Appendix O Urban and Landscape Design Framework

URBAN & LANDSCAPE DESIGN FRAMEWORK (VERSION 1)

ASHBURTON RIVER / HAKATERE SECOND BRIDGE

PREPARED FOR: ASHBURTON DISTRICT COUNCIL

DOCUMENT DATE
JULY 2022

Stantec

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PREPARED FOR: Ashburton District Council

PROJECT NUMBER: 310205125

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ACRONYMS / ABBREVIATIONS

ADC	Ashburton District Council
ATC	Ashburton Tinwald Connectivity
DBC	Detailed Business Case
ECAN	Environment Canterbury (Canterbury Regional Council)
HAIL	Hazardous activities and industries
LPED	Low Plains Environmental District
NESCS	National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
NoR	Notice of Requirement
NPSFM	National Policy Statement for Freshwater Management
ONF	One Network Framework
PSI	Preliminary Site Investigation
RMA	Resource Management Act (1991)
ULDF	Urban and Landscape Design Framework

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1. INTRODUCTION

1 INTRODUCTION

1.1 OVERARCHING CONTEXT

State Highway 1 (SH1) is the key strategic transport route for the South Island linking Picton in the north with Bluff in the south via all major towns and cities along the east coast. Ashburton is located on the northern side of the SH1 bridge over the Ashburton River / Hakatere, with Tinwald on the opposite side (southern) side of the river.

There is only one practical connection between Tinwald and Ashburton, which is via the SH1 bridge. This means that network resilience is very poor, and connectivity and economic prosperity would be significantly impacted by any event that closes the SH1 bridge. Although events such as earthquakes and floods have low probabilities, they have high consequences. The May 2021 flood event highlighted how susceptible the transport network and economy are to any event that either closes the SH1 bridge, even for a short period of time.

The SH1 bridge represents a critical lifeline for the Tinwald community to key facilities on the northern side such as health care, schools and supermarkets. It also is a critical link in the goods supply chain, with much of the South Island (including Dunedin) dependent on the connection remaining open.

The Urban and Landscape Design Framework (ULDF) forms part of the Ashburton River / Hakatere Second Bridge Detailed Business Case (DBC). This Urban and Landscape Design Framework sits as part of the DBC. It will bridge between the Landscape and Visual Assessment as part of the NoR process, and include scheme level landscape design to enable detailed design for the Project in the future.

The DBC focuses on progressing the design for the second bridge. It will be developed to the level where enough detail of the programme will be established to inform a project cost estimate. Design and robust economic analysis will be required to provide assurance that the right option (and design) is being progressed at the right time at the right price. Iwi should also be brought on as a project partner.

The DBC will provide certainty around technical aspects and will reduce the risk profile, including the cost estimate) for the project. The scope for the DBC captures:

- Engagement with Iwi, the local community, and potentially affected landowners in relation to the detailed design.
- Commercial, management and financial cases.
- Road safety audits.
- Scheme level design informed by technical assessments. Including geotechnical, bridge design, hydrology, ecology, property, pavement and landscape design.
- Consenting and property strategies.
- Cost estimate.
- Economic analysis, capturing resilience (costs associated with bridge closures) and sensitivity analysis.

There will be investigation into:

- An on demand public transport service, and
- A new walking/cycling bridge connecting Tarbottons Road and the Ashburton Mountain Bike Park.

Running in parallel should be the design and implementation of the improvements to the South Street / SH1 intersection and the SH1 passing bay clip-ons (both pending Waka Kotahi funding and approval).

1.2 PROJECT CONTEXT

Ashburton District Council are investigating a new road bridge across the Ashburton River / Hakatere, between Ashburton and Tinwald, as an alternative route to the existing SH1 bridge. For some time, the local community have expressed concerns

Figure 1: Location of the proposed bridge and road connection between Ashburton and Tinwald (indicated in yellow). Source: (Archer, E, 2022)

about the resilience of the existing bridge, as well as traffic volumes and safety along SH1. The proposed second bridge will improve connectivity and resilience for the community.

Since 2006, the ADC have undertaken transportation studies, investigated various bridge locations, and consulted landowners and the wider community. In 2010, a preferred route was identified, and technical assessments toward a Notice of Requirement (NoR) were subsequently undertaken, such as on landscape effects, terrestrial ecology effects, and noise and vibration. Designation for the preferred route under the Resource Management Act (RMA) was secured in 2014.

The Project is detailed to an extent in the Notice of Requirement (NoR), however, it is yet to go through detailed design. Given the time that has lapsed since the designation was confirmed in 2014, there are potentially different or new constraints and opportunities that may necessitate changes to the design.

The 2010 Ashburton District Plan review rezoned a large amount of land to the east of Tinwald to higher density Residential C and D zones to facilitate anticipated residential growth in this area. Another reason for the Proposal is to cater to the transportation needs with this anticipated residential growth.

The DBC revisits the recommendation of the NoR, and adds further evidence to confirm the preferred option remains the

Figure 2: Alignment of proposed bridge. Source: Notice of Requirement (NoR) drawings from (Archer, E, 2022)

Figure 3: Alignment of new road connection. Source: NoR drawings from (Archer, E, 2022)

The problem statements and outcomes, prepared with input from key stakeholders, are provided below:

Connectivity - An absence of route choice contributes to more traffic on SH1. This discourages, or stops people being able to, make journeys they otherwise would, creating social disconnect and lack of a 'one community' feeling. This is about ensuring that local education, health care, employment, recreation, and shopping trips can always be made. "Resilience" ties into this as does "severance" because not only is there difficulty travelling north to south across the river, but also east to west across the state highway.

Travel choice - Limited (or poor quality) facilities for sustainable modes makes it difficult to achieve long-term environmental and liveability objectives. This is about a) allowing people to choose their mode of travel between Ashburton and Tinwald, where currently the car is the only option; and b) giving people the choice of alternative routes.

Safety - High traffic volumes make it difficult for people to travel along, across, or onto SH1. This increases the likelihood of injury crashes and delays emergency services. This is about reducing the risk of injuries occurring because as the roads get busier, it becomes increasingly difficult to turn onto or get across the state highway.

Economic prosperity - Increasing traffic and constrained capacity on SH1 results in worsening travel time reliability between Tinwald and Ashburton. This impacts freight connections and economic prosperity. This is about delivering reliable journeys for people and freight passing through Ashburton.

1.3 SECOND BRIDGE

A new second bridge which will connect to Chalmers Avenue in Ashburton. A new road will connect the bridge through to Grahams Road in Tinwald. The bridge will include high-quality provisions (physical separation) for pedestrians and cyclists (2027-28).

The main reasons why this option was preferred are:

- **Investment objectives** – the Chalmers Avenue option will more strongly deliver the Investment Objectives. At the core, this is why investment is being made.
- **Congestion and efficiency** - the modelling indicates that the Chalmers Avenue bridge will attract up to 500 vehicles per hour by 2041. This level of traffic diversion is enough to keep the state highway operating efficiently during all peak periods out to 2041 (and likely beyond).
- **Severance** - the Chalmers Avenue bridge reduces traffic on the state highway, whilst the SH1 duplication encourages more traffic through this single corridor. A Chalmers Avenue bridge will reduce, rather than increase , the east-to-west severance issues which are already an issue.
- **Safety** – the Chalmers Avenue bridge reduces the number of vehicles turning right onto the state highway from give-way controlled intersections in Tinwald and reduces the likeliness of turning related crashes. Some people might also choose to take a longer route via Chalmers Avenue because it would be a safer route rather than take additional risks by trying to turn onto the state highway from give-way intersections.
- **Land use** – the Chalmers Avenue bridge directly supports the council's future land use plan, with residential growth targeted for east Tinwald/Lake Hood and employment growth in the Ashburton Business Estate. The option will generally help to better the shape the town away from one that is long, thin, and follows the state highway corridor.
- **Construction impact** – the Chalmers Avenue bridge and new road through to Grahams Road can be constructed almost entirely offline, with minimal impact to the community. A SH1 bridge duplication would require some periods of temporary speed restrictions along the existing state highway.
- **Complexity** – the Chalmers Avenue bridge is technically less complicated to build, with fewer constraints (e.g. railway line) and limited property impacts. The SH1 option has potentially significant property and constructability challenges to overcome. Waka Kotahi have identified that it will be very difficult to build a new bridge on either the upstream or downstream sides of the existing bridge.
- **Consentability** – Since a designation for the Chalmers Avenue bridge was put in place as part of the 2014 Notice of Requirement, this will reduce some of the potential challenges associated with property acquisition and means that more information is already available in terms of potential effects on the environment for the resource consent application.

• **Alignment to strategies** – a Chalmers Avenue bridge directly aligns with council's walking and cycling strategy which promotes improved connections across the river at both SH1 and at Chalmers Avenue.

• **Climate change** – the modelling has identified that the Chalmers Avenue bridge will help bring about an overall network reduction in vehicle km travelled and travel times. Both factors help reduce carbon emissions.

• **Recreation** – the location of the bridge means that recreational users of the river mountain bike trails no longer need to 'choose one side or the other' – the bridge will connect the two sides and significantly improve the cycling route between Ashburton and Lake Hood.

• **Creates new opportunities** – these include:

  ○ The Chalmers Avenue option opens the opportunity to make better use of the valuable natural asset that Ashburton possesses – the river.

  ○ It also opens the opportunity to work with developers to introduce amenities such as a small supermarket or pharmacy as part of new Tinwald developments.

The intent is that the project is 'shovel ready' by the start of the new National Land Transport Programme funding period of 2024-2027. The business case process has meant that there is robust justification for recommending a timeframe for construction of 2027-28.

The report was reviewed by both ADC and Waka Kotahi NZ Transport Agency (Waka Kotahi), with joint agreement around the technically preferred programme.

1.4 PROJECT DESCRIPTION

The second bridge across the Ashburton River / Hakatere is located approximately 600 m to the south (downstream) of the existing SH1 bridge. It will extend from the southern end of Chalmers Avenue to a new road that will link through to Grahams Road in Tinwald. The bridge will comprise two vehicle lanes, a shared path and on road cycle lanes. The new road will be constructed through what is currently rural residential land use, and will intersect with Carters Terrace, Wilkin Street, Johnstone Street and Grahams Road. The new bridge and road will have a posted speed limit of 50 km/h and will be designed as an urban road, with the intention of providing the local community with an alternative route between Ashburton and Tinwald, while allowing SH1 to remain primarily for heavy vehicles and through traffic.

Figures 4,5,6: Site Images, Stantec

1.5 URBAN DESIGN PHILOSOPHY

As a first design response, urban and landscape design objectives and considerations for the corridor have examined how the DBC and the NoR have considered landscape values to present a set of design principles in alignment with the matters for assessment in the IBC.

How does the NOR influence Urban Design and Landscape?

- Landscape and Visual Assessment – Landscape Conditions.
  - Landscape Plans:
  - Vegetation removal and earthworks extent.
  - Access to recreation, commercial and residential properties.
  - Landscape Mitigation (as minimum): planting, regressing, planting in stormwater swales, screen planting in the Res. C zone, Bridge abutment, deck and parapet treaments, river path connectivity, street trees, lighting.
- Terrestrial Ecology Conditions.
  - For birds: Avoid breeding season.
  - Avoid nesting sites.
  - Provide information to the public.
  - Ecological enhancement.
- OPW and Future Consenting Process.

How has the DBC considered Urban Design and Landscape?

- Connectivity and travel choice were two of the key problems identified.
- Community severance is a key matter.
  - If you can't drive, but are relatively mobile, you're stuck in Tinwald. This opens up an opportunity for walking or biking / e-bike across to Ashburton via the bridge.
  - In peak times, people don't make the journey to see friends / go to the shops, as getting onto the state highway from Tinwald is too dangerous. The new route will provide a less busy, if slightly further, option.
- Its about connecting one side of town which has few amenities (Tinwald), to the other which has the majority of them (Ashburton).
  - For the southern side, its more about journeys to the town rather than to schools. Schools are mostly all on the northern side of the state highway.
- Help is being sought from ADC planning team to understand what might be envisaged for land use and residential density in the region of the Project.
- Getting people walking and / or cycling is a major objective of the Project (note there is no Public Transport in Ashburton). It's flat, compact and mostly sunny, but there are currently no satisfactory options to get between Tinwald and Ashburton.
  - Tinwald and Lake Hood residents are key customers.
  - There is also a retirement village that would be right next to the bridge (on the Tinwald side).
  - The bridge would allow another access point onto the mountain bike trails to be made for Tinwald.
- The new route will be used by heavy vehicles as part of the local connection network.
- A link with other projects in Ashburton, e.g. the Waka Kotahi SH1 Corridor Project and the Ashburton CBD Revitalisation Project).

Proposed Road Corridor Character

- Canterbury Plains, Braided River landscape with historic rural land use and a significant habitat for native birds.
- Land use changes: from a predominantly rural landscape to residential in the Operative District Plan.
- Further changes to land cover: medium and higher building densities.
- The corridor to be classified as an Urban Connector using the One Network Framework.

ULDF

- Bridge Urban Design Assessment.
- Culture, Heritage & Tangata Whenua Values.
- Engagement.
- Design Themes.
- Design Interventions.

URBAN DESIGN PRINCIPLES

Connectivity

- Support ADC to achieve aims in the DP and District Strategies.
- Connect Tinwald and Ashburton & in doing so improve access to key destinations along the route and beyond.
- Ease of access and use.
- Reduce severance effects by providing an alternative to the SH1 bridge.
- Efficient movement and a reliable route.

Safety

- Ensure safety for all transport modes.
- Including perceived risks to personal safety (CPTED).
- Design for an ideal scenario: children walking or biking to town on their own.

Choices

- Design for multi modal transport from the outset.
- Potential to encourage more people to walk, cycle or take public transport.

People

- Create a corridor that has great user experiences.
- Cater for all.
- Enhance sense of place and community as Tinwald Grows.
- Build in expression & narrative to encourage participation and stewardship.
- Benefits to health and wellbeing with improved transport choice.

Landscape / Environment

- Streetscape that responds to current, and more importantly future changes in character and land use - design for context
- Streetscape and bridge deck that is visually appealing & easy to maintain.
- Limit CO_2 emissions with mode shift.
- Mitigation of landscape (including visual amenity) and ecological effects.
- Protect and remediate areas of cultural and natural significance affected by the work.

2. LANDSCAPE CONTEXT

2 LANDSCAPE CONTEXT

2.1 INTRODUCTION

The purpose of this section is to build on project context presented in Section 1 and incorporate new expert reporting.

2.2 LANDSCAPE AND VISUAL ASSESSMENT

Opus (now WSP) authored the Landscape and Visual Assessment for the NoR in 2013. To summarise context, effects and potential mitigation:

The broad landscape context surrounding the Ashburton and Tinwald residential area is that of the flat, open Canterbury Plains. Pastoral farming and cropping are major types of landuse with their grid pattern of open, flat paddocks contained in many cases, by conifer hedges and shelterbelts. The plains landscape has been formed by the large braided river systems which characterise much of the Canterbury region. Many smaller tributaries have generally been diverted and the water table lowered by artificial drainage ditches meaning that the landscape is largely a modified agricultural landscape.

No original or intact indigenous plant communities are apparent and any indigenous plants are isolated. The Ashburton River / Hakatere river bed represents the most intact and important habitat area.

Ashburton developed along the main road and rail route during early European settlement on the flat Canterbury Plains and has functioned as an agricultural service town for mid-Canterbury since. The settlement was laid out in the traditional grid pattern with the Ashburton River separating the southern part of the town from Tinwald. Ashburton remains a service town, but also has new and existing areas of rural–residential and light industrial development around its outskirts.

Ashburton is the major town of the Ashburton District and SH1 runs through the centre of the town. West Street (part of SH1) directs traffic parallel to the main retail street of Ashburton (East Street). The South Island Main Trunk (SIMT) railway line separates East Street and West Street (SH1). Tinwald is a suburb of Ashburton though, being completely to the south of the Ashburton River, feels separate.

The Ashburton River and transport corridors of SH1 and the SIMT railway line are the obvious local features; the river is paralleled by almost continuous plantings of shelter and amenity trees. Noticeable built features are the Fairton Meat Works to the north and relatively intense areas of rural-residential development to the south. To the south adjacent to SH1and west of the railway line is the Ashburton Golf Course.

The corridor of land occupied by the proposal overlays several land use zones under the Ashburton District Plan. From Grahams Road through to the Ashburton River the proposed designation crosses Residential C (between Grahams Road and Johnstone Street), Residential D (from Johnstone Street to the river terrace beyond Carters Terrace) and Rural A across the Ashburton River. On the west side of Chalmers Avenue between the north bank of the Ashburton River and South Street, the land zones are Open Space A, Open Space B and Business D respectively. On the opposite side of the Chalmers Avenue up to South Street, the land zones are Open Space B and Residential C respectively.

In terms of future development, the existing landscape context will change as a result of zoning changes established through the Ashburton District Plan Review 2010.

The report concluded that the construction of the new road is generally complementary and consistent with the zoning changes and would provide for additional access to these areas - designated for higher density Residential C and Residential D.

At present the Ashburton River / Hakatere forms a strong division between Ashburton and Tinwald Residential Areas and land use adjacent to the river is distinctive. The landscape character of the areas on either side of the river are different.

South of the river, land adjoins Tinwald and is semi-rural in character, containing lifestyle blocks associated with rural-residential housing. The landscape is strongly divided with paddocks surrounded by exotic shelter belt trees and hedges. Views range from short to distant depending on shelter belt locations. Larger blocks adjoin the rear of smaller more urban residential properties and streetscapes associated with Tinwald.

Immediately north of the river, the edge of Ashburton contains light industrial units, storage yards and several recreation grounds. Beyond this further towards the centre of Ashburton, streets become strongly residential in character and use

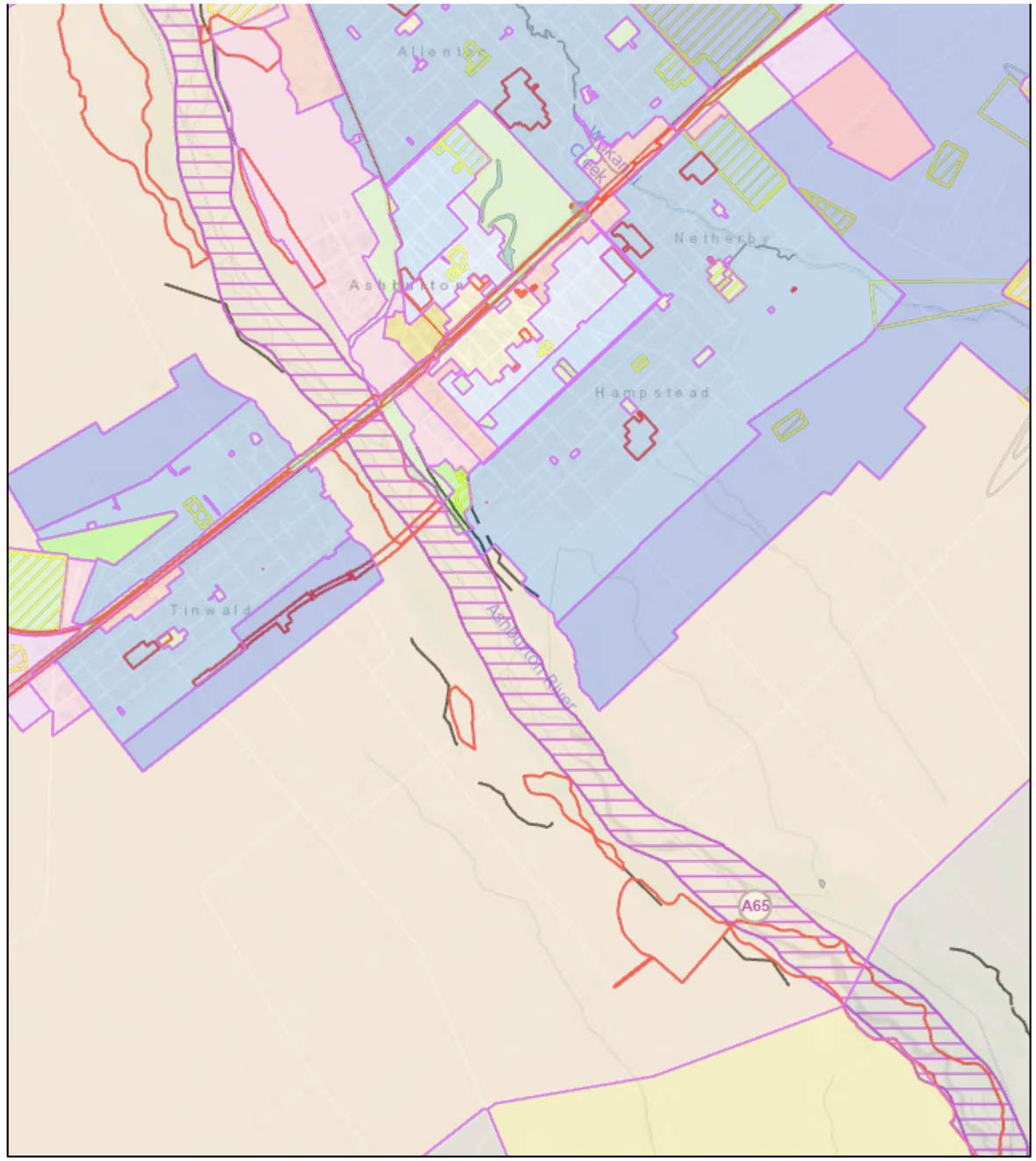


Figure 8: Ashburton Zoning Map source: maps.adc.govt.nz

before adjoining East Street, Ashburton's main street which is largely commercial/retail.

The Ashburton River / Hakatere flows in braided channels of greywacke gravels, typical of the larger Canterbury rivers and is subject to flooding and with limited direct access at present. The margins of the river, subject to flooding (defined as river channel in the district plan) are wooded with a mixture of poplar and willow bank protection planting. Beyond the bank protection planting are low river terraces and in some places, flood banks and to the south, pine plantations. The use of these margins is mainly recreational, though they adjoin industrial land to the north and form a strong backdrop and shelter for housing immediately to the south.

There are no views through to the river or its banks along this section of the river. Overall, views of the river are restricted to riverside walking/cycling trails and from road and rail bridges.

Roads immediately beyond the built-up residential areas are typically rural in character with roadside open drains, but no defined edge or kerb.

Drainage ditches characteristic of many Canterbury Plains rural areas have been excavated at road frontage boundaries to lower the water table and to carry water away. It is understood that all of the watercourses, aside from the river, are man-made and generally lack natural characteristics.

The assessment has identified and mapped four separate character areas:

- 1 - Southern link road,
- 2 - Bridge approach,
- 3 - Bridge/river crossing, and
- 4 - Chalmers Ave West

Figure 9: Project character areas. Adapted from (Opus (now WSP), 2013)

Effects are identified as:

- Addition of the new road and bridge is noted as the main change to local landscape character. Permanent physical effects are noted as removal of vegetation, filling and construction of road embankments, construction of swales and placement of the bridge and road surface.
- Additional visual change as a result of implementation of stormwater retention, visual mitigation measures and bridge pier support within the river bed with reference to river dynamics.
- Change to development as a result of District Plan zoning changes.
- Temporary effects during construction.
- The report notes that degree of effect will reduce over time.
- Users affected are residential on lifestyle blocks, those using the river recreationally, and people travelling on the SH1 bridge.

Potential mitigation for landscape (including visual) effects are:

- The primary visual mitigation measure will be to limit vegetation and (in particular) shelterbelt removal and the extent of physical earthworks.
- Bridge approaches and the bridge itself should be carefully designed to sit comfortably within this existing landscape, improve amenity and make provision for future growth and development.
- A landscape plan should be prepared during detailed design to ensure that mitigation measures and landscape treatments are properly addressed, having regard to the future state of the environment anticipated at the time of construction.
- The landscape plan would include landscape treatments such as tree and shelterbelt planting, general roadside swale and embankment planting to improve the amenity of the area, and address landform and planting surrounding the playing fields and the scout facility. It would also address the continuation of street tree planting on Chalmers Avenue.
- Measures to lessen the effects of the fill embankments include shaping the form of earthworks and integrating them with the surrounding landform. Gentle grades and well-rounded profiles to the top edge of batters should be provided, so that all of the final earthworks can be easily topsoiled and planted.
- Appropriate planting should then be carried out to these embankment slopes. The nature of such planting would need to be decided when the bridge construction is confirmed as adjacent plantations may have changed or may have a limited life expectancy e.g. if they are to be felled.
- The same applies to the river margin planting. Planting will need to complement and 'fit' comfortably within the adjacent landscape character.
- As a minimum, paths and access to riverside paths need to be reinstated after construction to continue access along the river for pedestrians and cyclists.

WHY IS THIS IMPORTANT?

The assessment describes the broad landscape character of the Project within an expansive plains landscape and highlights local nuances of the Project site. It describes the existing agricultural land use patterns overlayed on the geological and geomorphological landform that is the Canterbury Plains. We get clues to proposed land use change through zoning from rural residential to medium density residential that in itself represents an anticipated change in the built environment in the future, presenting challenges to landscape design in imagining a road that is more urban in nature. **How can the design of the road best meet the needs of future communities and the receiving environment?** There is a description of the river bank that leads to design thinking about desired access outcomes and how landscape values can be reflected. The assessment allows broad understanding of existing plant communities. Helpfully, the division of the site into character areas is relevant to landscape design in that it highlights opportunity for different landscape typologies as users move along the corridor. Identification of potential effects from construction of the Project and suggested mitigation measures provide direction and a basis for landscape concept design.

2.3 ECOLOGY

Stantec have undertaken a desktop ecological assessment to inform the DBC. The purpose of the assessment was to characterise the terrestrial and aquatic environments in the vicinity of the project to determine the likely ecological impacts of construction and operation, and to determine if more detailed assessments are required.

The Project is located within the Low Plains Ecological District (ED) which is part of the Canterbury Plains Ecological Region. It is characterised by large areas of alluvial fans formed from glacial outwash gravels sourced from large, braided rivers including the Ashley, Waimakariri, Rakaia, Rangitata Rivers, as well as the Ashburton River / Hakatere. There are also pockets of historic swamp deposits, beach gravels, coastal sand, and dunes. The area has low rainfall, warm summers and cool winters.

There are limited protected areas in and around the Ashburton River / Hakatere. In the upper catchment, the Hakatere Conservation Park, managed by the Department of Conservation, includes one of the best intact examples of an inter-montane wetland system in New Zealand. There are also small riparian DOC reserves including the Ashburton River Marginal Strip on the north and south branches. In the vicinity of the Project, the eastern (true left) bank of the Ashburton River / Hakatere south of State Highway 1 is zoned public open space, with Robilliard Park, Mania O Roto Park and Grigg Park. Further west, the Harris Scientific Reserve protects one of the last stands of dryland kanuka in Canterbury. Downstream, there are riparian DOC reserves near Shannon, Terrace Dale, and Ashton, as well as the Ashburton Mouth Esplanade Reserve and ADC Recreation Reserve.

Vegetation of the Low Plains Environmental District (LPED) is highly depauperate (lacking in numbers or variety of species) and modified by agricultural and urban land use. Former vegetation of the LPED consisted of lowland short tussock with some floodplain forest; podocarp-hardwood forest; extensive kanuka forest; flax (Phormium tenax), sedgeland and cabbage tree (Cordyline australis) swampland. Riparian kowhai (Sophora sp.) and native hardwood woodlands occurred on the banks of major rivers. Several native plant species reach their southern or eastern limit within the LPED.

Within the project area, the site consists of urban, peri-urban and rural land use adjacent to Ashburton and Tinwald. This includes pasture land, planted trees, street trees and existing roads. Alongside the river are areas of exotic vegetation including willows (Salix babylonica and S. fragilis), pines (Pinus spp.), poplars (e.g. Populus alba), broom (Cytisus scoparius), English ivy (Hedera helix) etc. Some native regeneration is also occurring amongst the exotic trees. The Ashburton River / Hakatere channel consists of braided river habitat with sparse, predominantly exotic, groundcovers.

The New Zealand Landcover Database (LCDB 5.0) lists the following vegetation types within the project area:

- Exotic Forest
- Deciduous hardwoods
- Gorse and/or Broom
- High Producing Exotic Grassland

Non -vegetation types:

- Built-up Area (Settlement)
- Gravel or Rock
- River

The NoR Terrestrial Ecology report confirms that the route consists of a mixture of modified, rural land use dominated by exotic vegetation. No original or intact indigenous plant communities were found to be present. Only five non-planted native species were specifically listed in the report. These are all non-threatened groundcover species: prickly shield fern (Polystichum vestitum), rautahi (Carex coriacea), Edgar's rush (Juncus edgariae), fireweed (Senecio glomeratus), and "possibly" Carex diandra (Harding, 2013). Planted native species recorded are cabbage tree (Cordyline australis), matipo (Pittosporum tenuifolium), lemonwood (Pittosporum eugenioides), koromiko (Hebe salicifolia), flax (Phormiun tenax), broadleaf (Griselinia littoralis) and pukio (Carex secta).

The project area potentially contains nationally significant habitat for braided river birds, with the area in and around the existing SH1 bridge supporting approximately 5-10% of the national population of nesting black-billed gulls. The river is also regionally significant for other braided river birds, including Threatened and At Risk species. The Ashburton River / Hakatere supports Threatened and At Risk fish and is regionally significant for recreational fishers. Carters Creek and Keddies Stream have historic records of Canterbury mudfish, a Nationally Threatened wetland species (Roper-Lindsay, S.A., Hooson, Sanders, & Ussher, 2018).

The report concludes that construction of the Project will result in short-term construction impacts as well longer-term operational impacts to terrestrial and aquatic ecology in and around the project area.

Potential impacts during construction may include but are not limited to:

- Destruction in native flora, fauna and associated habitat during vegetation clearance,
- Disturbance to nesting birds, eggs and chicks in the Ashburton Riverbed,
- Impacts to aquatic ecology during river diversions, excavation and piling,
- Potential loss in stream area in Carters Creek and Keddies Stream due to culverting (to be confirmed),
- Releases of sediment and contaminants to surface water, soil and/or groundwater,
- Noise, air and light pollution from construction vehicles.

Potential impacts during operation include but are not limited to:

- The permanent presence of bridge piers in the Ashburton Riverbed, altering sediment deposition and potential nesting habitat for black-billed gulls and other braided river birds,
- Potential changes in recreational access to the Ashburton Riverbed (as yet unknown if access will be improved or restricted),
- Stormwater discharges to the Ashburton River, Carters Creek and Keddies Stream, affecting water quality and quantity,
- Disturbance from traffic and pedestrians using the bridge,
- Vehicle strike,
- Noise, air and light pollution from vehicles and street lights,
- Increase in edge effects due to habitat fragmentation, particularly in riparian vegetation along the Ashburton River,
- Potential increases in native habitat from native revegetation and stormwater treatment wetlands, depending upon the design, location and plant species used.

The nature and extent of these impacts will largely depend upon the detailed design and construction methodology, as well as potential environmental management and mitigation.

2.3.1 ACTIONS

It is recommended that further field surveys be conducted in order to more accurately determine baseline conditions and assess potential impacts of the project. The following actions are recommended:

- Consultation with stakeholders including Department of Conservation and Forest and Bird to determine the spatial extent of the black-billed gull colony (noting that the extent varies annually), likely impacts of the bridge, and if the proposed project canfacilitate restoration of the area as previously proposed (McArthur, 2016), such as by creating gravel islands, funding weed control, pest control, and restricting access for people and/or vehicles to the riverbed,
- Field surveys of the Ashburton River, riparian vegetation, and wider project area for avifauna during the nesting season,
- Field surveys of for herpetofauna, particularly in riparian vegetation along the Ashburton River and remnant habitats (if present) to the west,
- Aquatic ecology surveys, including potential Stream Ecological Valuation assessments (or similar) if piping or culverting of streams is proposed,
- Targeted mudfish surveys in Carters Creek and Keddies Stream,
- Assessment of the presence and extent of wetlands under the RMA and National Policy Statement for Freshwater

Management (NPSFM),

- Ground truth and more accurately map areas of vegetation and habitat be removed for the project;
- Update the ecological assessment on the basis of the additional field surveys, including providing input into the detailed design and construction methodology to avoid, minimise and mitigate potential adverse effects.

WHY IS THIS IMPORTANT:

Ecological context adds to the overall picture of the site and supports the identification of patterns in the landscape. We also need to consider effects to nesting birds in terms of structures and lighting. Understanding existing and former vegetation patterns helps to identify the right plants for the right places in landscape design.

2.4 ENVIRONMENTAL SCIENCE

Stantec has undertaken a Preliminary Site Investigation (PSI), a desktop investigation, to identify the likelihood of encountering contaminated soil within the proposed project alignment. Risk is assessed under a framework under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) and performed by a Suitably Qualified Environmental Practitioner. The assessment is of the potential risk of contaminants migrating to the project site in concentrations that may pose a risk to human health and the environment.

Of most concern was land between Carters Terrace and Johnstone Street on the Tinwald side, south of the Ashburton / Hakatere River, having previously been market gardens. This is where the new road is located on the Project. It is categorised as HAIL A10, with the main risks being ingestion of pesticide residue in the soil. This area is recommended for further detailed investigation.

Figure 10: 1985-1989 image showing market gardens between Wilkin Street and Johnstone Street. Source: from (Fellers, S, 2022).

Four additional sites were identified adjacent to the Project alignment that may be contaminated through historic or current site uses:

- 13 Chalmers Avenue: Timber storage, concrete manufacturing and seed storage. Assessed as Low risk.
- 5 Chalmers Avenue: vehicle service, tractor repair site. Assessed as Low – Medium risk with potential for hydrocarbons and heavy metals.
- 146 South Street: engineering workshop. Assessed as Low risk.
- 128 South Street: Service station. Assessed as Low risk.

As a result, the The PSI concludes that, pursuant to Regulation 6(3) of the NESCS, the Project alignment is considered a "piece of land" and the NESCS applies.

WHY IS THIS IMPORTANT?

Consideration of the road corridor going through an old market gardens site and contaminants being released particularly during the construction phase of the Project. Presence may influence earthworks and planting methodologies, and should be considered early in the detailed design process.

2.5 CONNECTIONS & LAND USE

Analysis is being undertaken as part of the DBC and looked at land zoning, the adjacent transport network and delivery.

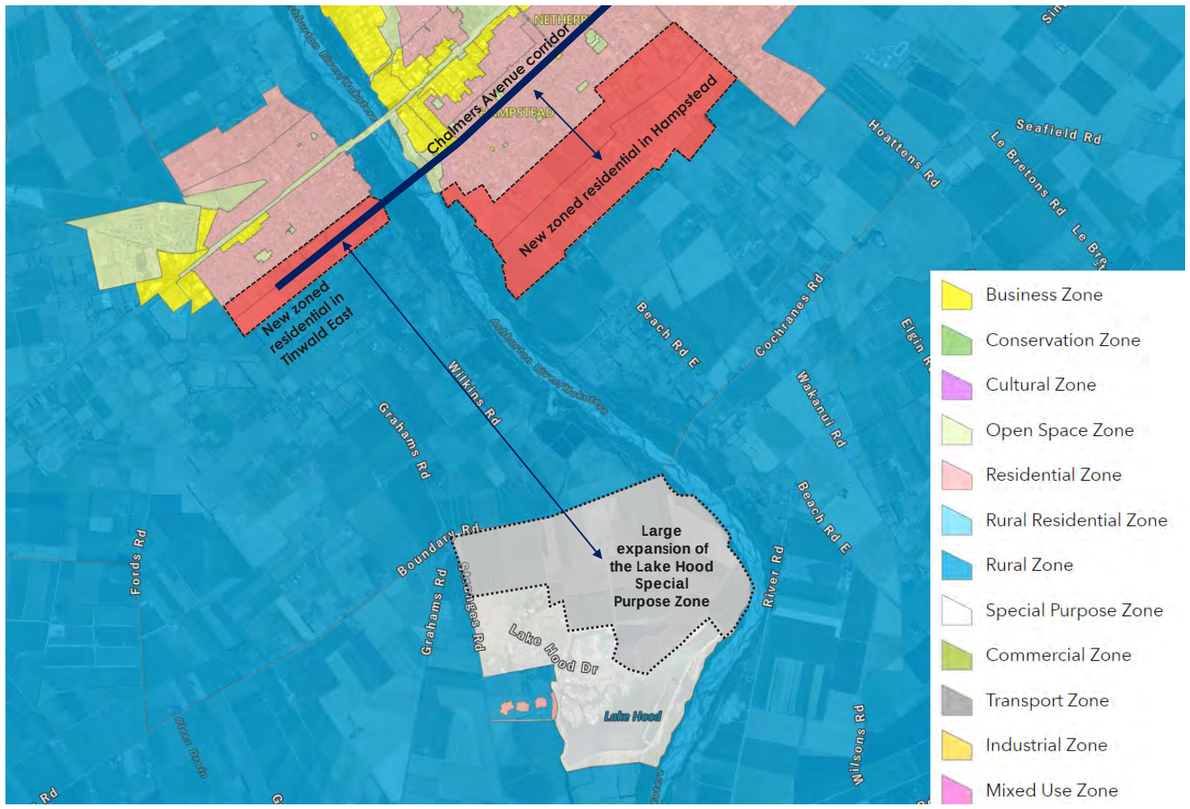


Figure 11: Wider context – Network Operation Framework. Source: Stantec

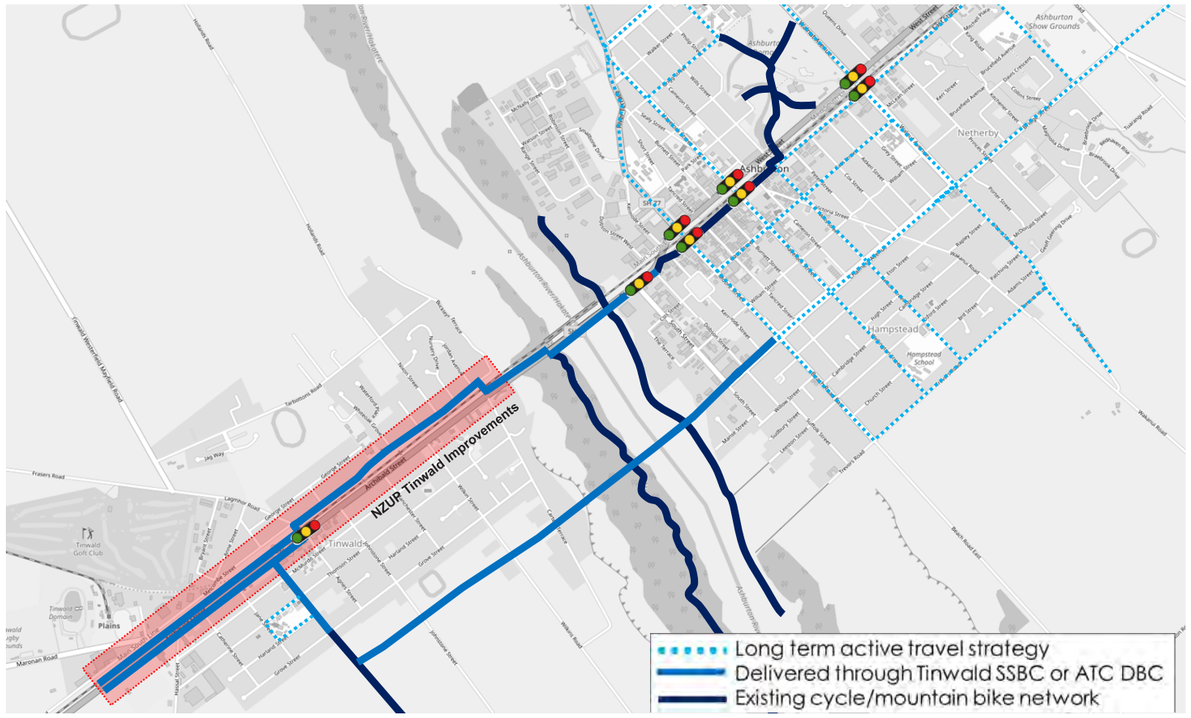


Figure 12: Adjacent transport network, existing and proposed under the Network Operations Framework. Source: Stantec

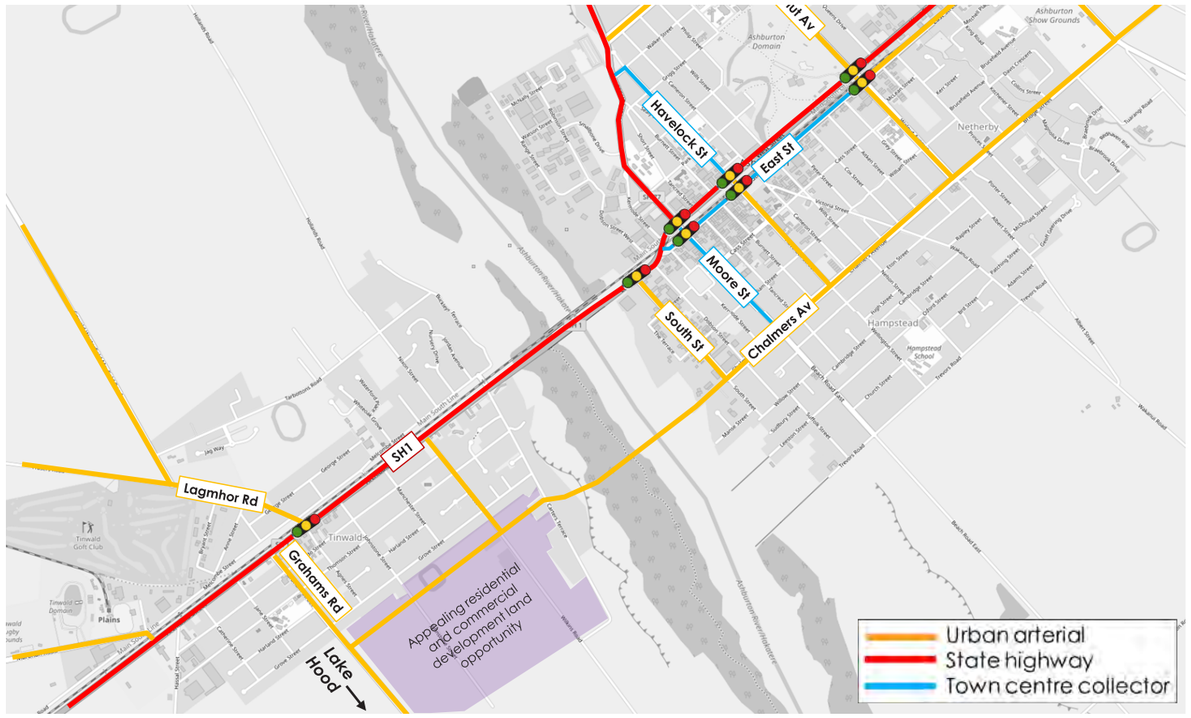


Figure 13: Network Operations Framework localised. Source: Stantec

Waka Kotahi now use the One Network Framework (ONF) to bring place making logic into road design at an appropriate scale, and to provide a design language that is inter-disciplinary.

https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/one-network-framework/

https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/one-network-framework/onf-use-in-other-frameworks/#business-case-approach

THE ONF:

- Replaces One Network Road Classification (ONRC),
- Recognises that the transport network has a place function,
- Roads & streets are destinations as well as transport corridors,
- Context is important – everyone involved in the project is talking and writing in the same language.

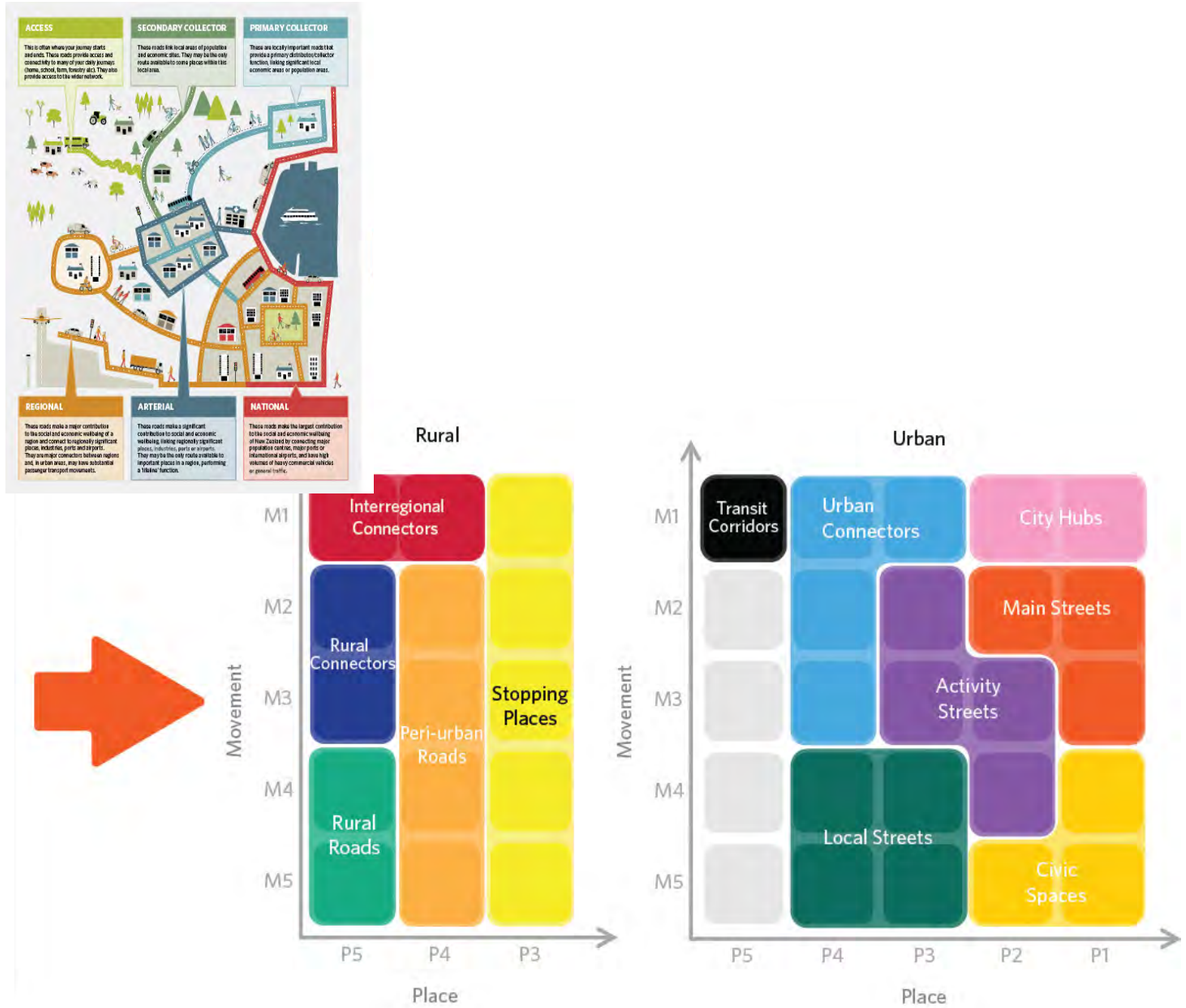


Figure 14: ONRC to ONF. Source: https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/one-network-framework/about-the-onf/

ADC have done an ONF classification for the Project. As shown in section 1.6 the classification is **Urban Connector**. For the purposes of the ULDF, comparison of the current and future land uses of the Project with both the ONRC and ONF classification systems has been undertaken to define a bit further the change in land use anticipated in the LVA and explore some design and placemaking options to tie back to the urban design principles.

TABLE 1. ROAD CLASSIFICATION

CLASSIFICATION	CURRENT LAND USE	FUTURE LAND USE
LAND USE	RURAL	URBAN RESIDENTIAL
ONRC	ACCESS OR SECONDARY COLLECTOR.	PRIMARY COLLECTOR.
ONF CURRENT NETWORK FUNCTION	**Place: P4 - P5** with Rural Spatial Significance, negligible activity, rural form.	**PLACE: P4** • Neighbourhood centre or stopping place. • Neighbourhood scale. • Community facilities on street to generate activity. • Medium density (/ mixed use) – more likely residential / medium density residential or a place of interest.
	MOVEMENT: M4 OR M5 Local movement, confirm metrics?	**MOVEMENT: M3** • Local area significance. • Places where people live / play. • Primarily residential spatially – Low / medium residential density.
ONF	**RURAL OR PERI URBAN ROAD**	**URBAN CONNECTOR**

Ideas for hard and soft landscape intervention as a result of the ONF classification:

- Movement Function with Small Community Places,
- Spaces between parking bays,
- Potential bus stops,
- Priority for people walking & cycling at junctions,
- Adequate space allocated in the road cross section to make the road attractive for more people to use and feel safer (wide footpaths),
- Picnic area and stopping places,
- Viewing platform,
- Regular crossing places,
- Tree planting, riparian planting,
- Artwork / Cultural expression if appropriate,
- Bridge lighting scheme – colours, movement, pole heights,
- Bridge hand rail / cycle grab rail,
- Elements that can only be notice if you are biking or walking making it special:
  - Planting and seasonal interest,
  - Signage – features, places, wayfinding,
  - Patterns in the footpath, potentially on the bridge deck only,
- Chances for residents to contribute if they want to e.g. berm planting.

WHY IS THIS IMPORTANT?

Acknowledgement of road infrastructure as having a place function, as well as a movement function enables combined design thinking and the generation of ideas toward landscape design.

Figure 15: Entrance to Mania-o-Roto Scout Camp, Chalmers Ave, Stantec

3. STRATEGIC CONTEXT TO INFORM CONCEPT DESIGN

3 STRATEGIC CONTEXT TO INFORM CONCEPT DESIGN

3.1 INTRODUCTION

This section demonstrates that the project is responding to drivers in regional and district policy, and national Waka Kotahi policy, especially in mode shift, and street design. ADC and Waka Kotahi also have strategies and guidance on walking and cycling, transport, ecology, bridge and roundabout design.

3.2 CANTERBURY REGIONAL POLICY STATEMENT 2013 (JULY 2021)

Section 5.1.4 of the Regional Policy Statement states that land use and transport systems need to be integrated to:

1. promote positive contributions to consolidated urban forms;
2. promote increased accessibility and mobility;
3. avoid or mitigate adverse effects on the environment, including on sensitive activities;
4. effectively and efficiently develop and expand; and/or
5. realise the full value of investment into establishing regionally significant infrastructure.

WHY IS THIS IMPORTANT?

This is important to realise the integration at community scale of regionally significant infrastructure corresponding to objective 5.2.2:

1. To recognise the benefits of enabling people and communities to provide for their social, economic and cultural well-being and health and safety and to provide for infrastructure that is regionally significant to the extent that it promotes sustainable management in accordance with the RMA.
2. To achieve patterns and sequencing of land-use with regionally significant infrastructure in the wider region so that: a. development does not result in adverse effects on the operation, use and development of regionally significant b. adverse effects resulting from the development or operation of regionally significant infrastructure are avoided, remedied or mitigated as fully as practicable. c. there is increased sustainability, efficiency and liveability.

Chapter 10 relates to the beds of rivers and lakes and their riparian zones.

Policy 10.3.1 is to provide for activities in river and lake beds and their riparian zones, including the planting and removal of vegetation and the removal of bed material, while:

1. recognising the implications of the activity on the whole catchment;
2. ensuring that significant bed and riparian zone values are maintained or enhanced; or
3. avoiding significant adverse effects on the values of those beds and their riparian zones, unless they are necessary for the maintenance, operation, upgrade, and repair of essential structures, or for the prevention of losses from floods, in which case significant adverse effects should be mitigated or remedied.

Policy 10.3.2 is to preserve the natural character of river and lake beds and their margins and protect them from inappropriate subdivision, use and development, and where appropriate to maintain and/or enhance areas of river and lake beds and their margins and riparian zones where:

1. they exist in a degraded state and enhancement will achieve long-term improvement in those values;
2. they have ecological values for which protection and/or enhancement will assist in the establishment or re-establishment of indigenous biodiversity or ecosystems, particularly for ecosystems that are threatened or unrepresented in protected areas;
3. they have existing significant trout or salmon habitat;
4. maintenance and/or enhancement will improve or establish connections between habitats and create corridors for indigenous species and trout and salmon and their movement between areas;
5. riparian zones provide a buffer from activities that may adversely affect bed values;
6. opportunities exist to create habitat corridors for plants and animals; or
7. riparian zones provide spawning or other significant habitats for at risk or threatened species, such as inanga or Canterbury mudfish.

And policy 10.3.4, when removing vegetation and bed material from river beds is to manage the use and removal of vegetation and bed material in river beds and their margins to ensure:

1. the maintenance of flood-carrying capacity of rivers
2. the protection of essential structures; and
3. erosion control and prevention, provided its management does not adversely affect: a. the instream and other values of the beds including habitat and associated ecosystems; or b. the stability, performance, operation and maintenance, upgrade and repair of essential structures.

WHY IS THIS IMPORTANT?

Restoration of riparian zones are important in protecting people and the land from natural disasters such as flooding, but also restoration of these areas protects habitat for native fish species.

3.3 CANTERBURY LAND & WATER REGIONAL PLAN 2015

The Ashburton River/Hakatere provides habitat for rare birds, fish, plants and other species, as well as a wide range of recreational values. A number of other foothill streams with associated bush remnants provide valuable recreational and ecological opportunities.

The Ashburton River / Hakatere is not considered a water body of high naturalness.

Region wide, rule 5.137 notes with regard to bridge installation guiding form and finishing, not withstanding permitted activity status:

1. Any material deposited in, on, under or over the bed of a lake or river in order to construct or maintain the structure is of inert materials of colour and material type that **blends with the surrounding natural environment** and does not contain or is not coated with any hazardous substance; and
2. Upon completion of the activity:
    a. Any area of the bed of a lake or river which has been disturbed is **returned to as near as practicable to its original state;** and
    b. **any excavated areas are left with battered slopes not steeper than 3:1 slope angle (3 horizontal to 1 vertical) and any flow channels disturbed during the activity are reinstated**; and

8. For any bridge:
    a. there are no piers within the bed; and
    b. the bridge and the approaches are designed so that a **5% Annual Exceedance Probability flood event does not cause any increase in upstream water levels**; and
    c. **the soffit (underside) of any bridge is higher than the top of the river bank, and at least 500 mm above the 5% AEP flood level;** and
    d. the bridge **abutments are constructed parallel to the flow**; and

9. The works or structures do not prevent any existing **fish passage.**

WHY IS THIS IMPORTANT?

This is important in providing a framework around integration of a bridge and structures into the landscape and reinstatement of the surrounding environment.

3.4 ADC DISTRICT PLAN

3.4.1 SECTION 2: TAKATA WHENUA VALUES

Maori were the first humans to travel through Ashburton District and to rely on its natural resources. Takata Whenua are Kai Tahu, Kati Mamoe, Rapuwai, and Hawea Waitaha (iwi). The hapu is Kati Huirapa. The tipuna marae and Arowhenua Runaka are located at Arowhenua (near Temuka). The rohe of Kati Huirapa extends from the Rakaia River to the Waitaki River. Arowhenua Runaka is the local representative group similar to local government. Te Runaka was formed to protect and defend rakatirataka, the turangawaewae, and the cultural and social values of its members.

The RMA identifies, as a matter of national importance, the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga. The Council is required to have particular regard to "kaitiakitanga" which is a Maori concept of cultural and spiritual guardianship over natural resources. The Act also states that the principles of the Treaty of Waitangi must be taken into account when managing the use, development and protection of natural and physical resources.

The principles of the Treaty of Waitangi (Te Tiriti o Waitangi) have been introduced into resource management through Section 8 of the Act. The Treaty is of particular relevance to resource management because it refers to the rights of governorship (kawanatanga) and chieftanship (rakatirataka) and the relationship of Maori with natural and physical resources.

Many of the issues identified in relation to Takata Whenua overlap with general concerns regarding the quality of the environment, especially in relation to water quality and public access to waterways. These concerns show that there is much common ground shared between Maori and many non-Maori in the District.

Objectives and Policies relate to:

- Recognition and promotion of the Treaty of Waitangi with regard to managing natural and physical resources, promoting communication, education and joint decision making.
- Protecting the relationship that Kati Huirapa has with culture and traditions and their ancestral lands, waters and other sites, recognising traditional Takata Whenua place names, vegetation and wildlife names.
- Recognition of Te Ao Māori in managing natural and physical resources.

WHY IS THIS IMPORTANT?

This is very important in providing background history and narrative to the Hakatere area and the values of Iwi in preparation for hui and in thinking about design and design features.

3.4.2 SECTION 3: RURAL ZONES

The entire Ashburton River / Hakatere is listed as an Area of Significant Conservation Value. These areas represent plant and animal communities and habitats which are representative, rare or unique within the District, or otherwise considered to be significant in terms of Section 6(c) of the Resource Management Act. Those habitats, communities and natural features which adjoin or encompass lakes, streams, rivers and wetlands also contribute to the natural character and functioning of these water bodies in terms of Section 6(a).

The plan notes: Together with the South branch above the gorge, the Ashburton River / Hakatere provides some of the most important braided river habitat for birds in Canterbury. The two major branches of the river are over 130km long, and include an important river delta and lagoon. 39 wetland and 25 terrestrial species of birds have been recorded in the river, and there are nationally significant populations of black fronted terns, black billed gulls, banded dotterels and black fronted dotterel. A total of 50 bird species, including 26 wetland species have been recorded at the river mouth.

WHY IS THIS IMPORTANT?

This is important in defining the values and character that the Ashburton River / Hakatere has, and the features and habitat of the river system. Waterways and their habitat potential are a significant part of the rural zone that design and construction teams will need to work along side.

3.4.3 SECTION 4: RESIDENTIAL ZONES

Housing is one of the most fundamental needs of the District's population. People's well-being is amongst other things a reflection of their quality of housing and general living environment. Ashburton (Kapuka), as the District's principal settlement, accounts for over 60% of the population. Ashburton District generally exhibits population trends typical of rural districts nationally.

There is undoubtedly a difference in the character and scale between the suburban residential and the very low density residential environments. The two zones that the new road will travel through are:

Residential C: The Medium Density Residential Zone covers the suburban residential areas of Ashburton (Kapuka), and other urban areas. This zone provides principally for moderate to low density, generally permanent living accommodation. There are some variations within the zone for specific areas, generally subject to an Outline Development Plan. The purpose of the zone is to maintain residential areas with open space for tree and garden plantings and with minimal adverse environmental effects experienced by residents.

Residential D: The Low Density Residential Zone covers areas adjoining the towns of Ashburton (Kapuka), and other urban areas. The zones are concentrated in close proximity to the towns in order to encourage energy conservation and to enable convenient access to the employment, services and facilities in those towns. The zone provides for very low density residential opportunities in association with these towns as an alternative to the suburban living areas typical of the District. The purpose of the zone is to maintain very low density residential areas with ample open space, tree and garden plantings and with minimal adverse environmental effects experienced by residents. However, rural productive activities are likely to remain a common use of land in the zone and an integral part of the rural-residential interface.

WHY IS THIS IMPORTANT?

The two new residential zones C&D on the Tinwald side of the river are important to define because the design team will need to be able to envisage a new residential character when designing the project, especially the link road between Carters Terrace and Grahams Road.

3.4.4 SECTION 10: TRANSPORT

The safety and convenience of pedestrians, cyclists, road, and rail users can be adversely affected by the inappropriate location, nature and design of land use activities, their vehicle access and vehicle crossings, parking and servicing.

Within most parts of the Ashburton District this accessibility will be assured with the maintenance of the current road system, providing fossil fuel remains an economic form of fuel for motor vehicles, or an alternative that retains a high degree of individual vehicle based mobility. Access to transport networks, in particular roads and the railway is vital to the economic wellbeing and growth in the Ashburton District.

Motorised transport can adversely affect the amenities of areas of the District, as a result of effects such as noise, emissions, loss of visual amenity, privacy, and accessibility.

Objective 10.4 on environmental effects of transport is, 'To provide for a transport network that avoids adverse effects on the surrounding environment.' Policies include provision for:

- Preserving amenity by adopting a road classification system,
- Ensure that new roads are designed to visually accommodate the character of any surrounding area,
- Incorporate planting,
- Roading design that enhances the visual experience, including protection of existing mature trees, and
- To avoid adverse effects on sensitive areas, natural and physical resources, amenity and landscape values.

Policies and objectives are anticipated to deliver the following environmental results:

- Safe, efficient and accessible transport systems,
- Minimal adverse effects on the environment from transportation,
- Efficiency in the use of fossil fuels and in traffic flow on the District's roads,
- Construction of any new road, accessways and parking areas to appropriate use and safety standards,
- Increased use of alternative forms of transport, rather than private cars,
- Improvement to pedestrian and cyclist safety and accessibility throughout Ashburton (Kapuka) town.

WHY IS THIS IMPORTANT?

This is important in reinforcing a shift in behavior away from car based transport and to provide viable options for people to choose how they travel. It also recognises good street design through placemaking and amenity.

3.4.5 SECTION 12 - HISTORIC HERITAGE VALUES & PROTECTED TREES

The Ashburton District covers a large geographical area and comprises a range of different landscape types. The District also contains many places, buildings, features and trees which have historical, cultural, spiritual, scientific or other special significance to both Maori and non-Maori. These items, which include archaeological sites, historic buildings and features, and waahi tapu (sacred places) of significance to Takata Whenua, all combine to give people a sense of place and belonging and are a connection to the past which most people wish to retain. Sites relating to traditional Maori occupation exist throughout the District and the Council has recognised the people of Te Runanga O Arowhenua as holding mana whenua over the district. A partnership between the Council and Arowhenua also extends to active protection of sites important to the takata whenua.

The natural, physical and cultural heritage features spread throughout the area are an important part of the amenity and character of the District.

Resources of historic heritage value and significant trees contribute to the present and future environment in many ways:

- A recognition of turangawaewae for Takata Whenua,
- A sense of place, identity and continuity for a community,
- A pleasant environment for people's activities;
- A record of human activity through time, maintaining a link with the District's history,
- Contribution to the character of an area or locality,
- Basis for community well-being and understanding,
- interest for visitors and associated economic opportunities, and
- In the case of trees; contributing to community health and well-being, air purification, shelter, shade, visual amenity and as a noise buffer.

There are no historic buildings or protected trees in the Project site. There are a few close by, with none being affected by the Project:

- H63 is the former house of Dr McBean Stuart at 4 Beach Road, Ashburton
- H72 a house at 4 Wilkin St, Tinwald
- H73 'Ardentrive', 22 Carters Terrace
- T46 *Fuscospora fusca*, Red Beech at 41 William Street, Ashburton
- T8 *Agathus australis*, Kauri at 34 Carters Terrace
- T15 *Acacia baileyana*, Cootamundra wattle, 22 Carters Terrace
- T7 *Juglans regia* at 1B Carters Terrace
- T44 *Fagus sylvatica purpurea,* Copper Beech at 18 Carters Terrace
- T68 *Quercus coccinea* (2 No.) at CCS (IHC), 21 Archibald Street.

WHY IS THIS IMPORTANT?

Heritage values and cultural landscapes are an important tool for design. This policy reinforces takata whenua values a place in the landscape and captures important places of colonial history. The protected trees offer an insight into appropriate tree species that may be included as street trees.

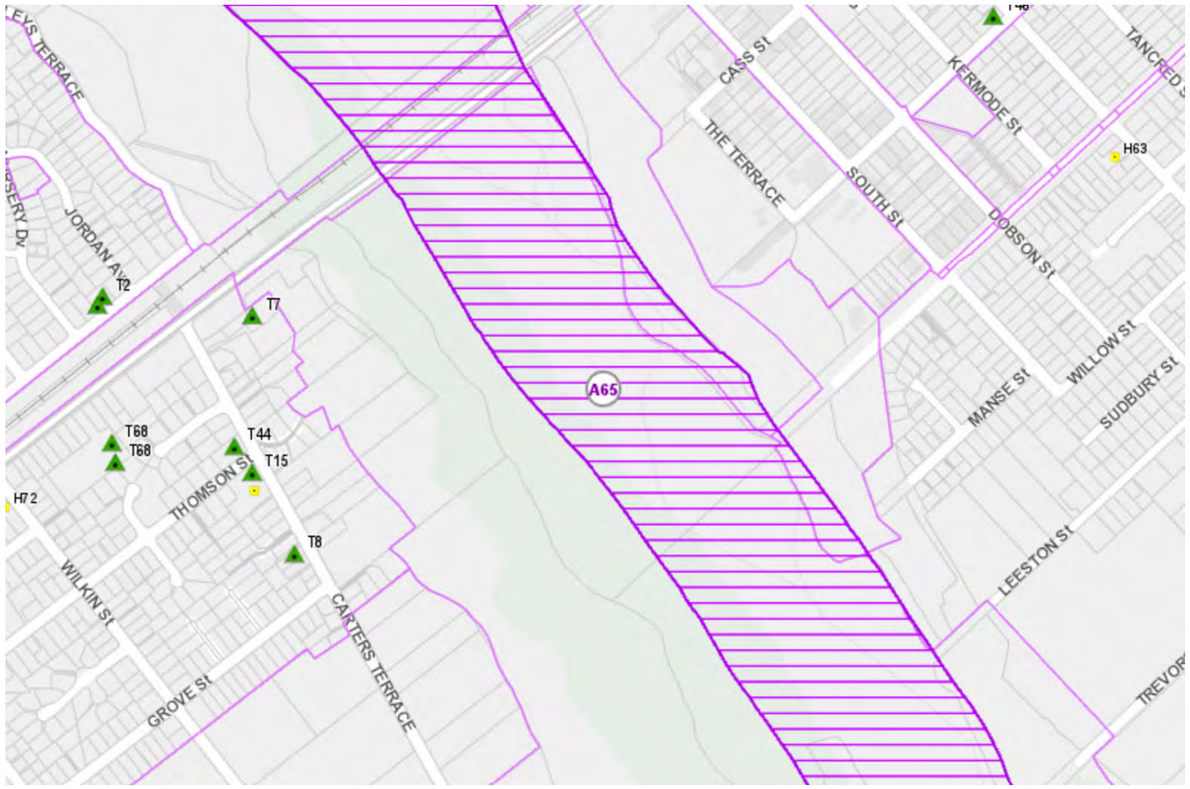


Figure 16: Heritage places and protected trees. Source: https://maps.adc.govt.nz/viewer/?map=27f6a894aaf8471f986da5e21203f09d

3.5 ADC STRATEGIES AND GUIDELINES

3.5.1 ITS OUR PLACE, WALKING AND CYCLING STRATEGY (2020 – 2030)

ADC maintain 233km of footpath that is suitable for walkers. This is mostly located within Ashburton township but there are also footpaths in parks and recreational areas. The network needs to cater for the needs of all users and different levels of ability. This ensures that footpaths can be used by people with mobility scooters, wheelchairs and recreational devices, such as skateboards and scooters.

Ashburtons flat terrain is ideal for walking and cycling within urban centres. However, the large distances between towns limits the use of walking or cycling as transport. Many of the roads within the rural network have narrow carriageways, little or no shoulders, and high speed limits. Travel by private car is the main form of transport in the district and between the townships within the district. There is no public transport.

The walking and cycling network is important for a number of reasons:

- It gives people the opportunity to walk or cycle,
- Enables an ageing population to move around easily, including using mobility devices,
- Improves health and well-being,
- Reduces carbon emissions by reducing the number of vehicles on the road, and
- Supports economic outcomes such as tourism.

Relevant goals and objectives to the Project:

1. A coherent, safe and connected urban walking and cycling environment

- Developing facilities that meet the needs of people in urban and rural areas,
- Networks that are easy to use and link to key destinations,
- People feel safe using the walking and cycling networks.

2. A quality, fit for purpose recreational walking and cycling network that connects to key destinations

- Networks meet the needs of people with varying abilities and allow for the use of different mobility devices,
- Networks are good quality for their purpose,
- People using the networks can travel between key destinations.

3. Ensuring the urban and rural walking and cycling networks integrate to create an accessible district

- There is adequate wayfinding signage and map information available for networks,
- Rural and urban networks are unified including linkages.

4. A district committed to walking and cycling for health, well-being, safety, environmental and economic reasons

- Encouraging travel behaviour changes through strong leadership and collaboration with key stakeholders,
- Promotion of walking and cycling in our district,
- Reviewing funding and resource prioritisation for walking and cycling amenities.

Our Action plan

Ongoing	Short term	Medium term	Long term
2021 - 2031	2021 - 2023	2024 - 2027	2027 - 2031

	OBJECTIVES	ACTIONS	PRIORITY/ TIMEFRAME
1.5	Investigate State Highway/railway/river severance issues for communities	**A.** In conjunction with NZTA, providing a SH77 crossing in Methven, possible safe crossing options includes pedestrian refuge island or kerb extension near the public toilets and park.	**Medium** priority; Short to medium term
		B. In conjunction with NZTA, reduce severance by improving crossings over SH1 in Rakaia.	**Medium** priority; Medium term
		C. In conjunction with NZTA, reduce severance by improving crossings over SH1 in Tinwald.	**High** priority; Short term
		D. Installing traffic signals at Walnut Ave/West and East Street intersections. This project is being developed by NZTA and is programmed for completion early 2021.	**Low** priority; Short term
		E. The current Ashburton Bridge, proposed Ashburton Second Bridge and associated upgrades on Chalmers Avenue and in Tinwald provides an opportunity for improved walking and cycling facilities.	**Medium** priority; Medium to long term
		F. In conjucntion with NZTA, reduce severance by improving crossings over SH1 between Havelock St and Walnut Ave. For the Railway overpass bridge, Domain, Museum	**High** priority; Short term
2.1	Improve wayfinding signage for recreational networks	**A.** Establishing wayfinding guidelines/signage for urban cycling and key walking networks that integrate with recreational and rural paths.	**High** priority; Short term
2.2	Develop resources such as track specifications that can be shared with community groups	**A.** Liaising with the Braided Rivers Cycleway Trust to establish if any standards have been developed. If not, ADC to facilitate the development of standards.	**High** priority; Short term
		B. Identifying where additional cycle parking is required and implement with best practice guidance from NZTA.	**Medium** priority; Medium to long term

Figure 17: Action plan in relation to the Project

Appendix A - **East Ashburton** | **Proposed Walking and Cycling Projects**

Figure 18: Proposed walking and cycling projects including the Project crossing over the Ashburton River – Hakatere

There are already established walking and cycling trails in Ashburton. The Ashburton MTB Loop runs along the Ashburton River. Near the CBD is Mountain Bike Ashburton's purpose built mountain bike track. The full loop is 11.5km but can be shortened by turning around in several places. The River Walkway as created primarily for walkers, runners and dogs to avoid collisions with cyclists on the busy MTB Loop. Beginner cyclists may also take this route. The Ashburton/Hakatere River Trail follows the north side of the river, to and from Ashburton to the Hakatere beach settlement and river mouth. It is a wide two-way track open to bikers, walkers and horse riders 17km long each way. The Lake Hood Trail follows the south side of the river for 7km from Ashburton to Lake Hood. It is a wide two way track suitable for walkers and bikers of beginner skill level. A loop of the lake adds another 6km. The Lake Hood trail is part of the New Zealand Cycle Trail Network and is categorised as a Cycle Touring / Bikepacking Route https://www.nzcycletrail.com/find-your-ride/new-zealand-cycling-map/. Trails are maintained by Local Trail Associations.

Figure 19: Proposed walking and cycling projects in Tinwald

WHY IS THIS IMPORTANT?

This is important in that it identifies the second bridge project as forming part of the current and future active transport network. The Project supports use of the trails in that people in Tinwald will have better access and ability to get to trail heads.

3.5.2 *ASHBURTON TRANSPORT ACTNITY MANAGEMENT PLAN (2018 -2021)*

Ashburton District Council operates and maintains a large network of public roads and footpaths that enables the convenient and safe movement of people through and within the district. The district has one of the largest road networks in New Zealand, covering 2623km. 1507km is sealed, 1116km is unsealed, and 92% (2422km) of our roads are located in rural areas.

Traffic congestion has been identified as a key concern by ADC. State Highway 1 (SH 1) is the main route through Ashburton and Tinwald, and also functions as a core traffic distributor. A number of factors combine to sometimes cause standstill congestion through the urban area, and other regions are increasingly reporting effects in their localities from this issue. With the Ashburton River Bridge creating a pinch point, a second bridge has been identified as a critical solution.

WHY IS THIS IMPORTANT?

This is important because the Ashburton Bridge project forms a significant part of the local and regional transport strategy.

3.5.3 *ASHBURTON BIODNERSITY ACTION PLAN (2017-2022)*

Vision Statement:

The Ashburton District community values and cares for biodiversity and accepts the shared responsibility to work together to ensure it is sustained and enhanced, both now and into the future.

The Ashburton District Biodiversity Action Plan sits within a strategic regional and national framework for biodiversity protection. It's central purpose is to give effect to Canterbury's Regional Biodiversity Strategy, at the district level, and to align with the Canterbury Water Management Strategy.

The relevant section of biodiversity for the Project site is braided river ecosystems. The braided rivers that flow through the Ashburton District are a rare and internationally significant feature, as well as a National Priority for protection. These rivers are a unique habitat for many fish, animals and plants and a significant habitat for threatened and endangered birds. Despite the Rangitata and Rakaia rivers being protected by Conservation Orders, continued threats to these and the other braided rivers include weeds, animal pests, human behaviour, land use intensification, water abstraction, channelization, changes in flow levels, and declining water quality. Didymo and other invasive aquatic species also pose a threat, as do barriers to fish passage and habitat disturbance from gravel extraction and recreational threats such as uncontrolled vehicle access.

District Plan - The Ashburton District Plan contributes to the protection of indigenous biodiversity by identifying areas of significant conservation value, classified according to their intactness, rarity, representativeness, distinctiveness, diversity or patterns. Plan "rules" regulate for the protection and maintenance of these areas. Activities such as earthworks and indigenous vegetation clearance are subject to restriction across the District to allow protection of natural conservation values.

The objectives of this plan align closely with the Biodiversity Strategy for the Canterbury Region and provide the overall direction for local biodiversity protection and promotion in the next five years.

The objectives are:

1. Identify the current state of biodiversity in the Ashburton District
2. First to protect, then maintain and restore significant areas of biodiversity
3. Engage with landowners in the identification, protection and enhancement of biodiversity
4. Integrate biodiversity protection principles into Council policy and practice
5. Celebrate local biodiversity and encourage protection and enhancement by the community.

Priority actions have been identified as particularly significant actions for driving progress in this area.

1. Complete the ecological survey of the Ashburton District roadsides
2. Distribute information to landowners regarding biodiversity identification, protection and enhancement
3. Maintain the Biodiversity Working Group, to meet at least quarterly for implementation of the Action Plan
4. Maintain a webpage on the Ashburton District Council website for biodiversity.

WHY IS THIS IMPORTANT?

This reinforces the ecological importance of the Canterbury braided rivers and the protection of their habitat values.

3.5.4 *ASHBURTON DISTRICT PARKING STRATEGY (2021)*

The Strategy provides a framework for managing the parking supply so that it is used in a way that is efficient and effective for everyone. This means balancing the needs of different users to meet their respective demands while also working towards the district's economic, social and environmental objectives. Managing the parking supply requires regular consideration of how parking is being used and whether that use is best for the people who live and work here, and also visitors to the district.

The Parking Strategy was last updated in 2011. Since that time, much has changed. Population growth has increased the demand for transport options in our town centres. Government priorities have shifted to put greater emphasis on well-being and quality of life. And, with New Zealand declaring a climate emergency in 2020, ADC has a responsibility to encourage transport options with improved environmental outcomes. The new Strategy provides direction on how parking should be managed and what interventions can be used to encourage effective use of parking resources.

The On-Street Parking Space Prioritisation framework sets out which types of parking takes precedence in each type of area, in most cases. It also informs road space allocation where other kerb-side uses such as cycle ways are proposed adjacent to the kerb. The Project will sit within the Residential part of the framwork.

Figure 21: Parking provision framework. Source: (Ashburton District Council, 2021)

Relevant objectives and actions relevant to the Project are:

A: Support placemaking, amenity and good urban design outcomes:

- Implement District Plan Policies that highlight the impacts of providing inappropriate levels of parking, both too little and too much parking,
- Require Integrated Transport Assessments for development of certain scales/ activities showing how parking will be managed,
- Implement District Plan Policies and Rules, and design guidelines for new streets, providing for good parking design, particularly in town centres,

C Support environmental outcomes:

Parking needs to be managed in a way that moves us towards achieving a balanced and sustainable environment. We can do this by providing dedicated parking for emerging technologies and schemes, such as electric vehicles and car sharing, and encouraging more environmentally friendly forms of transport like walking and cycling/micro-mobility.

- Facilitate the provision of EV charging spaces, carpooling spaces, car sharing spaces in Council car parks/streets and promote these in private parking areas through District Plan polices,
- Provide bicycle and motorcycle parking on streets and in Council car parks,
- Implement District Plan requirements for bicycle parking,
- Promote the development of Travel Plans for business and organisations to help reduce demand for parking.

D Support the Walking and Cycling Strategy:

The methods we use to manage parking will have an impact on walking and cycling. This strategy needs to be aligned with our Walking and Cycling Strategy and help to accomplish its objectives. This means making bicycle parking available near to key destinations; and prioritising street space for walking and cycling rather than parking on key walking and cycling routes.

- Provide bicycle parking on streets and in Council car parks,
- Implement District Plan requirements for bicycle parking supply and design.

E Parking is managed for the context:

Parking needs to be managed in a way that makes sense the district and the localities within it. Not all places are the same and our strategy needs to be tailored for people. This means parking restrictions are appropriate for the level of parking demand; and enforcement of parking restrictions is effective and affordable to the Council. This also could involve technology such as parking space sensors and associated Apps.

- Continue to operate an appropriate enforcement funding model,
- Monitor parking demand and regularly review restrictions as well as potential future pricing models,
- Support any new Council off-street parking with assessments of demand/need and cost analysis,
- Implement monitoring and enforcement systems to ensure that parking is responsive to changes in demand.

WHY IS THIS IMPORTANT?

The parking strategy is largely centred on the town centre of Ashburton, however parking is included in the project proposals. It should meet the objectives and actions set out in this strategy.

3.5.5 *ASHBURTON RIVER / HAKATERE SHOREBIRD HABITAT MANAGEMENT PLAN (2016)*

The shorebird management plan needs to be considered in the context of the current over-allocation of the water resources of the Ashburton River / Hakatere, and the lack of minimum environmental flow limits being enforced at the time of writing. Artificially low flows in the Ashburton River / Hakatere are likely to be causing or exacerbating a number of the threats being addressed by management actions in this plan, including the extent of woody weed infestations, impacts of mammalian predators and rates of human disturbance. The management required to address the impacts of weeds, pest animals and human impacts is likely to be much more costly, and much less effective in the long-term if water flows in the Ashburton River / Hakatere remain artificially low. Many of the stakeholders consulted during the preparation of this plan, including representatives from Environment Canterbury, the Department of Conservation, the Ashburton Zone Committee, Forest & Bird and the Arowhenua Rūnanga have clearly communicated that they consider the current, very low environmental flow limit in the Ashburton River / Hakatere as the single most important and urgent threat to the long-term health of the river and its shorebird and mahinga kai values.

For these reasons, it is important that the adoption and implementation of this management plan does not take any urgency away from the need to work towards implementing the minimum environmental flow limits outlined in the Canterbury Land and Water Regional Plan. Namely, that the minimum flow of the Ashburton River / Hakatere at SH1 will be increased from the current limit of 3000 L/sec to 6000 L/sec by the 1st July 2023, and to 10,000 L/Sec by the 1st July, 2033 (ECan, 2015).

Given that the establishment of these minimum flows could well have an impact on the threats and management actions described in this management plan, it is recommended that this plan be reviewed when each of these minimum flow limits have been achieved.

WHY IS THIS IMPORTANT?

This plan is important because it highlights ongoing threats to significant shorebird habitat in the Ashburton River / Hakatere.

3.5.6 *ASHBURTON DISTRICT SPORT AND RECREATION STRATEGY (2010)*

Vision statement:

A healthy community that supports lifelong participation in sport and recreation: Ashburton District, More Active, More Often!

The relevant goals and objectives to the Project:

1. Our district has outstanding facilities and environments for sport and recreation

- Our natural environments provide unique sport and recreation opportunities,

- Our district has networks of urban walkways and cycle ways in our main towns of Ashburton, Methven and Rakaia,
- We develop plans to improve the quality of our river environments so they are safe for swimming and recreation.
- Our district boasts a district cycleway which meets national standards. Braided Waters Cycleway Trust established in 2009 with tracks completed around Lake Hood in 2011.

6. 4. We are actively involved in sport and recreation throughout our lives

- Active transport is a viable alternative to travelling by a private vehicle in Ashburton, Methven and Rakaia,
- Ashburton, Methven and Rakaia have active transport modes available to key facilities and destinations within the town,
- Sport and recreation is used as a great way to make new residents feel a part of the community.

WHY IS THIS IMPORTANT?

This plan is important because it links to mode shift and the provision of recreational facilities in Ashburton District that the Project provides through shared paths.

3.6 ASHBURTON TOWN CENTRE DEVELOPED DESIGN

WHY IS THIS IMPORTANT?

The Ashburton Town Centre Streetscape Renewals Project (ADC, AECOM & Jasmax) is relevant to the Project in that we don't want to replicate it, but want to understand project themes and planting strategies of the new built character in the town centre. People using the new bridge and new road, will also be users of the town centre.

The main objectives are:

- Create the most attractive town centre in Aotearoa / New Zealand,
- Revive the economic and social heart of Ashburton,
- Provide a safe and efficient town centre for all modes.

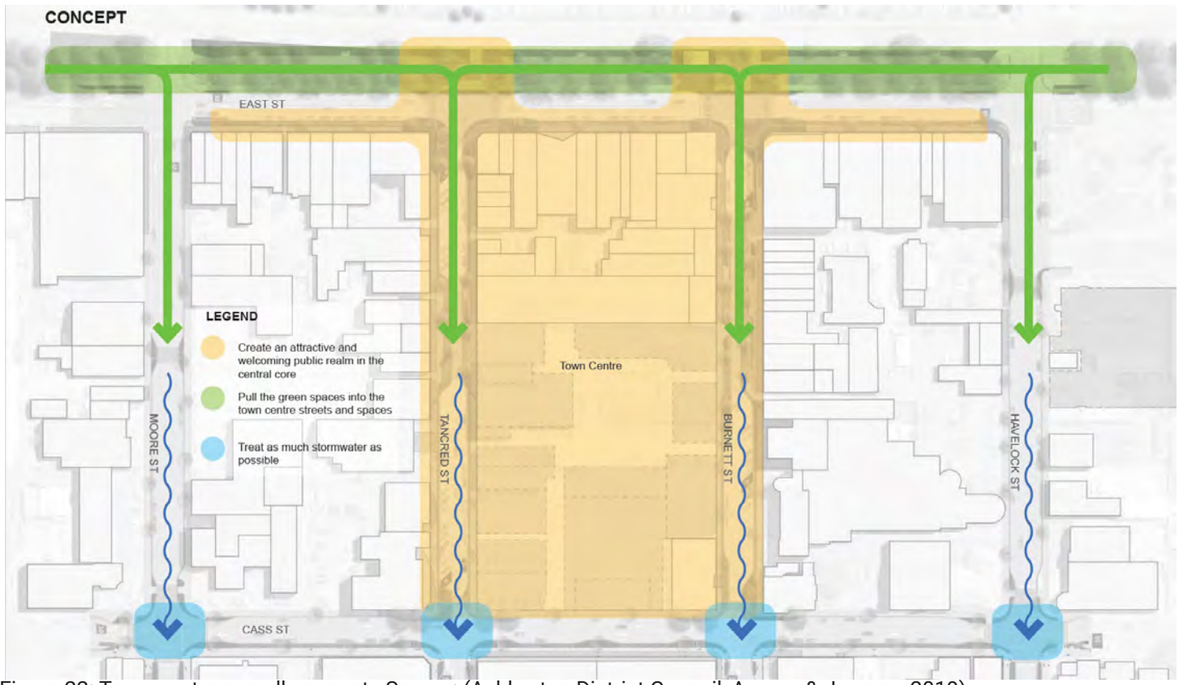


Figure 22: Town centre overall concept. Source: (Ashburton District Council, Aecom & Jasmax, 2019)

The concept responds to different character areas in the town centre. It incorporates movement patterns, cultural design and sense of place and adopts raingardens to treat stormwater, planting to enhance biodiversity values and collaboration with Arowhenua on plant selections, integrating cultural narratives through art and naming, and connection with the natural landscape. Connection is made by highlighting and preserving views, and taking inspiration from the 'nature of the braided river' systems and the 'warm tones' of the Canterbury Plains to inform material selections.

Figure 23: Examples of street design in the town centre. Source: (Ashburton District Council, Aecom & Jasmax, 2019)

Street furniture is a mix of proprietary and bespoke elements, using durable forms and materials for comfort, availability and ease of maintenance.

The planting strategy is a tiered approach, firstly for trees. Different trees or tree mixes have been selected for different streets corresponding to the overall concept and landscape character. Species for the street trees are:

- *Quercus robur*, English Oak
- *Liriodendron tulipifera* and *L. tulipifera* 'Fastigiata', Tulip Tree and columnar variety
- *Quercus palustrus*, Pin Oak
- *Ginko biloba*, Maidenhair Tree
- *Acer palmatum*, Japanese Maple
- *Nyssa sylvatica*, Tulepo Tree
- *Perrotia persica*, Persian Ironwood.

Garden beds are set out to ensure that taller species are planted in the centre of the beds, with edge planting and low growing ground covers to ensure coverage and minimise trip hazards. Again there are different plant mixes for different streets. Both native and exotic species are used.

3.7 WAKA KOTAHI URBAN DESIGN AND LANDSCAPE GUIDELINES

Urban design focuses on the relationship between the built form (including roads), land use and open space, natural features and human activity. In the context of a transport corridor, good urban and landscape design enables a road that functions well, has a distinctive identity and visual appeal to enhance the journey.

Waka Kotahi promotes a series of ten design principles for both Urban Design and Landscape.

Urban Design Principles:

1. Designing for the context
2. Integrating transport and land use
3. Contributing to good urban form
4. Integrating all modes of movement
5. Supporting community cohesion
6. Maintaining local connectivity
7. Respecting cultural heritage values
8. Designing with nature
9. Creating a positive road user's experience
10. Achieving a low maintenance design

(Waka Kotahi New Zealand Transport Agency, 2013)

Landscape Principles:

1. A context sensitive and place based approach
2. Facilitate green infrastructure and landscape integration
3. Understand the physical conditions
4. The right plant in the right place
5. Promote biodiversity and build in resilience
6. Champion water sensitive design
7. Deliver visual quality and a quality user experience
8. Facilitate community engagement and a collaborative approach
9. Low maintenance and whole of life value
10. Safety in design

(Waka Kotahi New Zealand Transport Agency, 2014)

Urban and landscape design is a multi-disciplinary approach to improve the quality of life for communities. Urban and landscape design as applicable to the Project, refers to how the infrastructure responds to the natural and the built environment. It concerns the design of infrastructure in response to place, and contribution to the form, function and visual quality of the area through which the Project passes and serves.

WHY IS THIS IMPORTANT?

This is important as part of best practice urban design and landscape principles applied nationally to Waka Kotahi projects primarily, but are also relevant to other roading projects.

3.8 WAKA KOTAHI SPECIFIC PRINCIPLES FOR BRIDGES & ROUNDABOUTS

3.8.1 BRIDGES

Bridging the Gap (Waka Kotahi New Zealand Transport Agency, 2013) provides guidance on urban design for road bridges. The guidance acknowledges that bridges exist to connect transport networks. However they can also support linkages between communities, offer new opportunities for viewing and appreciating the landscape, and be strong landscape features in their own right. Bridges can have a significant impact on the driving as well as the viewing experience and good bridge design will enhance both. In the bridge design process, a key issue is often the balance between cost and design quality. Design quality is more than aesthetics. It includes appropriate form and scale for the specific location, amenity for road users and others who may travel over or under the bridge, accessibility for pedestrians and cyclists, the integration of abutments in the landscape, personal safety and resource efficiency. Cost should be considered over the life of the bridge and in relation to the environmental, social and cultural benefits offered. A well considered bridge will create a well connected transport facility which incorporates good landscape design and enhances views. It will make a positive contribution to surrounding communities as well as to road users.

Location: Bridge design starts with its location. Bridges that span waterways can dramatically change the landscape and bridges within or next to residential areas can appear out of scale and out of character. The role of the bridge in the overall project must be established from the early stages of route selection as it can influence the alignment.

Context: Bridges should complement their context. This means considering the topography, the rural or urban setting, any existing structures, visibility of the bridge and the distance and height to be spanned. Where a series of bridges will be seen in succession by road users, they should be consistent in form and recognizable as a 'family' of structures with individual variations reflecting the requirements of their specific settings. Feature bridges are suitable for special places, where they can act as landmarks.

Views: Bridges are both viewed objects and viewing platforms. The bridge can frame a new and unexpected vista contributing to appreciation of the surrounding landscape. Optimising views to, through and from the bridge will also help with orientation on the journey. This can be achieved by making the bridge design as slender and open as possible, and minimising the height of solid barriers by using a top metal rail. Bridges that are highly visible from roads and public spaces should be designed for these views.

Underbridge experience: Where pedestrians and cyclists are likely to travel under a bridge, the treatment of the soffit, piers and abutments should provide a safe, convenient and attractive environment. In urban areas with high levels of foot traffic, the underbridge experience will be particularly important and justify architectural treatments and feature lighting.

Overbridge experience: Where a bridge provides an elevated viewpoint from which the wider landscape can be appreciated or crosses an important landscape feature (river, gully, etc), the overbridge experience should be carefully considered. This may involve using a metal top rail to minimise the height of solid bridge barriers and maximize the view from the bridge for motorists. If pedestrians and cyclists are likely to travel over the bridge, it may be desirable to provide space where they can safely stop and enjoy the view.

Form and proportion: The height of the bridge, number of supports, distribution of spans and size of the various components should be carefully considered to create a simple, elegant whole and to minimise the bridge profile. Structural integrity, where the forces at play in the bridge are clearly reflected in its design, generally results in pleasing composition.

Light and shadow: A play of light and shadow on a bridge can reduce the apparent mass and bulk of the structure and balance its vertical and horizontal proportions. Sloping all or part of the outer face of the parapet outwards to catch the sunlight, and recessing beams to create a shadow line, will reinforce the horizontal lines in the bridge. Surface texture on barriers and retaining walls will create a finer level of detail.

Texture: Barriers should have minimum embellishments, with any surface patterns reinforcing the clean lines of the bridge. Any textures on retaining walls and barriers should relate to the speed of travel. Abstract, repetitive patterns are suitable to add interest, while not distracting driver. Where abutments will be visible by slow moving traffic, textures can be used on retaining walls to provide a finer level of detail and can reference the area's cultural or historical significance.

Colour: Colour offers opportunities to provide consistency to a family of bridges and to reinforce the landmark quality of a standalone structure. When used to highlight particular elements it should form part of a coherent, ordered composition. Colour must be used carefully as it draws the eye, especially in a rural setting.

Lighting and drainage: These bridge components must be considered early and integrated in the design of the structure. The external surface of the bridge should be free of drainage pipes or services. Lighting at night, like colour during the day, can be used to highlight all or parts of a feature bridge. Lighting design and selection should incorporate protection against vandalism.

Maintenance: It is important to select durable materials and finishes that do not significantly degrade in appearance over

time. Where required, anti graffiti coating should be applied as part of the bridge construction phase to the full extent of piers and barriers to prevent patchy application and appearance at later stages.

Barriers: Barriers must be designed to respond to the bridge setting and to achieve a smooth transition between the structure and its approach. Barriers should have continuous lines that are not obscured or interrupted by non-structural elements. Their depth must be carefully proportioned in relation to the deck and superstructure. Barriers should be extended past the abutments to anchor the bridge in the landscape. Sloping the top of the barrier inwards towards the deck will minimise water staining on the outer face of the barrier.

Abutments: Open abutments should generally be used in rural areas to optimise views of the landscape. Landscaped sloped abutments are less likely to attract graffiti than retaining walls. In urban settings or when the corridor width is constrained, near vertical or vertical retaining walls are the most practical abutment options. The design of these retaining walls must present a high quality appearance if visible to approaching traffic, pedestrians and cyclists.

Headstock: These substructure elements should not be designed in isolation. Their design is integral to the overall form of the bridge. Structural systems that eliminate the need for headstock can lead to simpler, more elegant solutions.

This guidance is relevant in that good urban design starts at the structure itself, and that urban design on the bridge isn't just 'dressing', it is an integrated multidisciplinary approach.

3.8.2 ROUNDABOUTS

In general terms, roundabouts are to cater, and be safe for all users. They should be easy to maintain and, with all interventions, fit into the surrounding landscape character. The following principles from 'Bridging the Gap' (Waka Kotahi New Zealand Transport Agency, 2013) apply to the roundabouts at the South Street, Carters Terrace, Wilkin Street, Johnstone Street and Grahams Road junctions:

Connectivity: All footpaths leading to roundabouts should link to clearly indicated pedestrian crossings. Pedestrian refuges can be incorporated into splitter islands between approaching and exiting traffic lanes. Pedestrian paths must be as direct as possible.

Cycling: Vehicular speeds on entry and exit of the roundabout are a key safety issue for cyclists and need to be appropriately managed through the design of the roundabout.

Visibility: The approaching driver must be able to see the roundabout from a distance. The design of central islands on smaller roundabouts should not obstruct drivers' visibility beyond the roundabout to any pedestrian crossing points. Any planting along the approaches to the roundabout or on the central island should be of an appropriate height to maintain visibility.

Deflection: Sufficient deflection on the entry and exit points must be provided to reduce vehicle speed where pedestrians and cyclists are expected.

Landmark Feature: Large roundabouts provide opportunities to create special features which can help wayfinding and enhance local identity. This may take the form of large scale public art, feature lightings or distinctive planting.

Amenity: The central island is primarily a visual element. It should be designed to create a distinctive visual effect and require minimal maintenance.

Landscaping: The central island can be difficult to maintain without interfering with traffic movements. Robust, low maintenance planting or paving should be used to minimise maintenance requirements. Clear stem trees may be appropriate, as long as they do not obstruct drivers' visibility. Wide concrete edging should be used in conjunction with landscaping to reduce maintenance needs and minimise weed spraying. A wide hard standing area around the edge of the central island should be used to provide safe space for maintenance and minimise the need for weed spraying. Planting in the splitter islands should be avoided as it is difficult to safely maintain.

WHY IS THIS IMPORTANT?

This guidance is relevant in it provides a qualitative look at bridge and roundabout design in terms of functionality and traffic flow as well as placemaking.

3.9 CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED)

Crime Prevention through Environmental Design (CPTED) provides a framework for incorporating crime prevention within quality urban design by focusing on reducing the opportunity to commit crime, therefore lessening the motivation to offend. The Ministry of Justice's National Guidelines for Crime Prevention through Environmental Design in New Zealand [www.justice.govt.nz] identifies seven qualities of safer places. These qualities are:

Access: Safe movement and connections: Places with well-defined routes, spaces and entrances that provide for convenient and safe movement without compromising security.

Surveillance and sightlines: See and be seen: Places where all publicly accessible spaces are overlooked, and clear sightlines and good lighting provide maximum visibility.

Layout: Clear and logical orientation: Places laid out to discourage crime, enhance perception of safety and help orientation and way-finding.

Activity mix: Eyes on the street: Places where the level of human activity is appropriate to the location and creates a reduced risk of crime and a sense of safety at all times by promoting a compatible mix of uses and increased use of public spaces.

Sense of ownership: Showing a space is cared for: Places that promote a sense of ownership, respect, territorial responsibility and community.

Quality environments: Well designed, managed and maintained environments: Places that provide a quality environment and are designed with management and maintenance in mind to discourage crime and promote community safety in the present and the future.

Physical protection: Using active security measures: Places that include necessary, well designed security features and elements.

WHY IS THIS IMPORTANT?

This is relevant in that the following crime prevention principles apply to the Project:

Surveillance: Locate pedestrian paths so they benefit from informal surveillance from future adjoining buildings and passing vehicles. In most places, pedestrian paths are best provided along the road in full view of passing traffic. Avoid 'hiding' pedestrian paths behind earth bunds and dense landscape strips. Avoid sending pedestrian paths to the back of properties or in between two property fences.

Surveillance for pathways on the bridge embankments and under the bridge and / or on the river pathways will need to be considered carefully. The remaining pathways, including those on the bridge are next to traffic lanes.

Lighting: Adequate lighting can influence pedestrians' perception of safety and reduce their fear of crime. However, lighting is not a substitute for good design and should not be relied on in isolation to prevent criminal or anti-social behaviour. Lighting can be used to complement other crime-prevention techniques by increasing visibility which in turns increases the effectiveness of natural surveillance from members of the public and monitoring by CCTV cameras. Key pedestrian routes should be well lit at night.

Lighting design should also have a focus for the users of the pathways to support safety at night.

Graffiti deterrence: Preventive measures such as designing structures and gantries to minimise unauthorised access and using planting to shield retaining walls and noise barriers should be employed to prevent graffiti from happening in the first instance. Where access cannot be prevented, the use of textures which make tagging and graffiti difficult can be used as a deterrent and anti-graffiti coating can be applied to facilitate removal. As a last resort, the prompt removal of graffiti can be effective in discouraging further offences.

Anti graffiti measures are to be incorporated into structures and hard landscape features.

Visibility: Pedestrian and cycle paths should be designed with long sightlines to help navigation and monitoring of danger spots. Physical elements such as continuous solid fences, blank walls or planting beside footpaths that impede sightlines and reduce opportunities for surveillance should be avoided. Blind corners and sudden changes of grade also limit visibility and should be minimised.

Usage: Well used pedestrian routes and spaces have better surveillance and feel safer than poorly used ones. The location, number, and layout of pedestrian routes as well as their relation to the adjoining land uses should be considered to maximise usage. Attractive, convenient and direct pedestrian routes are more likely to be used than convoluted ones.

Grade separation: Wherever possible, keep pedestrians and vehicles at the same level. Elements such as footbridges, tunnels and underpasses restrict the opportunity for a victim to escape and should generally be avoided. Where these are unavoidable, other measures to reduce vulnerability such as increased visibility (eg exit ways that are visible from the entry), lighting, and activity at and around these spaces need to be considered.

Integration: Pedestrian and cycle paths should be physically integrated into surrounding areas to avoid predictability of movement and provide pedestrians with a choice of routes.

Stewardship: People's perception of order or disorder within an urban area affects the way they use it. An area that is neglected provides the conditions that can motivate criminals and provide better conditions for crime. Involving the local community in decision-making about public space planning, design, management and maintenance is an effective way to develop pride in a place and a sense of ownership. Features such as public art can also help to foster a sense of local identity and encourage the community to care for their space.

Robustness: The physical robustness of the elements of public space including landscaping, lighting, paving and street furniture will determine their susceptibility to damage. The existence of damage will in turn influence the public image of the area. Durable, robust, vandal-proof materials and fittings should be selected in preference to more fragile options.

CCTV: CCTV should not be considered as an alternative to getting the design right in the first place. While no substitute, CCTV can supplement 'harder' forms of security. CCTV can be an effective crime prevention measure when combined with appropriate lighting, targeted at particular offences, and supported by good management, monitoring and adequate response.

3.10 OTHER

Landscape Guidelines (Waka Kotahi New Zealand Transport Agency, 2014).

These guidelines recognise the important contribution landscape thinking, landscape planting, landscape design, implementation and management provides in the delivery of quality infrastructure. The guidelines outline the key considerations and critical steps to be followed when assessing, designing, constructing, and maintaining highway landscape assets.

P39 Landscape Specification (Waka Kotahi New Zealand Transport Agency, 2013).

Sets out minimum standards, covering:

- Site preparation, and
- Quality control, inspections and reporting for plant and animal pest control, plant propagation, planting, irrigation, and maintenance.

WHY IS THIS IMPORTANT?

These documents are important as a baseline for landscape design and planting procurement and design.

4. VISION FOR BRIDGE & ROAD CORRIDOR

4 VISION FOR BRIDGE AND ROAD CORRIDOR

4.1 INTRODUCTION

The urban and landscape design for the Ashburton River / Hakatere bridge and link road takes a corridor approach, with the intention to provide consistency along the corridor between Tinwald and Ashburton.

The theme for landscape interventions in the corridor are driven by the character of the adjacent land use previously identified in the LVA (Opus (now WSP), 2013). The design also builds on the vision and objectives of the District Plan and supporting guidance documents (sections 3.4 and 3.5). The bridge is the major intervention in the landscape, that will now form a series of three crossing the river, in combination with the existing rail and SH1 road bridges. The tie in roundabout to South Street will rationalise the road space through residential and industrial businesses on the Ashburton side, whilst new roundabouts at Wilkin Street and the connection with Grahams Road becoming new features in the landscape. Carters Terrace and Johnstone Street become intersections. The bridge and roundabouts are natural places for intervention to soften built form and assist in integration with the wider landscape. There is opportunity for ecological restoration not only to the banks of the Ashburton River / Hakatere, but to Carters Creek and Keddies Stream that cross the link road alignment between the Wilkin Street and Johnstone Street. Carters Creek and Keddies Stream are tributaries of the Ashburton River / Hakatere that run through Tinwald and eastern farmlands connecting with Lake Hood. Equitable access for people travelling by all modes should be the priority at all of the major features, with new connections to existing networks established, and a new mid block crossings located near Carters Creek to further reduce severance effects. At each major feature, at least one 'Focus Area or Stopping Place' is to be located, providing interest, opportunities for passive surveillance and for placemaking along the road corridor and under the bridge.

We are currently working with Arowhenua to integrate cultural narrative into the landscape design, further building on local Hakatere places and stories, imagery and significant plant species.

4.2 CULTURE, HERITAGE AND TAKATA WHENUA

A hui with Te Runanga o Arowhenua representatives and ADC representatives was held on the 4th of April 2022. The main narratives, names, ideas for features and patterns discussed are summarized, with the final cultural interventions to be advised and approved by Arowhenua.

4.2.1 CONTEXT AND THEME / NARRATIVE – WHAT MAKES THE ASHBURTON RIVER / HAKATERE AWA SIGNIFICANT OR SPECIAL?

1. Hakatere Awa is an important river to Arowhenua. As a river it is also a highway.

- It is part of the journey to the West Coast through Temuka, Waihi, Rangitata and Erewhon. Also, with the Orari and Ohape Rivers, used on the route to get around wetland areas.

- It took four days to get to the alps using the river highways.

- The coastal route along the beaches used the Hakatere Awa South Branch that was important for food and other resources.

2. Hakatere Awa is important for Mahinga Kai.

- Especially Paraki (Smelt – freshwater fish).

- Paraki is preserved for food during the winter.

- This links back to the bridge being a way of sustaining life and spanning the river during flooding events; moving people, food, fuel and other resources across the river.

3. Other places – pa sites, mahinga kai, with Whakapapa to each place.

- Stories and meaning.

4. Mōkihi

- Mōkihi (canoes) made from raupo were used to transport goods down river. Some would carry a tonne of material.

4.2.2 IS THERE OPPORTUNITY FOR NAMING OR NAMES THAT CAN BE USED?

- Raukapuka (*Griselinea littoralis*) a name associated with Geraldine and Hakatere, where there were huge stands of kāpuka present for rongoā (medicine) and other purposes.

- Pukanui – a sacred site near Methven & Mt Somers, also named after a tree (Puka? – *Mertya sinclairii*). This is where there were Waharoa (gateways) into the district.

The names, although not in the immediate vicinity of the bridge and road, can still be used.

4.2.3 INTERVENTION IDEAS – HARD LANDSCAPE

Imagery starts to emerge of people moving through the wider landscape, and a landscape that is very much reliant on water. Recommend a preference for use of locally sourced materials wherever possible.

Arowhenua have a group of artists that can advise and implement. Note that construction is still a few years away. Some ideas that have been discussed previously (and today in the hui):

- Mōkihi waka art – noting the bridge itself is a mokihi – either on or near the bridge.

- A way to warn or see when the river is rising – Kaitiaki (guardians) – (if appropriate and not over the top). Potential for something on the bridge that might hang below the deck that the water level can be measured against (structural implications – lightweight material, cost implications).

- OR Waharoa and / or Pou (if appropriate) – to mark significant places or enhance wayfinding.

- Patterns in concrete – on bridge barriers, parapets, footpath surfacing, abutments. under the bridge near trail network (like Toi maori patterns & pou in the Kaikoura P2C SH1 repair project).

- Design of bridge handrails (if these are being included).

- Lighting design. Arrangement and need to be habitat sensitive.

- Motifs could include paraki, raupo, braided rivers, wetlands, raukapuka, pukenui, people.

Hard landscape interventions are to reflect the overall theme and help tell the story of local people and place.

4.2.4 INTERVENTION IDEAS – SOFT LANDSCAPE / PLANTING

- Prefer to use native species in new planting.

- Arowhenua have established their own native plant nursery. They aim to grow 500K native plants a year using Eco sourced seeds.

- Indicative Plant Communities.

Construction footprint of the bridge – riparian edges and terraces – a challenge in a braided river landscape: large scale planting with hardy species (define edge), move to forest species on dryer terraces. Look at flood zones and plant types to best suit.

Riparian enhancement in any tributaries identified (if any): rushes, sedges, harakeke, toe toe, taller shrubs and trees for shelter and shade for fish, perching for birds.

Stormwater treatment along road in swales – rushes, sedges – consider CPTED: sight lines, personal safety – plant height.

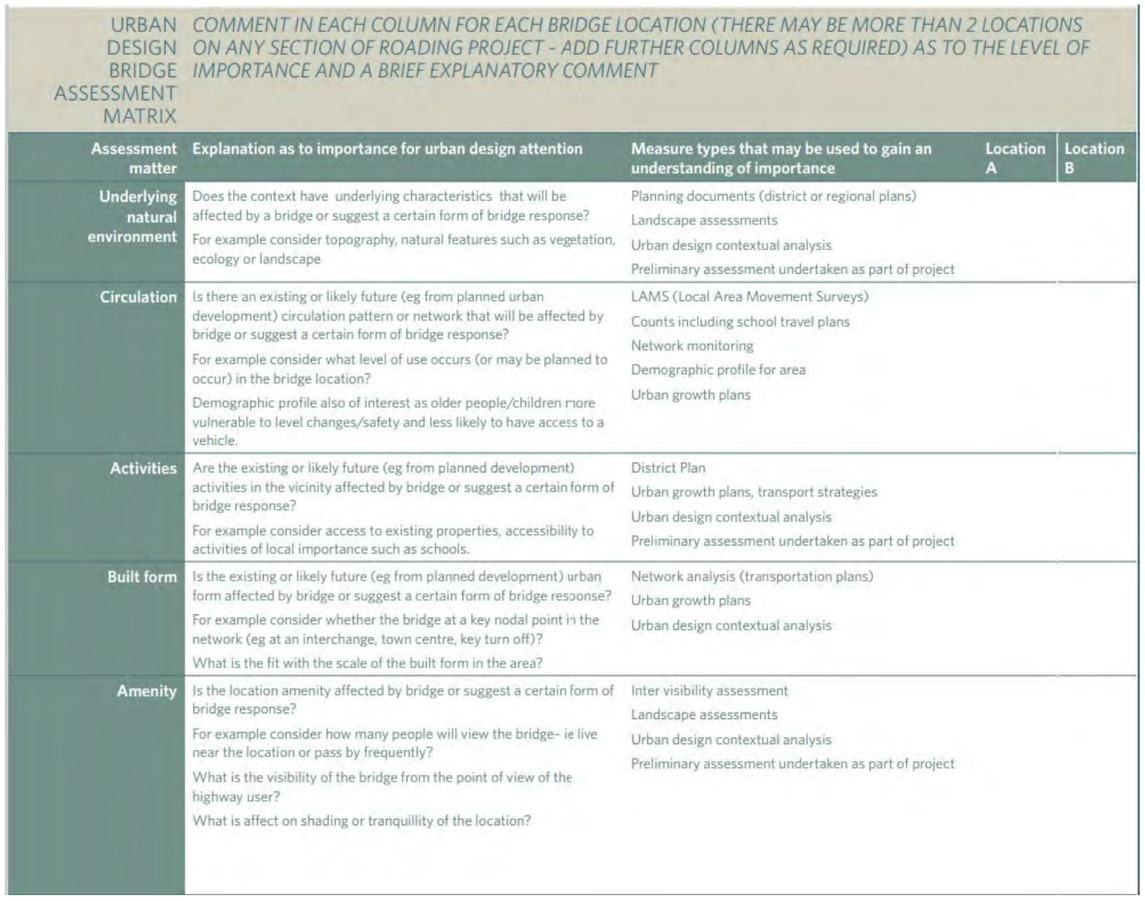
Markers / wayfinding – potential to use native trees as marker points in the landscape – textured planting Te kouka in clumps or as individuals

Garden Beds – Low shrubs and groundcover native planting to add to the journey and provide interest for all road users, with

Specimen trees to roadside: use native trees as street trees – consider form in terms of clear stem height, frangibility / clearway – distance from the carriageway.

4.3 URBAN DESIGN BRIDGE ASSESSMENT MATRIX

The bridge assessment matrix in Bridging the Gap (Waka Kotahi, 2013), has been used to to assist urban design decisions at and landscape design ideas at scheme level in relation to the second crossing new bridge:



URBAN DESIGN BRIDGE ASSESSMENT MATRIX

COMMENT IN EACH COLUMN FOR EACH BRIDGE LOCATION (THERE MAY BE MORE THAN 2 LOCATIONS ON ANY SECTION OF ROADING PROJECT - ADD FURTHER COLUMNS AS REQUIRED) AS TO THE LEVEL OF IMPORTANCE AND A BRIEF EXPLANATORY COMMENT

Assessment matter	Explanation as to importance for urban design attention	Measure types that may be used to gain an understanding of importance	Location A	Location B
Underlying natural environment	Does the context have underlying characteristics that will be affected by a bridge or suggest a certain form of bridge response? For example consider topography, natural features such as vegetation, ecology or landscape	Planning documents (district or regional plans) Landscape assessments Urban design contextual analysis Preliminary assessment undertaken as part of project		
Circulation	Is there an existing or likely future (eg from planned urban development) circulation pattern or network that will be affected by bridge or suggest a certain form of bridge response? For example consider what level of use occurs (or may be planned to occur) in the bridge location? Demographic profile also of interest as older people/children more vulnerable to level changes/safety and less likely to have access to a vehicle.	LAMS (Local Area Movement Surveys) Counts including school travel plans Network monitoring Demographic profile for area Urban growth plans		
Activities	Are the existing or likely future (eg from planned development) activities in the vicinity affected by bridge or suggest a certain form of bridge response? For example consider access to existing properties, accessibility to activities of local importance such as schools.	District Plan Urban growth plans, transport strategies Urban design contextual analysis Preliminary assessment undertaken as part of project		
Built form	Is the existing or likely future (eg from planned development) urban form affected by bridge or suggest a certain form of bridge response? For example consider whether the bridge at a key nodal point in the network (eg at an interchange, town centre, key turn off)? What is the fit with the scale of the built form in the area?	Network analysis (transportation plans) Urban growth plans Urban design contextual analysis		
Amenity	Is the location amenity affected by bridge or suggest a certain form of bridge response? For example consider how many people will view the bridge- ie live near the location or pass by frequently? What is the visibility of the bridge from the point of view of the highway user? What is affect on shading or tranquillity of the location?	Inter visibility assessment Landscape assessments Urban design contextual analysis Preliminary assessment undertaken as part of project		

Figure 20: Urban Design Bridge Assessment Matrix. Source Appendix 5 Urban design considerations in bridge design, Bridging the Gap (Waka Kotahi New Zealand Transport Agency, 2013)

TABLE 2. BRIDGE ASSESSMENT MATRIX

ASSESSMENT MATTER	MEASURE	COMMENTS
UNDERLYING NATURAL ENVIRONMENT	ADC District Plan	The bridge is important at a strategic level in the District Plan, however no guidance to form is provided.
	ECAN Reports / Regional Plans	Flooding reporting indicates protection of Tinwald from flood events to be of importance, however no guidance to the types or form of bridges required is provided. AshburtonRiverHakatereFloodHazardManagementStrategy2012.PDF AshburtonTinwaldfloodhazardinvestigationJune2015.PDF
		The RPS (Envrionment Canterbury, Updated July 2021), whilst dealing with transport integration, protection of landscape character and protection of structures, doesn't prescribe a certain form of bridge. Refer section 3.2.
		The Canterbury Land and Water Regional Plan (Environment Canterbury, 2015) does contain some guidance regarding height, completion, parapet direction and abutment height in relation to prescribed AEP flood level. Refer section 3.3.
	Landscape Assessment	Refer section 2.2 for context & character description.
		Specifically on bridge form, the landscape assessment (Opus (now WSP), 2013) indicates a 55m approx.. clearance of plantation forest on the Carters Terrace side of the river. It also notes the potential that the road embankments in this area may become more visible to users to meet the bridge height, which is anticipated to be similar to the existing SH1 bridge. The bridge would become the eastern most in a series of three, with the rail bridge north of the SH1 bridge. Suggested mitigation: Bridge Approach: • Form earthworks to integrate with the surrounding landform, • Set embankments back from the edge to enable riparian planting, • Plant the embankment slopes and river margins to suit landscape character, • Paths to be reinstated (at minimum) or improved, • Provision made for pedestrian and cycle access across intersections to the bridge approach, across the bridge and/or to the river banks. The paths could link and supplement cycle lanes within the road carriageway. Bridge: • Design of the structure to minimise bulk and keep finished height low, • Thinner profile and thinner edge to the bridge to create shadow and bulk. • Fewer supports. Chalmers Avenue West: • Bunds and planting could be used to provide screening to sports fields and club rooms, • Tree planting to central islands / swales, • Bridge as a recreational link with connected access to existing trails, improving access and amenity.
	Urban design contextual analysis	See section 1.

	Bridge preliminary assessment	A geotechnical investigation has been carried out consisting of boreholes on each side of the main river channel to 20m below bed level. The study concluded that the: • The river bed is hard well compacted Canterbury river gravels from bed level to founding level (10-15m below bed level), • There is minimal/no risk of liquefaction, • There is minimal/no risk of lateral spread. For flooding: • The ECAN flood estimation analysis concluded that it is recommended that the 1:1500 and 1:2500 AEP values of 2,800 m3/s and 3100 m3/s be adopted for bridge design calculations. • Flooding levels have dictated bridge height: There is compliance for 'freeboard' (the height below the bridge soffiet for resilience to flooding in a certain event) on the Ashburton side. There is non - compliance on the Tinwald floodplain meaning a secondary bridge is included in the design. • Minor 'backwater' effect (raise in water levels) upstream of the bridge due to addition of in bed structures e.g. piers. Bridge Design Options (see section 5.5): • Three length options were considered, • Three superstructure options were considered, • Three cross sections were considered for carriageway configuration.
CIRCULATION		A change in land use is expected on the Tinwald side of the bridge, from rural to residential C and residential D changing expected movement patterns. Refer sections: 1.2, 1.3, 1.6, 2.2, 2.5, 3.4.3, 3.5.1, 3.5.2, 3.5.4, 3.8.2, 3.9
ACTIVITIES		There is a strong desire that the project support transport mode change through providing infrastructure that is safe and attractive for users. There are existing and planned multimodal networks that the bridge is a key part of. Refer sections as circulation above.
	Bridge preliminary assessment	The following preferred option is: • Length: **Two bridges are proposed** with lengths - **360m for primary bridge** over the Ashburton River / Hakatere & **60m for a secondary bridge** between chainage 2480 and 2540 over the Tinwald floodplain. • Superstructure: **'Super T'** to allow wider spans between piers, and • Carriageway configuration: **Dual Shared Path**. Refer section 5.5 for discussion.
BUILT FORM		• Future urban form suggests a 'light', narrow, modern structure – sturdy enough to withstand the forces of the Ashburton River / Hakatere and rated to take heavy vehicles, • Tie in as a series with the historic rail and SH1 bridges: pier, deck, parapet form, • Precedent for SH1 bridge future works. • Refer section 3.8.1
AMENITY	Form:	See above
	Users:	• Views to bridge for local residents – see LVA, some residents affected due to vegetation clearance, bridge height. 'Glimpses of resilient structure grounded – through vegetation. • Views for people travelling the the SH1 bridge (how many?): third bridge in a series – more modern than the existing, but of similar design language. • Underbridge experience: intimate, more detailed, memorable – riparian vegetation, good access, storytelling (especially Takata Whenua values).
	Shading / tranquility:	• Will create shadow in a tranquil place. • Retains quiet nature. • Doesn't disturb / could enhance provide opportunity for habitat.

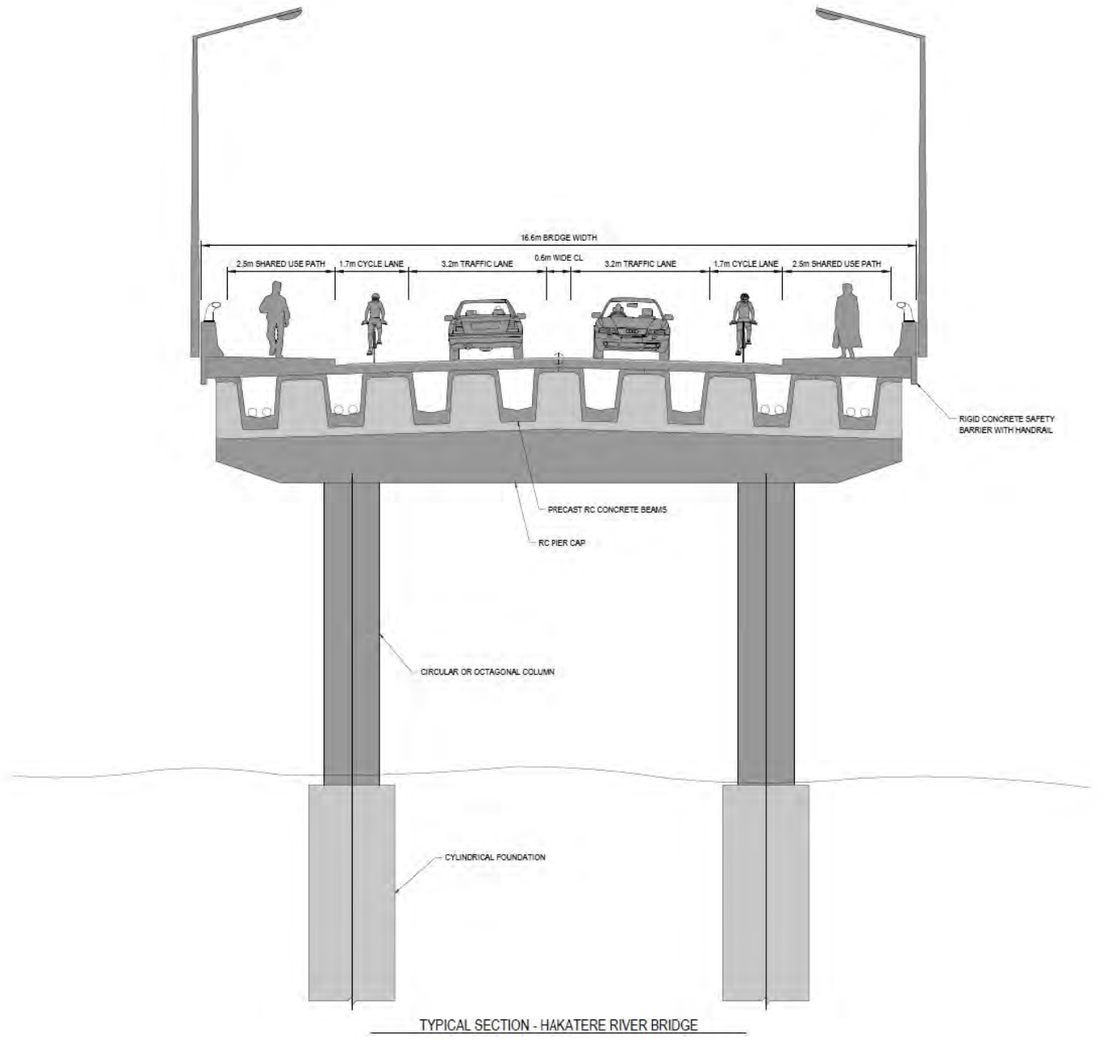


Figure 21: Bridge Typical Cross Section for the Ashburton River / Hakatere crossing

5. URBAN & LANDSCAPE DESIGN

5 URBAN & LANDSCAPE DESIGN

5.1 TRANSPORT DESIGN CONCEPT

5.1.1 TRANSPORT DESIGN PRINCIPLES

The scheme design for the whole project has been through a road safety audit process, with final sign-off from ADC. Final details will need to be resolved at the detailed design phase. A 'Safe Systems' approach has been used throughout all aspects of the design. To meet the objectives of the DBC, the new road must:

- Have one lane in each direction,
- Act as a resilience detour route for state highway traffic in the event of the SH1 Bridge closure, and therefore be able to support heavy vehicle movement,
- Provide high quality amenities for active modes, with safe connections to the wider cycle network and onto the riverside mountain bike trails.

5.1.2 KEY CONSIDERATIONS & CONSTRAINTS

- **Cost** – small increases to the width may result in significant increases to potential cost,
- **Safety** – Chalmers Avenue Extension will be a long, relatively straight road which initially will pass through a semi-rural road environment, with little adjacent development. As the area develops, it will function more as an urban road (a lower speed road with formed kerbs and footpaths). The road cross-section needs to deliver safe outcomes and deliver a 50kph speed environment.
- **Cycling** – a key outcome for the project is a high level of service for pedestrians and cyclists.
- **Parking** – the requirement for parking along the corridor, given its future function as an urban road which may (or may not) include a small neighbourhood centre. Key questions are:
  - Is parking needed the whole way along the corridor?
  - Is parking needed on both sides of the road?
- **Median treatment** – the choice of median treatment will have an influence on both safety (to reduce the likeliness of head-on collisions) and access (enabling turning movements to property or side roads). Key questions are:
  - Is a median required?
  - What is the optimal type? flush, raised or a wide centreline?

5.1.3 SAFE SYSTEM ACTIONS

The following principles of the Safe System have been applied into the design approach:

- Roundabouts at South Street, Wilkins Road and Grahams Road:
  - This helps slow traffic down and allow for safe turning movements from side roads,
  - The design also allows for safe crossings by pedestrians and cyclists.
- Providing a shared path for less confident cyclists, along with on-road cycle lanes (targeted at confident riders). These would then link with local roads.
- Providing a flush median to allow for turning movements. The flush median aids in making the road feel narrower due to the hatched markings. The flush median also provides vehicle turning space into adjacent properties (once developed) and an un-protected refuge for people crossing at any point along the alignment. It will also allow heavy vehicles to be able to navigate the road by overtracking.
- Utilising narrower vehicle lanes (3.2m) as a speed managment measure.
- Providing parking only along sections where it is needed.

5.1.4 TYPICAL CROSS SECTION

A key decision in the design process was confirming the appropriate cross-section for the new road and bridge. The process taken captured:

- Identification of a long list of cross-section options,
- A workshop with Ashburton District Council (ADC), Waka Kotahi and key stakeholders,
  - 'Live' cross-sections were developed by the group,
  - Discussion around key elements – inc. parking, median,
  - Identification of 'emerging preferred' cross-sections.
- Post workshop feedback from project partners regarding the 'emerging preferred' cross-sections,
- Update of cross-section post feedback, or response to key feedback,
- Agreement on a preferred option.

The preferred option for the road cross section was developed with the following additional points of agreement post workshop:

- On road-cycle lanes need to be provided for confident cycles, who regardless of whether a shared path was provided, would still use the main road.
- A median treatment was required in order to provide some form of separation between opposing flows, to help present the feel of a slower speed environment, and to accommodate future turning movements.
- Parking needed to be provided, but not necessarily along the entire corridor. Parking provisions would also need to be provided on both sides to support future adjacent land development. Figure 25 shows the road cross section with planted areas replacing parking. Currently this cross section isn't used anywhere in the design, but has been included if it is desired by ADC to incorporate some areas of no parking.

This removed the 'do minimum' / district plan / NZS 3604 basic development standards option, the narrowest option that had no median and no parking, and the option with parking but no median.

It left the development of a hybrid option between the 2013 NoR design and an option called 'single parking / dual shared path. Single parking means parking on one side of the road.

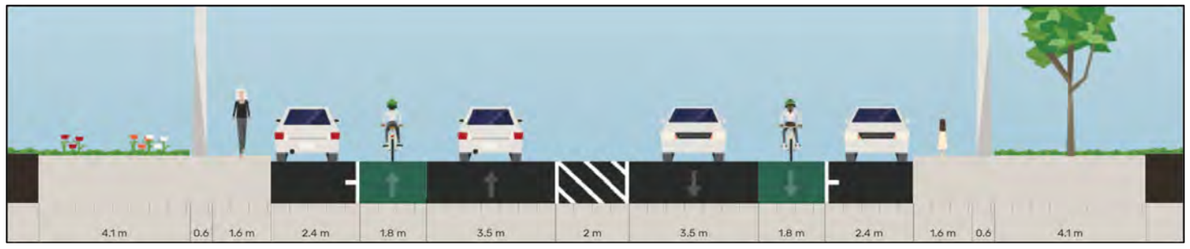


Figure 22: Option 1 NoR design cross section

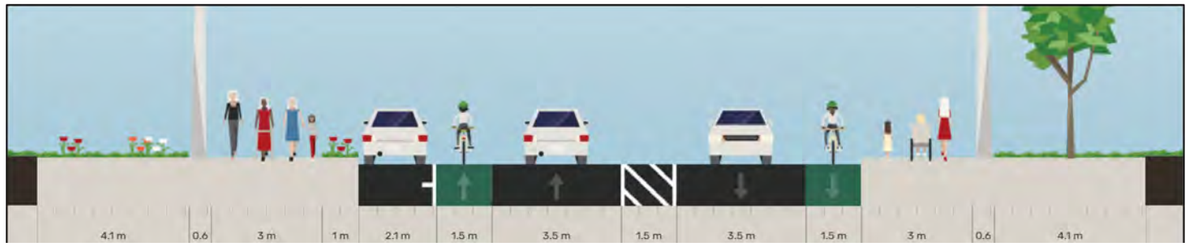


Figure 23: Option 3 Single Parking / Dual Shared Path cross section

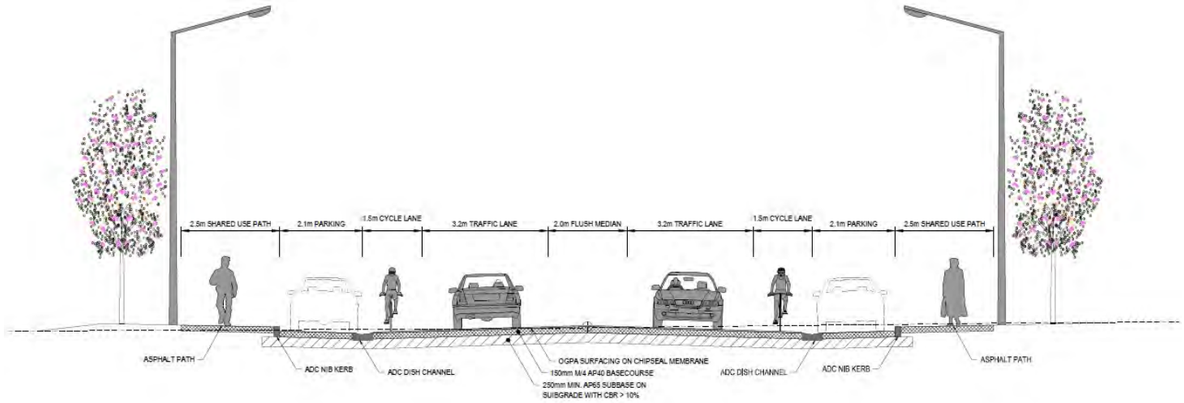


Figure 24: Road preferred option with parking

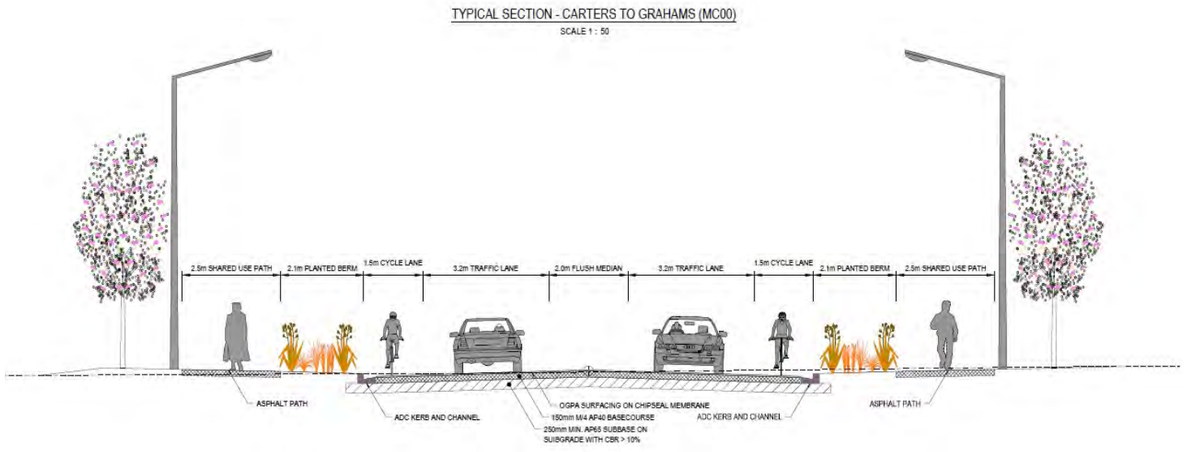


Figure 25: Road preferred option without parking

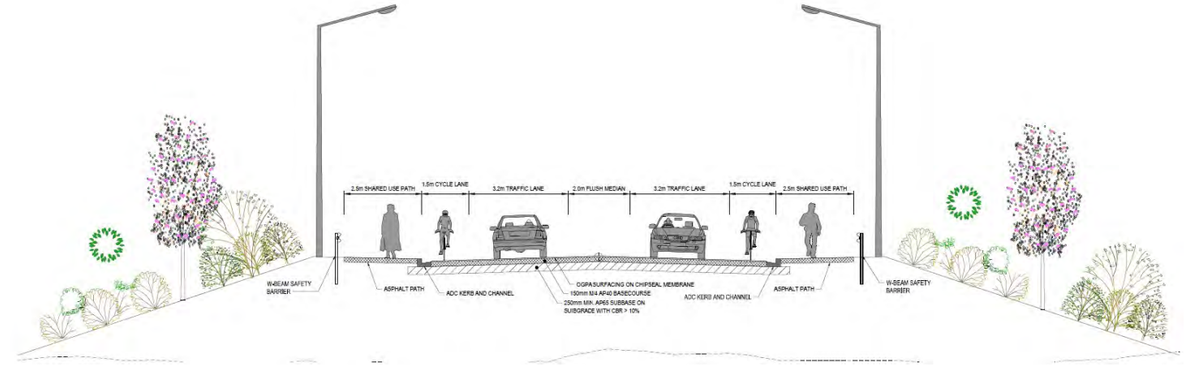


Figure 26: Agreed embankments cross section

A cross section was also agreed outside the workshop for the bridge embankments and between the two bridges.

5.1.5 INTERSECTIONS

All parties at the intersections workshop in March 2022 agreed that roundabouts were the safest approach at all junctions. Subsequently during a value engineering exercise it was decided to have roundabouts at both ends of the project (South Street and Grahams Road) and another roundabout roughly half way along the road at Wilkins Road. The remaining intersections at Carters Terrace and Johnstone Street are now proposed as give-way controlled cross roads.

At this stage raised tables have been suggested for the crossing points through the road safety audit response to be confirmed and detailed during the detailed design phase of the project.

Pedestrian crossing points at the roundabouts and intersections have been located at scheme design in the 'normally accepted' position, being ~6m back from the give way limit lines. At this stage no desire/demand lines to cross the new road midblock have been considered due to limited knowledge about future development. Aside from the section from South to Carters due to the bridges /embankments restricting access, the longest distance between intersection crossing points is 450m (Wilkins to Johnstone).

5.1.6 CONNECTION TO RIVERSIDE TRAILS

The design incorporates pathway connections to existing trails. On the Ashburton side on the north side of the Chalmers Avenue, the main access is being replaced and the trails modified to incorporate the bridge and embankment design. An unsealed gravel path between Chalmers Ave and the river to the north of the alignment is being used. This path will pass from a road crossing point located outside the Mania-O-Roto Scout Park, across the Chalmers Ave stormwater channel, around the tow of the proposed bridge approach embankment, before passing over a new culvert through the stopbank. Some modification to the existing trails will be required to integrate the existing trails with the new, and to allow safe passage under the bridge structure. There is no connection proposed to trails on the south side of Chalmers Avenue as additional property would need to be purchased.

For the True Right Bank trails, there is no existing connection on the proposed road alignment. A new off-road path is proposed to be located on the north side of the proposed alignment, passing from the Carters Terrace intersection, along the toe of the bridge embankments, through the forested area, then connecting to the existing trails and passing under the existing bridge. Again a connection to existing trails on the south side of the alignment would require additional property purchase.

5.2 BRIDGE

5.2.1 STRUCTURAL REQUIREMENTS

Three options were considered for the arrangement and length of the bridge following flooding analysis and further investigation into the Tinwald flood plain:

- Single bridge - 420m length over the Ashburton River / Hakatere Bridge adopted from the NoR.
- Double bridge - 360m length for the primary bridge over the Ashburton River / Hakatere (and 25% of the main tree block on the Tinwald side) and 60m length for a secondary bridge over the deeper channels in the Tinwald flood plain.
- Double bridge - shorter 330m length over the Ashburton River / Hakatere (and 15% of the tree block) and 60m length for a secondary bridge over the deeper channels in the Tinwald flood plain.

Three options were considered for the super structure :

- Double hollow core beams - for spans between piers at 10-18m.
- Single hollow core beams - for spans between piers at 16-25m.
- Super T beams for spans from 20-40m.

The preferred options are:

Arrangement & Length: **Double Bridge 360m + 60m** as a conservative option.

Super structure: **Super T** as supporting wider spans and fewer bridge piers.

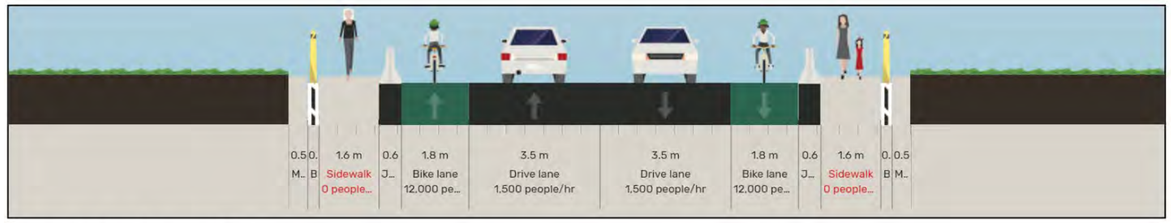
5.2.2 BRIDGE TRANSPORT DESIGN

Three bridge carriageway configurations were considered and worked through with stakeholders:

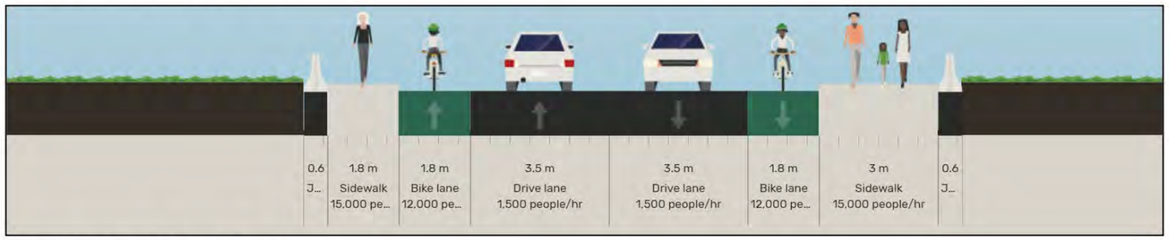
- The NoR design - including symmetrical dual carriageway, dual single direction on-road cyclelanes and dual footpaths.
- A single shared path - including dual carriageway, dual single direction on-road cyclelanes, a wide shared path to one side and a narrower footpath to the other side.
- Dual shared paths - including symmetrical dual carriageway, dual single direction on-road cyclelanes and dual wide shared paths to both sides. Option 3 (dual shared paths) was agreed by ADC and Waka Kotahi as the preferred cross-section for the bridge for the following reasons:

The **Dual Shared Paths** option (as shown in figure 21) was selected due to:

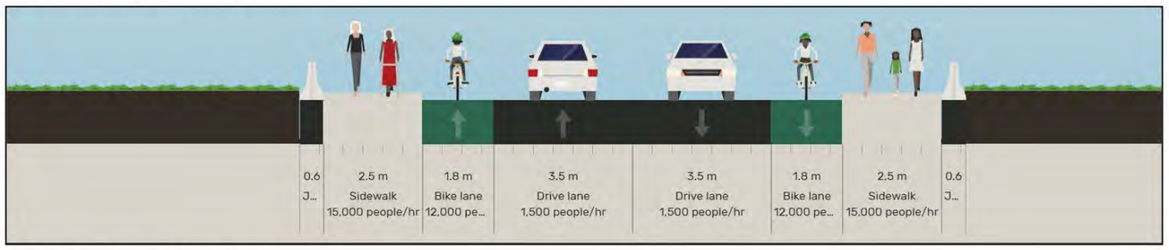
- There was agreement that that the cross-section of the bridge should not be compromised by having only one shared path or attempting to minimise the lane widths. There would be significant difficulty in coming back in later years to widen or add clip-on lanes.
- A focus around providing a high-quality active mode infrastructure.
- A means of managing the speeds of vehicles, a narrow vehicle lane with wide centreline treatment was developed, to provide some visual constriction, without removing the physical road space for larger vehicles.
- 2.5m shared paths provide a facility for less confident and vulnerable users to cross the river. The on-road cycle lanes provide a facility for more confident users who, as evidenced by how they use the SH1 Bridge, would most likely ride within the traffic lane rather than the shared path. The two types of facility are targeted at two distinctly different user types.



Option 1 - NoR design (2013)



Option 2 - Single Shared Path



Option 3 – Dual Shared Paths

Figure 27: Bridge cross section options

- One parapet barrier is used on each side, rather than two (as per Option 1). This presents a simple coherent barrier design and improves passive surveillance opportunities.
- Both the primary and secondary bridges will have the same cross section.

5.2.3 LIGHTING

Highway lighting will be fixed to the outside of the bridge piers so as not to encroach onto the deck space. It is likely to be arranged in an alternating pattern either side of the bridge.

Figures 28 & 29: Alternating lighting fixed to piers on the Springs Road bridge, Christchurch Southern Motorway, Google Earth.

5.3 EARTHWORKS

The foundation conditions are deemed to be relatively straight forward and low risk and would suit either multiple driven piles or a simpler bored caisson configuration. For the purposes of this assessment, bored caissons is the preferred foundation type. There will be significantly fewer piers on the new bridges (the existing SH1 bridge has 31 piers in the river plus 2 abutments). Indicatively there will be 13 foundation excavations on the main bridge (11 piers + 2 abutments) and three (1 pier and 2 abutments) on the Tinwald floodplain bridge. In comparison with the SH1 bridge, there will be just under half the piers in the waterway.

Earth fill embankments support the bridge. On the Ashburton side the embankments on both sides of the bridge raise from the existing road level at RL 90.4m to bridge deck level at RL 93.15. On the Tinwald side the embankment from the main bridge continues to a bridge level at RL 92.6m. The embankment resumes on the Tinwald side of the flood plain and returns back to road design level at approx.. RL 90.4m. The new Ashburton River / Hakatere bridge will be higher than the SH1 bridge, due to flood design levels and an allowance for aggradation and debris clearance. Fill embankments will incorporate growing media to enable planting and sloped at 4H:1V maximum.

Abutments are to be 'spill through' with an angled spill slope angling away from the the final pier. The spill through face, if unable to be planted, is to be finished in local rock rip rap.

The stormwater basins will also require earthworks. The cut slopes will be at a maximum grade of 4H:1V and incorporate growing media to enable planting.

5.4 STORMWATER

There is no significant formal stormwater network in the Tinwald area, with most stormwater being managed in kerb and channels through the urban streets, before ultimate discharge to a network of rural roadside swales that run north - south. Carters Creek has been considered a 'sensitive receiving environment' in the DBC. The existing roadside swales vary from shallow depressions to deeper engineered drainage channels. On the Ashburton side a more formal existing stormwater network is present, with a network of sumps and underground pipes capturing surface flows. For this project, the main consideration is the Chalmers Ave Stormwater main, which collects a large portion of the Ashburton CBD stormwater runoff, is treated for gross pollutants, before discharge to the Ashburton River / Hakatere via a large roadside drain on the northern side of Chalmers Avenue.

The stormwater design has been split into four distinct zones, and subsequent landscape treatment:

- Zone 1 North Bank (Chalmers Ave to Ashburton / Hakatere River): Modify the existing formal system on the Ashburton side to tie in the new road design and retain discharge in the Ashburton / Hakatere River via the existing roadside drain.
    - Revegetation of the existing roadside drain and that to the discharge point,
    - Maintain public access and visibility of this important part of the Project.
- Zone 2 South Bank (Ashburton River / Hakatere to Carters Terrace): New sump and pipe network on the road alignment.
    - Interaction with any effects of the stormwater system to the vegetated bridge embankments.
- Zone 3 Carters Creek (Wilkins to before Johnstone): New sump and pipe network with infiltration and treatment basins adjacent to Carters Creek as proposed in the NoR design.
    - Integrate treatment basins with the revegetation of Carters Creek,
    - Use natural forms from the surrounding landscape features e.g. braided stream patterns, lake edges to form the basins,
    - Native planting to the base, batters and edges of the treatment basins,
    - Native planting to the banks of Carters Creek.
- Zone 4 Grahams (Johnstone to Grahams): New sump and pipe network with infiltration and treatment basins (as proposed in the NoR design) adjacent to the Grahams Road roundabout.
    - Consideration and treatments as Zone 3, with sight lines & visibility considerations at the Grahams Road roundabout.

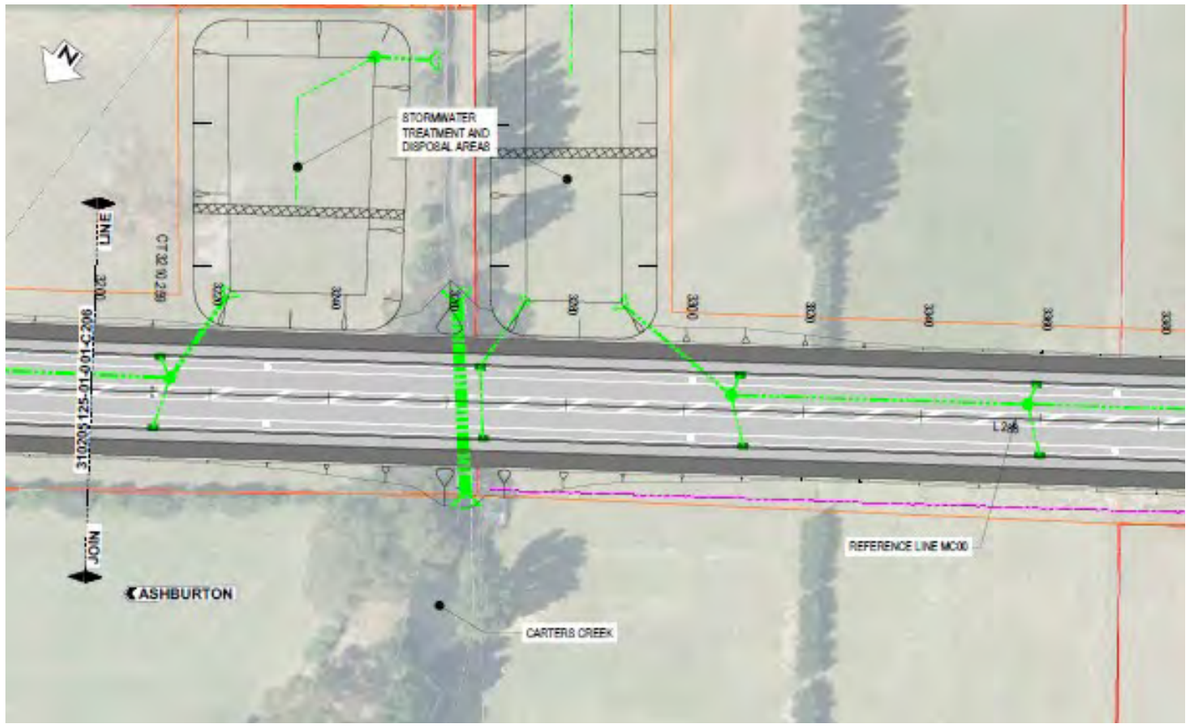


Figure 30: Stormwater treatment ponds at Carters Creek

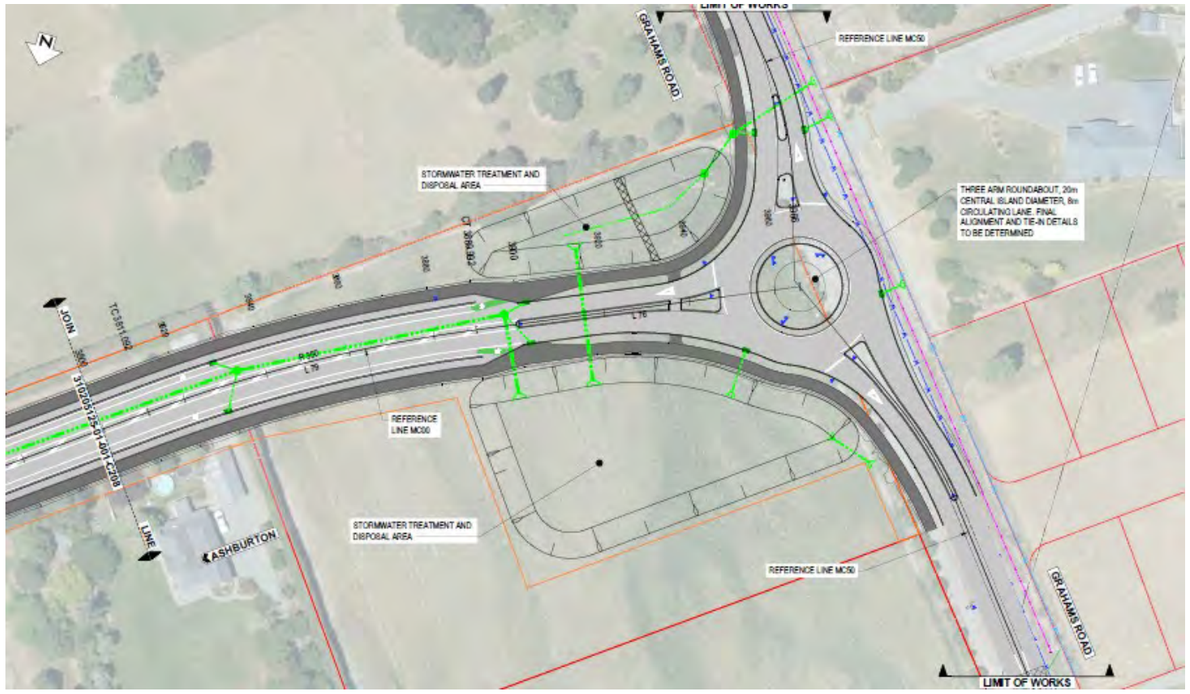
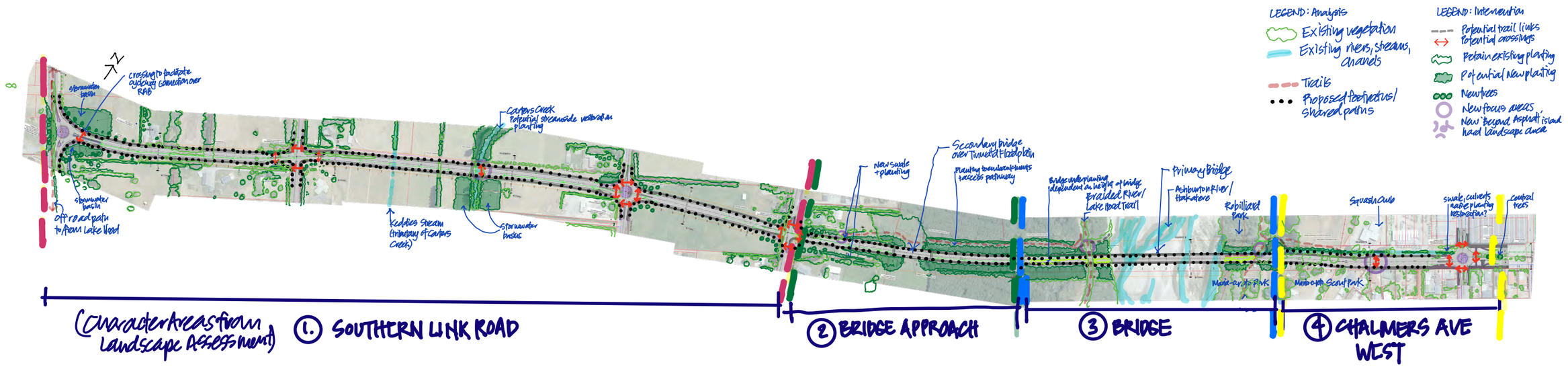


Figure 31: Stormwater treatment ponds at Grahams Road roundabout

5.6 OVERARCHING LANDSCAPE DESIGN

In looking at landscape design, firstly a spatial analysis has been undertaken combining information presented in previous ULDF sections, particularly based on landscape character. Overlayed are patterns of vegetation retention and removal, and what is known about conceptual design decisions. Interventions are developed and described by character area for further development as landscape plans. Final details will be resolved at the detailed design phase of the Project.



Character Area:	1. SOUTHERN LINK ROAD	2. BRIDGE APPROACH	3. BRIDGE	4. CHALMERS AVE WEST
Patterns / Observations:	• North – south shelterbelts (protection from easterly and nor' west winds), • Planting for dwelling amenity, • Groups and solo trees, • Streams, • How do we replace what is removed?	• Continuation of shelter & amenity planting, • Plantation forest begins at the edge of properties on river stop banks.	• Plantation forest on western side, • Forest and some planted natives on eastern side, • Tracks and trails on both sides of the river, • Currently access on the western side is from an access on SH1 between the road & rail bridges, • Eastern access already exists from Chalmers Ave.	• Existing commercial & residential area, • Trees to edges of the reserve and scout camp, • Amenity planting in residential areas, • Street trees in Chalmers Ave existing island, • Existing drain on northern side of street.
Theme:	**'Urban Connector'** • Home: the land will transition from rural to urban, more people and need for a transport network, • Roundabouts and a new road, • Change in views?	**A. 'Connections & Pathways'** **B. 'Hakatere Ecology'**	**'Mōkihi' – the bridge is a mokihi (canoe) over the Hakatere**	**'Transition'** · The river to the town centre
Landscape Interventions:	Overall:	**Embankments:**	**Naming:**	**Swale Planting:**

	• Retain existing shelter belts and trees. • We don't know where new property entrances will be. Focus attention on roundabouts and other select areas (Focus Areas / Stopping Places). Allowance has also been made to include specimen tree planting at 40m intervals on both sides of the road. • Provide crossings convenient for people cycling and walking, • Include provision for mid – block crossings at selected places, • Integrate stopping places with community / place function – (Focus Areas), • Hard landscape materials (beyond asphalt) in central and splitter islands, to footpaths / or shared paths at roundabouts & Focus areas, • Plant trees and low growing plants to roundabout extremities, • Leave pathway connections to adjacent streets. **Grahams Road Roundabout:** • Reinstate cycleway to Lake Hood, • Reinstate orphaned road section to planting. • New stormwater basins **Carters Creek:** • Protect / restore streamside vegetation (to designation as minimum) • New stormwater basins **Focus Areas:** • Crossings, • Bus stops, • Seating, • Bike parking, • Temporary amenities, • Trees & low garden planting.	• Shallow plantable slopes, • Plant with native vegetation – ecosourced where possible, • Integrate access pathways, **CPTED (see section 3.9) & Accessibility:** • Ramps, • Landings, • Fall heights, • Appropriate slopes, • Lighting **Focus Areas:** • To trail access on both sides of the road, • Same principles as Southern Link Road, • Wayfinding, • Trail markers. **Swale Planting:** • Part of stormwater management strategy • New swales	• Name to be gifted by Arowhenua. **Access:** • Clear transition for shared path / footpath from either end of the bridge. **Bridge Form:** • 'light' modern highway design, • Steel rail, • Fewer piers than SH1 & rail bridges • TL 4 parapet • Shadow insets • Viewpoints – buildouts with views up and downstream, • Lighting – assume streetlights are alternating sides – a random pattern, • Look at pedestrian / cycle scale lighting – add colour? • Patterns to pathway & parapet. **Underbridge Experience:** • Focus areas as bridge approach, potentially in pier / trail intersection, as wayfinding, • Native riparian planting.	• Restore existing drain on northern side of Chalmers Ave. **South Street Roundabout:** • Provide crossings convenient for people cycling and walking, • Hard landscape materials (beyond asphalt) in central and splitter islands, to footpaths / or shared paths, • Trees to wide central median to tie in to existing.

5.7 INDICATNE MATERIALS PALETTE

5.7.1 SURFACING

Pathways:

Asphalt – as standard along the corridor, outside Focus Areas

Exposed aggregate concrete – at Roundabout Islands and Focus Areas 'beyond concrete' as shown on the landscape plans. Use charcoal oxide and local aggregate extracted from the Ashburton River / Hakatere or nearby.

Concrete – Along the bridge pathways. Sandblast patterns into the concrete.

Trails:

Use natural ground OR match ADC cycleway material OR use local aggregate compacted.

Tactile Pavers at Crossings:

Directional and edge tactiles as per the Pedestrian Planning and Design Guide (Waka Kotahi, 2009).

5.7.2 BRIDGE:

Piers – concrete:

Integrate appropriate sandblasted patterns or steel attachments in Focus Areas located near the river.

Spill through abutments:

Robust surface treatment to abutments under the bridge deck. It will be too low and dark near the end to support planting. Combine hard landscape treatment, rock or concrete and support with planting to embankments and riparian planting as appropriate.

TL4 Concrete Parapet:

Application of textures and patterns in sections of the parapet to correspond with pathway textures and patterns. Precast modular sections of parapet with patterns / textures as gifted and designed by Arowhenua could be set to match sections of pathway and used in bridge lighting locations.

Rail:

To top of parapet, at 1.4m height from ground. Finish in metal or metallic coloured powdercoat.

Lighting:

Use round steel light poles – finish powdercoated in contrast to the concrete on the bridge. Luminaire to be LED and support dark night technology for sensitive habitats in the Ashburton River / Hakatere (see section 2.3).

Inground or in – parapet lighting to provide additional pathway lighting and colour.

Security ighting to abutments.

Exposed aggregate concrete - author

Patterned concrete at Rotorua Airport - author

Hagley Park Bridge with cycle grab rail - author

Street lighting

Existing trail surface - author

5.7.3 OTHER STRUCTURES

Boardwalks at South Street swale: hardwood timber, sustainably sourced (FSC certified) deck, with integrated antislip measure.

Fall protection rails or fences: Powdercoated aluminium open rail fencing. Grab rail for cyclists at 1.4m and for pedestrians at 1.1m or as per the New Zealand Building Code (Department of Building and Housing Te Tari Kaupapa Whare, 2012)

5.7.4 STREET FURNITURE

Street lighting:

Match those on the bridge along general sections of the road.

At roundabouts, bring lighting / lanterns into the central islands to add verticality in the absence of planting. Use 3 or 4 arms dependent on the roundabout type.

Bollard lighting for pedestrian and cycle scale in Focus Areas and to light pathways at roundabouts.

Seating:

Hardwood timber tops and backrests. Timber or aluminium frame and grab rails.

Timber picnic tables in larger Focus Areas.

Cycle Stands:

Galvanised steel and powdercoated or stainless steel hoop.

Wayfinding:

As ADC palette.

Bus Stops:

As developed and approved by ADC.

Hardwood timber - Licenced Adobe Stock

Bollard lighting - https://www.thornlighting.co.nz

Seating and cycle stands - Licenced Adobe Stock

Existing wayfinding map - author

Picnic table - https://streetfurniture.co.nz

Existing SH1 Bridge parapet and rail bridge piers - https://www.ashburtondc.govt.nz

5.8 INDICATNE PLANTING COMMUNITIES

Plants have been collated from information available at Ashburton District Council https://www.ashburtondc.govt.nz/ashburton-district/Plans,-Reports-and-Strategies/other-council-plans/biodiversity-action-plan/native-plants-in-our-district

The Cultural Impact Assessment from the NoR (Tipa & Associates, 2013) with appendix 2 containing plants of importance to Ngai Tahu and Te Runganga o Arowhenua.

New Zealand Plant Conservation Network https://www.nzpcn.org.nz/, that included some historic collections, and

Local nurseries https://lushingtons-garden-gifts-cafe.myshopify.com/collections/deciduous-trees and https://www.southernwoods.co.nz/

Species lists are inidicative and will be refined during detailed design based on native seed / commercial availability.

5.8.1 STREET TREES

At roundabout approaches and exits. Allowance has also been made in cost estimates to include a street tree at 40m intervals on both sides of the road. The final locations will need to be determined at detailed design to co-ordinate with future residential development.

SCIENTIFIC NAME	COMMON NAME(S)
Acer rubrum	Red Maple
Alnus cordata	Italian Alder
Betula jacquemontii	Himalayan White Birch (or varieties)
Carpinus betulus fastigiata	European Hornbeam
Cordyline australis	Tī, tī kōuka, Palm lily, cabbage tree
Fraxinus excelsior	Ash
Ginkgo biloba 'Fastigiata'	Upright Maidenhair tree
Liquidambar styraciflua	Sweetgum
Liriodendron tulipifera	Tulip tree
Magnolia × soulangeana	Deciduous Magnolia
Platanus × acerifolia	London Plane
Prunus sp.	Flowering cherry species or cultivars.
Pyrus calleryana 'Aristocrat'	Ornamental callery pear or cultivars.
Quercus palustris	Pin Oak
Sophora microphylla	Kōwhai, weeping kōwhai, small-leaved kōwhai

Acer rubrum

Liriodendron tulipefera

5.8.2 NATNE DRYLAND AMENITY

Grahams Road Roundabout in larger areas against boundaries, indicative of lowland forest species.

SCIENTIFIC NAME	COMMON NAME(S)
Acaena anserinifolia	Hutiwai, piripiri, bidibid
Acaena inermis	Blue mountain bidibid, spineless bidibid
Astelia fragrans	Kakaha, bush flax, bush lily
Austroderia richardii	Toetoe
Carex flagillifera	Glen Murray Tussock
Carmichaelia australis	Common broom
Chionochloa rubra subsp. cuprea	Copper tussock
Coprosma crassifolia	Mikimiki, thick leaved coprosma
Coprosma linariifolia	Mikimiki, yellow wood
Coprosma lucida	Karamū, shining karamū
Coprosma propinqua var. propinqua	Mingimingi
Coprosma rhamnoides	Mingimingi, twiggy coprosma
Coprosma robusta	Karamū, glossy karamū
Corokia cotoneaster	Korokio, wire-nettting bush
Elaeocarpus dentatus	Hīnau
Elaeocarpus hookerianus	Pōkākā
Festuca novae-zelandiae	Fescue tussock, hard tussock
Griselinia littoralis	Kāpuka, papauma, broadleaf
Kunzea ericoides	Kānuka
Leptospermum scoparium var. scoparium	Mānuka, kahikātoa
Libertia ixioides	Mikoikoi, NZ iris
Lobelia angulata	Pratia
Muehlenbeckia complexa var. complexa	Small-leaved pōhuehue, scrub pōhuehue, wire vine
Pittosporum tenuifolium	Kohukohu, kōhūhū, black matipo
Poa cita	Silver tussock
Pseudopanax crassifolius	Horoeka, lancewood
Pseudopanax ferox	Fierce lancewood
Veronica salicifolia	Koromiko

Austroderia richardii

Chionochloa cuprea

Coprosma rhamnoides

Elaeocarpus hookerianus

5.8.3 LOW GROWING AMENITY

At roundabout verges where there is space for low planting. ADC has requested no planting in the roundabout central islands.

SCIENTIFIC NAME	COMMON NAME(S)
Acaena anserinifolia	Hutiwai, piripiri, bidibid
Acaena inermis	Blue mountain bidibid, spineless bidibid
Anthosachne solandri	Native wheatgrass, blue wheatgrass
Carex flagillifera	Glen Murray Tussock
Chionochloa rubra subsp. cuprea	Copper tussock
Coprosma propinqua var. propinqua	Mingimingi
Festuca novae-zelandiae	Fescue tussock, hard tussock
Libertia ixioides	Mikoikoi, NZ iris
Lobelia angulata	Pratia
Muehlenbeckia complexa var. complexa	Small-leaved pōhuehue, scrub pōhuehue, wire vine
Poa cita	Silver tussock
Coprosma petriei	Turfy coprosma

Acaena inermis

Carex flagllifera

Melicytus alpinus	Porcupine shrub
Muehlenbeckia axillaris	Creeping pōhuehue, creeping muehlenbeckia
Pimelea prostrata subsp. prostrata	Pinātoro, New Zealand daphne, Strathmore weed
Poa colensoi	Blue tussock

5.8.4 ROADSIDE SWALES

South Street to Carters Terrace sections. Low growing, hardy species that will survive in both wet and dry conditions.

SCIENTIFIC NAME	COMMON NAME(S)
Carex coriacea	Rautahi, Cutty grass
Carex gaudichaudiana	Gaudichaud's sedge
Carex geminata	Rautahi, Cutty grass
Carex virgata	Pukio, toitoi, toetoe, rautahi
Juncus edgariae	Wiwi, Edgar's rush
Juncus pusillus	Dwarf rush
Leptinella maniototo	
Lobelia ionantha	Hypsela

Juncus edgariae

Leptinella maniototo

Carex coriacea

Lobelia ioantha

Carex geminata

5.8.5 BRIDGE EMBANKMENTS

Both sides of bridge to fill embankments.

SCIENTIFIC NAME	COMMON NAME(S)
Astelia fragrans	Kakaha, bush flax, bush lily
Austroblechnum penna-marina subsp. alpina	Little hard fern, alpine hard fern
Austroderia richardii	Toetoe
Botrychium australe	Patotara, Parsley Fern
Carmichaelia australis	Common broom
Coprosma propinqua var. propinqua	Mingimingi
Coprosma robusta	Karamū, glossy karamū
Cordyline australis	Tī, tī kōuka, Palm lily, cabbage tree
Corokia cotoneaster	Korokio, wire-nettting bush
Discaria toumatou	Matagouri, tūmatakuru
Griselinia littoralis	Kāpuka, papauma, broadleaf
Kunzea ericoides	Kānuka
Libertia ixioides	Mikoikoi, NZ iris
Muehlenbeckia axillaris	Creeping pōhuehue, creeping muehlenbeckia
Muehlenbeckia complexa var. complexa	Small-leaved pōhuehue, scrub pōhuehue, wire vine
Phormium tenax	Harakeke, kōrari
Poa cita	Silver tussock
Polystichum oculatum	Blue shield fern
Polystichum vestitum	Punui, prickly shield fern
Pseudopanax crassifolius	Horoeka, lancewood
Pteridium esculentum	Rarauhe, bracken fern
Veronica salicifolia	Koromiko

Astelia fragrans

Coprosma robusta

Austroblechnum penna-marina

5.8.6 BRIDGE CONSTRUCTION – RIPARIAN ZONE

Both sides of the main bridge outside the embankments where planting has been removed and to tie back into the existing flood protection planting. Opportunities for riparian planting at the river edge should also be investigated.

SCIENTIFIC NAME	COMMON NAME(S)
Astelia fragrans	Kakaha, bush flax, bush lily
Austroderia richardii	Toetoe
Botrychium biforme	Fine leaf parsely fern
Brachyglottis minimus	Fireweed
Carex gaudichaudiana	Gaudichaud's sedge
Carex geminata	Rautahi, Cutty grass
Carex maorica	Māori sedge
Carex secta	Purei, pukio
Carex virgata	Pukio, toitoi, toetoe, rautahi
Carmichaelia australis	Common broom
Coprosma crassifolia	Mikimiki, thick leaved coprosma
Coprosma foetidissima	Hūpiro
Coprosma linariifolia	Mikimiki, yellow wood
Coprosma lucida	Karamū, shining karamū
Coprosma rhamnoides	Mingimingi, twiggy coprosma
Coprosma rotundifolia	Round leaf coprosma
Cordyline australis	Tī, tī kōuka, Palm lily, cabbage tree
Corokia cotoneaster	Korokio, wire-nettting bush
Dacrycarpus dacrydioides	Kahikatea, white pine
Dacrydium cuppressinum	Rimu, Red pine
Discaria toumatou	Matagouri, tūmatakuru
Elaeocarpus dentatus	Hīnau
Elaeocarpus hookerianus	Pōkākā

Carex maorica

Coprosma foetidissima

Fuscospora solandri

Eleocharis gracilis	Slender spike sedge
Fuscospora solandri	Tawhairauriki, black beech
Griselinia littoralis	Kāpuka, papauma, broadleaf
Helichrysum lanceolatum	Niniao
Hoheria angustifolia	Narrow-leaved houhere
Juncus distegeus	
Juncus edgariae	Wiwi, Edgar's rush
Kunzea ericoides	Kānuka
Leptospermum scoparium var. scoparium	Mānuka, kahikātoa
Melicope simplex	Poataniwha
Melicytus flexuosus	
Melicytus ramiflorus	Māhoe, hinahina, whitey wood
Microlaena avenacea	Bush rice grass, oat grass
Myoporum laetum	Ngaio
Myrsine divaricata	weeping matipo, weeping mapou
Neomyrtus pedunculata	Rōhutu
Parablechnum novae-zelandiae	Kiokio, horokio, palm leaf fern
Pectinopitys ferruginea	Miro, brown pine
Phormium tenax	Harakeke, kōrari
Pittosporum eugenioides	Tarata, lemonwood
Plagianthus regius subsp. regius	Mānatu, ribbonwood, lowland ribbonwood
Poa cita	Silver tussock
Podocarpus totara var. totara	Tōtara
Polystichum vestitum	Punui, prickly shield fern
Prumnopitys taxifolia	Mataī, black pine
Pseudopanax arboreus	Whauwhaupaku, five finger
Pseudopanax crassifolius	Horoeka, lancewood
Pteridium esculentum	Rarauhe, bracken fern
Schefflera digitata	Patatē, patē, seven-finger
Solanum aviculare var. aviculare	Poroporo
Sophora microphylla	Kōwhai, weeping kōwhai, small-leaved kōwhai
Veronica salicifolia	koromiko

Dacrydium cupressinum

Poa cita

Discaria toumatou

Pseudopanax crassifolius

5.8.7 RIPARIAN RESTORATION

Carters Stream and Keddies Creek, with in-stream, lower bank and upper bank species, potentially achieving 20m width, especially on the northern side to restore habitat. Planting to the stormwater basins may require some modification to this list.

SCIENTIFIC NAME	COMMON NAME(S)
Alectryon excelsius	Titoki, New Zealand Ash
Astelia fragrans	Kakaha, bush flax, bush lily
Austroblechnum lanceolatum	Rereti, Nini, lance fern
Austroderia richardii	Toetoe
Carex buchananii	Buchanan's sedge, cutty grass
Carex coriacea	Rautahi, Cutty grass
Carex diandra	Sedge
Carex gaudichaudiana	Gaudichaud's sedge
Carex geminata	Rautahi, Cutty grass
Carex maorica	Māori sedge
Carex secta	Purei, pukio
Carex sinclairii	Sinclair's sedge
Carex virgata	Pukio, toitoi, toetoe, rautahi
Carmichaelia australis	Common broom
Carpodetus serratus	Putaputāwētā, marbleleaf
Coprosma linariifolia	Mikimiki, yellow wood
Coprosma lucida	Karamū, shining karamū
Coprosma rhamnoides	Mingimingi, twiggy coprosma
Coprosma rotundifolia	Round leaf coprosma
Cordyline australis	Tī, tī kōuka, Palm lily, cabbage tree
Coriaria arborea var. arborea	Tutu, tree tutu
Dacrycarpus dacrydioides	Kahikatea, white pine
Discaria toumatou	Matagouri, tūmatakuru
Eleocharis acuta	Sharp spike sedge
Eleocharis gracilis	Slender spike sedge
Eleocharis pusilla	Spike sedge
Griselinia littoralis	Kāpuka, papauma, broadleaf
Hoheria angustifolia	Narrow-leaved houhere
Isolepis aucklandica	
Isolepis basilaris	Pygmy clubrush
Juncus distegeus	
Juncus edgariae	Wiwi, Edgar's rush
Juncus pusillus	Dwarf rush
Kunzea ericoides	Kānuka
Leptinella maniototo	
Leptospermum scoparium var. scoparium	Mānuka, kahikātoa
Lobelia ionantha	Hypsela
Myoporum laetum	Ngaio
Myriophyllum propinquum	
Myrsine australis	Red mapou, red matipo, mapau, red maple

Austroblechnum lanceolatum

Carex gaudichaudiana

Carpodetus serratus

Coraria arborea

Myoporum laetum

Myrsine divaricata	weeping matipo, weeping mapou
Neomyrtus pedunculata	Rōhutu
Parablechnum minus	Swamp kiokio
Parablechnum novae-zelandiae	Kiokio, horokio, palm leaf fern
Pennantia corymbosa	Kaikōmako
Phormium tenax	Harakeke, kōrari
Pittosporum eugenioides	Tarata, lemonwood
Pittosporum tenuifolium	Kohukohu, kōhūhū, black matipo
Plagianthus regius subsp. regius	Mānatu, ribbonwood, lowland ribbonwood
Podocarpus totara var. totara	Tōtara
Prumnopitys taxifolia	Mataī, black pine
Pseudopanax arboreus	Whauwhaupaku, five finger
Pseudopanax crassifolius	Horoeka, lancewood
Schoenus pauciflorus	Bog rush, sedge tussock
Sophora microphylla	Kōwhai, weeping kōwhai, small-leaved kōwhai
Veronica salicifolia	Koromiko

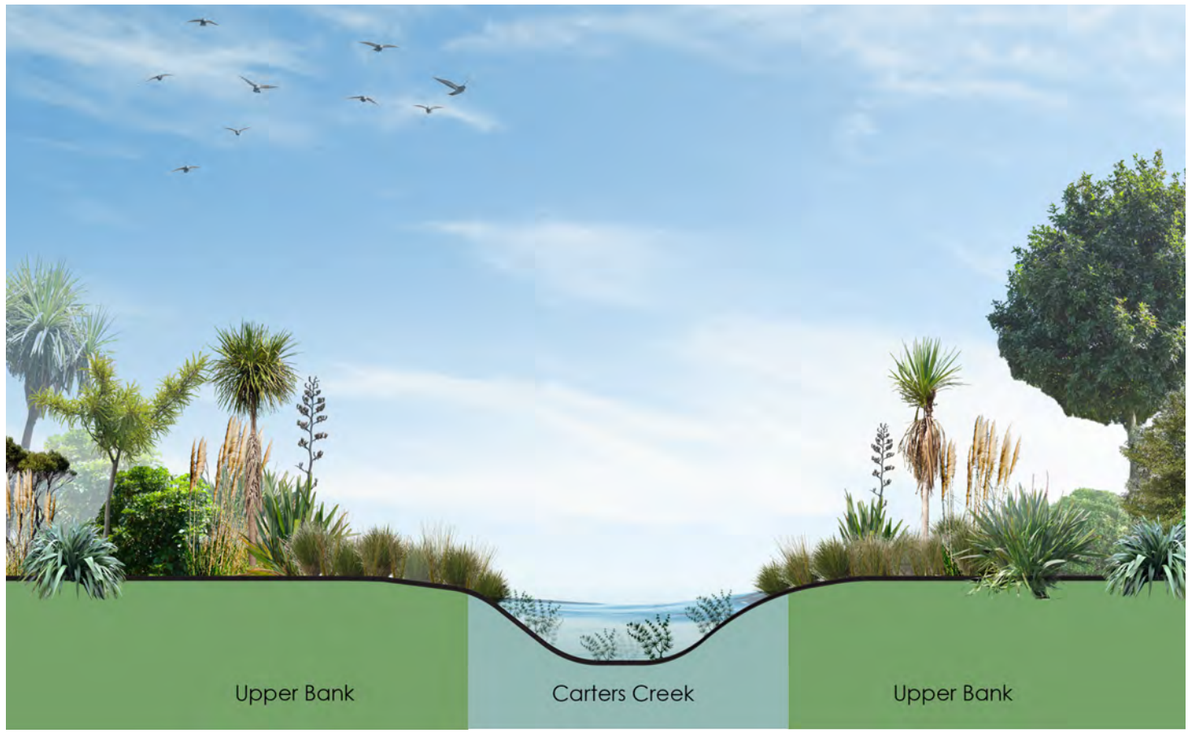


Figure 22: Indicative cross section at Carters Creek

5.9 ACHIEVING A LOW MAINTENANCE DESIGN

Maintenance is a large and costly component for transport infrastructure and must be considered early on in the design of all projects. Low maintenance and good aesthetics can be achieved through early consideration and good design. Landscape maintenance needs to reflect ADC maintenance requirements. The following recommendations for landscape of the Ashburton River / Hakatere bridge and link road should be further developed in detailed design and seek to:

- Adopt a minimum two year maintenance period for the contract,
- Continue engagement with ADC transport and parks maintenance teams to receive feedback on design and maintenance,
- The design is to be uncomplicated and coordinated, minimizing the number of, and using local materials,
- Robust and durable materials such as concrete and local planting and stone / rock are selected to be fit for purpose and appropriate for the context,
- The design to allow for easy and safe maintenance access where required, particularly under the bridge,
- Plant species are to be eco-sourced. Species selected in the preliminary lists are long-lived and hardy. They are known to be present in the Ashburton district,
- The design is to minimise opportunities for vandalism through CPTED measures. Graffiti deterrent will be through the use of textured finishes on concrete structures. Early reporting and removal will reinforce stewardship and low tolerance of graffiti. Where required by ADC Graffiti Guard can be added,
- The number of highway furniture and street furniture elements are to be minimal and coordinated,
- Design and finishing for the bridge, culvert retaining walls and any other structures are precast concrete panel units ensuring uniformity and availability. Any patterns should be cut into or sand blasted onto materials for permanence.

5.10 HOW WILL THE URBAN DESIGN PRINCIPLES BE ACHIEVED?

The following diagram overlays the four character areas described in the LVA (section 2.2) and the design themes established for these areas in section 5.6. It then describes how design interventions and features achieve design principles set out in section 1.6.

How does the NOR influence Urban Design and Landscape?

- Landscape and Visual Assessment – Landscape Conditions.
  - Landscape Plans:
  - Vegetation removal and earthworks extent.
  - Access to recreation, commercial and residential properties.
  - Landscape Mitigation (as minimum): planting, regressing, planting in stormwater swales, screen planting in the Res. C zone, Bridge abutment, deck and parapet treaments, river path connectivity, street trees, lighting.
- Terrestrial Ecology Conditions.
  - For birds: Avoid breeding season.
  - Avoid nesting sites.
  - Provide information to the public.
  - Ecological enhancement.
- OPW and Future Consenting Process.

How has the DBC considered Urban Design and Landscape?

- Connectivity and travel choice were two of the key problems identified.
- Community severance is a key matter.
  - If you can't drive, but are relatively mobile, you're stuck in Tinwald. This opens up an opportunity for walking or biking / e-bike across to Ashburton via the bridge.
  - In peak times, people don't make the journey to see friends / go to the shops, as getting onto the state highway from Tinwald is too dangerous. The new route will provide a less busy, if slightly further, option.
- Its about connecting one side of town which has few amenities (Tinwald), to the other which has the majority of them (Ashburton).
  - For the southern side, its more about journeys to the town rather than to schools. Schools are mostly all on the northern side of the state highway.
- Help is being sought from ADC planning team to understand what might be envisaged for land use and residential density in the region of the Project.
- Getting people walking and / or cycling is a major objective of the Project (note there is no Public Transport in Ashburton). It's flat, compact and mostly sunny, but there are currently no satisfactory options to get between Tinwald and Ashburton.
  - Tinwald and Lake Hood residents are key customers.
  - There is also a retirement village that would be right next to the bridge (on the Tinwald side).
  - The bridge would allow another access point onto the mountain bike trails to be made for Tinwald.
- The new route will be used by heavy vehicles as part of the local connection network.
- A link with other projects in Ashburton, e.g. the Waka Kotahi SH1 Corridor Project and the Ashburton CBD Revitalisation Project).

Proposed Road Corridor Character

- Canterbury Plains, Braided River landscape with historic rural land use and a significant habitat for native birds.
- Land use changes: from a predominantly rural landscape to residential in the Operative District Plan.
- Further changes to land cover: medium and higher building densities.
- The corridor to be classified as an Urban Connector using the One Network Framework.

ULDF

- Bridge Urban Design Assessment.
- Culture, Heritage & Tangata Whenua Values.
- Engagement.
- Design Themes.
- Design Interventions.

URBAN DESIGN PRINCIPLES

Connectivity

- Support ADC to achieve aims in the DP and District Strategies.
- Connect Tinwald and Ashburton & in doing so improve access to key destinations along the route and beyond.
- Ease of access and use.
- Reduce severance effects by providing an alternative to the SH1 bridge.
- Efficient movement and a reliable route.

Safety

- Ensure safety for all transport modes.
- Including perceived risks to personal safety (CPTED).
- Design for an ideal scenario: children walking or biking to town on their own.

Choices

- Design for multi modal transport from the outset.
- Potential to encourage more people to walk, cycle or take public transport.

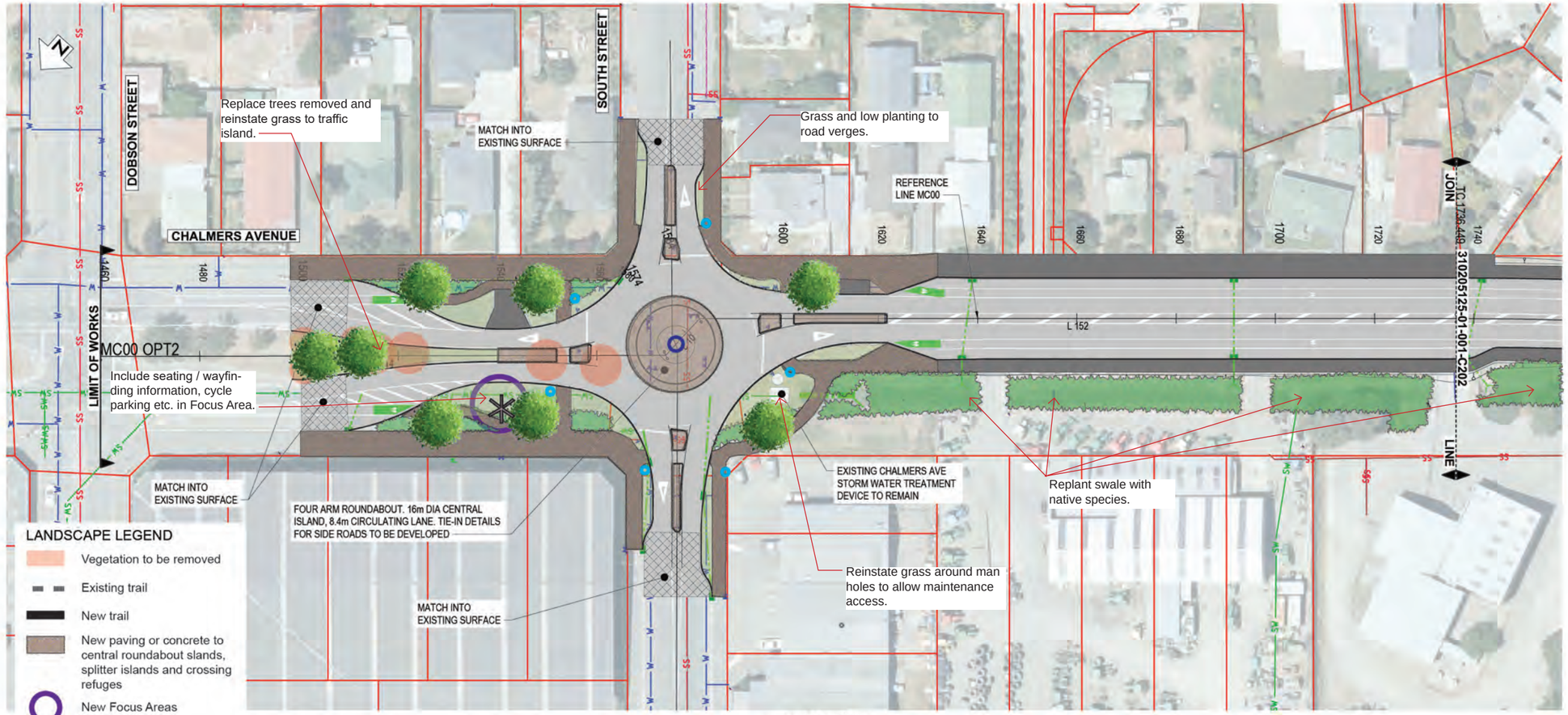
People

- Create a corridor that has great user experiences.
- Cater for all.
- Enhance sense of place and community as Tinwald Grows.
- Build in expression & narrative to encourage participation and stewardship.
- Benefits to health and wellbeing with improved transport choice.

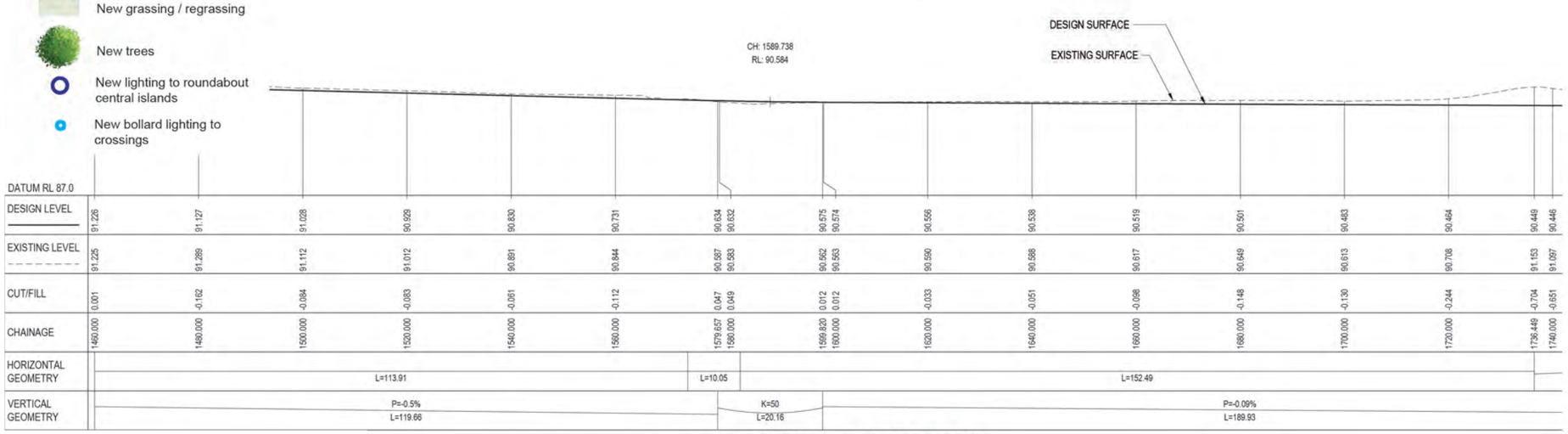
Landscape / Environment

- Streetscape that responds to current, and more importantly future changes in character and land use - design for context
- Streetscape and bridge deck that is visually appealing & easy to maintain.
- Limit CO_2 emissions with mode shift.
- Mitigation of landscape (including visual amenity) and ecological effects.
- Protect and remediate areas of cultural and natural significance affected by the work.

6. LANDSCAPE PLANS



PLAN (MC00)
SCALE 1 : 500



LONGITUDINAL SECTION (MC00)
SCALE HORIZ. 1 : 500 VERT. 1 : 100

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Note: Final tree and planting locations to be confirmed at detailed design.

NOT FOR CONSTRUCTION

Stantec

ASHBURTON RIVER / HAKATERE SECOND BRIDGE | LANDSCAPE DESIGN

Landscape Concept Plans

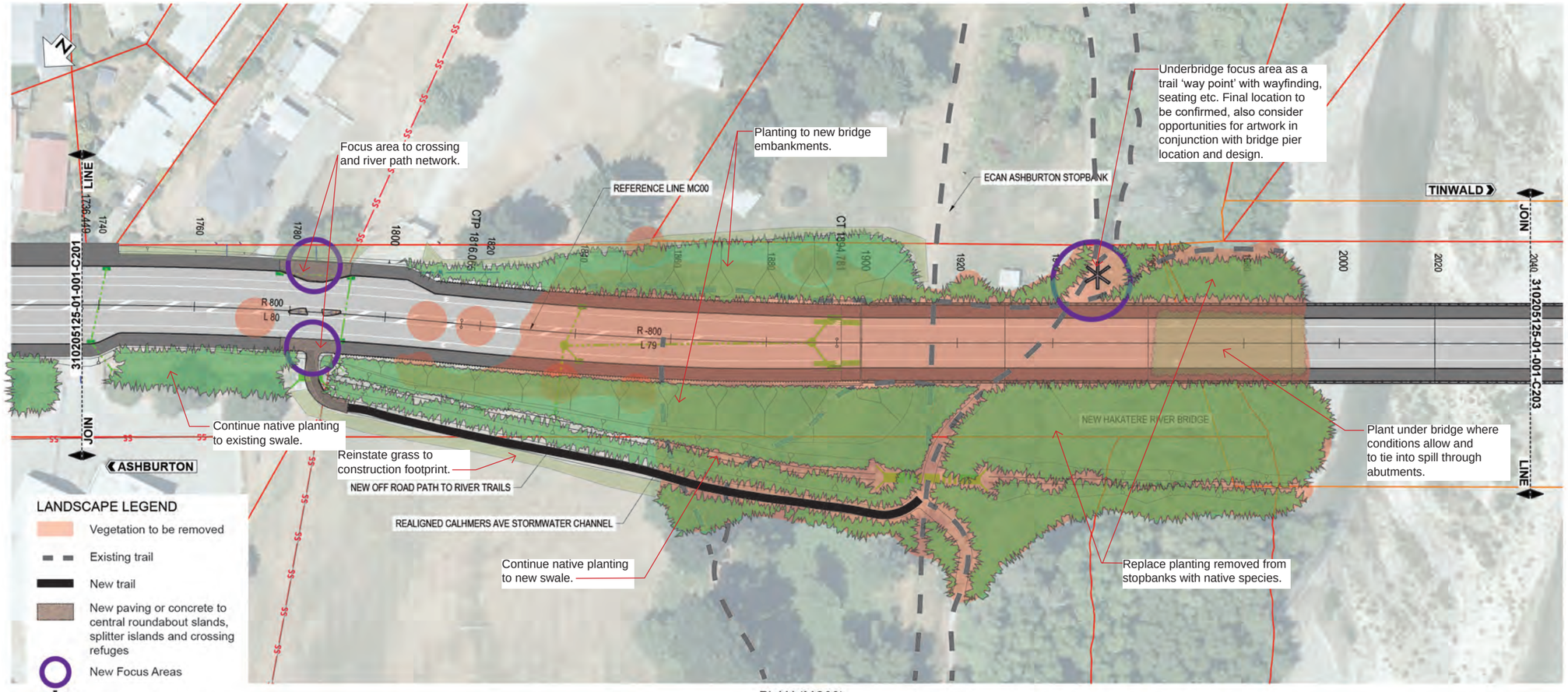
As shown

SHEET 1 OF 9

DRAWN	KT	CHECKED	NL	REVIEWED		APPROVED	

DRAFT | 19 JULY 2022

Ashburton DISTRICT COUNCIL



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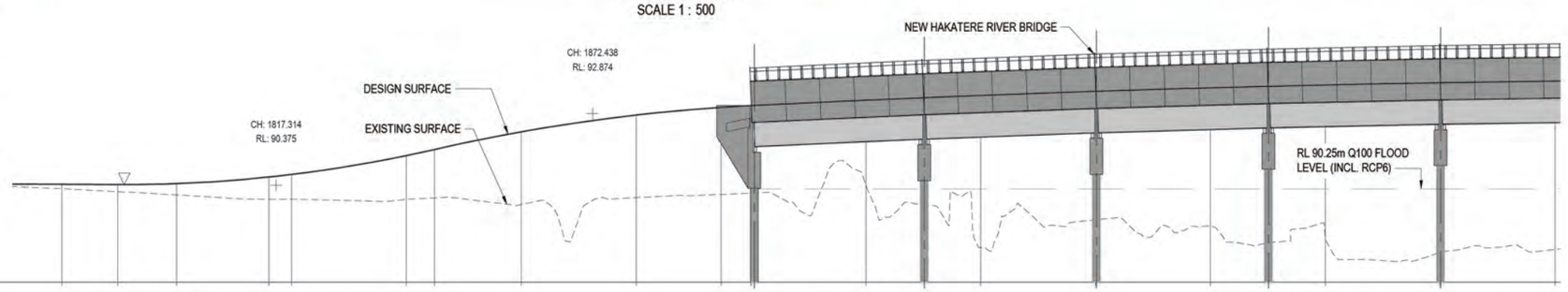

DATUM RL 87.0																						
DESIGN LEVEL	90.449	90.446	90.427	90.409	90.400	90.435	90.666	90.796	91.413	91.625	92.237	92.822	93.089	93.150	93.339	93.506	93.650	93.772	93.872	93.950	94.006	
EXISTING LEVEL	91.153	91.097	90.461	90.258	90.154	90.042	89.886	89.884	89.888	89.936	89.707	89.945	90.059	90.106	90.386	88.210	89.173	88.950	88.510	88.024	88.139	
CUT/FILL	-0.704	-0.651	-0.034	0.151	0.246	0.393	0.780	0.872	1.526	1.689	2.530	2.877	3.030	3.044	2.953	5.295	4.477	4.822	5.362	5.926	5.866	
CHAINAGE	1736.449	1740.000	1760.000	1780.000	1789.752	1800.000	1816.065	1820.000	1840.000	1844.676	1860.000	1880.000	1894.781	1900.000	1920.000	1940.000	1960.000	1980.000	2000.000	2020.000	2040.000	
HORIZONTAL GEOMETRY	R=800 L=79.62			R=800 L=79.62							R=-800 L=78.72							L=427.17				
VERTICAL GEOMETRY	P=-0.09% L=189.93						K=11.91 L=55.12		P=4.53%		K=15.6 L=55.12		P=1%					K=180 L=360				

LONGITUDINAL SECTION (MC00)
SCALE HORIZ. 1 : 500 VERT. 1 : 100

LANDSCAPE LEGEND

- Vegetation to be removed
- Existing trail
- New trail
- New paving or concrete to central roundabout slands, splitter islands and crossing refuges
- New Focus Areas
- New Focus Area Features
- New Planting
- New grassing / regrassing
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NOT FOR CONSTRUCTION

Stantec

ASHBURTON RIVER / HAKATERE SECOND BRIDGE | LANDSCAPE DESIGN

Landscape Concept Plans

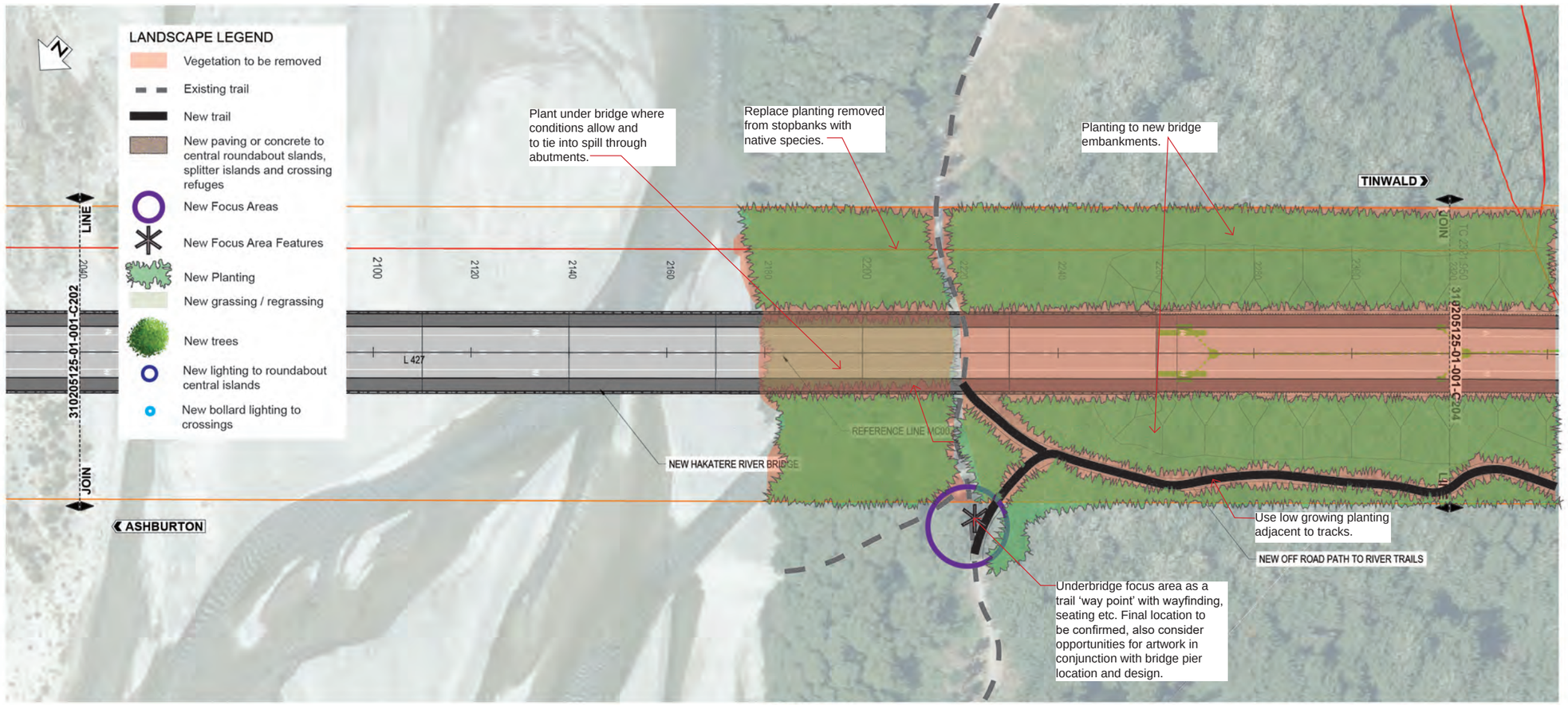
SHEET 2 OF 9

As shown

DRAWN	KT	CHECKED	NL	REVIEWED		APPROVED	

DRAFT | 19 JULY 2022

Ashburton DISTRICT COUNCIL



PLAN (MC00)
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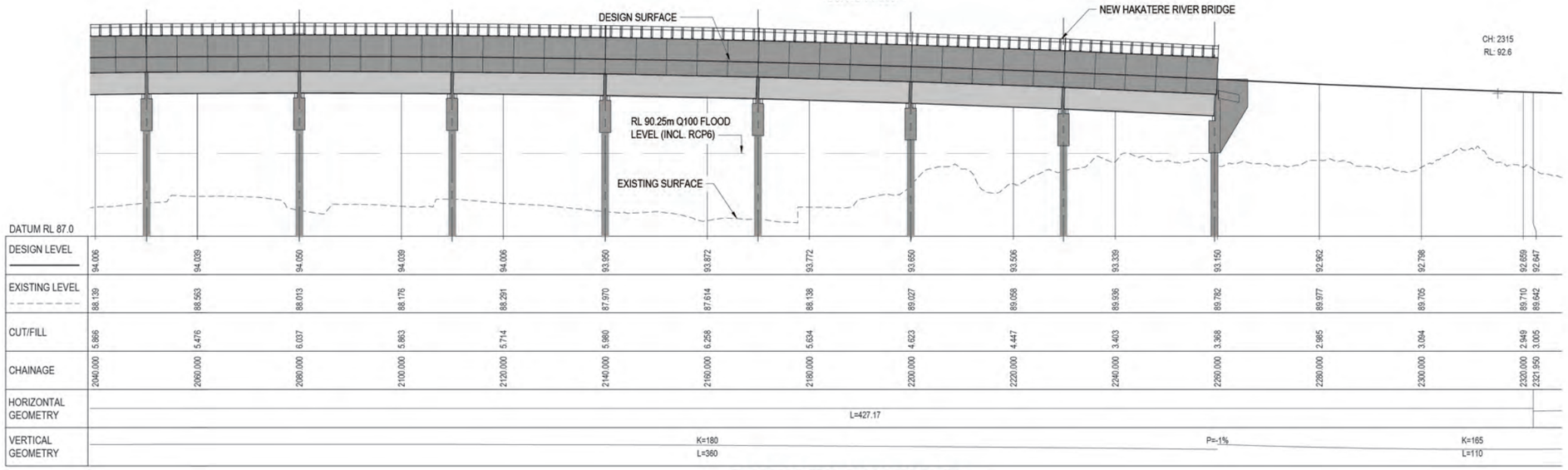

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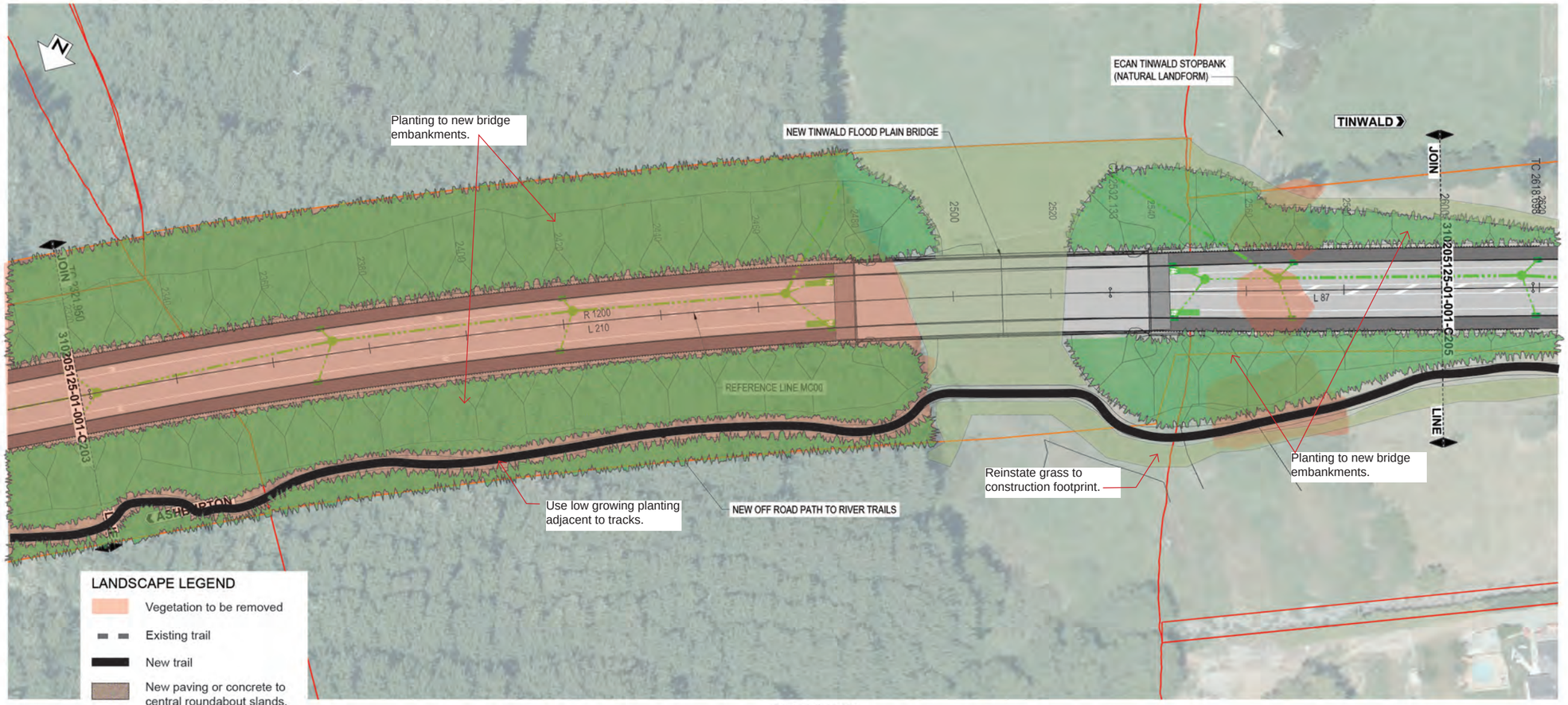

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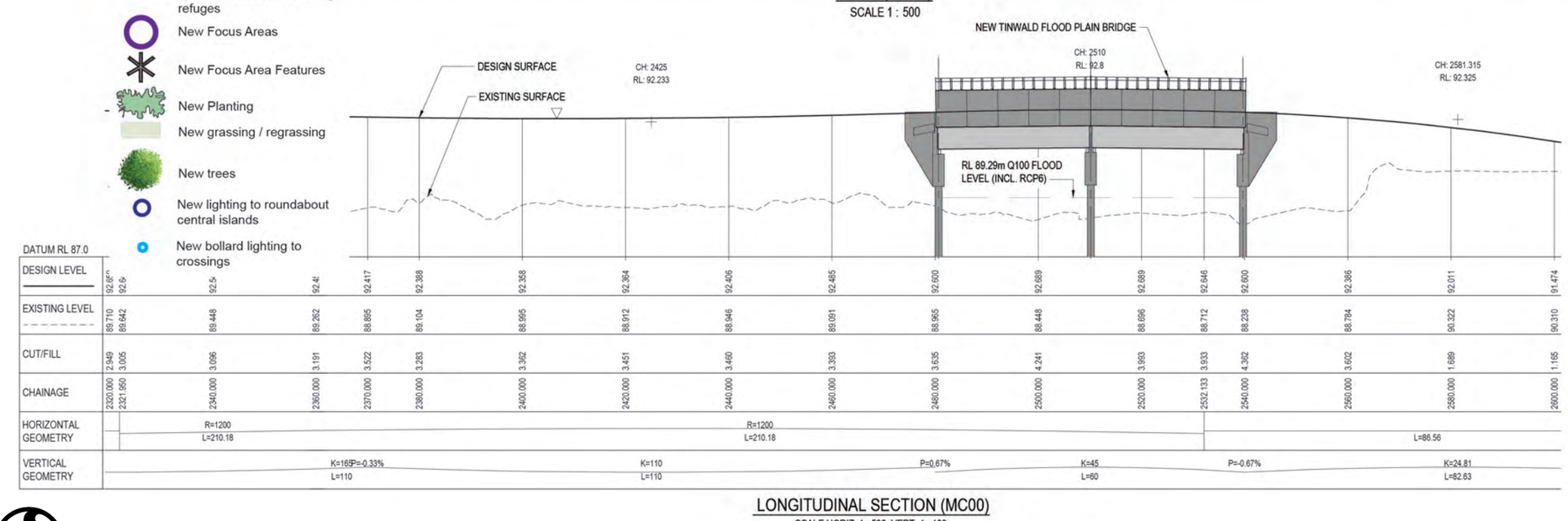

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SHEET 4 OF 9

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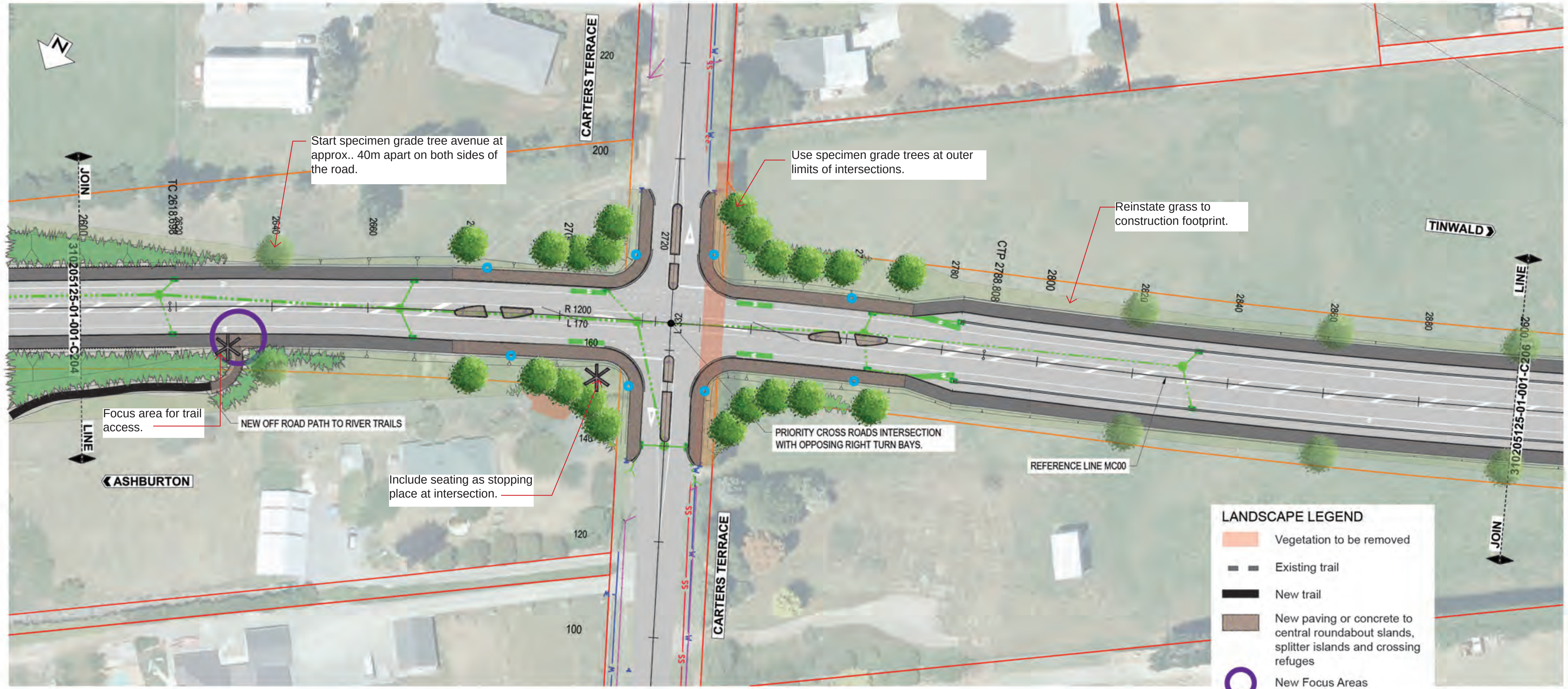

PLAN (MC00)

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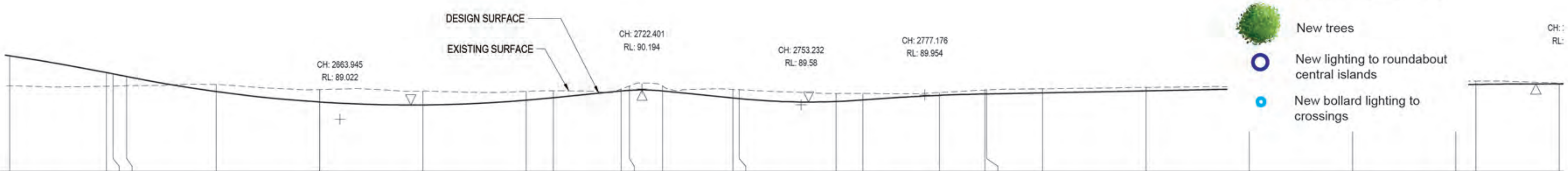

CHAINAGE	DESIGN LEVEL	EXISTING LEVEL	CUT/FILL
2600.000	91.474	90.310	1.165
2618.698	90.827	90.296	0.531
2620.000	90.777	90.303	0.474
2622.630	90.673	90.316	0.358
2640.000	90.088	90.364	-0.276
2660.000	89.687	90.167	-0.480
2680.000	89.575	90.110	-0.534
2700.000	89.755	90.098	-0.344
2705.259	89.850	90.125	-0.274
2718.406	90.114	90.190	-0.077
2720.000	90.139	90.299	-0.159
2726.397	90.114	90.309	-0.195
2740.000	89.843	90.173	-0.330
2741.260	89.818	90.161	-0.343
2760.000	89.706	90.015	-0.310
2765.204	89.767	90.011	-0.244
2780.000	89.944	90.051	-0.107
2788.808	89.999	90.151	-0.153
2789.149	90.000	90.155	-0.155
2800.000	90.042	90.198	-0.156
2820.000	90.119	90.251	-0.131
2840.000	90.196	90.304	-0.108
2860.000	90.274	90.443	-0.170
2880.000	90.351	90.498	-0.147
2883.907	90.366	90.495	-0.129
2900.000	90.385	90.418	-0.033

HORIZONTAL GEOMETRY: R=1200 L=170.11; R=1200 L=170.11; R=-1997.96 L=421.45

VERTICAL GEOMETRY: P=-4%; K=13.77 L=82.63; K=13.77 L=82.63; P=2.01% L=13.15; K=2 L=7.99; P=-1.99% L=14.86; K=6.74 L=23.94; P=1.56%; K=20.38 L=23.94; P=0.39% L=94.76

LONGITUDINAL SECTION (MC00)

SCALE HORIZ. 1 : 500 VERT. 1 : 100

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As shown

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SHEET 5 OF 9

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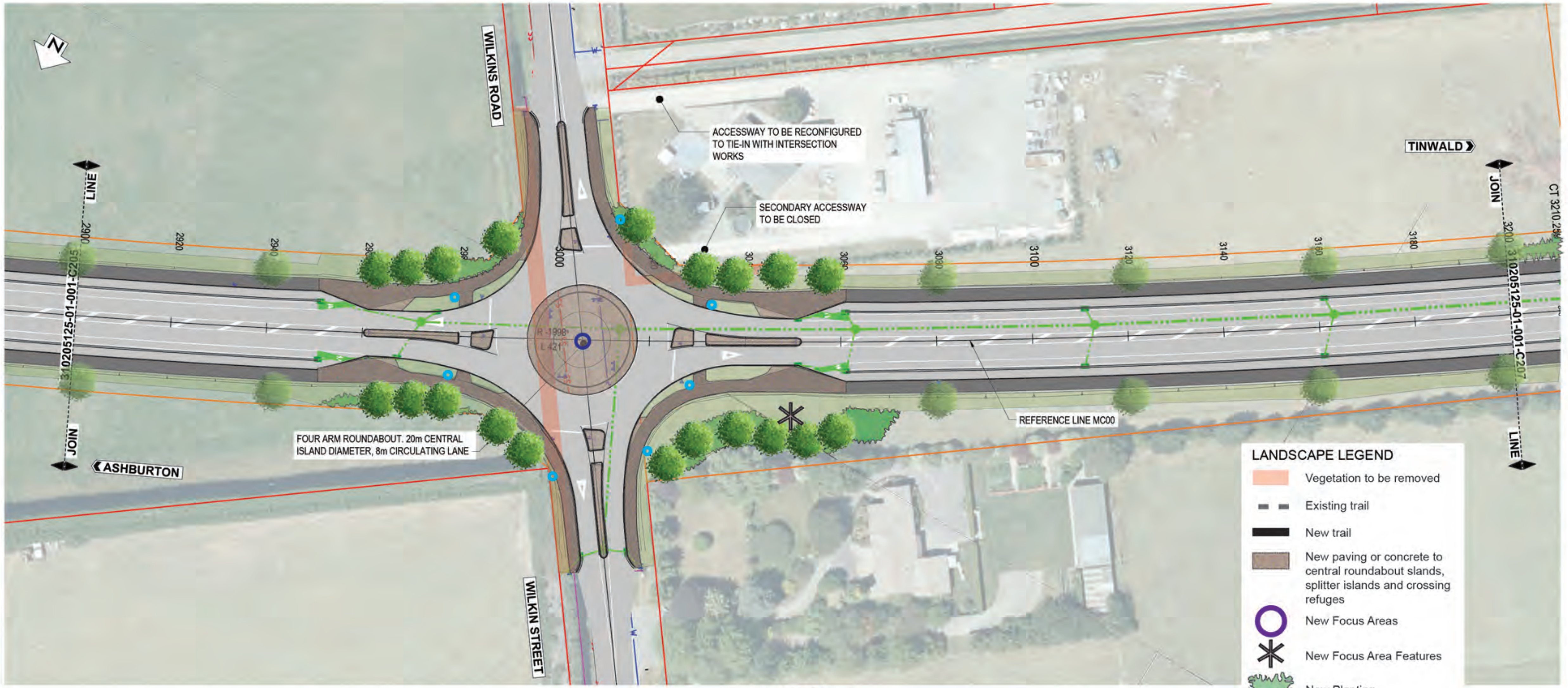
Ashburton District Council



PLAN (MC00)

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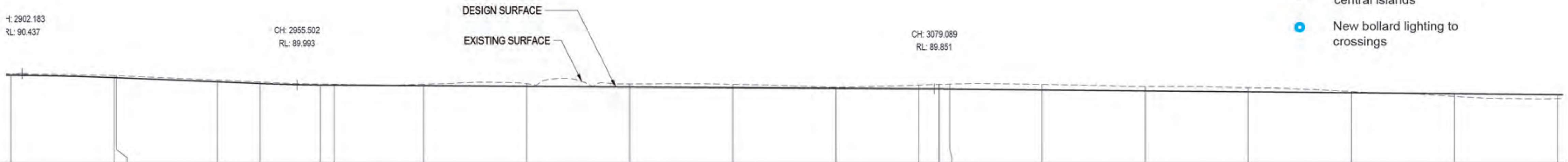

DATUM RL 87.0

CHAINAGE	DESIGN LEVEL	EXISTING LEVEL	CUT/FILL
2900.000	90.385	90.418	-0.033
2920.000	90.288	90.369	-0.081
2920.459	90.284	90.366	-0.082
2940.000	90.122	90.188	-0.066
2948.324	90.053	90.115	-0.062
2960.000	89.989	90.032	-0.043
2962.679	89.985	90.023	-0.038
2980.000	89.965	90.023	-0.059
3000.000	89.942	90.045	-0.103
3020.000	89.919	90.040	-0.121
3040.000	89.896	90.023	-0.127
3060.000	89.873	89.909	-0.036
3076.077	89.855	89.993	-0.138
3080.000	89.849	90.018	-0.168
3082.102	89.846	90.029	-0.184
3100.000	89.812	90.019	-0.207
3120.000	89.774	89.937	-0.163
3140.000	89.736	89.890	-0.154
3160.000	89.698	89.748	-0.051
3180.000	89.660	89.554	0.106
3200.000	89.622	89.468	0.154

HORIZONTAL GEOMETRY: R=-1997.96 L=421.45

VERTICAL GEOMETRY: K=30 L=36.55 | P=-0.83% L=27.86 | K=20 L=14.36 | K=20 L=14.36 | P=-0.11% L=113.4 | K=80 L=6.03 | P=-0.19% L=429.09

LONGITUDINAL SECTION (MC00)

SCALE HORIZ. 1 : 500 VERT. 1 : 100

NOTES:

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8. REFER TO MOTSAM PART 2 FOR PAVEMENT MARKINGS.

LANDSCAPE LEGEND

- Vegetation to be removed
- Existing trail
- New trail
- New paving or concrete to central roundabout slands, splitter islands and crossing refuges
- New Focus Areas
- New Focus Area Features
- New Planting
- New grassing / regrassing
- New trees
- New lighting to roundabout central islands
- New bollard lighting to crossings

LEGEND:

- EXISTING PARCEL BOUNDARY
- EXISTING CENTRELINE
- EXISTING FENCE
- EXISTING EDGE OF METAL
- EXISTING TOP OF BANK
- EXISTING GATE
- EXISTING POWER POLE
- EXISTING LIGHT POLE
- EXISTING TELECOMMUNICATIONS
- EXISTING SURVEY MARK
- EXISTING SIGN
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- NEW CULVERT (SIZE AND TYPE NOTED)
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- NEW DRAINAGE MANHOLE
- NEW STORMWATER SUMP
- NEW INFILTRATION POND
- E(OH) OVERHEAD POWER
- SS EXISTING SEWER
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- FIBRE FIBRE OPTIC
- UT TELECOMMUNICATIONS

Note: Final tree and planting locations to be confirmed at detailed design.

NOT FOR CONSTRUCTION

Stantec

ASHBURTON RIVER / HAKATERE SECOND BRIDGE | LANDSCAPE DESIGN

As shown

Landscape Concept Plans

SHEET 6 OF 9

DRAWN	KT	CHECKED	NL	REVIEWED		APPROVED	

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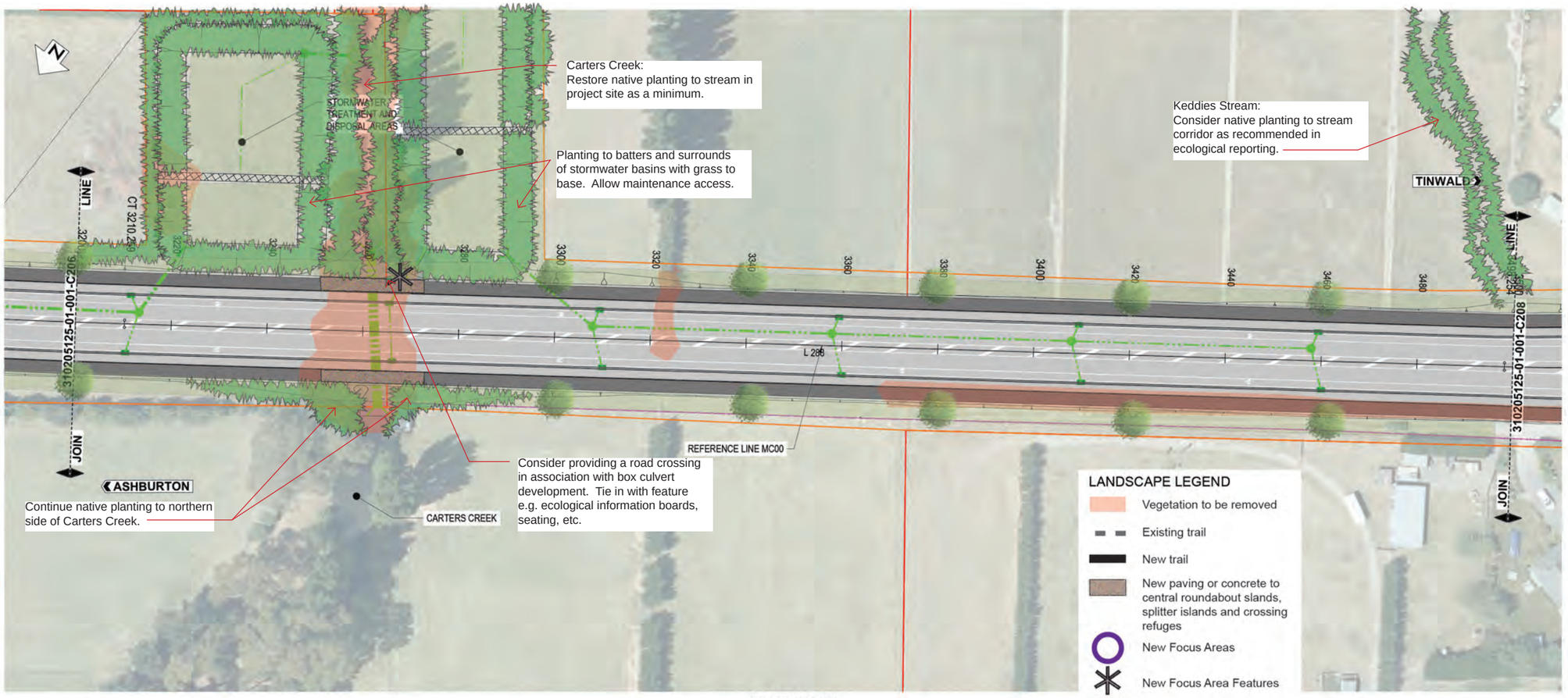
Ashburton DISTRICT COUNCIL



PLAN (MC00)
SCALE 1 : 500

LANDSCAPE LEGEND

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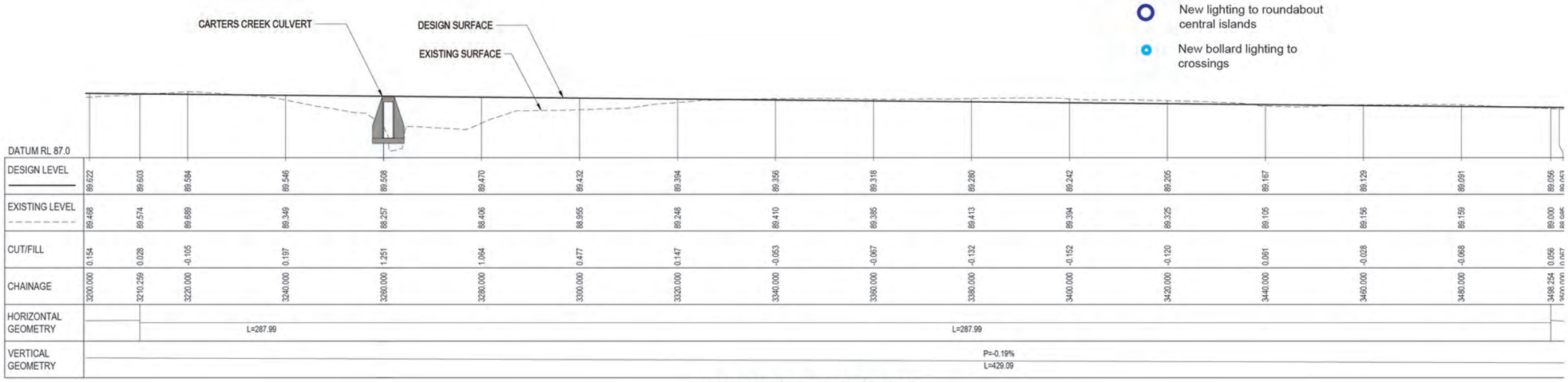

LONGITUDINAL SECTION (MC00)
SCALE HORIZ. 1 : 500 VERT. 1 : 100

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Note: Final tree and planting locations to be confirmed at detailed design.

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Stantec

ASHBURTON RIVER / HAKATERE SECOND BRIDGE | LANDSCAPE DESIGN

Landscape Concept Plans

SHEET 7 OF 9

As shown

DRAWN	KT	CHECKED	NL	REVIEWED		APPROVED	

DRAFT | 19 JULY 2022

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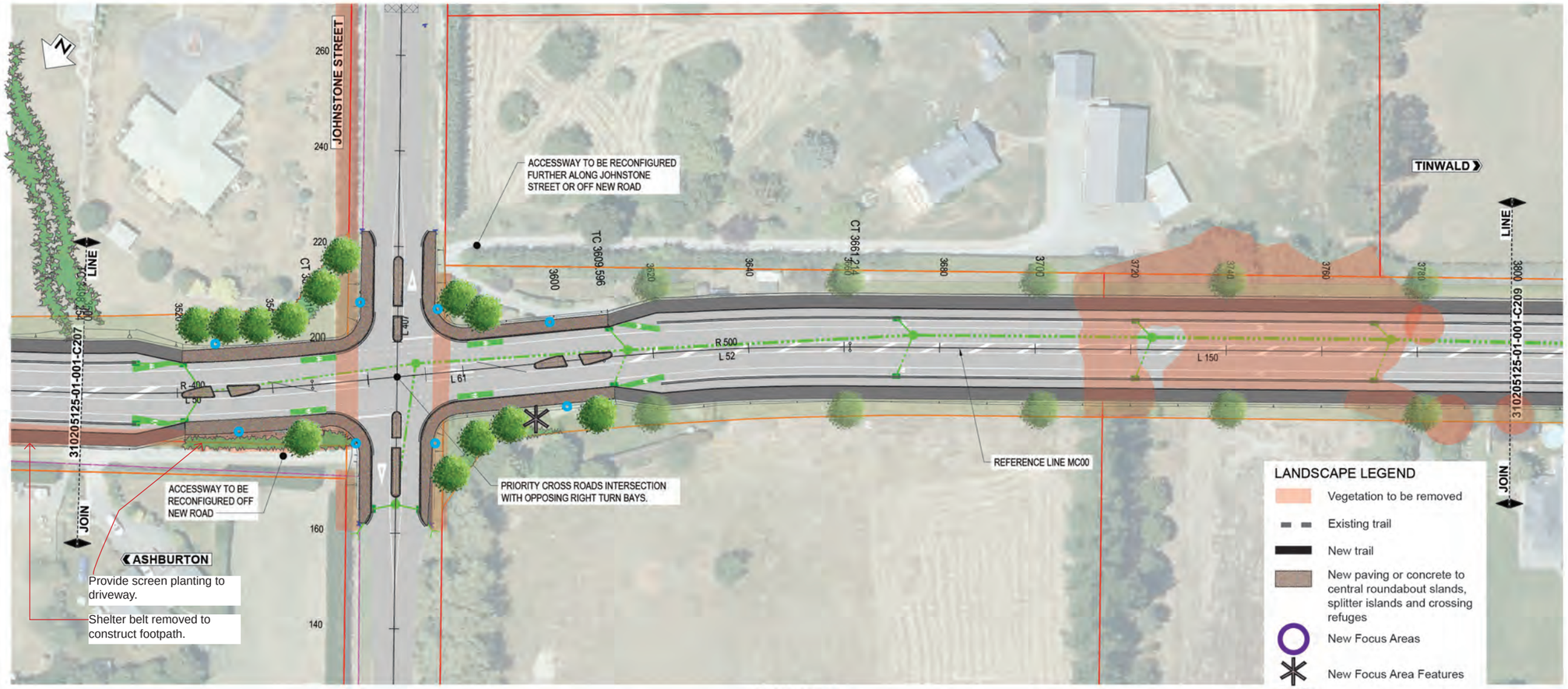
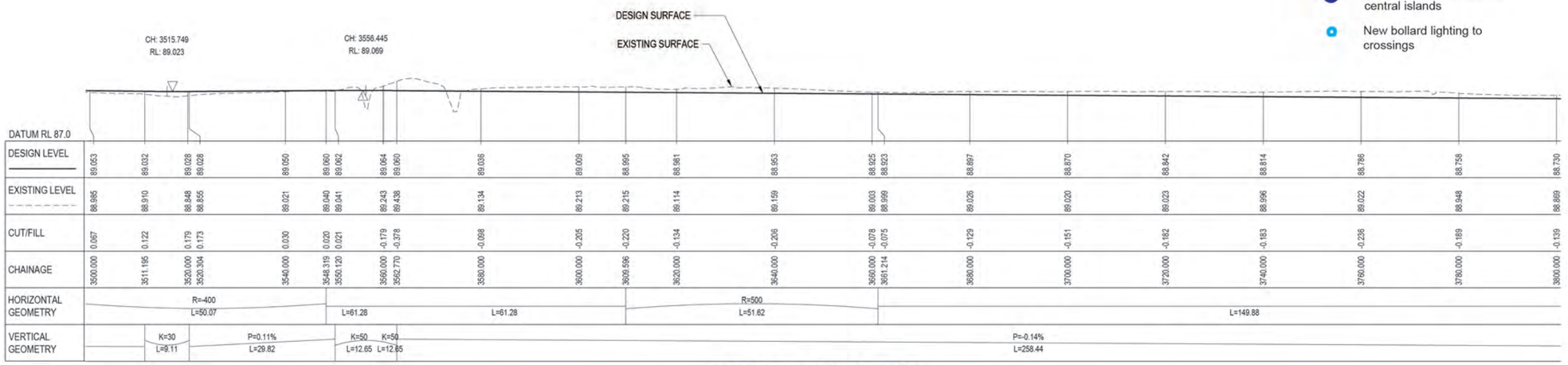


PLAN (MC00)
SCALE 1 : 500



LONGITUDINAL SECTION (MC00)
SCALE HORIZ. 1 : 500 VERT. 1 : 100

LANDSCAPE LEGEND

- Vegetation to be removed
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- New trail
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ASHBURTON RIVER / HAKATERE SECOND BRIDGE | LANDSCAPE DESIGN

Landscape Concept Plans

SHEET 8 OF 9

As shown

DRAWN	KT	CHECKED	NL	REVIEWED		APPROVED	

DRAFT | 19 JULY 2022

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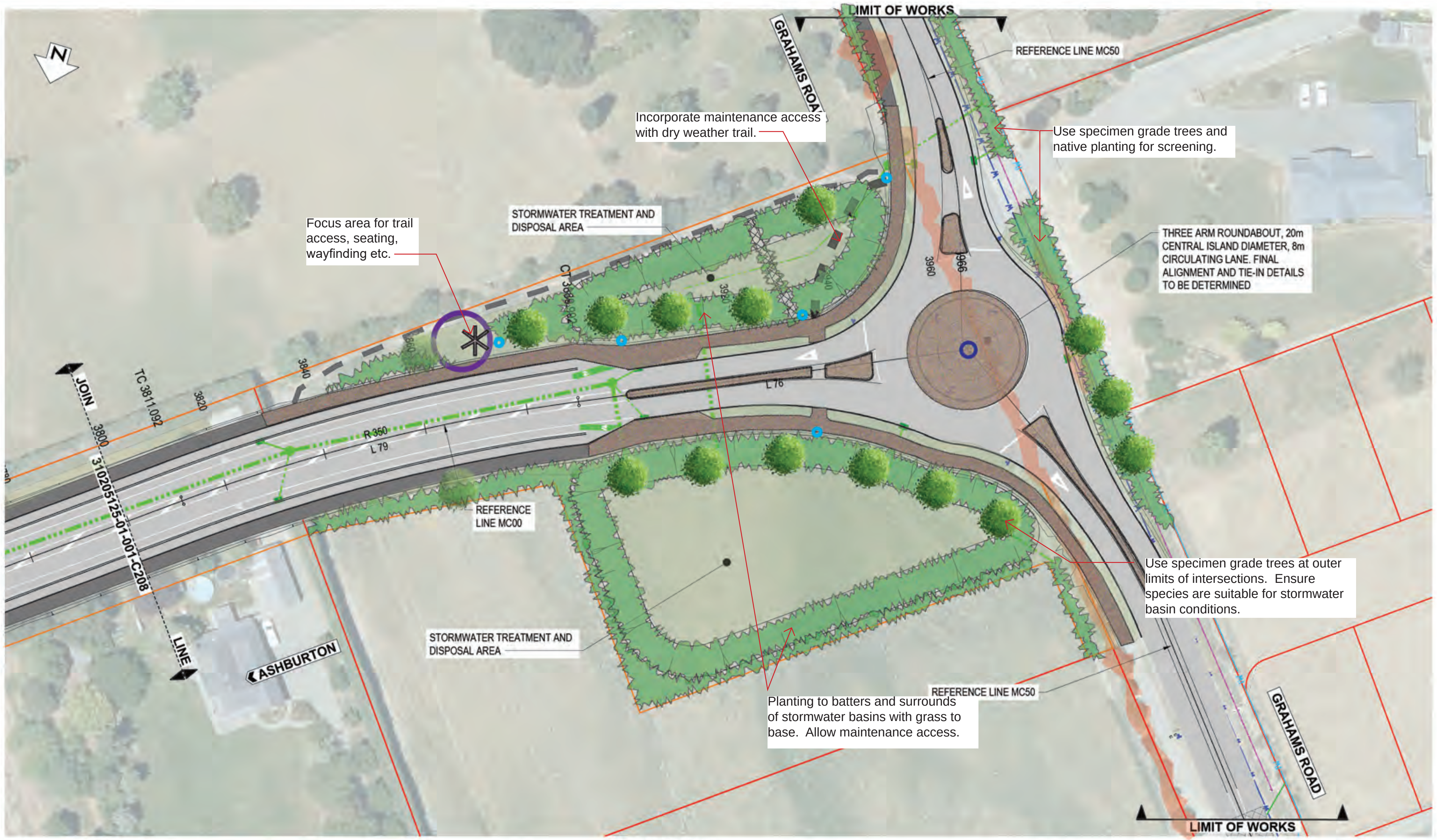

PLAN (MC00)

SCALE 1 : 500

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CHAINAGE	DESIGN LEVEL	EXISTING LEVEL	CUT/FILL
3800.000	88.730	88.869	-0.139
3811.092	88.715	88.843	-0.129
3820.000	88.703	88.840	-0.137
3821.206	88.701	88.840	-0.139
3834.424	88.700	88.645	0.055
3840.000	88.707	88.728	-0.021
3860.000	88.732	88.809	-0.077
3880.000	88.757	88.812	-0.055
3889.992	88.770	88.812	-0.043
3900.000	88.782	88.795	-0.013
3905.027	88.788	88.791	-0.002
3916.160	88.823	88.829	-0.006
3920.000	88.842	88.841	0.001
3940.000	88.941	88.858	0.083
3960.000	89.041	88.903	0.137
3965.920	89.070	88.549	0.521

HORIZONTAL GEOMETRY: R=350 L=78.9 | R=350 L=78.9 | L=75.93

VERTICAL GEOMETRY: K=50 L=13.22 | P=0.13% L=70.6 | P=0.13% L=70.6 | K=30 L=11.13 | P=0.5% L=49.76

LONGITUDINAL SECTION (MC00)

SCALE HORIZ. 1 : 500 VERT. 1 : 100

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As shown

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Ashburton DISTRICT COUNCIL

Figure 22: South Street roundabout axonometric view

Figure 23: Chalmers Avenue extension looking north to the South Street Roundabout

Figure 24: Crossing the South Street Roundabout over the existing swale

Figure 25: South Street Roundabout looking south

Figure 26: Grahams Road roundabout axonometric view

Figure 27: Grahams Road roundabout approach with link road on the left

Figure 28: Grahams Road roundabout approach with link road on the left close up

Figure 29: Grahams Road roundabout looking across to the Focus Area

Stantec

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