



SH8 NEW BEAUMONT BRIDGE

URBAN AND LANDSCAPE DESIGN FRAMEWORK

October 2019



WSP | OPUS

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1. INTRODUCTION

1.1 Background

The existing State Highway 8 (SH8) Beaumont Bridge is a single lane, five-span, wrought iron truss bridge constructed in 1884 in the township of Beaumont in Otago, approximately 110 km west of Dunedin. The bridge carries SH8 over the Clutha Mata-au River and provides the only connection between the two parts of Beaumont located on either side of the river (Figure 1). SH8 is a key arterial route between Central Otago and Coastal Otago being the most direct route between Queenstown and Dunedin. State Highway 8 is also an important freight route and is the only High Productivity Motor Vehicle (HPMV) route between the Dunedin and Queenstown.

Age related structural integrity issues have been identified, resulting in a susceptibility to fatigue and subsequent reduction in the remaining economic life of the existing bridge. A Detailed Business case completed by WSP Opus in 2017 demonstrated the need for a replacement bridge and confirmed a preferred option comprising a new two-lane structure on a curved alignment downstream of the existing bridge. It also identified opportunity for adaptive re-use of the existing structure for cycling and walking.

In May 2018, WSP Opus was engaged by the NZ Transport Agency (Transport Agency) to complete the pre-implementation phase for the replacement bridge. This Urban and Landscape Design Framework (ULDF) develops concepts for the Beaumont Bridge replacement to ensure that urban and landscape design components of the project are appropriately defined, developed and implemented. It provides a forum to capture and integrate the various elements of the project, and to ensure the urban and landscape design concepts and objectives are well defined, to enable them to be designed and implemented.

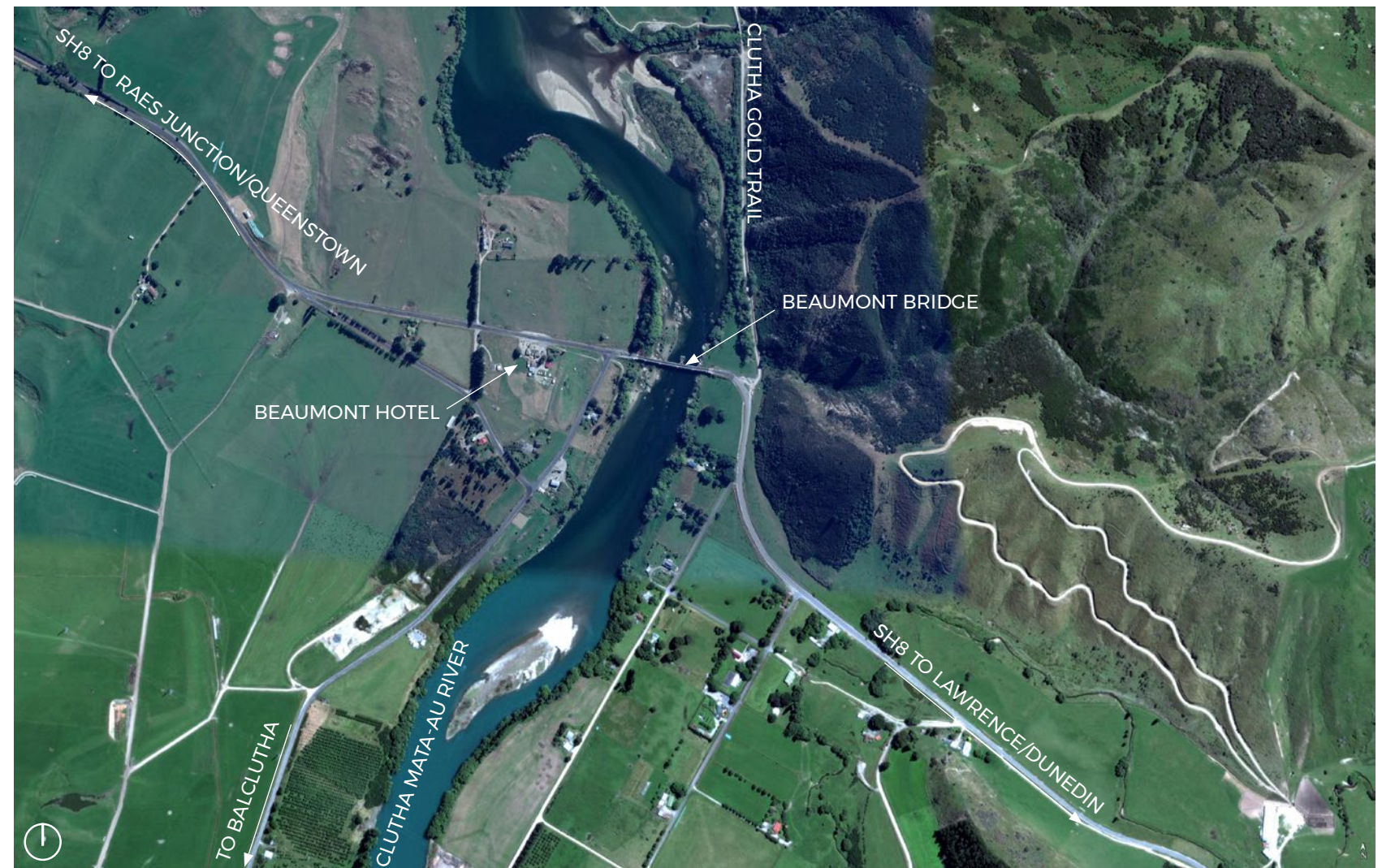


FIGURE 1: LOCATION MAP (SOURCE: GOOGLE EARTH, SCALE AS SHOWN)

1.2 Project Objectives

The primary objective of the Project is to achieve route security for SH8 across the Clutha Mata-au River at Beaumont. Through the Detailed Business Case, a number of consequential/ancillary objectives have also been identified, which include:

- Maintaining the highway function and standard in context with the adjacent state highway environment.
- Minimising social impact on the Beaumont community.
- Optimising environmental and heritage opportunities, where directly associated with the highway works.
- Ensuring the existing structure provides an attractive facility for ongoing use as a pedestrian and cycle linkage between the Clutha Gold Trail and wider Beaumont township and its services.

Through the Detailed Business Case, a number of consequential/ancillary objectives have also been identified, which include:

- Providing a safe and effective connectivity between the highway and the local road and street network.
- Providing safe connectedness for pedestrians and cyclists, both within the Beaumont community and across to the Clutha Gold Trail, in so far as this relates to the highway, or may be enabled through the highway corridor.

1.3 Purpose of the Framework

The purpose of the Urban and ULDF is to ensure the urban and landscape design concepts and objectives are well defined to enable them to be designed and implemented. The ULDF is a guiding document which sets out the urban and landscape design principles for the Project and is intended to be used as a supporting document for the Detailed Design phases of the Project¹.

The ULDF also considers the high level urban design issues, where the broader context and aspirations are considered while encompassing the Transport Agency's objectives and requirements. Additionally, the ULDF co-ordinates the technical inputs to ensure all elements of the Project are well integrated, while allowing innovation and design development to be added throughout the design process.

1.4 Report Structure

The ULDF utilises background documentation and contextual analysis to inform the design principles and objectives. Underlying the process is the co-ordination of multi-discipline specialists to ensure an integrated approach is achieved for all elements of the Project.

The following outlines the structure of this report:

SECTION 1: INTRODUCTION

Outlines report structure, background material and aims of the ULDF.

SECTION 2: POLICY CONTEXT

Background information in relation to the Transport Agency's protocols and other statutory expectations.

SECTION 3: PROJECT CONTEXT

Briefly comments on the context of the proposed bridge and its approaches and considers the contextual relationship of landform, hydrology, land uses, existing vegetation, character areas, historic heritage, Tangata Whenua, community facilities, ecology, movement networks and community consultation.

SECTION 4: CORRIDOR DESIGN PRINCIPLES

Describes urban and landscape design principles for the proposed bridge to ensure the Project is assimilated within the context of the surrounding environment.

SECTION 5: CONCEPT PLAN

Application of ULDF philosophies and principles to the Project. Specific approaches will demonstrate the intent to ensure a context sensitive and fully integrated design approach is achieved.

1.5 Project References and Background Information

An extensive review of background documentation has been undertaken to identify relevant landscape and urban influences on the bridge replacement, and design standards that should be integrated into the project.

The background documents include the following:

- Transport Agency's Urban Design Policy, 2004
- NZ Urban Design Protocol, March 2005
- NZ Transport Strategy, 2008
- Transport Agency's Urban Design Guidelines 'Bridging the Gap', 2013
- Transport Agency's Landscape Guidelines, 2014
- Transport Agency's P39 Landscape Specification for Highway Landscape Treatments, 2013
- NZTA Cycling Network guidance
- NZTA Pedestrian Planning and Design Guide, 2009
- Resource Management Act (RMA), 1991
- Heritage New Zealand Pouhere Taonga Act 2014.

¹ refer appendix 2: <https://www.nzta.govt.nz/assets/resources/bridging-the-gap/docs/bridging-the-gap.pdf>
www.wsp-opus.co.nz

2. POLICY CONTEXT

2.1 Planning Policy

The following provides the relevant RMA context that will be integrated into the Project.

CLUTHA DISTRICT PLAN

Land surrounding the site is zoned a mixture of Rural and Rural Settlement in the Operative Clutha District Plan (planning maps 8 and 9). Surrounding land use is predominantly residential and agriculture, with some commercial activity such as the Beaumont Hotel and Beaumont Jet.

The project objectives align with objectives in the plan regarding efficiency and continual development and upgrading of the transport network, maintaining amenity values in the rural environment.

2.2 Transport Policy

NEW ZEALAND TRANSPORT STRATEGY 2008

The New Zealand Government developed the New Zealand Transport Strategy (NZTS) to provide a plan until 2040 for the whole transport sector, and although the document is not a statutory document, it is given statutory weight in other documents.

The vision of the NZTS is to provide people and freight in New Zealand access to an affordable, integrated, safe, responsive and sustainable transport system. Additionally, the document has specific objectives which include:

- Ensuring environmental sustainability
- Assisting economic development
- Assisting safety and personal security
- Improving access and mobility
- Protecting and promoting public health.

GOVERNMENT POLICY STATEMENT ON LAND TRANSPORT

The Government Policy Statement on land transport 2018 reflects a new approach to transport through four clear priorities: a safer transport network free of death and injury, accessible and affordable transport, reduced emissions, and value for money.

OTAGO SOUTHLAND REGIONAL LAND TRANSPORT PLANS 2015 – 2021

Beaumont Bridge replacement has a regional priority of ‘2’ in the Otago Southland Regional Land Transport Plan (RLTP) 2015-2021. The reason for the priority is given as:

This is an aging bridge, which is close to the end of its economic life. The objective of the project is to ensure a resilient and secure transport network and reduce delays. Benefits network performance and capability, and safety and regional development.

SAFER JOURNEYS

The government’s long-term goal for road safety in New Zealand is a road system increasingly free of death and serious injury based on the international ‘Safe System’ approach.

The Safe System approach works across safe roads and roadsides, safe speeds, safe vehicles and safe road use. Of particular reference to landscape outcomes is that Safe Systems applies to all parts of the system including highway margins, to improve safety overall.

Safe Systems in relation to the highway landscape includes the following matters:

- Design of landscape treatments which encourage safe travel speeds and behaviours.
- Planting designs that integrate sight lines and safety setbacks from structures, barriers and signage.
- Frangible planting.
- Provision for safe access and landscape maintenance as part of maintenance operations requirements for high landscape assets.
- Provide for attractive and safe stopping places and rest areas with good visibility.
- Make walking and cycling safer.

2.3 Non-Statutory Documents

NZ TRANSPORT AGENCY URBAN DESIGN GUIDELINES ‘BRIDGING THE GAP’, 2013

Bridging the Gap sets out ten fundamental urban design principles. These principles reflect the Transport Agency’s expectation for the integration of urban design in all phases of transport projects and the desired inter-disciplinary approach to addressing urban design issues. The document also incorporates the New Zealand Urban Design Protocol (2005), Crime Prevention Through Environmental Design (CPTED) requirements and provides ULDF guidelines amongst other things.

NZ TRANSPORT AGENCY LANDSCAPE GUIDELINES (FINAL DRAFT), 2014

The Transport Agency Landscape 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.

NZ TRANSPORT AGENCY P39 STANDARD SPECIFICATIONS FOR HIGHWAY LANDSCAPE TREATMENTS, 2013

The Transport Agency P39 Standard Specifications for Highway Landscape Treatments set out the minimum performance, quality and workmanship standards for all Transport Agency landscape projects.

NZ TRANSPORT AGENCY BRIDGE MANUAL, 2016

The Transport Agency’s ‘Bridge Manual’ sets out the criteria for the design and evaluation of bridges, culverts, stock underpasses and subways, the design of earthworks and retaining structures. The manual is a companion document to the overarching Highway Structures Design Guide which provides general and specific design criteria for all highway structures.

Consideration was given to this manual and in particular Section 2.6 Urban Design when preparing the ULDF.

2. PROJECT CONTEXT

This section describes the main features of the locality and its related landscape opportunities and constraints, and provides an overview of the bridge replacement and associated works.

3.1 Site Description

A map showing the Beaumont township and roading network is provided in Figure 2.

From east to west, the existing state highway passes over the Low Burn bridge (small watercourse) then curves north as it passes Stonewall Street and Weardale Street which come off to the left (south side) of the highway via priority controlled tee-intersections. These streets provide access to residential properties on the eastern side of the river. As the curve of SH8 reverses back towards the west, Craig Flat Road comes off to the north, continuing up the true left (east) bank of the Clutha / Mata-au River (refer Figure 6). This intersection also provides a parking area with parking and interpretation signage.

At Weardale Street, the Clutha Gold (cycle) trail joins SH8 again after traversing across farmland from Chinaman Flat road to Eastferry street and then down Weardale Street (refer Figure 2). It runs down the south side of SH 8 as the curve reverses back westwards towards the existing Beaumont bridge. The trail then crosses SH8 to Craig Flat Road, which it continues along towards Roxburgh.

Heading westward, SH 8 arrives at the existing single lane, traffic signal controlled, bridge over the Clutha Mata-au River (refer Figure 5). Immediately after the bridge, the Rongahere Road priority-controlled tee-intersection provides a route along the true right of the Clutha Mata-au River to Clydevale and Balclutha. Access to the river below the bridge is via a metal track at the northern end of Rongahere Road.

After the intersection with Rongahere Road, SH8 then proceeds over a small rise in front of the Beaumont Hotel (refer Figure 4), and past the Dee Street priority controlled cross-road. Westferry Road is the next street to intersect with SH8, joining it at an intersection on the outside of the bend as the state highway turns north. It provides the most direct access from the state highway to Rongahere Road for traffic going to Clydevale or Balclutha from the west (Roxburgh / Queenstown (refer Figure 3). Westferry Road, when viewed by travellers heading from east to west, presents as a acute, almost hairpin corner.

From the curve to the north, SH8 continues up a relatively steep hill towards Roxburgh / Queenstown.



FIGURE 2: MAP OF BEAUMONT WITH THE CLUTHA GOLD TRAIL SHOWN AS A DASHED ORANGE LINE



FIGURE 3: SH8 / WESTFERRY STREET INTERSECTION ON THE WESTERN OUTSKIRTS OF THE TOWNSHIP



FIGURE 4: VIEW FROM THE FRONT OF THE BEAUMONT HOTEL LOOKING EAST TOWARDS THE EXISTING BRIDGE



FIGURE 5: VIEW ALONG THE EXISTING BRIDGE LOOKING WEST TOWARDS THE BEAUMONT HOTEL



(IMAGE ON RIGHT)
FIGURE 6: VIEW OF THE PARKING AREA AT THE CRAIG FLAT ROAD INTERSECTION PROVIDING ACCESS TO THE CLUTHA GOLD TRAIL (SOURCE: GOOGLE STREET VIEW)

3.2 Landscape Description

The broader landscape context of the Project is that of the broad river valley of the Clutha Mata-au River where the river flows out of the relatively short Island Block-Beaumont Gorge, through the local Beaumont Flats and south into the Beaumont-Tuapeka Mouth Gorge area. In general, the landscape is characterised by river flats and terraces and undulating to steep hill country, representative of an underlying geology of blocky to weathered schist. Landforms within the area include flat to undulating terraces and the river channel itself. The local topography is contained by hill country on all sides.

The Project site is central to the Beaumont Flats and the only other notable topographic feature is the Low Burn Valley through which SH8 traverses from the east.

The area is highly modified, with vegetation comprising grazed pasture, evergreen shelterbelts, clumps of well-established exotic trees around scattered dwellings, especially on the east side of the river and willow along both riverbanks. The local hills have a scrappy cover of gorse and broom with some pockets of native vegetation, such as mānuka, flax and cabbage tree within the gullies. On the more distant slopes of the Blue Mountains to the west and south is a dense cover of beech forest and pine plantation.

3.3 Significant Trees

Within the Project area there are seven trees listed in Clutha District Council's register of significant trees as having scenic and landscape significance. Three of these trees - English oak - are located on the north boundary of the Healey property on the eastern side (true left) of the river as shown in Figure 7



FIGURE 7: ENGLISH OAK TREES LISTED IN CLUTHA DISTRICT COUNCIL'S REGISTER OF SIGNIFICANT TREES

3.4 Reserves/ Open Space

Reserves or distinctive areas of open space within the Project site include:

- The existing node of the Clutha Gold Trail on the eastern side of the existing bridge adjacent Craig Flat Road which incorporates information panels and a picnicking area.
- The Clutha Mata-au River and its banks including a defined marginal strip on the western bank (administered by the Department of Conservation).
- The property on the eastern bank immediately south of the existing bridge is subject to Part 4A of the Conservation Act, meaning there is a movable 20 m marginal strip adjacent to the river (undefined).
- The local roads and streets form linear 'open space' network within the township of which the Clutha Gold Trail is an obvious part.

3.5 Movement Networks – Roads, Cycle, Pedestrian Routes

The section of SH8 running across the Beaumont Flats and the Clutha Mata-au River is the dominant roading link in the area, with various 'streets' within the township and local roads branching off it. The main local road – Rongahere Road – runs south along the west bank of the Clutha Mata-au River ~35 km to Clydevale where the next downstream road crossing of the river is located. There is also a historic punt ~25 km downstream of Beaumont at Tuapeka Mouth that operates on set hours and is funded by the Transport Agency.

On the east side of the river, the highway was once paralleled by a railway line that ran from Clarkville to Roxburgh and much of this old railway formation now carries the Clutha Gold Trail. There are no footpaths as such within the township as traffic volumes are very low. For the most part, the cycle trail also utilises the road formation through the eastern part of the township having been on Craig Flat Road and the old railway formation upstream of the township, rejoining the latter to the east of the township.

3.6 Heritage

Opened for use in 1887, the Beaumont Bridge consists of three wrought iron truss spans supported on concrete piers; refer Figure 8. It was the first of four iron truss bridges made entirely from ironwork assembled in New Zealand. The bridge now forms part of SH8 through Central Otago. It is listed as a historic structure in Clutha District Council's Register of Heritage Buildings, item no. H61; but is not on the New Zealand Heritage List/Rārangi Kōrero.

The settlement of Beaumont also has high cultural, archaeological, historic and social value with the Beaumont Hotel; being a focal point of the town on the western side of the river (refer Figure 9).

A Heritage Significance Assessment¹, was completed as part of the Detailed Business Case for the Project and made the following recommendations with regards to re-purposing of the existing bridge and design of the replacement bridge which are relevant to this ULDF:

- The existing bridge should be retained with a new use found, taking advantage of existing opportunities such as the cycle trail.
- Repair works necessary to make the bridge suitable for the selected alternative use should be carried out.
- Replacement bridge options should consider the heritage significance of both the existing bridge and the Beaumont settlement.



FIGURE 9: BEAUMONT HOTEL FRONTING THE STATE HIGHWAY ON THE WESTERN APPROACH TO THE BRIDGE

¹ Beaumont Bridge, Clutha, Otago: Heritage Significance Assessment – Opus, October 2016



a) Beaumont Bridge c1890 with Hotel in the background (source: Hocken Collection Asset ID 6264)



b) Elevation of existing bridge showing buttressing to piers and geometry of wrought iron trusses
FIGURE 8: EXISTING BRIDGE PHOTOS

3.7 Environmental and Social Responsibility Screen

The Environmental and Social Responsibility Screen completed during the Detailed Business Case identified the following for the Project:

- The Clutha Mata-au River is the predominant natural feature and is a Statutory Acknowledgment under the Ngāi Tahu Claims Settlement Act. There is limited indigenous vegetation on the river margins.
- Heritage status of the existing bridge.
- Seven listed trees on the Healey property.
- Identified HAIL site at the former railway station and yards.
- Presence of boat ramp/river access on true left bank downstream of the bridge.
- Integration of the Clutha Gold Trail will be an important urban and landscape design element.

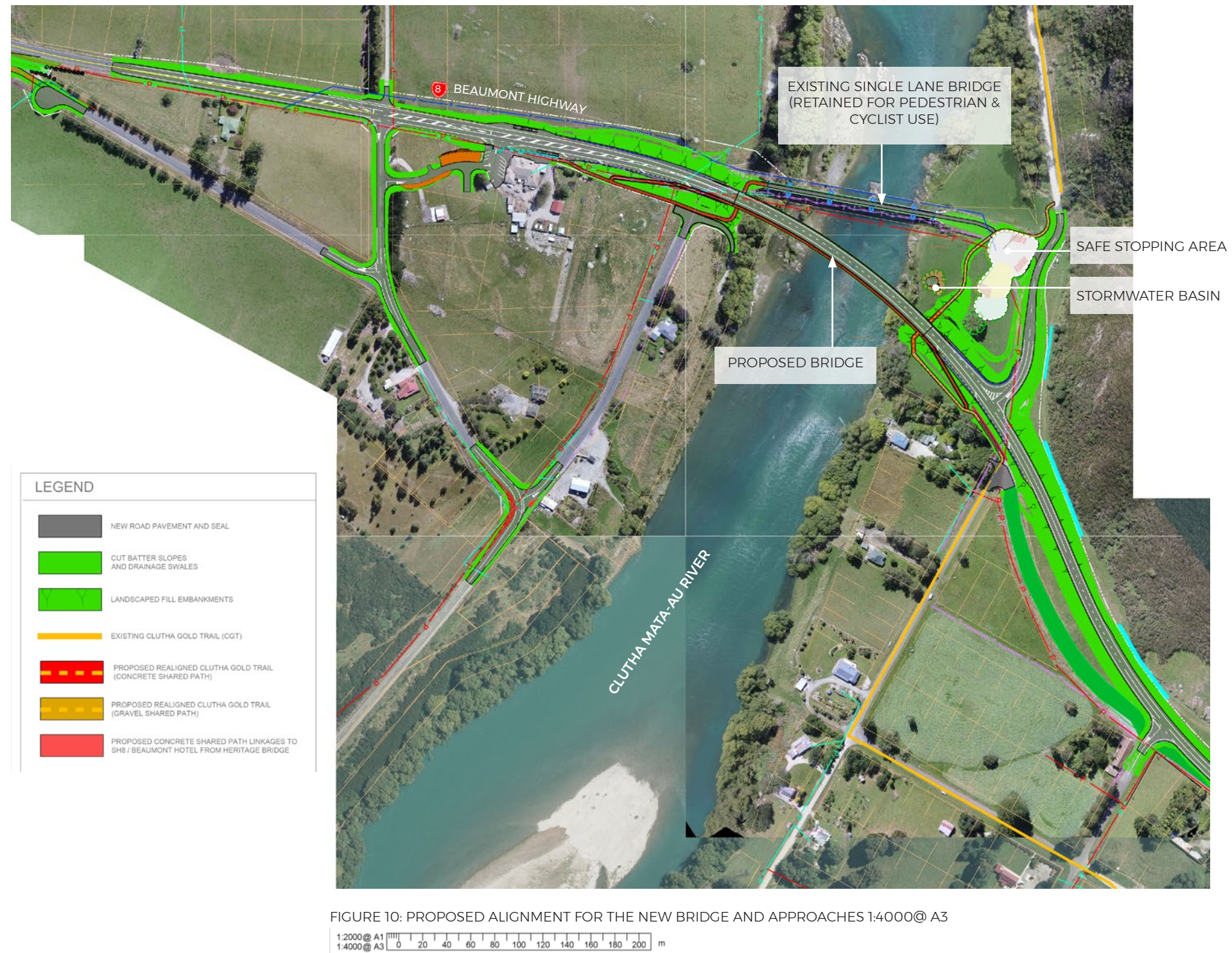
3.8 Description of Proposed Bridge and Approach Alignment

A preliminary alignment has been developed for the proposed new bridge and approaches as shown in Figure 10. This is based on the Detailed Business Case alignment with minor refinement to position the central bridge pier on the prominent rock outcrop within the main river channel.

As part of the Project, the existing state highway intersections with Weardale Street, Rongahere Road and Westferry Street will be closed.

Proposed pedestrian and cycle linkages will create a pedestrian path and route a 'side path' of the Clutha Gold Trail across the existing bridge and under the west abutment of the new bridge to link to the Beaumont Hotel and camp ground. The proposed new bridge will also have a 2.0 m shared pedestrian/cyclist path to provide future resilience (for example if an event led to the loss of the existing bridge).

The existing stormwater management of the area is a combination of roadside swales and overland flow paths into the Clutha Mata-au River. Stormwater design will be completed in accordance with the NZTA Stormwater Treatment Standard for State Highway Infrastructure and will incorporate a mixture of grassed roadside swales, piped conveyance and a planted stormwater basin on the eastern approach to provide treatment of runoff prior to discharge into the Clutha Mata-au River.



3.9 Proposed Bridge Structure

Preliminary alignment design has progressed on the basis of a 193 m long curved bridge, with span lengths (from east to west) of 36 m- 45m- 40 m- 40 m- 32 m (west to east) to enable founding on prominent rock outcrops within the river channel and river banks (refer Figure 12). It is expected the span lengths will be refined/optimised as the design progresses and geotechnical and topographical constraints are better understood.

It is also expected that a continuous steel multi-girder superstructure, with composite concrete deck, founded on reinforced concrete hammerhead piers (i.e. single pile) will provide a cost-effective solution relative to the site constraints. Abutment and pier form will be shaped to complement the existing bridge, while overall form will also feature angular shapes to reference but not imitate the existing bridge (refer Figure 13).

The proposed bridge cross section has been developed in accordance with the NZTA Bridge Manual (refer Figure 11). This allows for two traffic lanes, 1.5m wide shoulder on the upstream side and 2.5m wide sealed shoulder with a 2.0m shared path on the downstream side. The wide shoulder and shared path combined with 1.2m height pedestrian safety barrier on the downstream side provides for the appropriate level of stopping sight distance on the inside of the curve.

Performance Level 5 rigid concrete “HT” barriers comprising a steel top rail are proposed for vehicle containment on the outside edges of the bridge deck. A pedestrian / cycle safety barrier is to be installed on the downstream side of the bridge.

3.10 Proposals for Existing Bridge

The existing bridge is to be re-purposed to cater for pedestrians and cyclists and also to ensure the structure is in a suitable condition for potential handover to another party. This is expected to comprise modifications to the deck, handrails/parapets and maintenance of the structure and abutments. All works will need to be cognisant of the heritage status of the bridge.

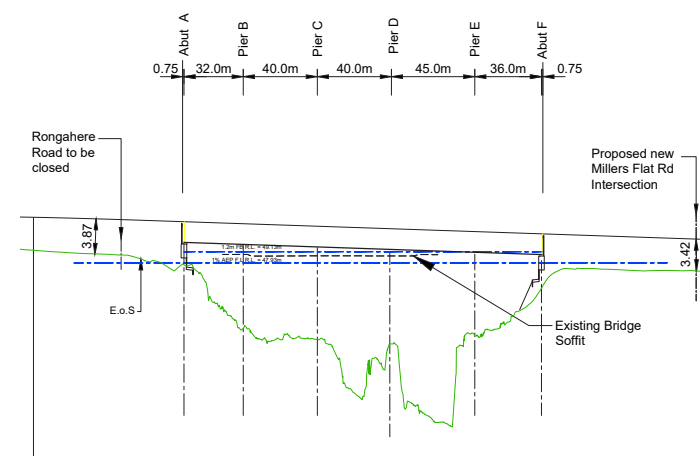


FIGURE 12: PROPOSED BRIDGE LONG SECTION (HZ 1:4000 VT 1:800 @A3)

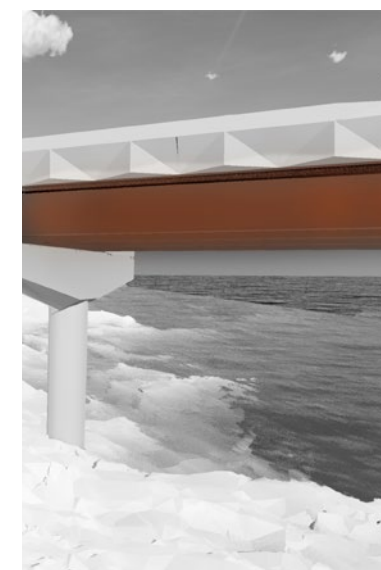


FIGURE 13: PROPOSED BRIDGE PIER & BARRIER (UPSTREAM SIDE)

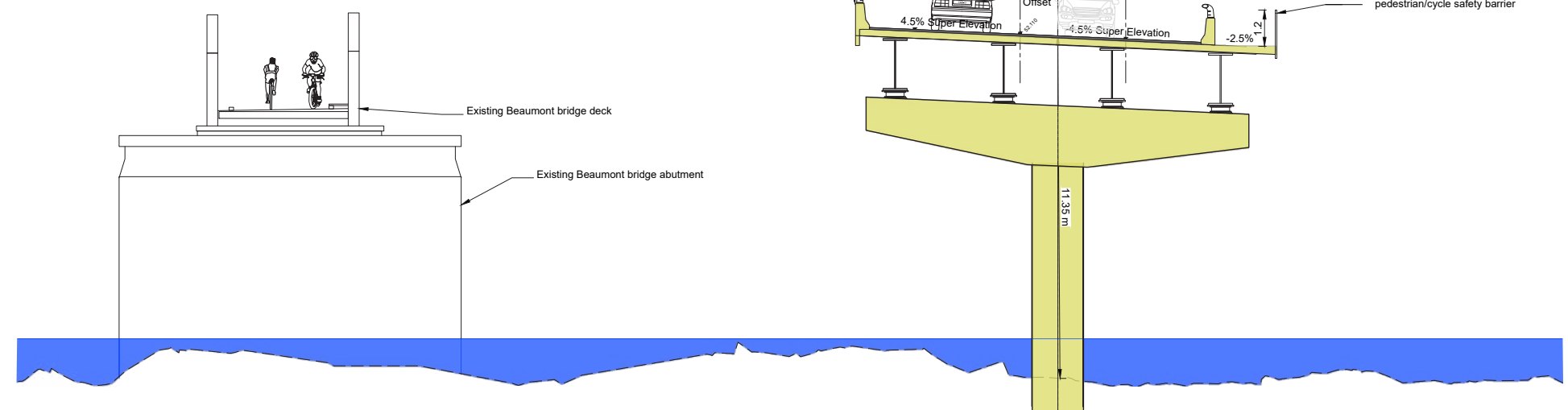


FIGURE 11: PROPOSED BRIDGE CROSS-SECTION (1:200 @A3)

4. CORRIDOR DESIGN PRINCIPLES

This section of the ULDF sets out the vision and specific urban and landscape design principles and objectives that will be applied to the Project.

4.1 Urban and Landscape Design Vision

The urban and landscape design vision for the Project is to design a highway bridge which forms a distinct and attractive ‘connection’ between the existing bridge, the wider landscape and between Beaumont township and the Clutha Gold Trail. It will also providing a safe multi-modal transport corridor that:

- Upholds the spirit of the Otago Southland RLTP.
- Balances the need for long term connectivity for local community with the need to deliver a safe and effective operating highway.
- Delivers a robust and integrated design that is attractive, coherent and durable.

4.2 Project Wide Principles

The following principles and objectives set out the approach and design intent for the Project:

- Ensure the proposed bridge is context sensitive in terms of acknowledging local cultural aspects, heritage, landforms, land use, views and rural environment.
- Ensure good urban design outcomes are achieved, utilising creative and innovative measures to integrate sustainable design measures including structures, street and highway furniture, drainage and ecology.
- Ensure that the Project relates to the future growth of the township, the cycle trail and a range of connections to the wider landscape.
- Ensure the design is environmentally sensitive.
- Ensure the design is aligned with Transport Agency's and Council's policies and objectives.
- Ensure the design collaborates with local community and interest groups.

4.3 Key Design Objectives and Outcomes

Project objectives provide more specific design responses that will be incorporated into the Project as follows:

- Consider the design quality of the proposed bridge in terms of amenity, aesthetics of the experience, accessibility, safety and landscape context.
- Create a connection via the proposed and existing bridges that is sympathetic to the wider landscape and integrates with the surrounding environment and land uses.
- Relate to the future development of the area including tourism.
- Connect and retain access to the existing built environment, future development and links between the Clutha Mata-au River, its recreational use and wider land uses.
- Integrate stormwater design and ecological planting as part of the Project's stormwater management.
- Provide quality open space for cyclists and pedestrians ‘passing through’ on the Clutha Gold Trail.
- Provide a robust and integrated design that is attractive, coherent, durable and innovative.
- Ensure secondary elements and detailing are part of the integrated design.

4.4 Bridge Design Expectations

A major bridge design ‘driver’ for this Project is to ensure that the relationship between the proposed bridge and the existing bridge works. That is, the design and aesthetic appearance of the proposed bridge acknowledges, but does not compromise the existing bridge and, in particular, its heritage aspects.

When considering the design of a new bridge that is going to be in close proximity to and approximately parallel to an existing bridge, one response is to duplicate the existing bridge in many, if not all, of its structural aspects. The wrought iron truss form of the existing bridge is both relatively uncommon and very distinctive, so replicating its form, albeit in a modern idiom, would definitely acknowledge the existing bridge. However, aside from this approach not having favour

from a heritage point of view, the constructibility of a ‘replica’ negates this approach. This is due to a range of reasons such as geotechnical conditions, flood capacity relative to pier placement, cost and safety in design.

The converse approach, and that which will be followed in this case, is to develop a new design that complements, but does not compete, with that of the existing bridge. In this case the sweeping or changing alignment of the proposed bridge will provide continuity via an approach that does not dominate the existing bridge. Additionally the increased height of the new bridge is balanced by the (less dominant) single pier structure, which maintains a visual balance with the lower, but more ‘solid’ existing bridge with its combination of buttressed piers and wrought iron trusses.

Another major bridge design ‘driver’ is to create a bridge that acknowledges the history of the distinctive forms of the range of heritage bridges in the Central Otago region. It is noted that within the broader Clutha Mata-au River catchment, which includes the Kawarau and Shotover Rivers, there are many existing bridge types from historic bridges. The include suspension bridges such as the Kawarau Bridge Bungy bridge, the steel through tress Luggate ‘Grandview Bridge’ and Clyde - Earnsclough Bridge, the steel tress arch SH8 Alexandra Bridge, the concrete, bowstring SH1 Balclutha Bridge as well as the more conventional concrete bridges such as the SH6 Shotover Bridge and the Clydevale Bridge .

All of these bridges are distinctive due to their form, location and their contribution to the local landscape character as well as that of the Clutha Mata-au catchment. The ‘place’ of the proposed SH8 Beaumont Bridge, both locally and regionally, is an important consideration going forward. While a large embellished structure may detract from the historic bridge, a plain concrete structure would conversely be out of place in its utilitarianism.

Consideration has been given to a number of modern bridge types or designs as the Project developed. The selection of the actual bridge form that will be progressed to detail design will be strongly influenced by the landscape and urban design drivers of having least effect on the existing bridge, while becoming a memorable structure when traveling on SH8 and being an asset in both form and function for the local and wider community.

5. CONCEPT PLAN

5.1 Landscape Concept Plan

The Project's Landscape Concept Plan at Appendix A acknowledges a number of recreational and amenity opportunities that can be developed as part of the Project. One of which is to provide an interesting safe stopping area that is also a positive and memorable feature of Beaumont township, acknowledging history, especially the historic bridge; while linking cyclists on the trail, to the township. This relies on creating an appealing setting for the proposed bridge that visually and physically links to the surrounding landscape.

The integration of the local section of the Clutha Gold Trail for both cyclists and pedestrians will encourage greater recreational use of the area. The 're-purposing' of the existing bridge provides the opportunity for a safe and interesting link from the cycle trail to the Beaumont Hotel and Holiday Park and to the highway and local roads on the west bank of the Clutha Mata-au River. It also allows the opportunity for an 'off-highway' safe stopping area to be created that is focused on an existing 'node' on the cycle way. This area, in turn, leads to the existing bridge and the opportunity to view and appreciate the river and both existing and proposed bridges.

It is intended that the Landscape Concept Plan will be further developed and implemented as part of the Project.

5.2 Urban and Landscape Treatment

Simple and bold landscape treatments will be key in providing a cohesive environment that creates a strong 'gateway' to Central Otago. Key elements and focus areas for the route are outlined below:

EASTERN APPROACH

Approaching from Lawrence, the highway will have a more flowing alignment than the current situation which has curves that 'tighten' and then the required halt at the traffic lights before proceeding across the existing single lane bridge. Depending on traffic safety advice, it may be necessary provide highway threshold treatment in the area of Low Burn Bridge to assist in 'signaling' the approach to Beaumont township and the proposed bridge.

Local road intersections will be improved at Stonewall Street and Craig Flat Road, with Weardale Street intersection being closed. As part of the latter, sycamore trees and associated exotic shrubbery will be

removed from the near corner of the adjoining Healey property, but the large oak trees with significant tree status within the property will not be affected. The large macrocarpa tree in the adjacent paddock will be impacted by the proposed eastern approach embankment and will be removed while the prominent walnut tree in this paddock will be retained. There is the possibility to retain the macrocarpa tree in the landscape treatment as slabs of timber used in seating or decking or as sculpture / art.

Detail design will define the placement and alignment of the cycle trail in this area, along with incorporating screen planting to visually 'close-off' the end of Weardale Street as seen when approaching from the south along the street. A stormwater detention basin serving the proposed bridge and its eastern approaches will be created within this paddock. This basin will be planted with wetland species that will rise into the native species planting of the bridge approach embankment.

The local section of the cycle trail will be realigned from the proposed cul-de-sac head on Weardale Street along the toe of the eastern approach batter, then under the proposed bridge, past the proposed stormwater basin to the proposed safe stopping area. A pedestrian pathway will rise from this route at the approaches to the bridge to join the shared path on the downstream side of the proposed bridge. In all areas fall protection fencing will be added, as necessary.

BEAUMONT BRIDGE SAFE STOPPING AREA

As previously mentioned, the defunct section of highway at the sharp approach bend to the existing bridge provides an opportunity. This would be to create a safe stopping place/rest area that incorporates the existing information node on the Clutha Gold Trail. This would then provide cycle and pedestrian access to the existing bridge, once it has been de-commissioned as a traffic bridge.

The existing open area of the Craig Flat Road intersection with the highway affords a broad area that can be shaped and re-surfaced for parking, while maintaining a link and a node in the Clutha Gold Trail. The surfacing will need to take into account the shared use of the space and prioritise safe cycle and pedestrian crossing.

There is the potential for the installation of seating, picnic tables and cycle stand; this could also tie-in with the existing cycle trail information/ interpretation signage. Re-used asphalt, concrete, schist and hardwood

such as old railway sleepers would be materials that reference the history of the area. Inclusion of the retained walnut tree as a feature in the design of the safe stopping area will also build on the heritage themes.

An objective of the Clutha Gold Trail project is to re-establish glades of large native trees along the length of the trail. This would be combined with the opportunity to provide shade and a backdrop to the proposed safe stopping area. Tōtara would a suitable tree species as it was once common to the local river banks and was used in the construction of the original bridge across the Clutha Mata-au River at this point.

EXISTING BRIDGE 'LINKAGE'

The defunct highway bridge will become a 'viewing platform' for both the river and the proposed bridge. This will also allow the opportunity to observe the form, structure and materials of the historic bridge at close hand. It is anticipated that scaffolding that is currently in place for the frequent maintenance that the traffic bridge requires will be removed and the uncluttered form of the bridge will become visible again.

At the western end of the existing bridge, the combined cycle and pedestrian path would lead under the proposed bridge and to the south side of the highway to the hotel and holiday park. A path from the end of shared path crossing the proposed bridge will lead down to join this path. Design solutions will prioritise safety and accessibility, with appropriate gradients allowing cyclists and pedestrians to enjoy the riverside experience as they travel towards the hotel and holiday park.

Detail landscape design would develop the connection to the river edge and also create a visual screen and physical barrier to block taking a direct and unsafe route across the highway to the hotel. This screen would also reinforce the 'closing-off' of the west approach to the existing bridge relative to passing traffic. Similar landscape treatment would also aid in visually 'closing-off' Rongahere Road to local traffic heading north on this section of road. This planting on both sides of the highway would also help define the western approaches to the proposed bridge.

WEST APPROACH

The main local feature on the west bank of Clutha Mata-au River is the Beaumont Hotel, which fronts directly on to the highway. With an improved highway alignment, traffic speeds in this area are likely to increase and some form of separation between hotel and highway is required. Given the space constraints, the detail design of this area will have a single vehicle entrance to the hotel and holiday park, traffic barriers and a physical and planted landscape screen. Traffic would exit the area via a new link to Dee Street, the local road on the property's western boundary; refer Appendix B for concept plan.

To the immediate west of the hotel frontage, Dee Street intersection will be improved as it will become the one link from the highway south to Rongahere Road and to Tuapeka Mouth-Clydevale area. Any landscape treatment would be kept to the minimum in this area ensuring clear sightlines.

Further to the west, the Westferry Road intersection would be closed with landscape planting reinforcing the visual closure of this road relative to highway traffic approaching from Roxburgh and the west.

PROPOSED BRIDGE

The current Beaumont Bridge is one of New Zealand's oldest landmarks, with its structural form being unique and characteristic of the Central Otago Region. The proposed new two lane bridge located downstream presents an unique opportunity to pay homage to this icon; tying in with the character whilst being sympathetic to the history yet maintaining it's own distinct and elegant form.

As noted in Section 3.9, a continuous steel multi-girder superstructure, with composite concrete deck, founded on reinforced concrete hammerhead piers (i.e. single pile) will provide a cost-effective solution for the site constraints.

Opportunities for urban design features of the bridge that can be developed to 'embellish' the design include:

Piers – concrete columns (circular or simple geometric shapes such as octagonal) provide a contemporary solution to support the bridge. Careful consideration for integrating the pier with any pile cap or larger diameter cylinder forming the piled foundation will be required to avoid a disconnect and ensure the bridge is visually well 'grounded'.

Abutments - Due to the retention of the historic bridge as a part of the cycle trail, pedestrians and cyclists will pass under the new bridge at both ends (refer Figure 14). Important consideration has been given to this experience and vantage angle, to both engage and promote a secure and inviting passage and journey for all parties. The two abutments present the opportunity for patterning signifying elements of area during passage under the bridge adjacent to the Clutha Mata-au River at what is a historic and long used crossing area.



FIGURE 14: ARTISTS IMPRESSION OF TRAIL LEADING UNDER ABUTMENTS, SHOWING OPPORTUNITY FOR ART APPLICATION TO ABUTMENTS & INCLUSION OF ANGULAR FORMS ON SIDE BARRIERS

Superstructure – There is the potential to incorporate some degree of contrast in the steel bridge beams which will be visible below the side barriers. The use of weathering steel provides a low maintenance option and bold contrast with the concrete of the edge barriers and is recommended for further consideration (refer Figure 15 and Figure 16). Careful detailing will need to be adopted to ensure staining of substructure elements is avoided.

The connection between the steel bridge beams and hammer head piers will need to be well considered and a simple treatment without end upstands is proposed similar to the Waitaki River Bridge. Utilisation of a hammer head pier structure allows the pier shapes to pay homage to the existing bridge.

Side barriers; outside face – The standard TL-5 HT barrier provides opportunities for incorporation of textures and patterns. This ‘infill’ line work would be visible from the cycle and pedestrian path on the existing bridge and on the riverbanks immediately below the proposed bridge (refer Figure 14 and Figure 15).

Side barriers; inside face – There is the opportunity to embellish the inside faces of the side barriers as seen from the traffic lanes. This embellishment could take the form of exposed aggregate or embossed lines that reflect the external ‘panel’ elements. While there is an urban design preference for embellishment on the inside face of the barriers, the actual texture used will be guided by the practicality of ‘installing’ such.

Side barriers; top rail – An unpainted, hot dip galvanised (HDG) or thermal metal spray finish is proposed for exposed steel elements such as the barrier top rails. However, the top rail of the side barriers is an element where colour can be introduced with relative ease and limited cost. Given that weathering steel is proposed for the superstructure, this ‘rust’ colour could be carried through to the top rails. Alternatively a simple HDG finish could reference the grey tones of the existing bridge. In terms of ‘whole-of-life’ considerations, it is expected that the colour will need to be a lighter shade so it does not readily fade, but has enough ‘weight’ so that the top rail ‘reads’ as a distinct line.

Pedestrian / cycle side barriers between path and river can also feature similar colour and angular forms to complement the rest of the bridge design.

The appropriate combination of design features will allow the new structure to tie in with the existing landscape and be appropriately “of place” (refer Figure 18).

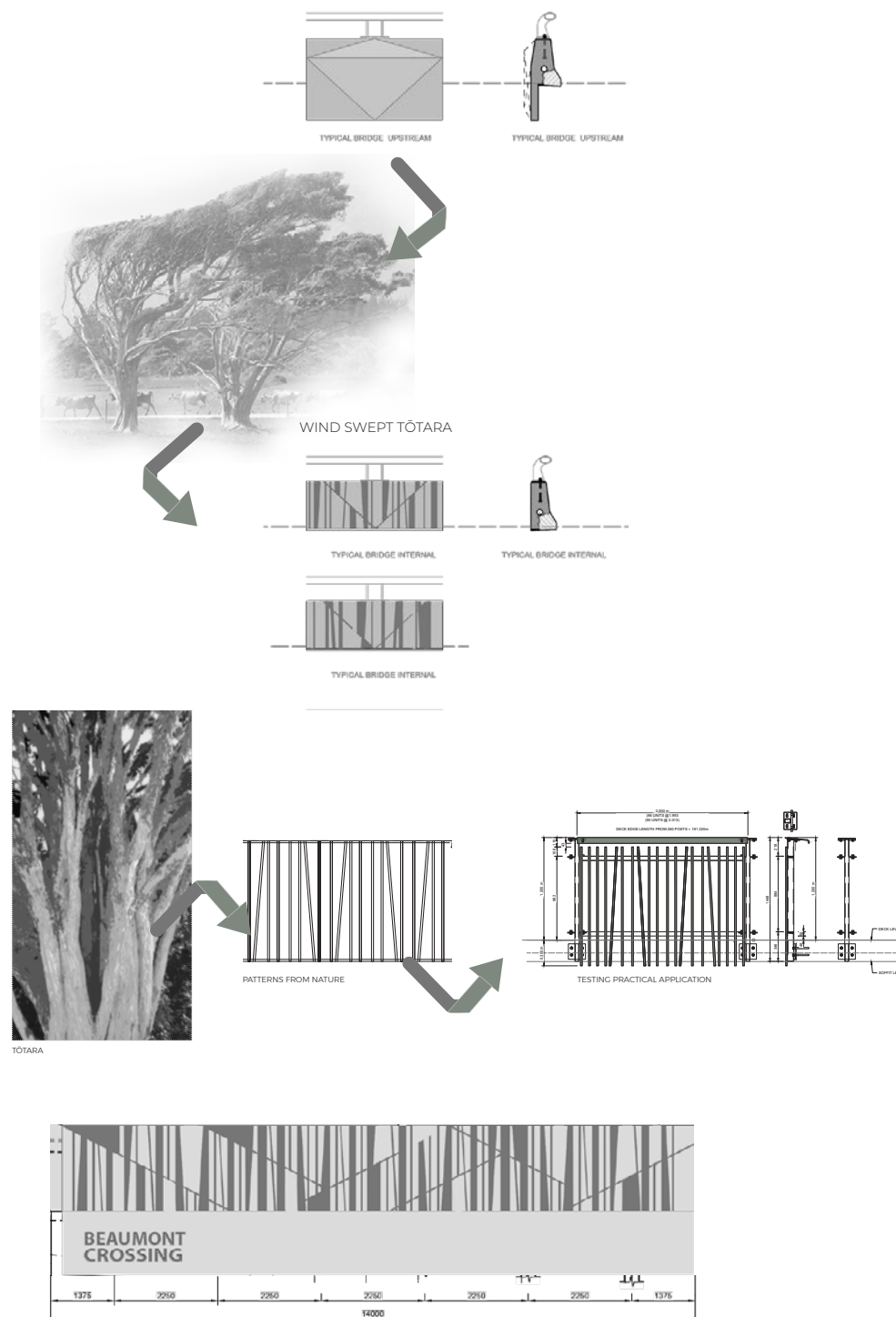


FIGURE 17: INDICATIVE PATTERNS SHOWING POTENTIAL TO USE ELEMENTS FROM THE ENVIRONMENT TO FORM PATTERN ON ELEMENTS OF THE BRIDGE.



FIGURE 15: EXAMPLE OF WEATHERING STEEL USED FOR BRIDGE GIRDERS AT KAWARAU FALLS BRIDGE NEAR QUEENSTOWN. THE KAWARAU FALLS BRIDGE ALSO INCORPORATES TEXTURES IN THE OUTSIDE FACE OF “HT” CONCRETE BARRIERS.



FIGURE 16: EXAMPLE OF WEATHERING STEEL USED FOR BRIDGE GIRDERS ON THE WAITAKI RIVER BRIDGE, KUROW.



FIGURE 18: ARTIST'S IMPRESSION OF PROPOSED BRIDGE & SAFE STOPPING AREA

5.3 Crime Prevention Through Environmental Design

Consideration will be given to limit any potential CPTED/personal security risks relative to the detailed design of the proposed safe stopping area, the sections of path passing under the proposed bridge (refer Figure 19). This consideration will also guide the actual placement and massing of plant species so as to not create unintended screened-off areas and the opportunities for undesirable behaviour.

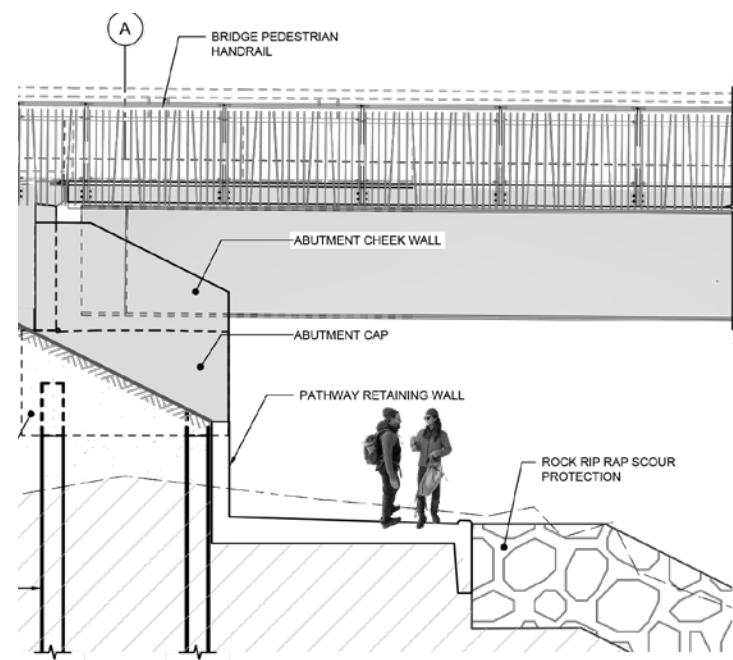


FIGURE 19: CONSIDERATION OF ABUTMENT FORM TO AVOID CREATION OF UNDUE PERSONAL SAFETY RISK

5.4 Landscape Maintenance

The long-term maintenance consideration of the proposed landscape treatment is fundamental to the design of an appropriate, practical and sustainable design solution and will be applied to the design.

Landscape design should establish long-term aims and objectives for landscape and feature management (as a continuous process). This is to optimise the life and value of the vegetation, while maintaining, managing and improving safety. Further to this, biodiversity, visual quality, stormwater runoff, pest, local air quality considerations and Transport Agency business practices are foremost. Maintenance consideration will cover the following:

- Design of core areas with hard surfaces at the narrow parts, to avoid plant establishment and maintenance issues
- Co-ordinated street furniture
- Plant selection to deliver whole of life value
- Maintenance needs being coordinated with the design
- Space created for practical mowing operations as part of the design, if such are required
- Safety margin to mowing operators.

6. CONCLUSION

The Urban and Landscape Design Framework outlines the guiding principles to be incorporated from concept through to detailed design of the replacement bridge and associated approach works. The ULDF has drawn on the high level urban design issues, where the broader context and aspirations are considered, while encompassing the Transport Agency's objectives and requirements to develop an integrated Landscape Concept Plan for the highway corridor and river crossing.

A contemporary modern structure incorporating circular columns, hammer head piers and weathering steel bridge beams below concrete deck and concrete edge barriers, it is proposed this bridge will acknowledge but not compete with the distinctive form of the existing wrought iron truss bridge. Careful detailing and provision of texture to edge barriers and colour to barrier top rails will further embellish the structure.

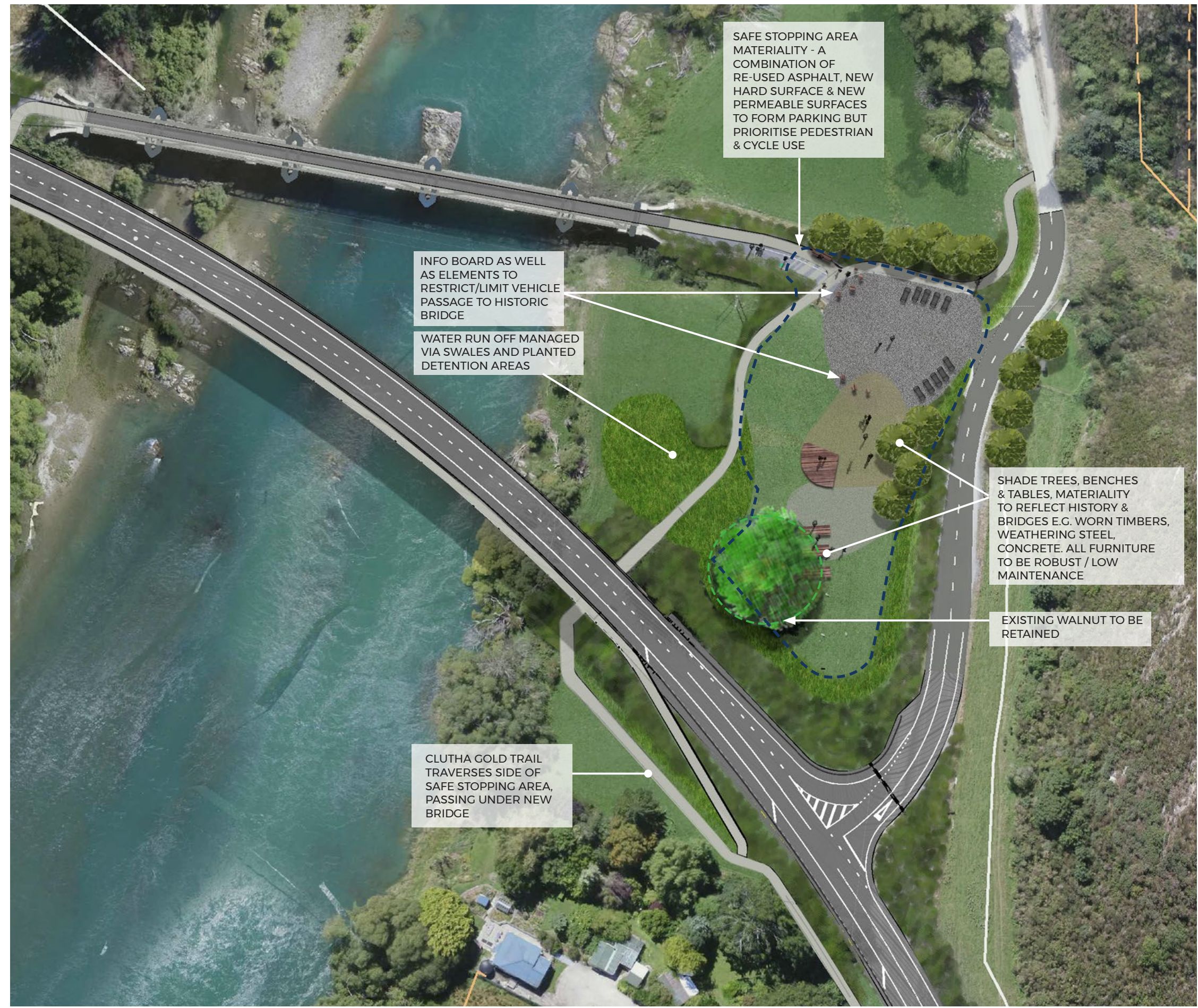
This bridge structure is accompanied with cohesive landscape strategy which forms a safe stopping area for motorists, a distinctive crossing area and rest for cyclists and pedestrians, and cohesive pedestrian and cycle links to the both sides of the bridge. This will be accompanied with planting to form necessary screening chosen from palettes particular to the area in terms of both original ecosystem, and other locally valued species.

The safe stopping area and associated paths and amenity also provide opportunity to experience the historic Beaumont Bridge. The Beaumont Hotel's place in the area is maintained, with sympathetic landscape development around the new bridge maintaining clear, safe access and an attractive frontage. Access to the river will also be redeveloped, maintaining both pedestrian and recreational vehicular access.

APPENDIX A - LANDSCAPE CONCEPT PLAN

LEGEND

- WAYFINDING SCULPTURE - SLEEPERS OR SIMILAR
- PROPOSED STORMWATER INFILTRATION AREA
- LANDSCAPE PLANTING - EMBANKMENTS
- PROPOSED TREE GLADES
- BEAUMONT CROSSING REST AREA
- EXISTING TREE TO RETAIN
- CLUTHA GOLD TRAIL -PROPOSED NEW ROUTE



SAFE STOPPING AREA DETAIL SCALE: 1:1000@A3

1

BEAUMONT BRIDGE SAFE STOPPING AREA

- create rest area with safe access to existing bridge, walnut tree, cycle way and vista to river
- tell the story of the crossing - traditional crossing area for both Tangata Whenua and European settlers, by punt and bridge
- allow for parking, but overall provide a safe pedestrian and cycle area with lower priority given to vehicles
- robust cycle parking systems to allow safe parking
- use materiality of ground plane to help signal cycle and pedestrian priority
- re-use asphalt via retention and/or de-pave and re-use
- use combination of permeable and non permeable materials such as asphalt, concrete and crusher dust
- provide amenity which reflects the materiality of the bridges - hardwood sleepers, weathering steel or powdercoated steel in heritage colours, concrete, with forms that also complement bridge architecture
- provide clear wayfinding cues and signs & interpretation signage
- provide native ecology and soften edges via planting which complements the roadside planting and adjacent stormwater infiltration area
- CPTED principles adhered to

2

TOTARA GLADES:

- incorporate Clutha Gold Trail objective to re-establish glades of large native trees
- reflect the original construction materials of the Beaumont Bridge
- planning for eventual shade and shelter for cyclists and other users
- visually signpost the rest area and bridge from multiple directions of approach aiding wayfinding
- aid in visual and physical screening of closed road areas
- provide native ecology.

3

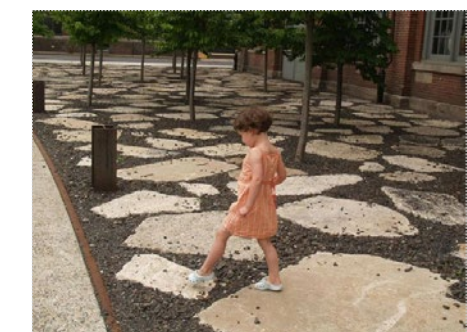
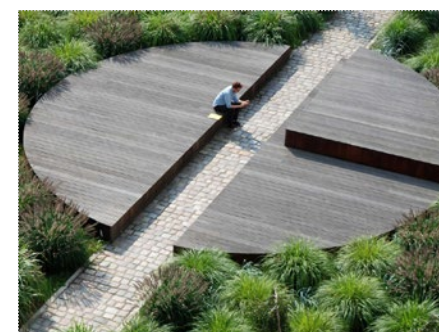
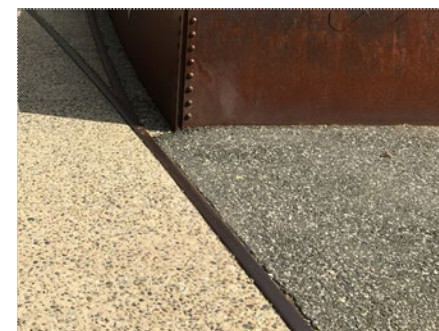
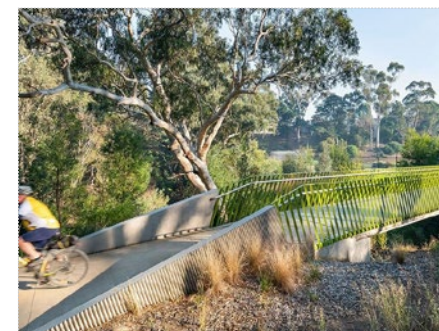
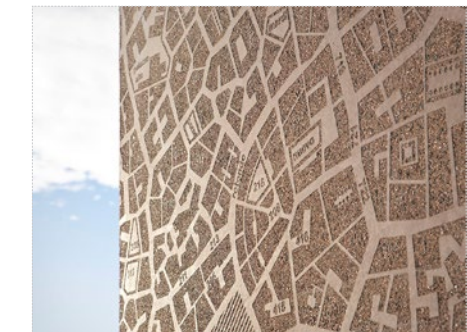
BEAUMONT BRIDGE RIVERSIDE - SHARED CYCLE/WALKING PATH:

- shared cycle walking path provides safe viewing of river, potential access to river
- abutment's featuring natural stones and element of surprise/interest
- abutment materials referencing geography and history
- CPTED principles adhered to
- materiality includes natural stones, concrete, patterned concrete, weathering steel, railway sleepers to reference bridge and railway history
- Any pedestrian/cycle fencing needed combines materiality which references the bridge (i.e. weathering steel) with timber palisade with a nod to the mānuka "hill stick" typically used by shepherds in the region
- riparian planting with high amenity value planted in open spaces
- rip rap adjacent to abutments for flood protection
- planting reflects original ecosystems
- inclusion of river boulders into the track surrounds to blend into riverside
- gradients managed to eliminate risk of serious fall from track. Where not possible, track has appropriate barrier fencing or railing with similar materiality to rest of area
- interpretation to reflect history of this section of the river.

4

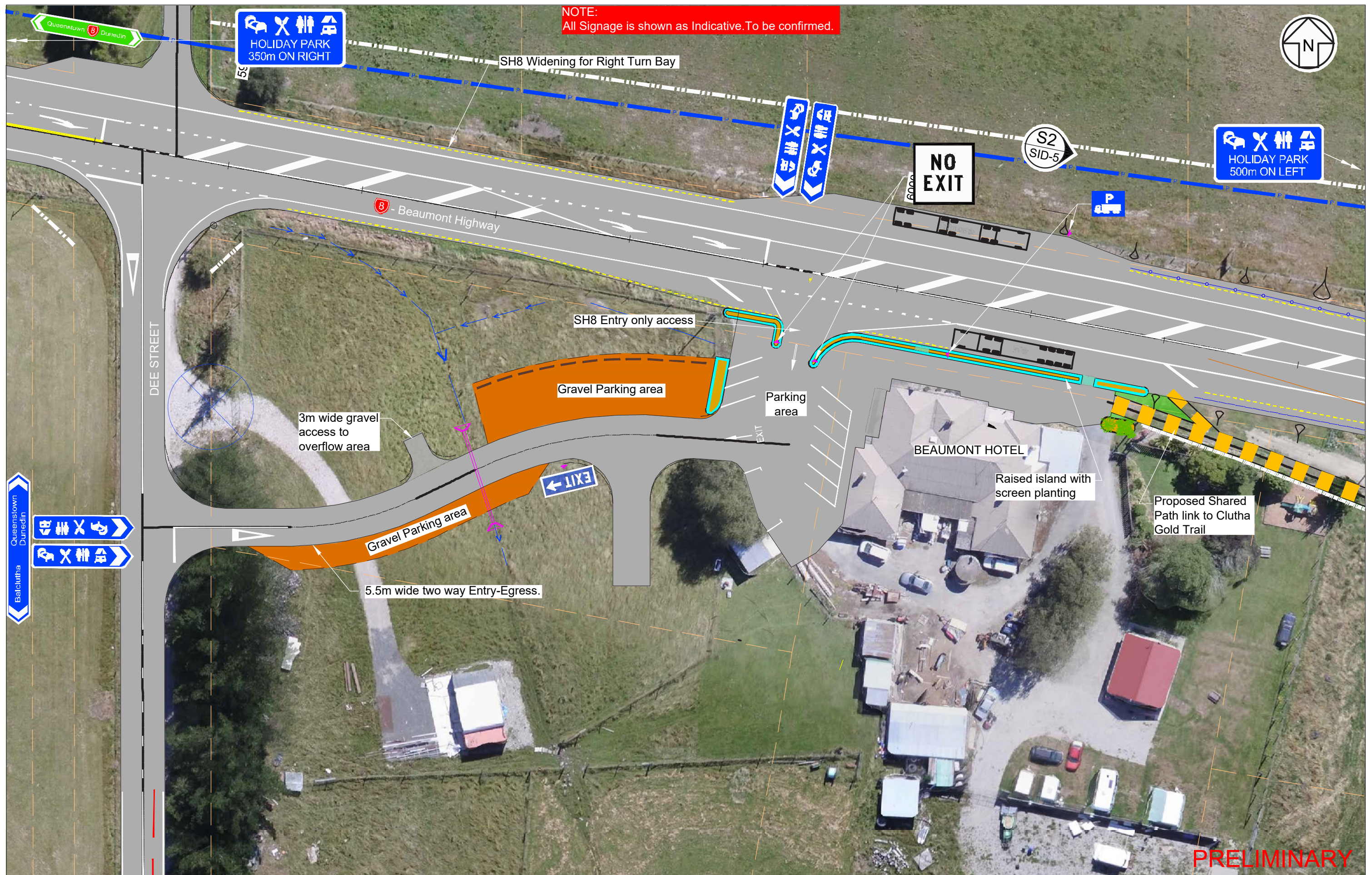
BEAUMONT HOTEL:

- landscape treatment highlights Beaumont Hotel including signalling of new entranceway.
- cycle and pedestrian paths provide pleasant and safe linkage to hotel from safe stopping area and cycleway via both bridges.



PRECEDENT IMAGES

APPENDIX B - HOLIDAY PARK ENTRY LAYOUT



PRELIMINARY



BEAUMONT BRIDGE REPLACEMENT

BEAUMONT HOTEL & HOLIDAY PARK ENTRY - EGRESS
PRELIMINARY DESIGN LAYOUT PLAN



OPUS



