King Street	*Tilia x europaea*	Lime		Lot 4 DP 10554
T533	35	456 Great King Street	*Betula pendula*	Silver birch		Lot 4 DP 10554
T534	35	519 Great King Street	*Araucaria heterophylla*	Norfolk pine		Lot 7 DP 4409
T536	28	52 Green Street	*Quercus robur*	Oak		Lot 67 DP 8287
T538	32	50 Greenock Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 16 DP 20
T539	32	10 Grendon Street	*Eucalyptus globulus*	Blue gum		Lot 1 DP 2423
T540	34	58 Grendon Street	*Quercus robur*	Oak		Lot 13 DP 2602
T541	35	58 Grendon Street	*Pseudotsuga menziesii*	Douglas fir		Lot 13 DP 2602
T542	35	58 Grendon Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 14 DP 2602
T543	35	64 Grendon Street	*Agathis australis*	Kauri	Kauri	Lot 1 DP 9648
T544	34	32 Grendon Street	*Quercus robur*	Oak		Pt Lot 25 DEEDS 152
T545	35	58 Grendon Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 13 DP 2602
T546	52	39 Gresham Street	*Araucaria heterophylla*	Norfolk pine		Lot 3 DP 8750
T547	52	39 Gresham Street	*Metasequoia glyptostroboides*	Dawn redwood		Lot 3 DP 8750
T549	20	79 Hall Road	*Quercus robur*	Oak		Pt Lot 10 Blk II DP 659
T550	35	90 Hanover Street	*Nothofagus menziesii*	Silver beech	Tawhai	Sec 21 Blk XXIII TN OF DUNEDIN
T551	35	90 Hanover Street	*Quercus sp*	Oak		Sec 21 Blk XXIII TN OF DUNEDIN
T552	22	64 Harbour Terrace, Careys Bay	*Araucaria heterophylla*	Norfolk pine		Lot 1 DP 6965
T553	22	64 Harbour Terrace, Careys Bay	*Aesculus hippocastanum*	Horse chestnut		Lot 1 DP 6965
T554	33	35 Harcourt Street	*Betula pendula*	Silver birch		Lot 15 DP 5123
T556	39	20 Harrier Road	*Eucalyptus sp*	Eucalyptus		Lot 2 DP 91
T557	39	22 Harrier Road	*Eucalyptus globulus*	Blue gum		Lot 1 DP 91
T559	45	4 Harrison Street	*Quercus robur*	Oak		Lot 8 Blk XII DP 97
T560	32	9 Hart Street	*Cedrus sp*	Cedar		Lot 5 DP 5289
T561	32	25 Hart Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 2951
T562	32	25 Hart Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 2 DP 2951
T563	1	Strathavon, 366 Hartfield Road	*Cedrus libani*	Cedar		Sec 1 Blk VI STRATH TAIERI SD
T564	32	5 Hastings Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 17 DP 532

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T565	24	185 Hatchery Road	*Cupressus macrocarpa*	Monterey cypress		Sec 28 Blk VI PORTOBELLO SD
T566	24	Hatchery Road (Road Reserve)	*Podocarpus totara*	Totara	Totara	Road Reserve (HATCHERY ROAD)
T567	46	46 Hawthorn Avenue	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 11465
T568	47	32 Haywood Street	*Ulmus glabra*	Elm		Pt Lot 10 DP 2011
T569	46	50 Hazel Avenue	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 13 DP 1964
T570	46	69 Hazel Avenue	*Sequoia sempervirens*	Sequoia		Lot 21 DP 1964
T571	46	84 Hazelhurst Avenue	*Magnolia sp.*	Magnolia		Pt Lot 1 Blk I DP 2088
T573	32	231 Helensburgh Road	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 3 DP 19062
T574	40	8 Hellyer Street	*Araucaria heterophylla*	Norfolk pine		Lot 14 DP 7541
T575	54	452 Henley Road (Road Reserve)	*Pseudotsuga menziesii*	Douglas fir		Road Reserve (HENLEY ROAD)
T576	25	140 Hereweka Street	*Podocarpus totara*	Totara	Totara	Lot 1 DP 22000
T577	35	26 Heriot Row	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 30 Blk XXIV TN OF DUNEDIN
T578	35	28A Heriot Row	*Acer sp.*	Maple		Pt Sec 30 Blk XXIV TN OF DUNEDIN
T579	35	35 Heriot Row	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 23497
T580	35	49 Heriot Row	*Quercus robur*	Oak		Lot 8 DP 4651
T581	47	8 Alva Street	*Podocarpus totara*	Totara		Lot 5 DEEDS 289
T582	47	367 High Street, Dunedin	*Metasequoia glyptostroboides*	Dawn redwood		Lot 1 DP 5964
T583	47	367 High Street, Dunedin	*Pennettia baylisiana*	Three Kings Pennettia		Lot 2 DP 5964
T584	47	379 High Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 58 Blk IV TN OF DUNEDIN
T585	47	434 High Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 26 Blk II TN OF DUNEDIN
T588	47	434 High Street, Dunedin	*Aesculus hippocastanum*	Horse chestnut		Pt Sec 36 Blk II TN OF DUNEDIN
T589	24	669 Highcliff Road	*Podocarpus totara*	Totara	Totara	Lot 4 DP 193
T590	24	669 Highcliff Road	*Metrosideros umbellata*	Southern rata	Rata	Lot 5 DP 193
T591	24	669 Highcliff Road	*Araucaria heterophylla*	Norfolk pine		Lot 4 DP 193
T592	24	669 Highcliff Road	*Rhododendron sp*	Rhododendron		Pt Lot 6 DP 193
T593	24	669 Highcliff Road	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 2 DP 193
T594	32	26 Highgate	*Nothofagus solandri var Solandri*	Black beech	Tawhairauriki	Lot 1 DP 307386
T595	32	45 Highgate	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 5470
T596	33	111 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 17306
T597	33	201 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunui	Road Reserve (LEVEN STREET)
T598	33	373 Highgate	*Quercus robur*	Oak		Pt Lot 10 DEEDS 85
T599	33	399 Highgate	*Cedrus deodara*	Deodar Cedar		Pt Lot 16 DEEDS 85
T600	33	399 Highgate	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 15 DEEDS 85
T601	33	408 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 4 DP 534
T602	33	409 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Lot 92 DEEDS 85
T603	33	421 Highgate	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Lot 1 DP 1994
T604	33	421 Highgate	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 1 DP 1994
T605	33	421 Highgate	*Ulmus glabra*	Elm		Pt Lot 1 DP 1994
T606	33	421 Highgate	*Nothofagus menziesii*	Silver beech	Tawhai	Pt Lot 1 DP 1994
T608	32	516 Highgate	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 1 DP 20160
T609	32	516 Highgate	*Fagus sylvatica*	English beech		Lot 1 DP 20160
T610	32	556 Highgate	*Metrosideros umbellata*	Southern rata	Rata	Lot 1 DP 7950
T611	32	580 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 26904
T612	34	580 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 26904
T613	34	618 Highgate	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 3652
T614	34	720 Highgate	*Pyrus communis*	Pear		Pt Lot 4 DP 1364
T615	34	759 Highgate	*Quercus robur*	Oak		Lot 2 DP 4243
T616	33	372 Highgate	*Faxinus excelsior*	Ash		Lot 1 DP 25089
T617	33	373 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunu	Pt Lot 9 DEEDS 85
T618	33	373 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunu	Pt Lot 9 DEEDS 85
T619	33	373 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunu	Pt Lot 9 DEEDS 85
T620	33	373 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunu	Pt Lot 9 DEEDS 85
T621	33	373 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunu	Pt Lot 10 DEEDS 85
T622	33	373 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunu	Pt Lot 10 DEEDS 85
T623	33	373 Highgate	*Nothofagus fusca*	Red beech	Tawhairaunu	Pt Lot 11 DEEDS 85
T624	12	15 Hill Road	*Fraxinus excelsior*	Ash		Lot 8 DP 2368
T625	12	17 Hill Road	*Sequoia sempervirens*	Sequoia		Lot 1 DP 3223
T626	12	17 Hill Road	*Fagus sylvatica*	English beech		Lot 1 DP 3223
T627	8	Hindon Road	*Populus nigra var. Italica*	Lombardy poplar		Sec 50 Blk IV MOUNT HYDE SD
T628	8	Hindon Road	*Eucalyptus sp*	Eucalyptus		Sec 78 Blk IV MOUNT HYDE SD
T629	48	10 Hobson Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 3506
T630	48	10 Hobson Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 3506
T631	7A	8 Holyhead Street	*Quercus robur*	Oak		Lot 21 DP 101
T632	32	2 Holyrood Avenue	*Chaemycyparis lawsoniana*	Lawsons cypress		Lot 5 DP 8564
T633	25	12 Hoopers Inlet Road	*Elaeocarpus hookerianus*	Pokaka	Pokaka	Pt Sec 14 Blk V PORTOBELLO SD
T634	39	14 Howard Street	*Metasequoia glyptostroboides*	Dawn redwood		Lot 19 DP 3893
T635	39	14 Howard Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 18 DP 3893
T636	39	14 Howard Street	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 17 DP 3893
T637	39	19 Howard Street	*Podocarpus totara*	Totara	Totara	Lot 7 DP 3893
T638	39	20 Howard Street	*Cryptomeria japonica*	Japanese cedar		Lot 9 DP 3893
T639	39	Howard Street	*Prumnopitys taxifolia*	Black pine		Pt Sec 25 UPPER HARBOUR EAST SD
T640	39	Howard Street	*Podocarpus totara*	Totara	Totara	Pt Sec 26 UPPER HARBOUR EAST SD
T641	39	Howard Street	*Podocarpus totara*	Totara	Totara	Pt Sec 26 UPPER HARBOUR EAST SD
T642	44	3 Howden Street	*Quercus robur*	Oak		Lot 43 Blk III DP 44
T643	44	3 Howden Street	*Fraxinus excelsior*	Ash		Lot 39 Blk III DP 44
T644	1	8988 Hyde-Middlemarch Road	*Pinus radiata*	Pine		Pt Sec 3 Blk VI TN OF HYDE
T645	1	8988 Hyde-Middlemarch Road	*Quercus robur*	Oak		Lot 1 DP 22564
T646	48	10 Ings Avenue	*Quercus robur*	Oak		Lot 11 DP 2100
T647	23	20 Island Terrace	*Araucaria heterophylla*	Norfolk pine		Pt Sec 130 TN OF PORT CHALMERS
T648	52	118 Jeffery Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 31 DEEDS 114
T649	33	23a Jellicoe Street	*Eucalyptus sp*	Eucalyptus		Lot 1 DP 2968

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T650	44	13 John Street, Abbotsford	*Sequoia sempervirens*	Sequoia		Lot 6 DP 9699
T651	32	151 Kaikorai Valley Road	*Pseudotsuga menziesii*	Douglas fir		Lot 2 DP 20567
T652	32	151 Kaikorai Valley Road	*Pseudotsuga menziesii*	Douglas fir		Lot 2 DP 20567
T653	32	171 Kaikorai Valley Road	*Eucalyptus sp*	Eucalyptus		Pt Sec 3 Blk V LOWER KAIKORAI SD
T654	32	171 Kaikorai Valley Road	*Eucalyptus sp*	Eucalyptus		Pt Sec 3 Blk V LOWER KAIKORAI SD
T655	32	171 Kaikorai Valley Road	*Eucalyptus sp*	Eucalyptus		Lot 2 DP 20567
T656	46	382 Kaikorai Valley Road	*Araucaria araucana*	Monkey puzzle		Lot 6 DP 17057
T657	46	500 Kaikorai Valley Road	*Eucalyptus sp*	Eucalyptus		Pt Sec 18 Blk V LOWER KAIKORAI SD
T658	45	500 Kaikorai Valley Road	*Griselinia littoralis*	Broadleaf	Papauma	Pt Sec 20 Blk V LOWER KAIKORAI SD
T659	32	40 Kaikorai Valley Road	*Cupressus macrocarpa*	Monterey cypress		Lot 1 DP 4636
T660	1	Kelvin Grove, Gladbrook Road	*Quercus robur*	Oak		Sec 2 Sec 3S GLADBROOK SETT
T661	1	Kelvin Grove, Gladbrook Road	*Quercus robur*	Oak		Sec 2 Sec 3S GLADBROOK SETT
T662	32	26 Kenmure Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 6 Blk V DEEDS 307
T663	33	8 Kilgour Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Lot 2 DP 4723
T664	50	351 King Edward Street	*Cedrus sp*	Cedar		Lot 1 DP 9119
T666	42	27 Kings Street	*Quercus palustris*	Pin oak		Lot 11 Blk IV DEEDS 183
T667	36	19 Knox Street	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 4 NORTH EAST VALLEY SD
T668	36	19 Knox Street	*Quercus robur*	Oak		Pt Sec 4 NORTH EAST VALLEY SD
T669	36	19 Knox Street	*Quercus robur*	Oak		Pt Sec 4 NORTH EAST VALLEY SD
T670	46	6 Lancefield Street	*Aesculus hippocastanum*	Horse chestnut		Lot 4 DP 5257
T671	51	12 Larnach Road	*Eucalyptus globulus*	Blue gum		Lot 5 DP 11572
T672	6	1131 Lee Steam/ Outram Road	*Pinus coulteri*	Big cone pine		Lot 2 DP 7711
T673	6	1131 Lee Steam/ Outram Road	*Quercus robur*	Oak		Lot 2 DP 7711
T674	47	49 Lees Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 1349
T675	37	385 Leith Street, Dunedin	*Podocarpus totara*	Totara	Totara	Sec 9 Blk XXXVII TN OF DUNEDIN
T676	37	409 Leith Street, Dunedin	*Ulmus glabra 'Horizontalis'*	Spreading elm		Sec 12 Blk XXXVII TN OF DUNEDIN
T677	18	317 Leith Valley Road	*Podocarpus totara*	Totara	Totara	Lot 2 DP 24524
T678	18	317 Leith Valley Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 2 DP 24524
T679	37	315 Leith Walk	*Sequoiadendron giganteum*	Wellingtonia		Sec 4 SO 11710
T680	37	333 Leith Walk	*Sequoiadendron giganteum*	Wellingtonia		Sec 18 Blk XXXVI TN OF DUNEDIN
T681	35	364 Leith Walk	*Ilex aquifolium*	Holly		Pt Blk LXXI TN OF DUNEDIN
T682	35	364 Leith Walk	*Ilex aquifolium*	Holly		Pt Blk LXXI TN OF DUNEDIN
T683	35	364 Leith Walk	*Quercus robur*	Oak		Pt Blk LXXI TN OF DUNEDIN
T684	35	364 Leith Walk	*Quercus robur*	Oak		Pt Blk LXXI TN OF DUNEDIN
T685	35	364 Leith Walk	*Magnolia cambelli*	Magnolia		Pt Blk LXXI TN OF DUNEDIN
T686	33	43 Leven Street	*Nothofagus menziesii*	Silver beech	Tawhai	Lot 1 DP 16831
T687	33	21 Leven Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 3520
T688	33	17 Littlebourne Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 21 DP 308
T689	33	23 Littlebourne Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 22 DP 308
T690	35	84 London Street	*Rhopalostylis sapida*	Nikau	Nikau	Lot 3 DP 10097
T691	35	93 London Street	*Fraxinus excelsior*	Ash		Lot B DP 1553
T692	33	143 London Street	*Cupressus macrocarpa*	Monterey cypress		Sec 2 Blk XIX TN OF DUNEDIN
T693	33	143 London Street	*Ulmus glabra*	Elm		Sec 3 Blk XIX TN OF DUNEDIN
T694	33	143 London Street	*Fraxinus excelsior*	Ash		Pt Sec 4 Blk XIX TN OF DUNEDIN
T696	33	143 London Street	*Fagus sylvatica*	English beech		Pt Sec 4 Blk XIX TN OF DUNEDIN
T697	46	33 Lonsdale Street	*Fraxinus excelsior*	Ash		Lot 3 DP 12503
T698	46	33 Lonsdale Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 3 DP 12503
T699	46	33 Lonsdale Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 3 DP 12503
T700	36	40 Lovelock Avenue	*Sequoiadendron giganteum*	Wellingtonia		Sec 1 Blk LXXX TN OF DUNEDIN
T701	32	16 Lynn Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 3A DP 157
T705	51	1 Magdala Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 1 Blk V DP 1746
T707	43	76 Main Road, Fairfield	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 18 GREEN ISLAND WEST SD
T708	42	30 Main South Road (SH1), East Taieri	*Eucalyptus globulus*	Blue gum		Pt Sec 35 Irreg Blk EAST TAIERI SD
T709	41	186 Main South Road (SH1), East Taieri	*Quercus robur*	Oak		Pt Sec 16 Irreg Blk EAST TAIERI SD
T710	41	255 Main South Road (SH1), East Taieri	*Eucalyptus globulus*	Blue gum		Pt Lot 1 DP 24398
T711	42	69 Main South Road, East Taieri	*Quercus robur*	Oak		Lot D DEEDS 244
T712	45	104 Main South Road, Green Island	*Betula pendula*	Silver birch		Lot 3 Blk III DP 168
T713	45	130 Main South Road, Green Island	*Ginkgo biloba*	Maidenhair tree		Lot 5 Blk II DP 97
T714	45	134 Main South Road, Green Island	*Ulmus glabra "Pendula"*	Weeping elm		Lot 6 Blk II DP 97
T715	45	140 Main South Road, Green Island	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 7 DP 4654
T716	44	237 Main South Road, Green Island	*Abies procera*	Noble fir		Lot 2 DP 17492
T717	10	6 Malloch Street	*Quercus robur*	Oak		Sec 14 Blk XIII TN OF HAWKSBURY
T718	10	6 Malloch Street	*Quercus robur*	Oak		Sec 11 Blk XIII TN OF HAWKSBURY
T719	17	435 Malvern Street	*Cupressus macrocarpa 'Aurea'*	Golden macrocarpa		Lot 11 DP 87
T720	17	435 Malvern Street	*Podocarpus totara*	Totara	Totara	Lot 14 DP 87
T721	17	435 Malvern Street	*Beilschmiedia tawa*	Tawa	Tawa	Lot 11 DP 87
T722	32	45 Manchester Street	*Araucaria araucana*	Monkey puzzle		Lot 29 DP 342
T723	8	67 Manse Street	*Griselinia littoralis*	Broadleaf	Papauma	Lot 6 DP 23662
T724	47	47 Maori Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 16 DP 771
T725	47	47 Maori Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 16 DP 771
T726	47	47 Maori Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 16 DP 771
T727	47	47 Maori Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 16 DP 771
T728	47	47 Maori Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 17 DP 771
T729	47	47 Maori Road	*Quercus robur*	Oak		Lot 17 DP 771
T730	47	47 Maori Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 17 DP 771
T732	39	39 Marion Street	*Quercus robur*	Oak		Lot 1 DP 8057
T733	47	92 Maryhill Terrace	*Quercus robur*	Oak		Lot 3 DP 20299
T734	47	101 Maryhill Terrace	*Sequoia sempervirens*	Sequoia		Lot 2 DP 4865

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T735	47	101 Maryhill Terrace	*Sequoia sempervirens*	Sequoia		Lot 1 DP 4865
T736	47	121 Maryhill Terrace	*Pseudotsuga menziesii*	Douglas fir		Pt Lot 7 DP 2750
T737	9	51 Matanaka Road	*Eucalyptus globulus*	Blue gum		Pt Sec 19 Blk VI HAWKSBURY SD
T738	44	Matthew Street (Road Reserve)	*Eucalyptus globulus*	Blue gum		Road Reserve (MATTHEW STREET)
T739	54	487 Maungatua Road	*Cryptomeria japonica*	Japanese cedar		Lot 1 DP 4838
T740	53A	923 Maungatua Road	*Betula pendula*	Silver birch		Sec 2 SO 301944
T741	6	Rapid 187 Maungatua Road	*Eucalyptus sp*	Eucalyptus		Pt Sec 37 Irreg Blk WEST TAIERI SD
T742	16	SH1 McArthurs Bend	*Nothofagus menziesii*	Silver beech	Tawhai	SEC 2 SO 24829
T743	9	197 McGrath Road	*Araucaria araucana*	Monkey puzzle		Lot 1 DP 22525
T744	9	197 McGrath Road	*Populus sp)*	Poplar		Lot 1 DP 22525
T745	9	197 McGrath Road	*Populus sp)*	Poplar		Pt Sec 4 Blk V HAWKSBURY SD
T746	9	197 McGrath Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 22525
T747	9	197 McGrath Road	*Cedrus deodara*	Cedar		Lot 1 DP 22525
T748	9	197 McGrath Road	*Fraxinus excelsior "Pendula"*	Weeping ash		Lot 1 DP 22525
T749	9	197 McGrath Road	*Pyrus communis*	Pear		Lot 1 DP 22525
T750	9	197 McGrath Road	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 22525
T751	9	197 McGrath Road	*Juglans regia*	Walnut		Lot 1 DP 22525
T752	9	197 McGrath Road	*Quercus robur Fastigiata*	Fastigiate oak		Lot 1 DP 22525
T753	9	197 McGrath Road	*Quercus palustris*	Pin oak		Lot 1 DP 22525
T754	9	197 McGrath Road	*Ulmus glabra "Pendula"*	Weeping elm		Lot 1 DP 22525
T755	9	197 McGrath Road	*Eucalyptus regnans*	Eucalyptus		Lot 1 DP 22525
T756	9	197 McGrath Road	*Eucalyptus regnans*	Eucalyptus		Lot 1 DP 22525
T757	6	130 McKendry Road	*Eucalyptus regnans*	Eucalyptus		Sec 20 Blk IX MAUNGATUA SD
T758	44	83 McMeakin Road	*Pinus radiata*	Monterey pine		Lot 2 DP 19351
T759	47	7 Meadow Street	*Quercus rubra*	Red oak		Lot 3 DP 771
T760	36	54 Mechanic Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 35 Blk II DP 202
T761	50	65 Melbourne Street	*Phoenix caneriensis*	Phoenix palm		Lot 9 Blk VI DP 17
T762	33	43 Melrose Street	*Fagus sylvatica*	English beech		Lot 5 DP 5572
T763	33	43 Melrose Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 5 DP 5572
T764	33	9 Melrose Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 2 DP 6300
T765	33	20 Melrose Street, Dunedin	*Nothofagus menziesii*	Silver beech	Tawhai	Pt Lot 12 DP 4
T766	33	32 Melrose Street, Dunedin	*Juglans regia*	Walnut		Lot 4 DP 4508
T769	47	33 Melville Stree, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 56 Blk III TN OF DUNEDIN
T770	47	33 Melville Street Dunedin	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 55 Blk III TN OF DUNEDIN
T771	47	17 Melville Street, Dunedin	*Sequoiadendron giganteum*	Wellingtonia		Lot 4 DP 7855
T772	47	33 Melville Street, Dunedin	*Fagus sylvatica*	English beech		Sec 49 Blk III TN OF DUNEDIN
T773	47	33 Melville Street, Dunedin	*Sequoia sempervirens*	Sequoia		Pt Sec 55 Blk III TN OF DUNEDIN
T774	47	33 Melville Street, Dunedin	*Cordyline australis*	Cabbage tree	Ti kouka	Pt Sec 57 Blk III TN OF DUNEDIN
T775	47	91 Melville Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 23501
T776	48	16 Middleton Road	*Araucaria araucana*	Monkey puzzle		Lot 3 DP 10912
T777	48	16 Middleton Road	*Araucaria araucana*	Monkey puzzle		Lot 3 DP 10912
T778	48	35 Middleton Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 2 DP 9668
T779	48	62 Middleton Road	*Pseudopanax crassifolium*	Lancewood	Horoeka	Lot 3 DP 4300
T780	46	23a Milburn Street	*Sequoiadendron giganteum*	Wellingtonia		Pt Lot 2 DP 9091
T781	46	23a Milburn Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 2 DP 24719
T782	46	23a Milburn Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 2 DP 24719
T783	46	23a Milburn Street	*Tilia x europaea*	Lime		Lot 2 DP 24719
T784	46	23a Milburn Street	*Metrosideros umbellata*	Southern rata	Rata	Pt Lot 2 DP 9091
T785	46	23a Milburn Street	*Betula pendula*	Silver birch		Pt Lot 2 DP 9091
T786	46	23a Milburn Street	*Nothofagus menziesii*	Silver beech	Tawhai	Pt Lot 2 DP 9091
T787	46	23a Milburn Street	*Cryptomeria Japonica*	Japanese cedar		Pt Lot 2 DP 9091
T788	52	6 Minto Street	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 3 DP 26063
T790	33	8 Michie Street	*Nothofagus menziesii*	Silver beech	Tawhai	Lot 6 DEEDS 251
T791	39	14 Moa Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 11 Blk III DP 160
T792	39	14 Moa Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 9 Blk III DP 160
T793	51	15 Moana Cresent	*Arbutus unedo*	Strawberry tree		Lot 1 DP 2849
T794	51	47 Moana Cresent	*Metrosideros excelsia*	Pohutukawa	Pohutukawa	Pt Lot 6 DP 2849
T795	2	86 Mold Street	*Quercus robur*	Oak		Lot 118 Blk VI DP 825
T796	2	15 Mold Street	*Quercus robur*	Oak		Sec 10 Blk VI TN OF ARDEN
T797	2	86 Mold Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 118 Blk VI DP 825
T798	47	14 Montpellier Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 12 DP 771
T799	31	17 Mooltan Street	*Castanea sativa*	Sweet chestnut		Lot 15 DP 9918
T800	35	29 Moray Place	*Taxus baccata*	Yew		Pt Sec 29 Blk XIV TN OF DUNEDIN
T801	35	405-417 Moray Place	*Ulmus glabra*	Elm		Lot 1 DP 10275
T802	35	405-417 Moray Place	*Cupressus macrocarpa*	Monterey cypress		Lot 1 DP 10275
T803	35	405-417 Moray Place	*Cupressus macrocarpa*	Monterey cypress		Lot 1 DP 10275
T804	35	405-417 Moray Place	*Fraxinus excelsior*	Ash		Lot 1 DP 10275
T805	35	405-417 Moray Place	*Ulmus glabra*	Elm		Lot 1 DP 10275
T806	35	405-417 Moray Place	*Cupressus macrocarpa*	Monterey cypress		Lot 1 DP 10275
T807	35	405-417 Moray Place	*Cupressus macrocarpa*	Monterey cypress		Lot 1 DP 10275
T808	45	116 Mornington Road	*Nothofagus menziesii*	Silver beech	Tawhai	Lot 2 DP 4058
T809	46	Mornington School, Kenmure Road	*Fagus sylvatica*	English beech		Lot 21 Blk III DEEDS 26
T810	46	Mornington School, Kenmure Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 21 Blk III DEEDS 26
T811	46	Mornington School, Kenmure Road	*Nothofagus menziesii*	Silver beech	Tawhai	Pt Lot 20 Blk III DEEDS 26
T812	46	Mornington School, Kenmure Road	*Nothofagus solandri*	Black beech	Tawhairauriki	Pt Lot 20 Blk III DEEDS 26
T813	16	386 Mount Cargill Road	*Dacrydium cupressinum*	Red pine	Rimu	Sec 53 Blk VII NORTH HARBOUR & BLUESKIN SD
T814	16	Mount Cargill Road	*Podocarpus totara*	Totara	Totara	Sec 22 Blk VII NORTH HARBOUR & BLUESKIN SD
T815	10	37 Mount Street, Waikouaiti	*Quercus robur*	Oak		Lot 30 Blk VI DEEDS 51
T816	10	37 Mount Street, Waikouaiti	*Cupressus macrocarpa*	Monterey cypress		Pt Lot 50 Blk VI DEEDS 51
T817	10	37 Mount Street, Waikouaiti	*Quercus robur*	Oak		Lot 29 Blk VI DEEDS 51
T818	10	24 Mount Street, Waikouaiti	*Aesculus hippocastanum*	Horse chestnut		Lot 13 Blk IX DEEDS 51

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T819	45	1 Mt Grand Road	*Ulmus glabra*	Elm		Lot 1 DP 22043
T820	45	1 Mt Grand Road	*Ulmus glabra*	Elm		Lot 1 DP 22043
T821	45	1 Mt Grand Road	*Ulmus glabra*	Elm		Lot 1 DP 22043
T822	45	1 Mt Grand Road	*Ulmus glabra*	Elm		Lot 1 DP 22043
T823	45	1 Mt Grand Road	*Quercus robur*	Oak		Lot 1 DP 22043
T824	45	26a Mulford Street	*Castanea sativa*	Sweet chestnut		Lot 3 DP 5472
T825	46	23 Murray Street, Dunedin	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 3 DP 3762
T826	28	19 Murray Street, Mosgiel	*Fraxinus excelsior*	Ash		Lot 1 DP 26245
T827	47	2 Murrayfield Street	*Fraxinus sp.*	Ash		Lot 13 Blk VI DEEDS 128
T828	47	16 Neidpath Road	*Fagus sylvatica 'Riversii'*	Copper beech		LOT 1 DP 302503
T829	35	72 Newington Ave	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 8 Blk I UPPER KAIKORAI SD
T830	35	72 Newington Ave	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 8 Blk I UPPER KAIKORAI SD
T831	35	72 Newington Ave	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 8 Blk I UPPER KAIKORAI SD
T832	35	29 Newington Avenue	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 10 DP 10533
T833	35	29 Newington Avenue	*Sophora microphylla*	Kowhai	Kowhai	Lot 9 DP 10533
T834	33	72 Newington Avenue	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 9 Blk I UPPER KAIKORAI SD
T835	33	72 Newington Avenue	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 8 Blk I UPPER KAIKORAI SD
T836	33	72 Newington Avenue	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 8 Blk I UPPER KAIKORAI SD
T837	35	72 Newington Avenue	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 8 Blk I UPPER KAIKORAI SD
T838	33	72 Newington Avenue	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 8 Blk I UPPER KAIKORAI SD
T839	35	72 Newington Avenue	*Tilia x europaea*	Lime		Pt Sec 8 Blk I UPPER KAIKORAI SD
T840	33	72 Newington Avenue	*Tilia x europaea*	Lime		Pt Sec 8 Blk I UPPER KAIKORAI SD
T841	33	72 Newington Avenue	*Ulmus glabra 'Horizontalis'*	Spreading elm		Pt Sec 9 Blk I UPPER KAIKORAI SD
T842	35	72 Newington Avenue	*Fagus sylvatica*	English beech		Pt Sec 8 Blk I UPPER KAIKORAI SD
T843	35	72 Newington Avenue	*Fagus sylvatica*	English beech		Pt Sec 8 Blk I UPPER KAIKORAI SD
T844	33	72 Newington Avenue	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 8 Blk I UPPER KAIKORAI SD
T845	35	72 Newington Avenue	*Acer saccharinum*	Silver maple		Pt Sec 9 Blk I UPPER KAIKORAI SD
T846	33	72 Newington Avenue	*Quercus ilex*	Holm oak		Pt Sec 8 Blk I UPPER KAIKORAI SD
T848	32	86 Newington Avenue	*Quercus robur*	Oak		Lot 3 DEEDS 130
T849	32	90 Newington Avenue	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DEEDS 130
T850	1	307 Ngapuna Road	*Cedrus atlantica 'Glauca'*	Blue cedar		Sec 66 Blk V STRATH TAIERI SD
T851	1	660 Ngapuna Road	*Sequoiadendron giganteum*	Wellingtonia		Sec 20 Blk V STRATH TAIERI SD
T852	1	660 Ngapuna Road	*Quercus robur*	Oak		Sec 20 Blk V STRATH TAIERI SD
T853	1	660 Ngapuna Road	*Abies alba*	European silver fir		Sec 20 Blk V STRATH TAIERI SD
T854	54	53 Nichols Road	*Araucaria araucana*	Monkey puzzle		Lot 2 DP 15229
T855	6	187 Nichols Road	*Quercus robur*	Oak		Pt Sec 22 Blk III MAUNGATUA SD
T856	6	187 Nichols Road	*Ulmus glabra*	Elm		Pt Sec 22 Blk III MAUNGATUA SD
T857	6	187 Nichols Road	*Tilia x europaea*	Lime		Pt Sec 22 Blk III MAUNGATUA SD
T859	60	96 Norfolk Street	*Podocarpus totara*	Totara	Totara	Lot 4 DP 11292
T860	36	293 North Road	*Eucalyptus sp*	Eucalyptus		LOT 2 DP 300760
T861	36	293 North Road	*Eucalyptus sp*	Eucalyptus		LOT 2 DP 300760
T862	36	210 North Road	*Cedrus atlantica*	Atlantic cedar		Lot 2 DP 546
T863	19	424 North Road	*Quercus robur*	Oak		Lot 1 DP 159
T864	19	426 North Road	*Araucaria araucana*	Monkey puzzle		Lot 3 DP 159
T865	19	552 North Road	*Eucalyptus sp*	Eucalyptus		Lot 2 DP 5994
T866	19	860 North Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Sec 119 NORTH EAST VALLEY SD
T867	19	Rapid 664 North Road	*Sophora microphylla*	Kowhai	Kowhai	Road Reserve (NORTH ROAD)
T868	19	opp Rapid 662 North Road	*Sophora microphylla*	Kowhai	Kowhai	Road Reserve (NORTH ROAD)
T869	44	100 North Taieri Road	*Eucalyptus globulus*	Blue gum		Lot 10 DP 8124
T870	44	100 North Taieri Road	*Eucalyptus globulus*	Blue gum		Lot 10 DP 8124
T871	44	123 North Taieri Road	*Quercus robur*	Oak		Lot 8 DP 25192
T872	44	123 North Taieri Road	*Metrosideros umbellata*	Southern rata	Rata	Lot 8 DP 25192
T873	44	123 North Taieri Road	*Aesculus hippocastanum*	Horse chestnut		Lot 8 DP 25192
T874	32	6 Northview Crescent	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DEEDS 309A
T875	32	22 Northview Crescent	*Ulmus procera*	English elm		Lot 10 DEEDS 309A
T876	32	22 Northview Crescent	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 10 DEEDS 309A
T877	19	42 Norwood Street	*Picea abies*	Norway spruce		Lot 32 DP 83
T878	19	188 Norwood Street	*Fraxinus excelsior*	Ash		Lot 1 DP 21174
T879	19	188 Norwood Street	*Fraxinus excelsior*	Ash		Lot 1 DP 21174
T880	2	8 Nottage Street	*Betula pendula*	Silver birch		Lot 1 DP 26492
T881	46	28 Nottingham Crescent	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 20 Blk II DP 2162
T882	33	16 Oban Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 5761
T883	43	27 Old Brighton Road	*Araucaria heterophylla*	Norfolk pine		Lot 8 Blk VII DP 706
T884	40	Opp Greenacre Street (Road Reserve)	*Quercus robur*	Oak		Lot 89 DP 2362
T885	13	62 Orokonui Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 25982
T886	13	62 Orokonui Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 2 DP 302886
T887	13	62 Orokonui Road	*Quercus robur*	Oak		Lot 3 DP 302886
T888	54	485 Otokia Road	*Cedrus atlantica 'Glauca'*	Blue cedar		Lot 1 DP 12837
T889	53	485 Otokia Road West	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 12837
T890	54	485 Otokia Road West	*Quercus coccinea*	Scarlet oak		Lot 1 DP 12837
T891	6	Rapid 356 Outram-Mosgiel Road	*Eucalyptus sp*	Eucalyptus		Pt Sec 10 Blk XVII EAST TAIERI SD
T892	33	70 Pacific Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 5 DP 3
T893	12	20 Park Road, Warrington	*Ulmus glabra 'Horizontalis'*	Spreading elm		Pt Lot 1 DP 1636
T894	12	20 Park Road, Warrington	*Cedrus deodara*	Cedar		Pt Lot 1 DP 1636
T895	35	44 Park Street, Dunedin	*Sequoiadendron giganteum*	Wellingtonia		Sec 62 Blk XIX TN OF DUNEDIN
T896	34	35 Passmore Crescent	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Lot 14 DP 1824
T897	34	57 Passmore Crescent	*Nothofagus menziesii*	Silver beech	Tawhai	Pt Lot 24 DP 1824
T898	34	57 Passmore Crescent	*Podocarpus totara*	Totara	Totara	Pt Lot 24 DP 1824
T899	47	49a Patrick Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 3196
T900	46	3 Picardy Street	*Fagus sylvatica 'Riversii*	Copper beech		Pt Lot 2 DP 6412
T901	32	2 Pilkington Street	*Eucalyptus sp*	Eucalyptus		Lot 2 DP 11333
T902	32	2 Pilkington Street	*Podocarpus totara*	Totara	Totara	Pt Sec 4 Blk II UPPER KAIKORAI SD
T903	32	2 Pilkington Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 4 Blk II UPPER KAIKORAI SD
T904	18	521 Pine Hill Road	*Quercus robur*	Oak		Pt Sec 16 Blk X NORTH HARBOUR & BLUESKIN SD

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T905	18	523 Pine Hill Road	*Pinus radiata*	Monterey pine		Pt Sec 16 Blk X NORTH HARBOUR & BLUESKIN SD
T906	35	18b Pitt Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 3 DP 2478
T907	39	430 Portobello Road	*Pumnopitys taxifolia*	Black pine	Matai	Lot 2 DP 2679
T908	39	432 Portobello Road	*Eucalyptus globulus*	Blue gum		Pt Lot 2 DP 12012
T909	21	722 Portobello Road	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 23 DEEDS 127
T910	40	529 Portobello Road (Road Reserve)	*Podocarpus totara*	Totara	Totara	Road Reserve (PORTOBELLO ROAD)
T911	18	18 Poulters Road	*Prumnopitys taxofolia*	Black pine	Matai	Pt Lot 1 DP 714
T913	32	22 Prestwick Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 9372
T914	32	26 Prestwick Street	*Nothofagus menziesii*	Silver beech	Tawhai	Pt Lot 44 DP 1383
T915	32	26 Prestwick Street	*Nothofagus menziesii*	Silver beech	Tawhai	Pt Lot 44 DP 1383
T916	21	3 Prospect Row	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Pt Lot 18 DP 98
T917	21	3 Prospect Row	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 19 DP 98
T918	21	3 Prospect Row	*Quercus robur*	Oak		Lot 20 DP 98
T919	29	268 Puddle Alley	*Eucalyptus sp.*	Gum		Pt Sec 12 Blk XIII EAST TAIERI SD
T920	29	268 Puddle Alley	*Eucalyptus sp.*	Gum		Pt Sec 12 Blk XIII EAST TAIERI SD
T921	39	6 Pukeko Street	*Quercus robur*	Oak		Lot 1 DP 8105
T922	15	503 Purakanui Road	*Podocarpus totara*	Totara	Totara	Sec 41 Blk IV NORTH HARBOUR & BLUESKIN SD
T923	34	180 Queen Street North, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 23 Blk XXXII TN OF DUNEDIN
T924	35	21 Queen Street, Dunedin	*Metrosideros umbellata*	Southern rata	Rata	Pt Sec 37 Blk XXV TN OF DUNEDIN
T925	35	38 Queen Street, Dunedin	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 2 DP 1566
T926	35	38 Queen Street, Dunedin	*Quercus palustris*	Pin oak		Lot 2 DP 1566
T927	35	40 Queen Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Sec 20 Blk XXV TN OF DUNEDIN
T928	35	42 Queen Street, Dunedin	*Ulmus glabra*	Elm		Sec 19 Blk XXV TN OF DUNEDIN
T929	35	44 Queen Street, Dunedin	*Metrosideros umbellata*	Southern rata	Rata	Sec 18 Blk XXV TN OF DUNEDIN
T930	35	69 Queen Street, Dunedin	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 3216
T931	35	69 Queen Street, Dunedin	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 3216
T932	35	69 Queen Street, Dunedin	*Cupressus macrocarpa*	Monterey cypress		Lot 1 DP 3216
T934	35	83 Queen Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 10144
T935	34	93 Queen Street, Dunedin	*Juglans regia*	Walnut		Pt Lot 2 DP 16701
T937	47	501 Queens Drive, Dunedin	*Cryptomeria japonica*	Japanese cedar		Lot 4 DP 771
T938	47	502 Queens Drive, Dunedin	*Sequoiadendron giganteum*	Wellingtonia		Lot 8 DP 771
T940	33	277 Rattray Street	*Taxus baccata*	Yew		Pt Sec 77 Blk XII TN OF DUNEDIN
T941	38	259 Ravensbourne Road	*Metrosideros umbellata*	Rata		Lot 31 DP 136
T942	38	265 Ravensbourne Road	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Pt Lot 7 DP 166
T943	38	279 Ravensbourne Road	*Metrosideros umbellata*	Southern rata	Rata	Pt Lot 1 DP 1
T944	48	35 Ravenswood Road	*Quercus robur*	Oak		Lot 48 DP 370
T945	48	35 Ravenswood Road	*Pyrus communis*	Pear		Lot 48 DP 370
T947	48	83 Ravenswood Road	*Quercus robur*	Oak		Lot 1 DP 21542
T948	48	83 Ravenswood Road	*Sequoia sempervirens*	Sequoia		Lot 1 DP 21542
T949	48	83 Ravenswood Road	*Rhopalostylis sapida*	Nikau	Nikau	Lot 1 DP 21542
T950	48	83 Ravenswood Road	*Griselinia littoralis*	Broadleaf	Papauma	Lot 1 DP 21542
T951	48	83 Ravenswood Road	*Metrosideros umbellata*	Southern rata	Rata	Lot 1 DP 21542
T952	48	83 Ravenswood Road	*Aesculus hippocastanum*	Horse chestnut		Lot 1 DP 21542
T953	48	83 Ravenswood Road	*Pyrus communis*	Pear		Lot 1 DP 21542
T954	13	Reserve opposite 22 Orokonui Road	*Eucalyptus sp*	Gum		Pt Sec 78 Blk I North Harbour & Blueskin SD
T955	51	10 Rewa Street	*Rhopalostylis sapida*	Nikau	Nikau	Lot 15 DP 2087
T956	41	193 Riccarton Road	*Salix sp.*	Willow		Pt Sec 1 Blk VIII EAST TAIERI SD
T957	41	24 Riccarton Road (Road Reserve)	*Podocarpus totara*	Totara	Totara	Road Reserve (RICCARTON ROAD EAST)
T959	34	24 Rockside Road	*Pseudotsuga menziesii*	Douglas fir		Lot 47 DEEDS 143
T962	33	32 Ross Street, Dunedin	*Dacrydium cupressinum*	Red pine	Rimu	Pt Lot 5 Blk V DEEDS 15
T963	33	32 Ross Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Lot 5 Blk V DEEDS 15
T964	33	43 Ross Street, Dunedin	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 6574
T965	28	7 Ross Street, Mosgiel	*Liriodendron tulipifera*	Tulip tree		Lot 59 DP 8959
T966	35	34 Royal Terrace	*Nothofagus meziesii*	Silver beech	Tawhai	Sec 33 Blk XIX TN OF DUNEDIN
T967	35	42 Royal Terrace	*Nothofagus fusca*	Red beech	Tawhairaunui	Sec 38 Blk XIX TN OF DUNEDIN
T968	35	42 Royal Terrace	*Nothofagus solandri var Solandri*	Black beech	Tawhairauriki	Sec 38 Blk XIX TN OF DUNEDIN
T969	35	42 Royal Terrace	*Nothofagus fusca*	Red beech	Tawhairaunui	Sec 35A Blk XIX TN OF DUNEDIN
T970	35	42 Royal Terrace	*Nothofagus solandri var Solandri*	Black beech	Tawhairauriki	Sec 35A Blk XIX TN OF DUNEDIN
T971	35	42 Royal Terrace	*Nothofagus fusca*	Red beech	Tawhairaunui	Sec 36 Blk XIX TN OF DUNEDIN
T972	35	42 Royal Terrace	*Nothofagus fusca*	Red beech	Tawhairaunui	Sec 37 Blk XIX TN OF DUNEDIN
T973	35	42 Royal Terrace	*Fagus sylvatica 'Riversii'*	Copper beech		Sec 36 Blk XIX TN OF DUNEDIN
T974	35	42 Royal Terrace	*Fagus sylvatica 'Riversii'*	Copper beech		Sec 36 Blk XIX TN OF DUNEDIN
T975	35	54 Royal Terrace	*Nothofagus fusca*	Red beech	Tawhairaunui	Pt Sec 41 Blk XIX TN OF DUNEDIN
T976	35	55 Royal Terrace	*Juglans regia*	Walnut		Lot 1 DP 7442
T977	44	5 Runciman Street	*Pyrus communis*	Pear		Pt Lot 13 Blk D DP 346
T978	48	25 Ruskin Terrace	*Metasequoia glyptostroboides*	Dawn redwood		Lot 2 DP 2347
T979	48	44 Rutherford Street	*Betula pendula*	Silver birch		Lot 2 DP 6187
T980	48	42 Rutherford Street	*Aesculus hippocastanum*	Horse chestnut		Pt Lot 1 DP 6187
T981	48	42 Rutherford Street	*Fraxinus excelsior*	Ash		Pt Lot 1 DP 6187
T982	48	44 Rutherford Street	*Ulmus glabra*	Elm		Lot 2 DP 6187
T983	48	44 Rutherford Street	*Tilia x europaea*	Lime		Lot 2 DP 6187
T984	42	167 Saddle Hill Road	*Juglans regia*	Walnut		Sec 68 Blk VIII DUNEDIN & EAST TAIERI SD
T985	42	167 Saddle Hill Road	*Juglans regia*	Walnut		Sec 68 Blk VIII DUNEDIN & EAST TAIERI SD
T986	42	167 Saddle Hill Road	*Juglans regia*	Walnut		Sec 68 Blk VIII DUNEDIN & EAST TAIERI SD
T987	42	167 Saddle Hill Road	*Juglans regia*	Walnut		Sec 68 Blk VIII DUNEDIN & EAST TAIERI SD
T988	42	167 Saddle Hill Road	*Juglans regia*	Walnut		Sec 68 Blk VIII DUNEDIN & EAST TAIERI SD
T989	56	167 Saddle Hill Road	*Various*	Remnant bush		Sec 68 Blk VIII DUNEDIN & EAST TAIERI SD
T990	48	17 Sandringham Street	*Cordyline australis*	Cabbage tree	Ti kouka	Lot 48 Blk I DP 335

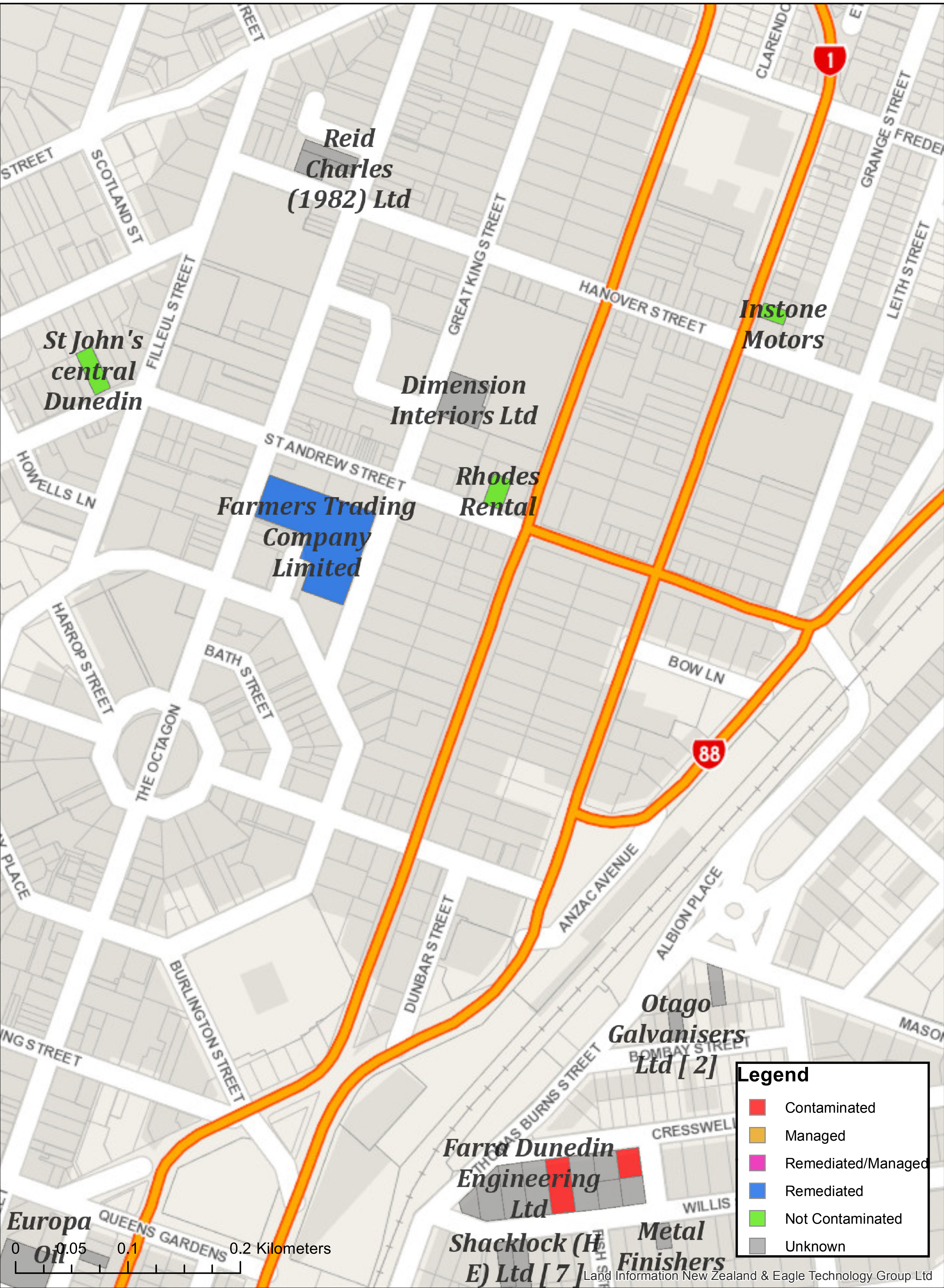
Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T991	33	47 Scarba Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DEEDS 240
T992	28	145 Hazlett Road	*Fagus sylvatica*	English beech		Lot 2 DP 386907
T993	28	145 Hazlett Road	*Fagus sylvatica*	English beech		Lot 2 DP 386907
T994	28	153 Hazlett Road	*Ginkgo biloba*	Maidenhair tree		Lot 1 DP 386907
T995	33	29 School Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 19 DP 252
T996	35	15 Scotland Street	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 30 Blk XX TN OF DUNEDIN
T997	35	15 Scotland Street	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 30 Blk XX TN OF DUNEDIN
T998	45	23 Scotland Terrace	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 9 DP 1866
T1000	51	184 Scott Street, Dunedin	*Quercus robur*	Oak		Lot 14 Blk II DP 289
T1001	56	Scroggs Hill Road (Road Reserve)	*Cordyline australis*	Cabbage tree remnant	Ti kouka	Road Reserve (unnamed)
T1002	56	Scurr property, Saddle Hill Road	*Dacrycarpus dacrydioides*	White pine		Pt Sec 29 Blk VIII DUNEDIN & EAST TAIERI SD
T1003	56	Scurr property, Saddle Hill Road	*Eucalyptus sp*	Eucalyptus		Pt Sec 29 Blk VIII DUNEDIN & EAST TAIERI SD
T1004	56	Scurr property, Saddle Hill Road	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 29 Blk VIII DUNEDIN & EAST TAIERI SD
T1006	55	Scurr Road	*Pyrus communis*	Pear		Sec 12 Blk VIII DUNEDIN & EAST TAIERI SD
T1007	1	143 Settlement Road, Middlemarch	*Quercus robur*	Oak		Sec 34S GLADBROOK SETT
T1008	44	6 Severn Street, Abbotsford	*Pseudopanax crassifolium*	Lancewood	Horoeka	Lot 16 DP 2469
T1009	44	Shand Street	*Quercus robur*	Oak		Lot 1 DP 23545
T1010	24	2 Sherwood Street	*Podocarpus totara*	Totara	Totara	Lot 2 Blk IV DP 10
T1011	32	141 Shetland Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 1 DP 11853
T1012	32	173 Shetland Street	*Sequoia sempervirens*	Sequoia		Lot 9 DP 3252
T1013	32	173 Shetland Street	*Ulmus glabra*	Elm		Lot 9 DP 3252
T1014	45	22 Short Street, Burnside	*Populus nigra var. Italica*	Lombardy poplar		Pt Lot 18 DP 407
T1015	46	46 Sidey Street	*Araucaria heterophylla*	Norfolk pine		Lot 2 DP 1989
T1016	7A	17 Skerries Street	*Juglans regia*	Walnut		Sec 8 Blk VI TN OF OUTRAM
T1017	7A	19 Skerries Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 23086
T1018	48	27 Skibo Street	*Araucaria heterophylla*	Norfolk pine		Lot 25 Blk IV DP 2088
T1019	46	32 Skibo Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 4 DP 9458
T1020	46	36 Skibo Street	*Cedrus deodara*	Cedar		Lot 2 DP 17077
T1022	45	162 South Road, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 4 DP 9885
T1023	45	178 South Road, Dunedin	*Phoenix caneriensis*	Phoenix palm		Pt Lot 21 Blk IV DP 97
T1024	48	217 South Road, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 21 Blk VII TOWN SD
T1025	48	217 South Road, Dunedin	*Aesculus hippocastanum*	Horse chestnut		Pt Sec 21 Blk VII TOWN SD
T1026	46	286 South Road, Dunedin	*Metrosideros umbellata*	Southern rata	Rata	Lot 1 DP 16661
T1027	46	441 South Road, Dunedin	*Quercus robur*	Oak		Lot 47 DP 2531
T1028	52	29 Spencer Street	*Cupressus macrocarpa*	Monterey cypress		Lot 2 DP 22932
T1029	46	9 Springhill Road	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 1 DP 15445
T1030	46	22 Springhill Road	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 283 DEEDS 253
T1031	46	22 Springhill Road	*Quercus robur*	Oak		Pt Lot 283 DEEDS 253
T1032	35	80 St Davids Street	*Ilex aquifolium*	Holly (variegated)		Pt Blk LXXI TN OF DUNEDIN
T1033	35	80 St Davids Street	*Cedrus atlantica 'Glauca'*	Blue cedar		Pt Blk LXXI TN OF DUNEDIN
T1034	35	80 St Davids Street	*Juglans regia*	Walnut		Pt Blk LXXI TN OF DUNEDIN
T1035	39	20 St Leonards Drive	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 1 Blk III DP 160
T1036	20	50 St Leonards Drive	*Sequoiadendron giganteum*	Wellingtonia		Lot 16 DEEDS 109
T1037	20	50 St Leonards Drive	*Chaemycyparis lawsoniana*	Lawsons cypress		Lot 17 DEEDS 109
T1038	20	50 St Leonards Drive	*Juglans regia*	Walnut		Lot 17 DEEDS 109
T1039	47	89 Stafford Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 4 DP 1071
T1040	47	89 Stafford Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 4 DP 1071
T1041	21	4 Station Road, Sawyers Bay	*Quercus robur*	Oak		Pt Sec 16 SAWYERS BAY SD
T1042	21	4 Station Road, Sawyers Bay	*Quercus robur*	Oak		Pt Sec 16 SAWYERS BAY SD
T1043	12	12 Station Road, Warrington	*Fagus sylvatica*	English beech		Pt Lot 34 DP 244
T1044	21	20 Stevenson Avenue	*Ulmus glabra 'Horizontalis'*	Spreading elm		Lot 3 Blk I DP 2235
T1045	34	4 Stonelaw Terrace	*Acacia melanoxylon*	Blackwood		Pt Town Belt TN OF DUNEDIN
T1046	34	4 Stonelaw Terrace	*Acacia melanoxylon*	Blackwood		Pt Town Belt TN OF DUNEDIN
T1047	35	4 Stoutgate	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 1 DP 12462
T1048	1	Strathburn, Gladbrook Road	*Quercus robur*	Oak		Sec 21S GLADBROOK SETT
T1049	1	Strathburn, Gladbrook Road	*Sequoiadendron giganteum*	Wellingtonia		Sec 21S GLADBROOK SETT
T1050	1	Strathburn, Gladbrook Road	*Fagus sylvatica*	English beech		Sec 21S GLADBROOK SETT
T1051	1	Strathburn, Gladbrook Road	*Betula pendula*	Silver birch		Sec 21S GLADBROOK SETT
T1052	35	228 Stuart Street	*Populus sp*	Poplar		Sec 25 Blk XVII TN OF DUNEDIN
T1053	35	228 Stuart Street	*Fraxinus excelsior*	Ash		Sec 25 Blk XVII TN OF DUNEDIN
T1054	33	284 Stuart Street	*Tilia x europaea*	Lime		Sec 39 Blk XIII TN OF DUNEDIN
T1055	33	312 Stuart Street	*Betula pendula*	Silver birch		Pt Sec 33 Blk XVIII TN OF DUNEDIN
T1056	33	312 Stuart Street	*Quercus robur*	Oak		Pt Sec 33 Blk XVIII TN OF DUNEDIN
T1057	33	381 Stuart Street	*Agathis australis*	Kauri	Kauri	Lot 1 DP 8725
T1058	33	416 Stuart Street	*Cedrus deodara*	Cedar		Lot 3 DP 7102
T1059	52	33 Sunbury Street	*Ulmus glabra 'Horizontalis'*	Spreading elm		Pt Sec 5 Blk II ANDERSONS BAY SD
T1060	52	31-33 Sunbury Street	*Podocarpus totara*	Totara	Totara	Pt Sec 4 Blk II ANDERSONS BAY SD
T1061	52	31-33 Sunbury Street	*Podocarpus totara*	Totara	Totara	Pt Sec 4 Blk II ANDERSONS BAY SD
T1062	2	33 Swansea Street	*Abies alba*	European silver fir		Pt Sec 3 Blk XXIV TN OF ARDEN
T1063	2	33 Swansea Street (Middlemarch School)	*Quercus robur*	Oak		Pt Sec 3 Blk XXIV TN OF ARDEN
T1064	2	6365 Swansea Street (Road Reserve)	*Sequoiadendron giganteum*	Wellingtonia		Road Reserve (CARDIFF STREET)
T1065	32	207 Taieri Road	*Cedrus sp*	Cedar		Lot 1 DP 12394
T1066	32	207 Taieri Road	*Chaemycyparis lawsoniana*	Lawsons cypress		Lot 1 DP 12394
T1067	32	222 Taieri Road	*Chaemycyparis lawsoniana*	Lawsons cypress		Lot 2 DP 4797
T1068	32	222 Taieri Road	*Pseudopanax crassifolium*	Lancewood	Horoeka	Lot 2 DP 4797
T1069	32	226 Taieri Road	*Cedrus sp*	Cedar		Lot 1 DP 15757
T1070	32	226 Taieri Road	*Fraxinus excelsior*	Ash		Lot 1 DP 15757

Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T1074	32	282 Taieri Road	*Chaemycyparis lawsoniana*	Lawsons cypress		Sec 188 WAKARI SD
T1075	32	282 Taieri Road	*Podocarpus totara*	Totara	Totara	Pt Lot 1 DP 6946
T1076	32	349 Taieri Road	*Podocarpus totara*	Totara	Totara	Lot 2 DP 26386
T1077	32	371 Taieri Road	*Griselinia littoralis*	Broadleaf	Papauma	Lot 7 DP 26386
T1078	32	371 Taieri Road	*Dacrydium cupressinum*	Red pine	Rimu	Lot 7 DP 26386
T1079	32	371 Taieri Road	*Prumnopitys taxofolia*	Black pine		Lot 7 DP 26386
T1080	32	371 Taieri Road	*Prumnopitys taxofolia*	Black pine	Matai	Lot 7 DP 26386
T1081	32	371 Taieri Road	*Podocarpus totara*	Totara	Totara	Lot 7 DP 26386
T1082	31	496 Taieri Road	*Cordyline australis*	Cabbage tree	Ti kouka	Lot 1 DP 25915
T1083	31	496 Taieri Road	*Fraxinus excelsior 'Aurea'*	Golden ash		Lot 1 DP 25915
T1084	31	496 Taieri Road	*Cedrus atlantica*	Atlantic cedar		Lot 1 DP 25915
T1085	32	371 Taieri Road	*Eucalyptus sp*	Eucalyptus		Lot 7 DP 26386
T1086	32	371 Taieri Road	*Araucaria araucana*	Monkey puzzle		Lot 7 DP 26386
T1087	32	371 Taieri Road	*Araucaria araucana*	Monkey puzzle		Lot 7 DP 26386
T1088	32	371 Taieri Road	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 26386
T1089	32	371 Taieri Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 7 DP 26386
T1090	32	371 Taieri Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 7 DP 26386
T1091	32	371 Taieri Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 7 DP 26386
T1092	32	371 Taieri Road	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 7 DP 26386
T1093	31	496 Taieri Road	*Pseudotsuga menziesii*	Douglas fir		Lot 1 DP 25915
T1094	20	15 Takahe Crescent	*Aesculus hippocastanum*	Horse chestnut		Lot 2 DP 304073
T1095	20	15 Takahe Crescent	*Ulmus glabra "Pendula"*	Weeping elm		Lot 2 DP 304073
T1096	34	9 Tanner Road	*Populus nigra var. Italica*	Lombardy poplar		Lot 3 DEEDS 143
T1098	44	23 Teignmouth Street	*Quercus robur*	Oak		Lot 1 DP 6555
T1099	44	23 Teignmouth Street	*Quercus robur*	Oak		Lot 2 DP 6555
T1100	44	43 Teignmouth Street	*Eucalyptus niphophila*	Snow gum		Pt Lot 3 DP 7704
T1101	35	41 Tennyson Street	*Quercus robur*	Oak		Sec 57 Blk XIII TN OF DUNEDIN
T1102	33	41 Tennyson Street	*Quercus robur*	Oak		Sec 57 Blk XIII TN OF DUNEDIN
T1103	28	6 Thames Street	*Taxus baccata*	Yew		Lot 41 DEEDS 233
T1104	28	6 Thames Street	*Taxus baccata*	Yew		Lot 41 DEEDS 233
T1105	10	30 Thomas Street, Waikouaiti	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 17 Blk XI DEEDS 19
T1107	10	87 Thomas Street, Waikouaiti	*Sequoiadendron giganteum*	Wellingtonia		Lot 35 Blk II DEEDS 51
T1108	45	5 Thoreau Street	*Quercus robur*	Oak		Lot 63 DP 2357
T1109	31	5 Three Mile Hill Road	*Larix decidua*	Larch		Lot 4 DP 24751
T1110	31	5 Three Mile Hill Road	*Alnus glutinosa*	Alder		Lot 4 DP 24751
T1111	29	546 Three Mile Hill Road	*Cordyline australis*	Cabbage tree	Ti kouka	Lot 1 DP 18445
T1112	29	546 Three Mile Hill Road	*Cordyline australis*	Cabbage tree	Ti kouka	Lot 1 DP 18445
T1113	29	546 Three Mile Hill Road	*Quercus robur*	Oak		Lot 1 DP 18445
T1114	29	546 Three Mile Hill Road	*Quercus robur*	Oak		Lot 1 DP 18445
T1115	35	8 Tolcarne Avenue	*Arbutus unedo*	Strawberry tree		Lot 3 DP 4089
T1116	35	8 Tolcarne Avenue	*Tilia x europaea*	Lime		Lot 3 DP 4089
T1117	35	8 Tolcarne Avenue	*Quercus robur*	Oak		Lot 3 DP 4089
T1118	35	8 Tolcarne Avenue	*Tilia x europaea*	Lime		Lot 3 DP 4089
T1119	52	14 Tomahawk Road	*Metrosideros excelsa*	Pohutukawa	Pohutukawa	Lot 2 Blk I DP 1858
T1120	52	257 Tomahawk Road	*Pseudopanax ferox*	Lancewood		Sec 5 Blk VII OTAGO PENINSULA SD
T1121	52	257 Tomahawk Road	*Myoporum laetum*	Ngaio	Ngaio	Sec 21 Blk VII ANDERSONS BAY SD
T1122	44	45 Torquay Street	*Cupressus sempervirens*	Italian cypress		Lot 1 DP 19156
T1123	51	4 Torr Street	*Cupressus sempervirens*	Mediterranean cypress		Lot 1 DP 8793
T1124	51	15 Torr Street	*Quercus robur*	Oak		Lot 3 DP 9750
T1125	51	15 Torr Street	*Quercus robur*	Oak		Lot 3 DP 9750
T1127	36	1 Torridon Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 3 DP 6284
T1128	36	1 Torridon Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 1 DP 6284
T1129	36	1 Torridon Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 2 DP 6284
T1130	36	1 Torridon Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 2 DP 6284
T1131	36	1 Torridon Street	*Sequoiadendron giganteum*	Wellingtonia		Lot 2 DP 6284
T1132	36	1 Torridon Street	*Araucaria heterophylla*	Norfolk pine		Lot 2 DP 6284
T1133	36	1 Torridon Street (Road Reserve)	*Quercus robur*	Oak		Road Reserve (TORRIDON STREET)
T1134	38	59 Totara Street	*Araucaria heterophylla*	Norfolk pine		Lot 5 DP 8824
T1135	38	59 Totara Street	*Araucaria heterophylla*	Norfolk pine		Lot 5 DP 8824
T1137	33	1 Tweed Street, Dunedin	*Sphaeropteris medullaris*	Tree fern (group of 3 ferns)	Mamaku	Pt Lot 6 DP 308
T1138	33	28 Tweed Street, Dunedin	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 1 DP 12965
T1139	33	22 Tyne Street, Dunedin	*Quercus robur*	Oak		Lot 30 DEEDS 85
T1140	33	22 Tyne Street, Dunedin	*Quercus robur*	Oak		Lot 29 DEEDS 85
T1141	33	22 Tyne Street, Dunedin	*Tilia x europaea*	Lime		Lot 30 DEEDS 85
T1142	33	22 Tyne Street, Dunedin	*Tilia x europaea*	Lime		Lot 29 DEEDS 85
T1143	33	22 Tyne Street, Dunedin	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 28 DEEDS 85
T1144	33	22 Tyne Street, Dunedin	*Populus nigra var. Italica*	Lombardy poplar		Lot 28 DEEDS 85
T1145	33	22 Tyne Street, Dunedin	*Ulmus glabra*	Elm		Lot 28 DEEDS 85
T1146	33	22 Tyne Street, Dunedin	*Populus nigra var. Italica*	Lombardy poplar		Lot 31 DEEDS 85
T1147	35	8 Union Street	*Arbutus unedo*	Strawberry tree		Lot 8 DP 1640
T1148	37	145 Union Street (cnr Anzac Ave & Union Street)	*Aesculus hippocastanum*	Horse chestnut		Lot 1 DP 4452
T1149	37	145 Union Street (cnr Anzac Ave & Union Street)	*Cedrus atlantica*	Atlas Cedar		Lot 1 DP 4452
T1150	37	111 Union Street East	*Myoporum laetum*	Ngaio	Ngaio	Pt Sec 7 Blk XXXVI TN OF DUNEDIN
T1151	58	61 Viscount Road	*Pinus coulteri*	Big cone pine		Lot 152 DP 8877
T1152	40	1 Waikana Street	*Juglans regia*	Walnut		Lot 18 Blk IV DP 1227
T1153	13	1737 Waikouaiti-Waitati Road	*Dacrydium cupressinum*	Red pine	Rimu	Pt Sec 21 Blk II NORTH HARBOUR & BLUESKIN SD
T1154	13	1737 Waikouaiti-Waitati Road	*Podocarpus totara*	Totara	Totara	Pt Sec 21 Blk II NORTH HARBOUR & BLUESKIN SD
T1155	8	97 Wairongoa Road	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 7457
T1156	8	138 Wairongoa Road	*Sequoia sempervirens*	Sequoia		Lot 2 DP 8649
T1157	8	138 Wairongoa Road	*Pinus ponderosa*	Western yellow pine		Lot 2 DP 8649

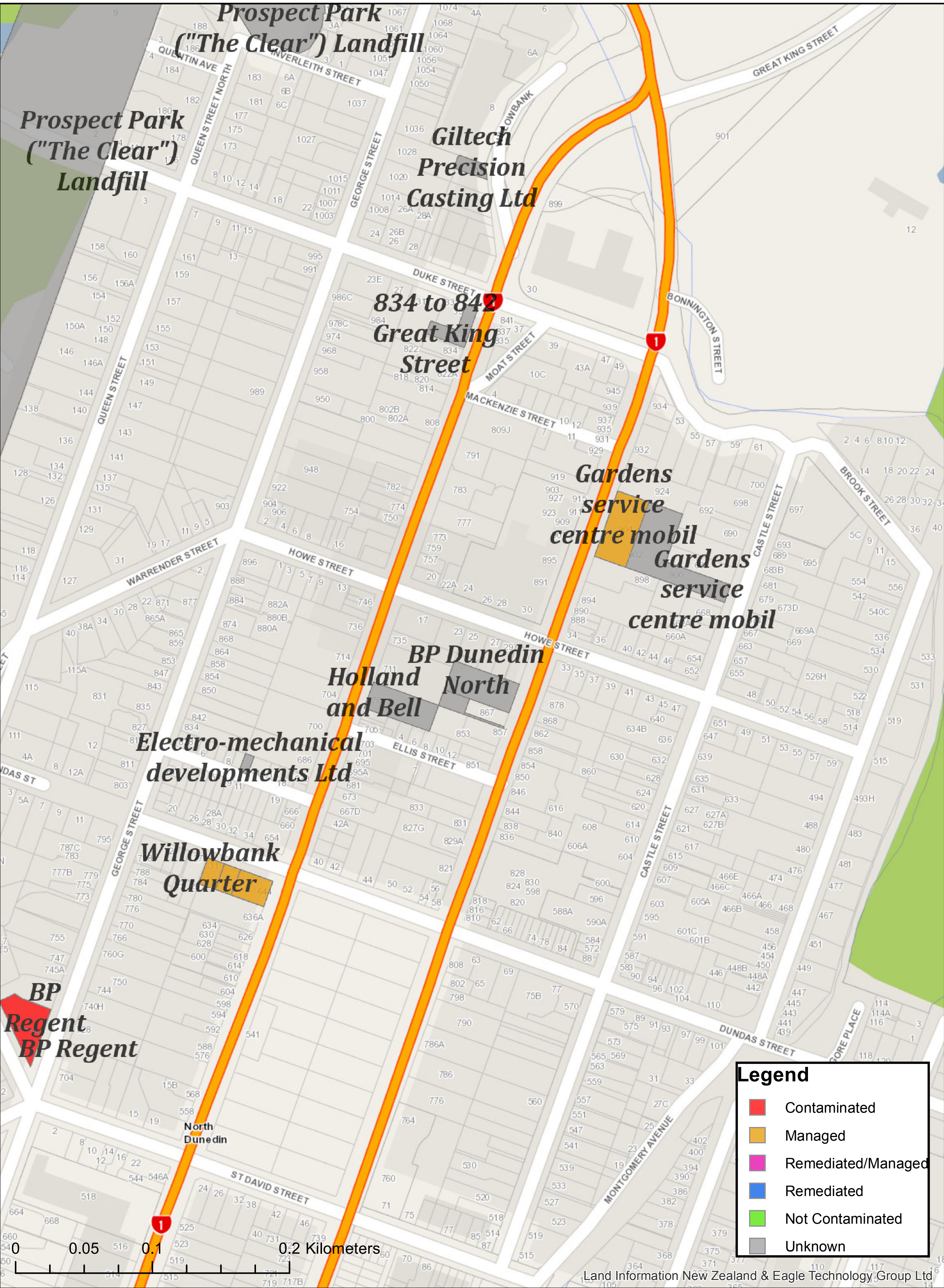
Tree No	Map No	Address	Species	Common Name	Maori Name	Legal Description
T1158	8	183 Wairongoa Road	*Quercus robur*	Oak		Pt Sec 1 Blk XV EAST TAIERI SD
T1159	8	183 Wairongoa Road	*Quercus robur*	Oak		Pt Sec 1 Blk XV EAST TAIERI SD
T1160	8	237 Wairongoa Road	*Agathis australis*	Kauri	Kauri	Lot 1 DP 23736
T1161	13	SH1 Waitati	*Dacrycarpys dacrydioides*	White pine		Pt Sec 44 Blk I NORTH HARBOUR & BLUESKIN SD
T1162	13	SH1 Waitati	*Podocarpus totara*	Totara	Totara	Pt Sec 44 Blk I NORTH HARBOUR & BLUESKIN SD
T1163	13	SH1 Waitati Corner	*Quercus robur*	Oak		Pt Lot 9 DEEDS 401
T1164	16	Waitati Valley Road	*Podocarpus totara*	Totara	Totara	Pt Sec 3 Blk III NORTH HARBOUR & BLUESKIN SD
T1165	32	245 Wakari Road	*Auracaria auracana*	Monkey puzzle		Lot 1 DP 27299
T1166	32	245 Wakari Road	*Auracaria auracana*	Monkey puzzle		Lot 1 DP 27299
T1167	32	297 Wakari Road	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 74 WAKARI SD
T1168	32	297 Wakari Road	*Chaemycyparis lawsoniana*	Lawsons cypress		Pt Sec 74 WAKARI SD
T1169	32	297 Wakari Road	*Sequoiadendron giganteum*	Wellingtonia		Pt Sec 74 WAKARI SD
T1170	32	297 Wakari Road	*Quercus robur*	Oak		Pt Sec 74 WAKARI SD
T1171	32	312 Wakari Road	*Pinus radiata 'Aurea'*	Golden pine		Lot 2 DP 15027
T1172	32	312 Wakari Road	*Pinus radiata 'Aurea'*	Golden pine		Lot 2 DP 15027
T1174	33	11 Wallace Street	*Quercus robur*	Oak		Lot 4 DP 5572
T1175	35	55 Wallace Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Lot 83 DP 2191
T1176	35	61 Wallace Street	*Fagus sylvatica 'Riversii'*	Copper beech		Pt Sec 7 Blk I UPPER KAIKORAI SD
T1177	33	74 Walton Street	*Pseudotsuga menziesii*	Douglas fir		Lot 2 DP 8248
T1178	38	14 Wanaka Street	*Araucaria araucana*	Monkey puzzle		Lot 25 DP 185
T1179	38	14 Wanaka Street	*Araucaria araucana*	Monkey puzzle		Lot 24 DP 185
T1180	38	23 Wanaka Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 11 Blk V DP 28
T1182	25	Weir Road	*Phoenix caneriensis*	Phoenix palm		Lot 1 DP 11088
T1183	58	36 Weir Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 25 DP 8397
T1184	58	36 Weir Street	*Fagus sylvatica 'Riversii'*	Copper beech		Lot 25 DP 8397
T1185	58	38 Weir Street	*Abies alba*	European silver fir		Lot 26 DP 8397
T1186	46	3 Whitby Street	*Fagus sylvatica*	English beech		Lot 22 DEEDS 47
T1187	23	75 Wickliffe Terrace	*Araucaria heterophylla*	Norfolk pine		Sec 487 TN OF PORT CHALMERS
T1188	36	2 Wilkinson Street	*Cedrus deodara*	Cedar		Lot 68 DP 4333
T1189	44	2 Will Street	*Metrosideros umbellata*	Southern rata	Rata	Lot 1 Blk II DP 100
T1190	44	2 Will Street	*Quercus robur*	Oak		Lot 6 Blk II DP 100
T1191	44	4 Will Street	*Fraxinus sp.*	Ash		Lot 2 DP 9189
T1192	44	4 Will Street	*Cedrus atlantica*	Atlantic cedar		Lot 3 DP 9189
T1193	44	1a Will Street	*Sophora microphylla*	Kowhai	Kowhai	Lot 1 DP 12246
T1194	6	125 Woodside Road	*Quercus robur*	Oak		Pt Sec 20 Irreg Blk WEST TAIERI SD
T1195	6	Woodside Road	*Eucalyptus obliqua*	Eucalyptus		Lot 2 DP 22202
T1196	31	42 Wray Street	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 80 DP 10063
T1197	33	277 York Place	*Pseudopanax macintyrei*	Lancewood		Sec 16 Blk XI TN OF DUNEDIN
T1198	33	284 York Place	*Pittosporum eugenioides*	Lemonwood	Tarata	Lot 2 DP 4992
T1199	33	324 York Place	*Cryptomeria japonica*	Japanese cedar		Pt Sec 44 Blk XI TN OF DUNEDIN
T1200	33	349 York Place	*Quercus robur*	Oak		Lot 2 DP 12739
T1201	33	284 York Place	*Nothofagus fusca*	Red beech	Tawhairaunui	Lot 2 DP 4992
T1202	50	37 Young Street	*Myoporum laetum*	Ngaio	Ngaio	Lot 1 DP 11718
T1203	50	37 Young Street	*Myoporum laetum*	Ngaio	Ngaio	Lot 1 DP 11718
T1204	50	37 Young Street	*Myoporum laetum*	Ngaio	Ngaio	Lot 1 DP 11718
T1205	50	37 Young Street	*Myoporum laetum*	Ngaio	Ngaio	Lot 1 DP 11718
T1207	46	10 Jubilee Street	*Hoheria sp* (group)	Lacebark	Houhere	Lot 2 DP 5252
T1208	33	Arthur Street Reserve	*Sequoiadendron giganteum*	Wellingtonia		Sec 88 Blk XIX TN of Dunedin
T1209	42	25 Ashton Street	*Fagus sylvatica 'Purpurea'*	Copper Beech		Lot 1 DP 304960
T1210	42	25 Ashton Street	*Quercus coccinea*	Scarlet Oak		Lot 1 DP 304960
T1211	35	560 Castle Street (Selwyn College)	*Pyrus sp*	Pear		Sec 55 Blk XXXI TN of Dunedin
T1212	19	Chingford Park Stables	*Cupressus macrocarpa*	Monterey Cypress		Pt Lot 29 DP 4921
T1213	33	3 City Road	*Nothofagus fusca*	Red Beech	Tawhairaunui	Lot 1 DP 5987
T1215	34	Dundas Street Road Reserve	*Ulmus glabra 'Horizontalis'*	Spreading Elm		Legal Road (Dundas Street)
T1216	36	Dunedin Botanic Garden (Rhododendron Dell)	*Griselinia littoralis*	Broadleaf	Kapuka	Pt Town Belt Town of Dunedin
T1217	1	95 Gladbrook Road	*Pinus ponderosa*	Western Yellow Pine		Sec 13 Blk IX Strath Taieri SD
T1218	1	6491 Hyde Middlemarch Rd, Middlemarch (Milne's Cottago – located on Gladbrook Rd)	*Abies procera*	Noble Fir		Sec 10 Blk IX SO 1567 Strath Taieri SD
T1219	32	13 Hart Street	*Nothofagus fusca*	Red Beech	Tawhairaunui	Lot 3 DP 5289
T1220	35	70 Heriot Row	*Podocarpus totara*	Totara	Totara	Lot 1 DP 10552
T1221	21	15 Hugh Street, Sawyers Bay	*Ulmus sp*	Elm		Lot 9 Blk IV DP 2251
T1222	32	48 Hood Street	*Eucalyptus sp*	Gum		Lot 1 DP 8153
T1223	1	7797 Hyde-Middlemarch Road	*Fraxinus excelsior*	Ash		PR A Blk II Strath Taieri SD
T1224	48	37A Middleton Road	*Metrosideros excelsa*	New Zealand Christmas Tree	Pohutukawa	Lot 4 DP 16369
T1225	38	392 North Road	*Tilia sp*	Lime		Pt Lot 3 Blk II DP 179
T1226	35	22 Pitt Street	*Vitex lucens*	Puriri	Puriri	Lot 7B DP 2040
T1227	36	72 Signal Hill Road	*Cupressus sp*	Cupress		PT Lot 53 BLK I DP 26
T1228	35	30 Smith Street	*Myoporum laetum*	Ngaio	Ngaio	Lot 2 DP 7947
T1229	33	388 Stuart Street	*Nothofagus sp*	Native Beech		Lot 2 DP 9128
T1230	54	58 Taieri Mouth Road, Taieri Mouth, Brighton (tree above quarry)	*Cupressus macrocarpa*	Monterey Cypress		Pt Sec 2 Blk III Otokia SD

T1231	54	58 Taieri Mouth Road, Taieri Mouth, Brighton (conjoined)	*Cupressus macrocarpa*	Monterey Cypress		Pt Sec 2 Blk III Otokia SD
T1232	54	58 Taieri Mouth Road, Taieri Mouth, Brighton	*Cupressus macrocarpa*	Monterey Cypress		Ot Sec 2 Blk III Otokia SD
T1233	12	6 The Terrace, Warrington	*Quercus sp*	Oak		Lot 16 Blk II DP 2305
T1234	48	173 Victoria Road, St Clair	*Metrosideros excelsa*	New Zealand Christmas Tree	Pohutukawa	Lot 1 DP 10384
T1235	40	4 Wharfdale Street	*Metrosideros excelsa*	New Zealand Christmas Tree	Pohutukawa	Lot 25 DP 2362
G107	41	171 Gladstone Road South, Mosgiel	*Sequoia sempervirens (*group)	Coastal Redwood		Lot 1 DP 5537
G108	35	33 Heriot Row	*Sophora microphylla/Prumnopitys ferruginea.Pseudopanax crassifolius* (group)	Kowhai/Miro/Lancewood		Lot 4 DP 2040
G109	1	7797 Hyde-Middlemarch Road	*Rinus ponderosa* (group)	Western Yellow Pine		PR A Blk II Strath Taieri SD
G110	19	95 Norwood Street	*Nothofagus fusca/Nothofagus truncata/Nothofagus menziesii* (group)	Beech		Pt Sec 45 North East Valley SD
G111	36	31 Royston Street	*Nothofagus fusca* (group)	Red Beech	Tawhairaunui	Lot 8 DP 546
G112	21	107 Stevenson Avenue	*Metrosideros umbellata* (group)	Southern Rata	Rata	Pt Sec 18 Sawyers Bay SD
G113	54	58 Taieri Mouth Road, Taieri Mouth, Brighton	*Cupressus macrocarpa* (group of 2)	Monterey Cypress		Pt Sec 2 Blk III Otokia SD
G114	36	1 Torridon Street	*Quercus robur* (group)	Oak		Lot 2 DP 6284
G115	32	224 Wakari Road	*Eucalyptus sp* (group of 6)	Gum		Lot 15 DP 328800
G116	32	224 Wakari Road	*Eucalyptus sp* (group of 9)	Gum		Lot 15 DP 328800
G117	32	224 Wakari Road	*Eucalyptus sp* (group of 12)	Gum		Lot 15 DP 328800

Land-use and Site Contamination Request - SH1 Cycleway Improvement



Land-use and Site Contamination Request - SH1 Cycleway Improvement



Land-use and Site Contamination Request - SH1 Cycleway Improvement