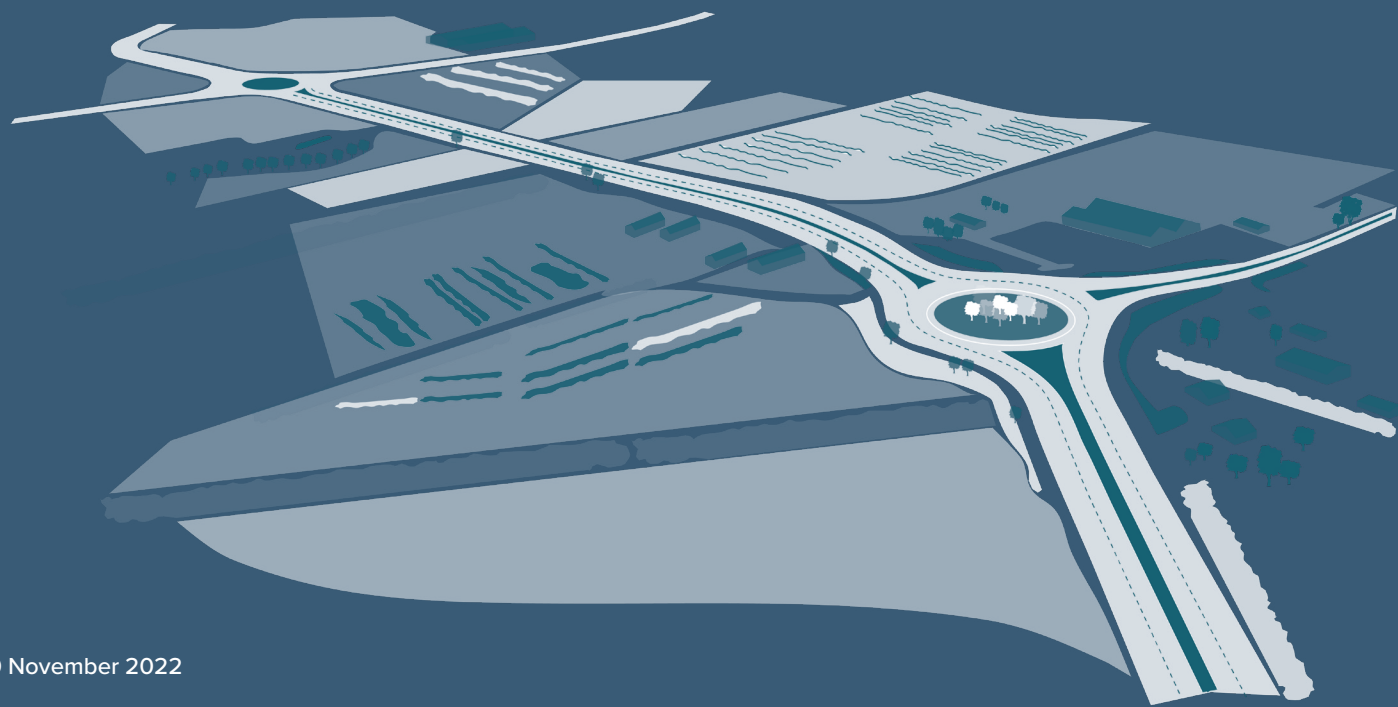


SH16 URBAN AND LANDSCAPE DESIGN MASTERPLAN



10 November 2022



Revision History

Project Number: 3235084

Revision	Project Name	Date
A (Draft)	SH16 Urban and Landscape Design Masterplan	02/12/2020
B (Draft)	SH16 Urban and Landscape Design Masterplan	03/02/2021
C (Draft)	SH16 Urban and Landscape Design Masterplan	29/09/2022
D (Final)	SH16 Urban and Landscape Design Masterplan - For Consenting	10/11/2022

Document Acceptance

Action	Name	Date
Prepared by	Emily Cambridge , Kate McNeill	28/09/2022
Reviewed by	Jeremy Cooke	29/09/2022
Approved by	Peter Burgess	03/02/2021

on behalf of Beca Ltd.

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1.1 PROJECT DESCRIPTION

CONTEXT SECTORS

The State Highway 16 (SH16) corridor from Brigham Creek to Waimauku was identified within the Safer Journeys - Delivering State Highway Safer Roads and Roadsides Programme Business Case (PBC) March 2014. The SH16 project corridor enhances the connection from Auckland to Waimauku. The new section of highway starts immediately north of the Brigham Creek Roundabout and will provide a link through Kumeū / Huapai to Waimauku thereby connecting communities, employment centres and catering for multi-modal transport.

The project corridor presents several issues relating to safety, efficiency and resilience, as well as how future growth demands will respond to these.

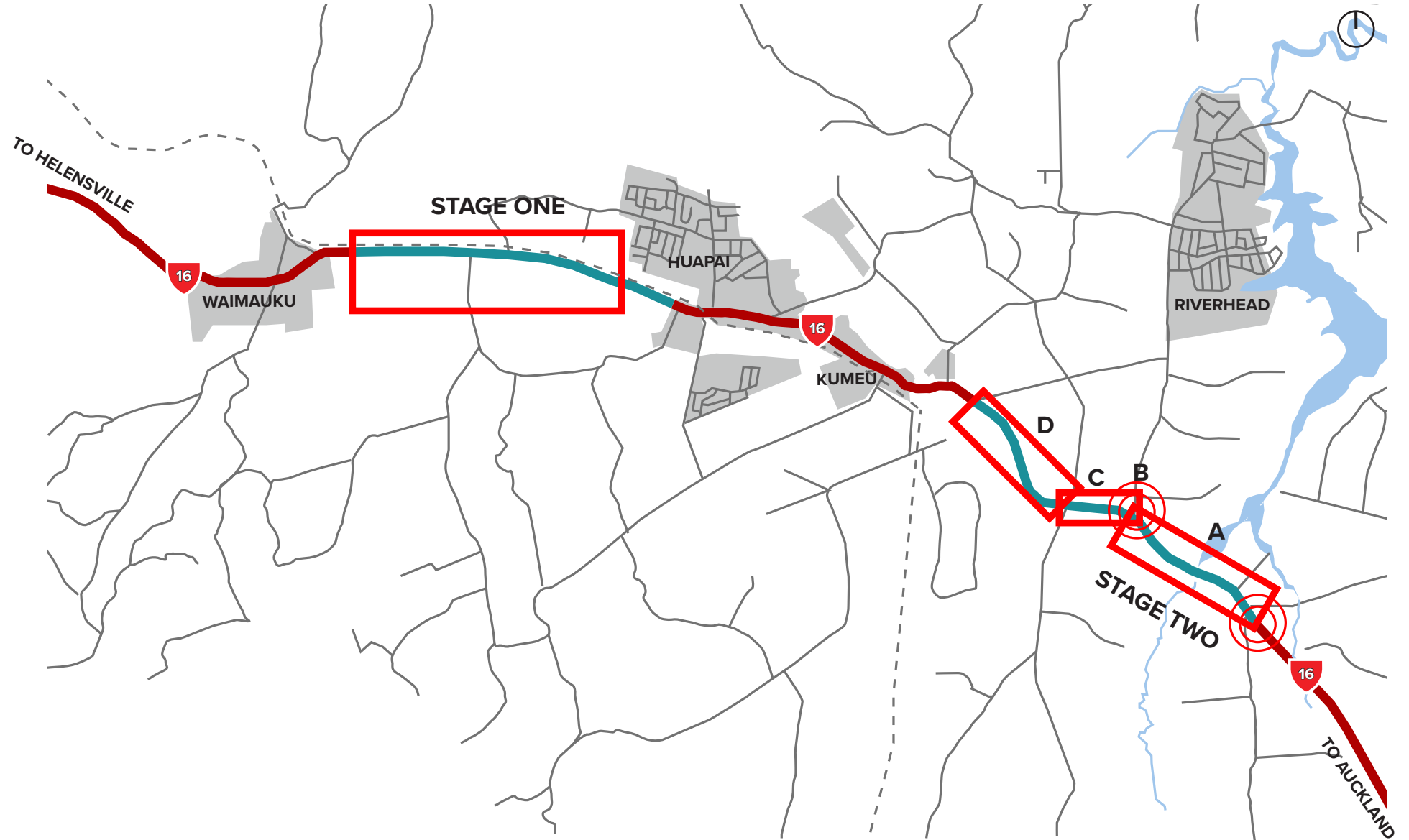
The State Highway 16 corridor is split into two stages:

- Stage 1 – Waimauku to Huapai (detailed design completed)
- Stage 2 – Brigham Creek to Kumeū: this stage is the focus for this ULDMP document

The Stage 1 detailed design was completed in early 2020. The Stage 2 section of SH16 is now in preliminary design. This Urban and Landscape Design Masterplan (ULDMP) focusses on the Stage 2 section highlighted in Figure 1.

The Stage 2 corridor is divided into 4 sections as follows:

- Section A: Brigham Creek roundabout through to Coatesville-Riverhead Highway intersection;
- Section B: Coatesville-Riverhead Highway intersection;
- Section C: Coatesville-Riverhead Highway intersection through to Taupaki Road / Old North Rd intersection; and
- Section D: Taupaki Road / Old North Road intersection through to the posted speed limit change (80km/h and 60km/h) east of Old Railway Road intersection, Kumeū.



LEGEND

	State Highway		Proposed Project		Key intersection
	Urban Centre		Local Road		
			Railway line		

Figure 1 - Map of Sectors

Scale 1 : 50,000

PURPOSE OF THE ULDMP

The purpose of this Urban and Landscape Design Master Plan (ULDMP) is to provide:

- A technical report demonstrating how the SH16 Stage 2 Project fulfills the Urban Design and Landscape Requirements of New Zealand Transport Agency - Waka Kotahi
- A guidance document that describes the urban design and landscape opportunities, design approach and outcomes sought to inform the future design phases
- A supplement to the business case that is specific to the relevant investment objectives, visually describing the outcomes sought.

The ULDMP provides an overview of the Stage 2 project including integration with Stage 1 design objectives and philosophy. Section 2 illustrates both the strategic and the physical context of the SH16 corridor between Brigham Creek and Kumeū. Existing features and constraints are outlined along with opportunities in Section 3. These have informed the corridor strategy and design approach that follow in the document.

The design principles build upon the design philosophy developed during Stage 1. This ULDMP provides specific guidance on features within this section of the roading corridor as well as considering how the wider context (for example, Stage 1 integration, cultural and stormwater aspects) needs to be taken into account and integrated with the project. The framework is supported with discussion of specific urban and landscape design elements through graphics and the overall landscape preliminary design plans. Some of these elements are translated into outcomes referenced through Waka Kotahi’s Bridging the Gap document. Others provide a platform for further development with Waka Kotahi and its partners, in particular iwi during the project detailed design and construction phases.

It is intended that the ULDMP is used by;

- Designers of the preliminary design, detailed design and construction phase of the project as a reference for the overall project objectives, urban design and landscape opportunities, design approach and outcomes sought
- Waka Kotahi to ensure that as the design develops through detailed design, consenting and construction phases, it maintains alignment with Waka Kotahi’s design objectives and outcomes sought in the Bridging the Gap document
- Iwi and any nominated cultural advisor(s) working with the project design professionals, to assist in furthering the development of any cultural expression component of the project
- Local community and project neighbours to illustrate that issues raised through the engagement process have been captured and considered in the design.
- The ULDMP has been prepared as a requirement of Waka Kotahi and will be submitted as part of the SH16 Stage 2 Preliminary Design to Waka Kotahi.
- The ULDMP has been prepared as a requirement of Waka Kotahi and will be submitted as part of the Assessment of Environmental Effects to Auckland Council.

METHODOLOGY

The approach in preparing the SH16 specific ULDMP has been to:

- Reference the urban and landscape design outcomes sought during Stage 1 of the SH16 project
- Identify where the context of the corridor has changed or developed since the design of Stage 1
- Define the impacts of the Supporting Growth context, Auckland Council Unitary Plan future urban zones and proposed Rodney Local Paths Plan on Stage 2 of the project
- Identify relevant objectives from the National Policy Statement on Urban Development 2020 (NPS UD) that should be incorporated into the project. In particular this encompasses the overarching objectives which focus on well-functioning urban environments, supporting reductions in greenhouse gas emissions and climate change resilience.
- Build on Stage 1 urban design and landscape philosophy to develop the design drivers for the project
- Identify key aspects of the Stage 2 project where quality design outcomes need to be considered by the technical teams through design integration discussions to arrive at a preferred solution.
- To inform the project team at technical meetings and for collaboration between disciplines.
- Inform the Mātauranga Māori approach from Bridging the Gap. Mātauranga Māori is ‘the knowledge, comprehension, or understanding of everything visible and invisible existing in the universe.’
- Record in the ULDMP the urban design and landscape requirements to direct the way in which the design should evolve in the next phases of the project.

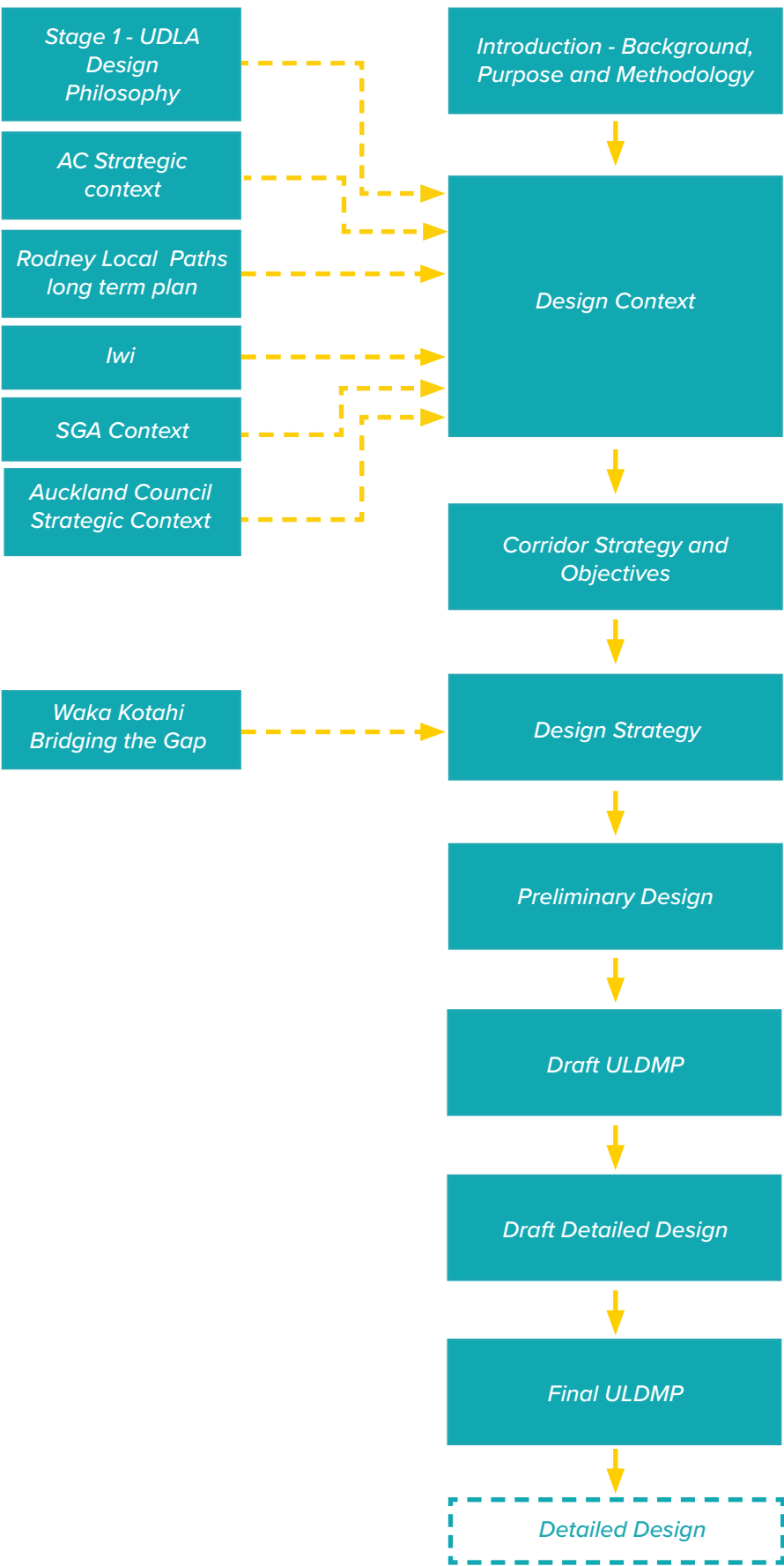


Figure 2 - ULDMP Process

PHYSICAL CONTEXT

Topography

The land surrounding the SH16 corridor is characterized by broad gently undulating terrain and rolling valley slopes. The area to the north of the highway gently rolls east towards the Waitemata Harbour. Areas to the south of the alignment are influenced by the Kumeū River floodplain and the Ngongetepara Stream.

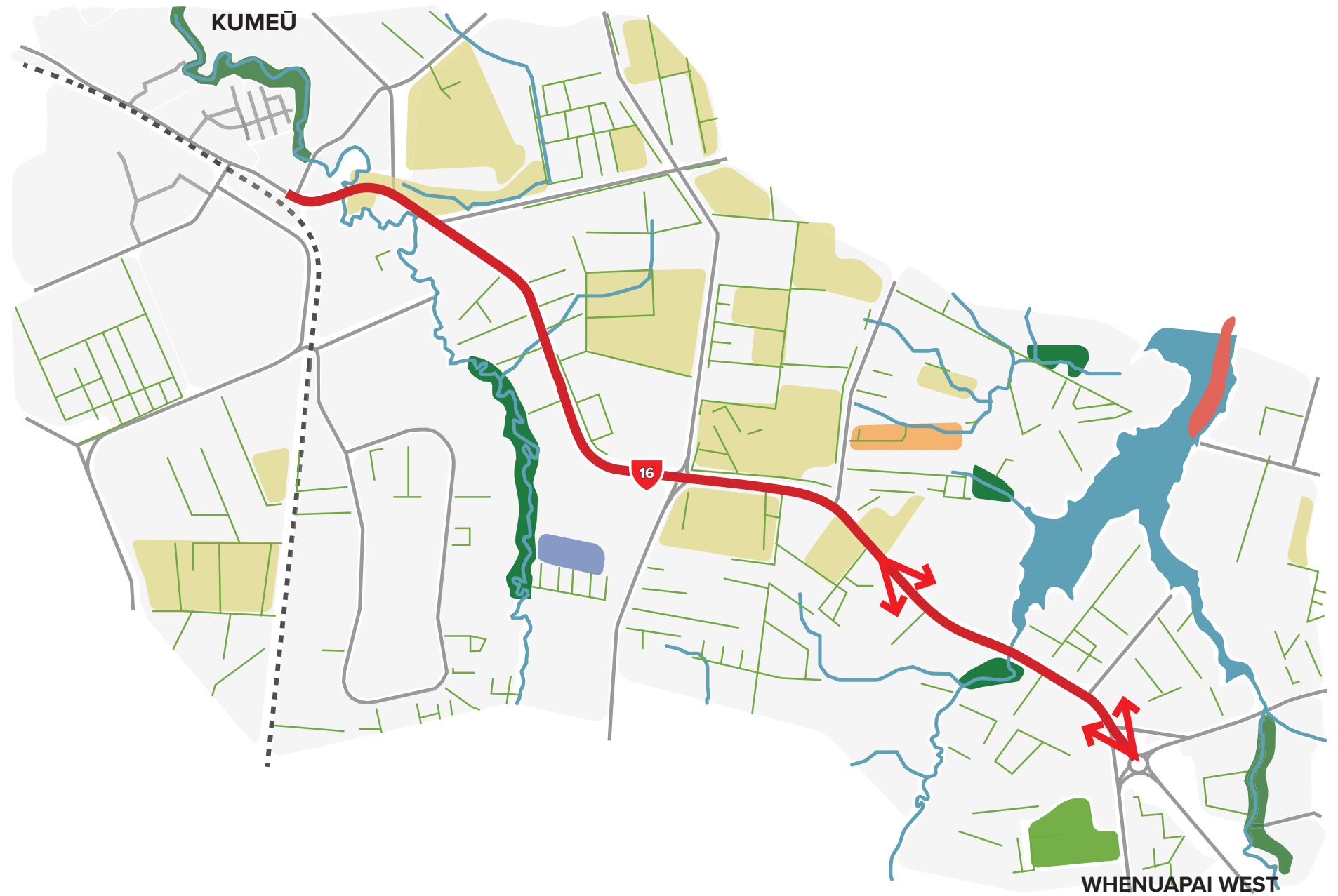
Land use

The SH16 area is predominantly a modified rural landscape with a patchwork of cultivated fields. There is limited evidence of pre-settlement landscape patterns along the corridor. The Kumeū River and Ngongetepara Stream are the only evidence of natural corridors in the surrounding area.

Views over the market gardens, vineyards and open farmland are experienced along the corridor and reinforce the rural character of the corridor. There are pockets of native planting and exotic hedgelines within private properties adjacent to the SH16 corridor which provide an opportunity for the SH16 landscape planting to connect into.

Hydrology

Regional and local waterways including Kumeū River and Ngongetepara Stream which feed into the Waitemata Harbour provide significant ecological habitat for fauna. These waterways should be protected throughout the design and construction of this project.



LEGEND

	State Highway 16		Vineyard
	Existing roads		Exotic vegetation
	Railway line		Native vegetation
	Views		Reserve
	Rivers and streams		Orchard
	Shelterbelt		Mangrove

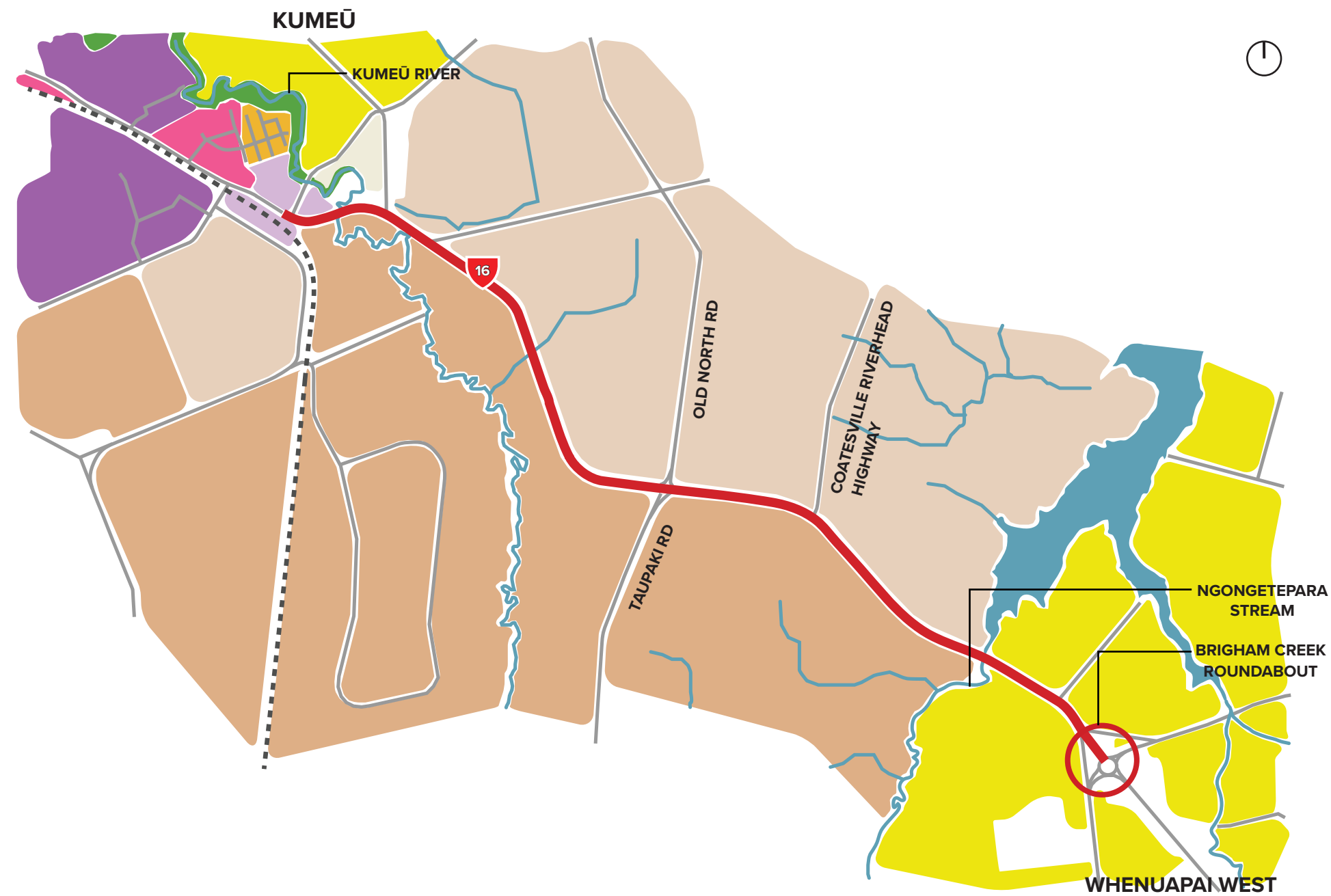
Figure 3 - Map illustrating the existing physical context surrounding SH16

LAND USE AND PLANNING

Under the Auckland Unitary Plan (AUP) - Operative in Part (2016) the land on the northern side of the highway is predominantly zoned Mixed Rural (Light brown area on map) and the land to the south is Rural – Countryside Living (Dark brown area on map). The area surrounding Kumeū/ Huapai and Brigham Creek Roundabout is zoned for Future Urban Zone and the sequencing and timing of the **future urban zoned land** for development readiness is guided by the Future Urban Land Supply Strategy (2017).” This will book end the Stage 2 section of road and bring a significant population increase to each end of the corridor. Another proposed Future Urban Zone to the west of Riverhead will also bring additional traffic and people through the SH16 corridor. The Unitary Plan proposed land zoning is shown in Figure 4.

Impact

- The proposed change in land zoning should be considered during the future design phases. It is important to note the increase in residential area proposed at Kumeū and Brigham Creek as the landscape character is likely to change over time becoming more residential in nature. In particular at Brigham Creek east of Ngongetepara Stream.



LEGEND

 State Highway 16	 Light Industry Zone	 Countryside Living Zone
 Existing roads	 Town Centre Zone	 Single House Zone
 Railway line	 Mixed Use Zone	 Mixed Housing Urban Zone
 Rivers and streams	 Mixed Rural Zone	 Conservation Zone
 Future Urban Zone		

Figure 4 - Unitary plan map illustrating the land use adjacent to SH16

TRANSPORT

The Supporting Growth Programme - Te Tupu Ngātahi has completed the initial investigation and planning phase for a transport network that will connect the new urban growth areas identified in Section 1 over the next 30 years. Auckland Transport, Waka Kotahi and Auckland Council have come together to develop the high level transport plan. The plan with proposed strategic transport network that will support future urban growth includes:

- New Rapid transit corridor
- New walking and cycling corridors
- New or improved road corridors including an alternative State Highway corridor, upgrades to Brigham Creek Road, Riverhead Road and Coatesville-Riverhead Road and other identified strategic corridors

Impact

The proposed Supporting Growth programme will influence the SH16 Stage 2 project corridor connection to the wider north west area. There are several opportunities and constraints including:

- Improved connectivity to key local centres including Kumeū/ Huapai, Riverhead, Whenuapai and Westgate
- There are opportunities for traffic numbers to reduce along SH16 as improved public transport, active travel routes and new road corridors are established in the future. This will enhance the experience for walking and cycling given the heavy use of the corridor by vehicles
- There are several interchanges proposed to be implemented in the coming years (ie. Brigham Creek interchange) which may cause disruption to the work completed through this project
- Active travel user numbers increase as connections from local centres including Huapai and Riverhead are constructed
- The development to the northern edge of Kumeū will also introduce a higher demand for pedestrians and cyclists to cross the corridor. This presents safety risk which should be considered through the design phase
- There is a potential for Future Urban Zones to contribute to increase in transport volumes along the corridor.

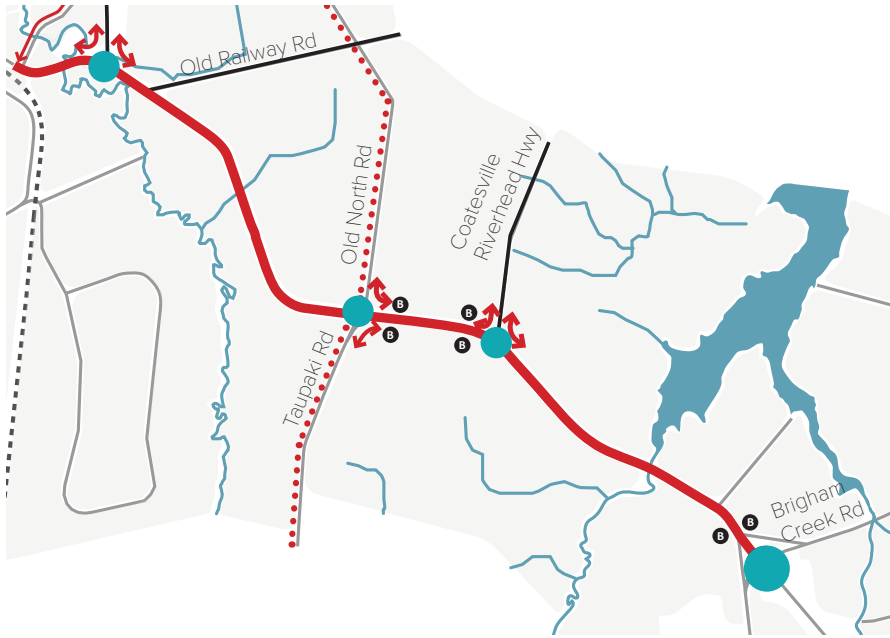


Figure 5 - SH16 Stage 2 Transport context map

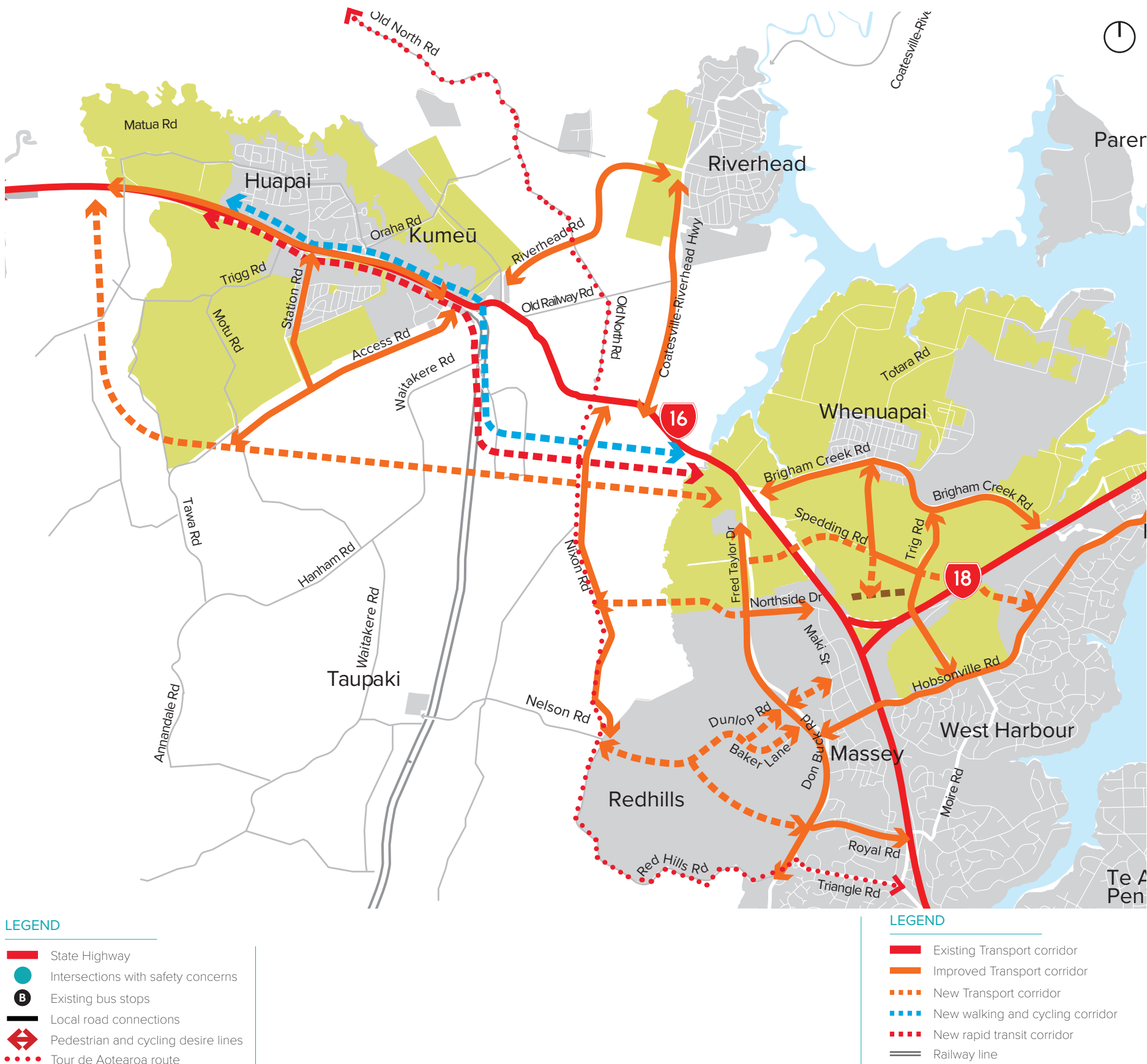


Figure 6 - Supporting Growth Context adjacent to SH16 Corridor (extracted from North West IBC - July 2019)

2.1 PROJECT OBJECTIVES

STAGE 1 DESIGN CONTEXT

The SH16 Stage 1 Huapai to Waimauku Landscape Design Philosophy Statement was established during the pre-implementation stage of that project. The philosophy statement set out several landscape design drivers which informed the development of the design for the highway corridor between Huapai and Waimauku.

The Stage 1 key design drivers that also inform the Stage 2 design include:

- **Enhanced amenity to the townships** of Waimauku and Huapai through gateway elements
- **Complementary response** to the character of the surrounding landscape
- **Integrating bridge and retaining walls into the surrounding landscape.** The landscape design aims to reduce the prominence of these structures, as required, including strategic placement of planting, exploration of planted walls and / or design development that provides a pattern and design that is fitting with the rural landscape character.
- The design approach to waterways will include native planting to enhance the existing vegetation pattern and **‘stitch’ the landscape** treatment across the alignment, integrating the landscape treatment with the stormwater to achieve water treatment and biodiversity outcomes. This approach provides for increased legibility of the valleys and integration with the existing vegetation patterns.

Subsequent changes from Stage 1

The design philosophy for Stage 1 was established in 2018. Since the completion of Stage 1 there have been several significant strategic context changes in the area that impact on the Stage 2 section of this project, these include:

- Land use planning – updates and changes as part of the AUP-Operative in Part 2016.
- Transport – Supporting Growth Programme established to investigate and develop a high level transport plan to support the North West future growth area including road, Rapid Transit Network (RTN) and active transport
- Rodney Greenways Local Paths Plan (Auckland Council 2019) established that outlines the long-term greenways plan for the Rodney area including cycleways, walkways and bridledways.
- The NPS UD (2020) also looks for density to be provided around rapid transit stations with key access to the stations being via active transport.

Impacts of Context changes

The result of changes to land use planning have led to a desire to include a shared pathway that will provide safe access for pedestrians and cyclists along the corridor. The Supporting Growth programme proposes a future transport network for the wider area and indicates where new roads as well as active transport routes could be located. SH16 is at the heart of this network and will continue to form an important spine for all users in the north west. The SH16 shared path should consider key connections to the SGA and Rodney Greenways pathways to enable ease of movement for all modes in the future.

In line with the NPS UD (2020), the north west Supporting Growth network is also centred around a Rapid Transit corridor which will promote access to stations via active transport. Consideration for key desire lines and connections for people to local centres will enable ease of movement for cyclists and pedestrians to and from public transport.

Given the level of change in the area there is a need to refresh the objectives for Stage 2 to align urban and landscape design outcomes envisaged for these future developments.

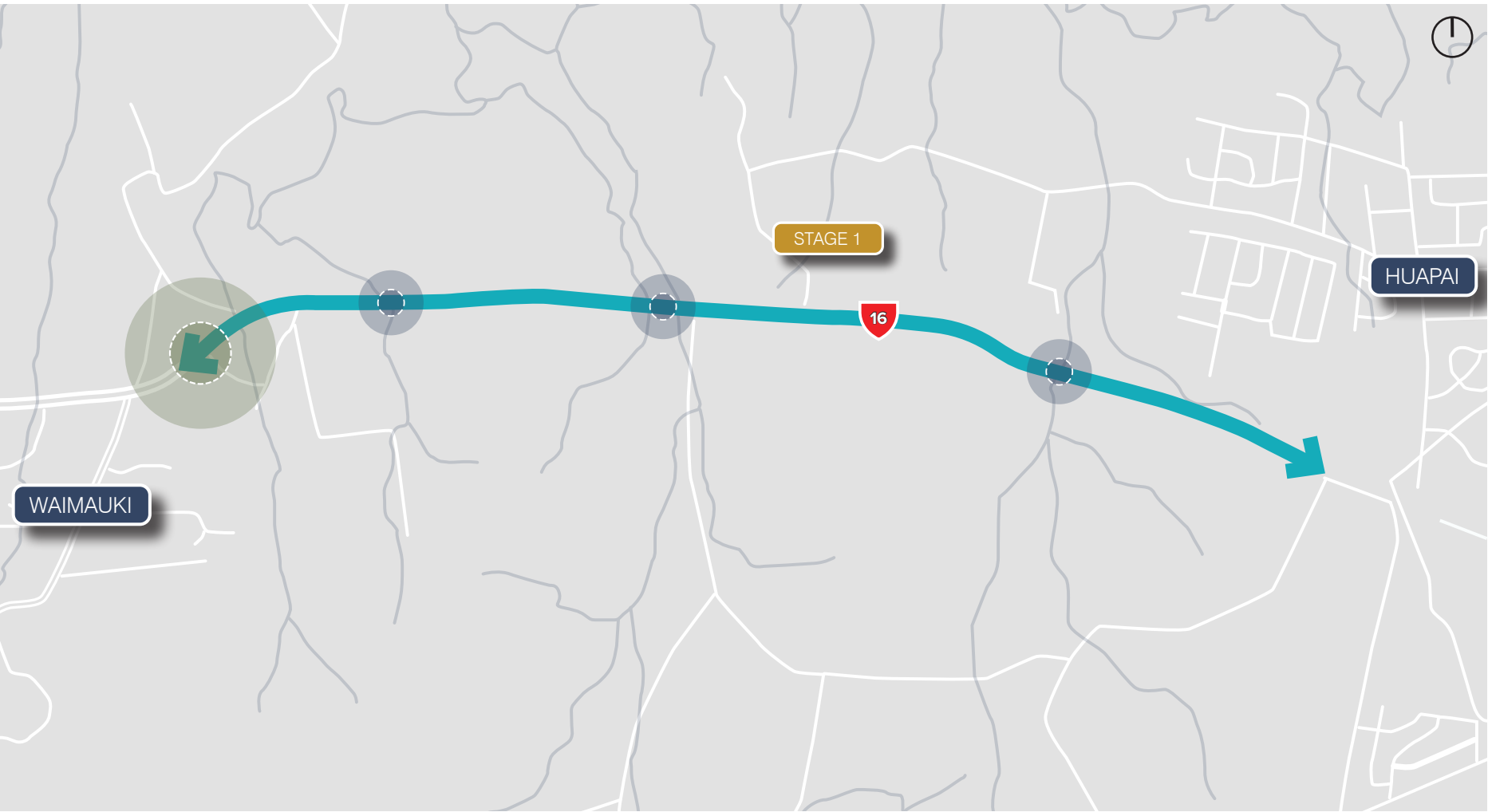


Figure 7 - Map illustrating Stage 1 extents

CONNECTIVITY AND KEY DESTINATIONS

While there are few destinations along the corridor within the project extents; at each end of the project Kumeū and Westgate present significant metro centres with commercial, industry and education facilities. The SH16 corridor provides a key connection to these employment and economic opportunities . The route also provides opportunities to connect directly to the growing local centres of Riverhead and Whenuapai. There is also an opportunity to connect the SH16 shared path to the existing shared path connection from Massey, along the North-western motorway to create a continuous 28km active travel link to Auckland City centre.

The SH16 shared path will provide connections to local destinations along the route including:

- Phil Greig Strawberry Gardens
- Juicy New Zealand Strawberries
- Kumeū River Wines
- Heart & Soul Early Learning Centre (Early Childhood Centre)
- Kumeū Produce Market
- Allely Estate venue
- Soljans Estate Winery
- Boric Food Market and Blossoms Café
- Ngongetepara Stream
- Kumeū River
- The Grind Restaurant

The Tour de Aotearoa bisects the SH16 alignment at Old North Road/Taupaki Road. The intersection with SH16 currently cause significant safety concerns for users and consideration should be made for improvements to the crossing points.

Greenways

The Rodney local paths plan was established in 2016 and outlines the long-term greenways plan for the Rodney area including cycleways, walkways and bridleways. The following map identifies the location of a proposed greenway network which will form connections with the SH16 shared path and enhance connectivity for active modes throughout the North West area including connections to Ngā Haerenga Cycle Trail.

Public Transport and Active Mode interface

To enable multi modal transport opportunities and enhance transport choice for people living in the north west there is an opportunity to create strong connections between the public transport stops and the active mode path network now and in the future. Figure 8 highlights the existing bus stops, proposed SH16 shared path and other proposed cycleways/ active mode corridors in the North west that should be provide for future connections.

Bus stop locations should consider future development and future connectivity for people walking and cycling to access public transport.

Enable the integration of future bus shelters, lighting and bike racks to create an attractive environment for people utilising public transport.

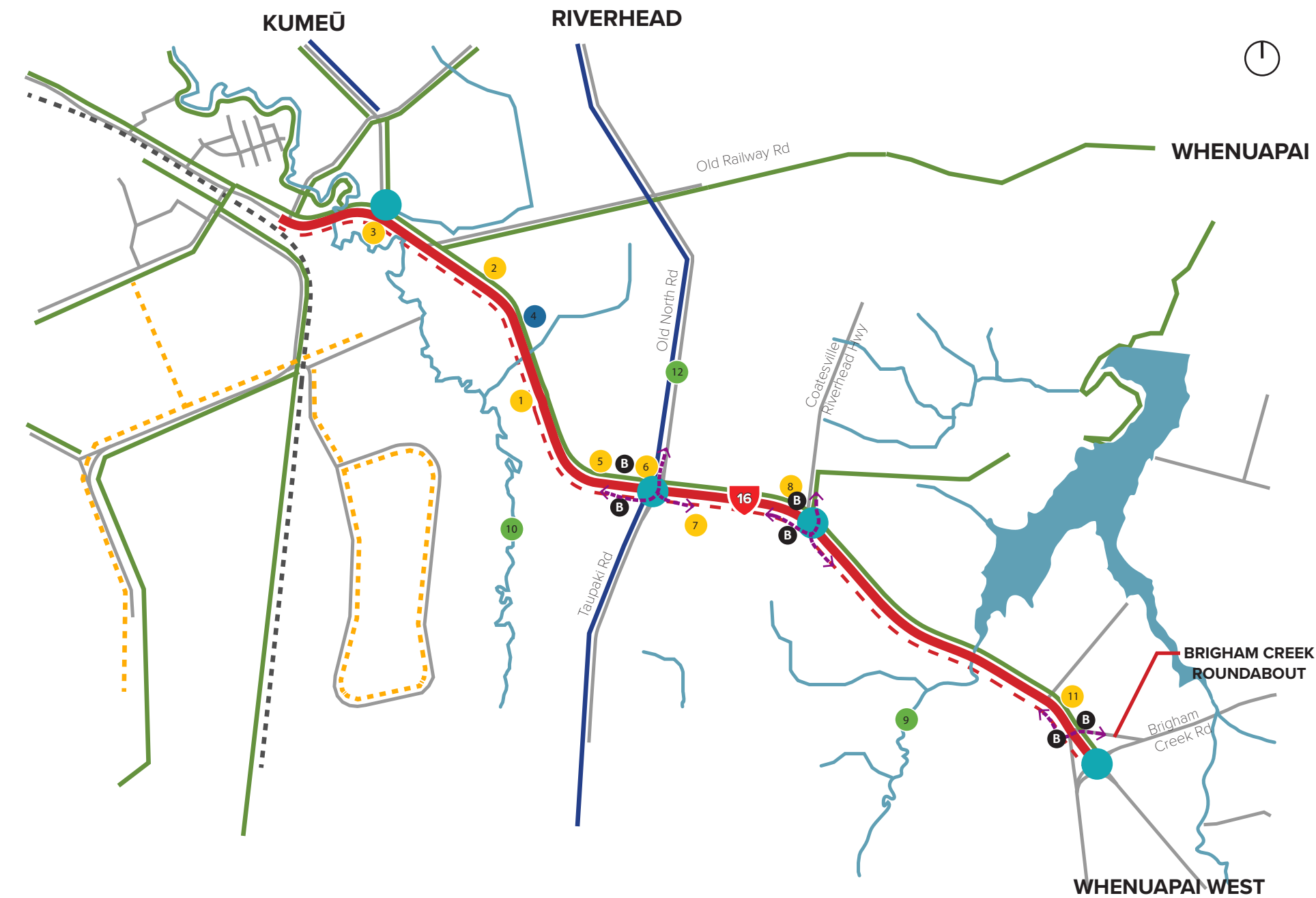


Figure 8 - Key Destinations and Connectivity

2.2 CULTURAL CONTEXT

CULTURAL AND HISTORIC HERITAGE

The State Highway 16 project area is covered by two iwi and the design should celebrate and reflect the coming together of Ngāti Whātua o Kaipara and Te Kawerau ā Maki.

Ngāti Whātua o Kaipara Historical Context

Ngāti Whātua o Kaipara progressively extended their control over the Kaipara area from 1680's onwards until European settlement. This includes the Kumeū to Brigham Creek project area.

The Kaipara region (Aotea) was selected by the Crown as the first place for the Native Land Court to operate, from 1864, the Native Land Court granted land to individuals, rather than to iwi and hapū, this made those lands more susceptible to partition, fragmentation, and alienation. Following colonisation land was progressively cleared of kauri forest and gum extracted. Later it was used for either pastoral farming or horticulture.

Te Kawerau ā Maki Historical Context

Te Kawerau ā Maki history in the area goes back to the Tūrehu, and then the various migrations including the peoples of Toi and waka such as the Tainui. The iwi tribal origins arose in the general area, around 1620, when the rangatira Maki stamped his mana on the land including Ngā Rau Pou ā Maki (the Waitākere Ranges) and locations between Kumeū and the Kaipara Harbour. From him came Tawhiakiterangi, and from him Te Au ō Te Whenua. Te Au ō Te Whenua made peace with Te Taou (Ngāti Whātua) at locations stretching from Muriwai to Rangitōpuni (Riverhead). He married Rangihina of Ngāti Poataniwha. Thus, Te Kawerau ā Maki heartlands cover all of West Auckland and the lands surrounding Te Wai Roa ō Kahu (Upper Harbour). The mana to these lands has always sat with Te Kawerau ā Maki. In addition are two guardian taniwha within the catchments of the Kumeū-Kaipara awa and the western catchment of Waitematā. Of significance to the SH16 corridor it has been acknowledged by the Crown in the 2014 Deed of Settlement that Te Kawerau ā Maki have statutory acknowledgements over the Kumeū River and Te Wai Roa ō Kahu.

Project area context

Following a hui with Ngāti Whātua o Kaipara and Te Kawerau ā Maki in January 2021 we were provided with further definition of the cultural context of the area and key themes to inform the project design:

State Highway 16 is located to the south of Te Oneone Rangatira an area of great significance to iwi. The coast where souls pass over on their way to Spirits Bay, the start of their new journey. It has been home for centuries, evidenced by the many Pa garden remnants and midden of old. The rivers and coast have provided and continue to provide kaimoana to fee whanau.

Travelling further on State Highway 16 you will reach Reweti Marae, one of the five marae of the Kaipara and home to mana whenua of Waimauku and Muriwai.

The waters of awa Kumeū and of Te Wai Roa ō Kahu are protected and where possible their mauri is enhanced. The Kumeū River and Ngongetepara Stream are also both significant transport corridors for iwi linking the Waitemata and Kaipara Harbours. The waterways are important portage routes and were a source of kaimoana for the travellers and local settlements in the area.

(All cultural information extracted from the background information supplied to Waka Kotahi as part of their agreement with Ngāti Whātua o Kaipara for State Highway 16 project).

The following Ngāti Whātua o Kaipara Values are to be upheld through the future design stages of the SH 16 corridor:



Aroha

To foster goodwill and trust among our whānau of the five Marae at every opportunity – Whaia te Kotahitanga (seek to unite as one).

Manaakitanga

To foster opportunities for the welfare and well-being of the whānau of the Ngāti Whātua o Kaipara Marae. Respect our shared knowledge and experiences and that of the wider community.



Tikanga

To protect and uphold the customary cultural rights and ownerships, beliefs and values of the Ngāti Whātua o Kaipara Marae. Through the use and promotion of cultural practice unique to the Kaipara, Te Reo, Powhiri, Rahui, Tangi, Waiata and other protocols.

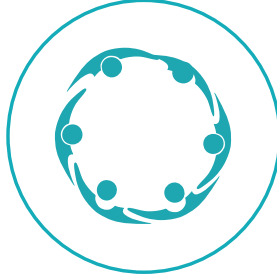
Ngā Rawa Whakahirahira

Identify and care for places of spiritual significance, customary resource areas and archaeological sites. Those which are in our control and support others to care appropriately for things outside our direct control.



Kaitiakitanga

To foster, strengthen and develop the Ngāti Whātua o Kaipara guardianship of the natural environment. Our fresh-water bodies, springs, wetlands, streams, rivers, lakes, harbours, sea, islands, air, land, birds, fish, insects, plants and trees. Safeguard the mauri and mana of the area and its resources. Ensure that what we pass on to future generations is the same or better than we came to it.



Whakawhānaungatanga

To strengthen and maintain relationships with each of the Ngāti Whātua o Kaipara Marae and other whānaunga.

Rangātiratanga

To develop relationships with Crown agencies between the Ngāti Whātua o Kaipara Marae and local government and other organisations that give positive and sustainable outcomes to Te Tiriti o Waitangi obligations.

2.3 CORRIDOR STRATEGY

DESIGN GOALS AND OUTCOMES

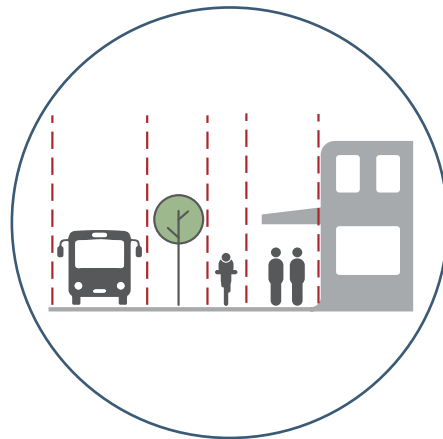
The following urban and landscape design goals have been based on Stage 1 and have been developed to specifically relate to the Stage 2 section of the route.

1. ENHANCE THE AMENITY OF THE TOWNSHIP KUMEŪ-HUAPAI



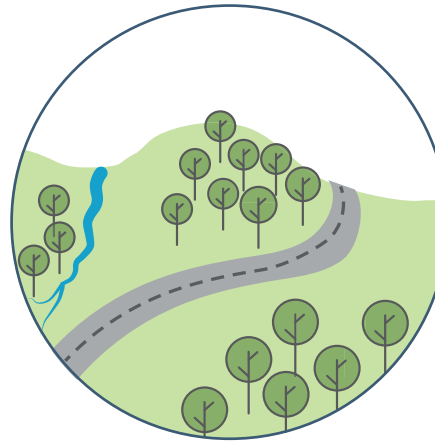
Gateway enhancements celebrate the arrival to Kumeū-Huapai - in alignment with other adjacent projects

4. PROVIDE AN ATTRACTIVE ROUTE FOR PEDESTRIANS AND CYCLISTS THAT IS SEPARATED FROM TRAFFIC



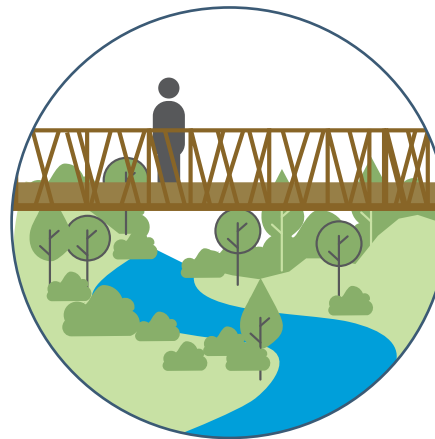
Route connects to the wider active travel network, promotes a safer environment for pedestrians and cyclists and facilitates a high level of connectivity on and across the highway where appropriate.

2. COMPLEMENTARY RESPONSE TO THE SURROUNDING RURAL LANDSCAPE CHARACTER



Seamless connection with the adjacent vegetation patterns along the corridor.

5. INTEGRATE BRIDGE AND RETAINING WALLS INTO THE SURROUNDING LANDSCAPE



Landscape design reduces the prominence of structures, as required, (including strategic placement of planting, exploration of planted walls and / or design development that provides a pattern and design that fits with the rural character of the landscape).

3. IMPROVE AND ENHANCE BIODIVERSITY ALONG THE CORRIDOR



Design approach for waterways includes native planting to enhance the existing vegetation patterns, biodiversity and 'stitch' the landscape across the alignment.

Landscape treatments are integrated with the stormwater systems to achieve both water treatment and biodiversity outcomes.

A linear ecological corridor that provides opportunities for movement of fauna through the area.

OPPORTUNITIES

Figure 9 map identifies opportunities at a high level for the route's entirety.

There is an opportunity to explore further cultural expression through the ULDMP and future design phases through further engagement with Mana Whenua.

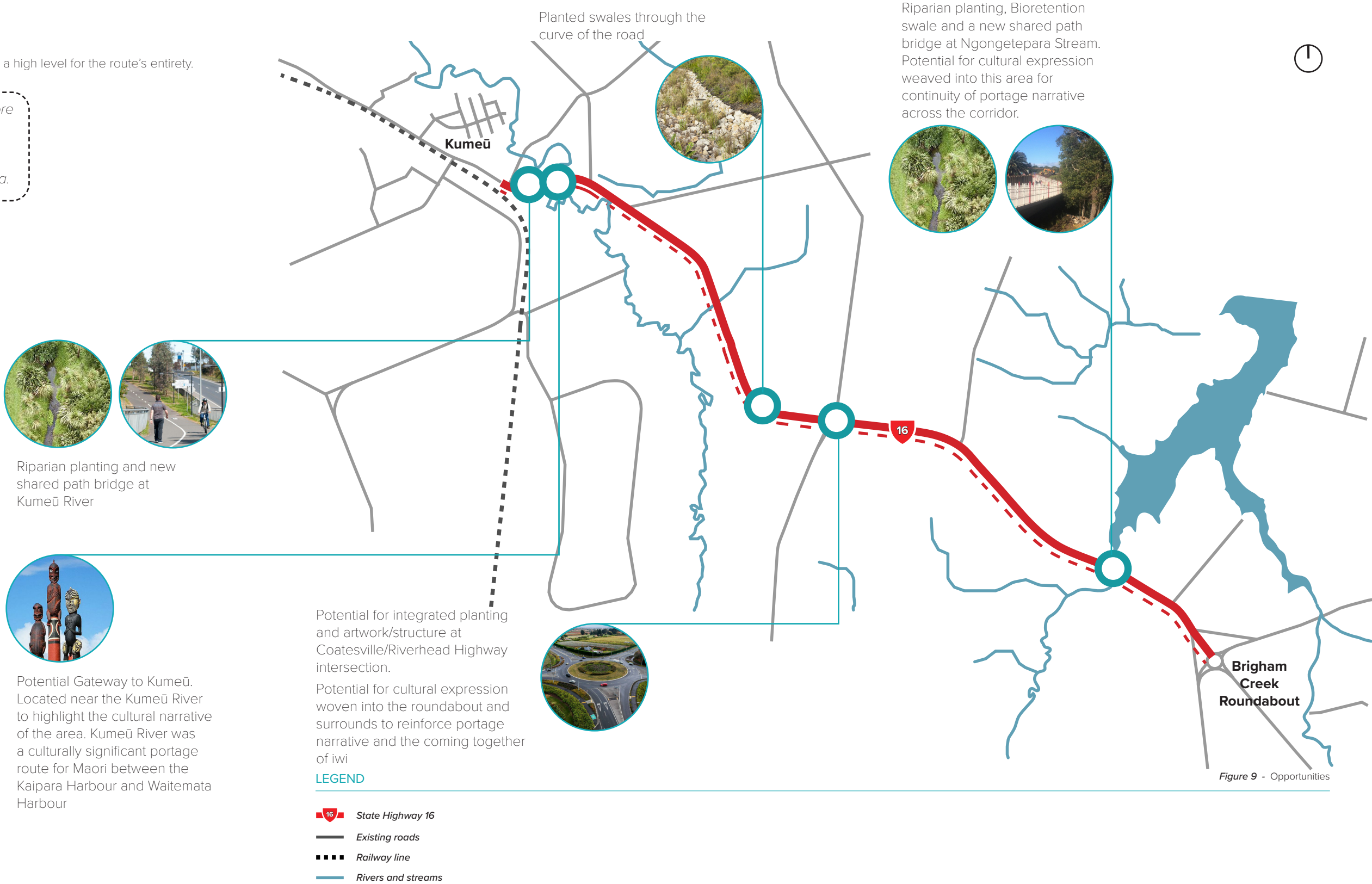


Figure 9 - Opportunities

GATEWAYS

Given the proposed growth in the area and the role this project will have in connecting communities, it is important to acknowledge and accentuate the transition from rural to urban. The design will focus on demarcating the Kumeū township entry point near Riverhead Road, provide a sense of arrival and a visual cue for the speed transition between the rural and urban areas.

A gateway near the entrance to Kumeū township at the Kumeū River provides an opportunity to highlight the portage narrative of the area. Kumeū River was a culturally significant portage route for Maori between the Kaipara Harbour and Waitemata Harbour. It provides a link between both the waters and the settlements along the way



LIGHTING

There is existing lighting along the full extent of this section of State Highway 16, this provides illumination for the road corridor. The 10-12m lighting columns are proposed to be replaced as part of the project.

Provide coordinated project-wide lighting coverage that responds to the local context, addresses CPTED requirements and provides lighting for both the state highway corridor and the shared path.

The required considerations and outcomes for the lighting associated with the Project include:

- Lighting along the pathway and other connected open spaces should be selected to provide a safe, secure, legible and comfortable environment for all operators and users; and
- A coordinated lighting approach should be employed to provide consistency across the corridor defining high activity zones, and providing an inviting environment to all users.



BRIDGE ABUTMENTS

SH16 crosses the Kumeū River and Ngongetepara Stream. Landscape planting will integrate the bridge abutments into the surrounding landscape whilst naturalising stream edges that may be disturbed by the construction works. The design approach to waterways will include native riparian planting which enhances the existing vegetation patterns and thereby provides a connection across the highway. This approach provides for increased legibility of the valleys and links with the existing vegetation patterns.



TREE REMOVAL

To undertake the works there will be a requirement for vegetation removal. This vegetation is both within the existing designation and on private property.

Removal within the designation is driven by the road geometric design and supporting elements including barriers and stormwater devices. Landscape mitigation measures may be included as conditions of the designation and will form part of the main alignment landscape scope.

Any vegetation removal required outside the designation will be subject to the property agreement process.



RETAINING WALLS

The current preliminary road design has a large number of retaining walls due to the elevation of the corridor above the surrounding landscape and to accommodate the alignment within the designation width constraints. The landscape design will aim to reduce the prominence of these structures including exploration of planted walls and / or design development that provides a pattern and design that is unique and fitting with the rural character of the landscape.



DESIGNATION CONDITIONS

The project includes a new roundabout at Coatesville- Riverhead Highway. Given the intersection proposes a multi lane approach – there shall be consideration for a design treatment that encourages speed reduction and increases safety for pedestrians and cyclists crossing the intersection. Hard textured landscaping shall be considered for the roundabout and approach islands to enable clear sightlines across the roundabout for all users and reduce maintenance issues.



FENCES

Where road corridor widening is required and fencing is removed – replacement fences are to match the existing fencing with adjacent property boundary fences.

Consider standard farm fencing in rural areas, as illustrated in the image below. This type of fencing will match the existing farm fencing in the area and fits with the rural nature of the surrounds.

Wire rope safety barriers are proposed along the corridor at the edge of the carriageway. This will provide physical delineation between the shared path and highway. Consideration should be made for additional fencing where wire rope barriers are not present. Fencing should be consistent with fencing used across northern motorway shared path network which is predominantly black powder coated pool fencing.



PLANTING PHILOSOPHY

The overall landscape planting strategy aims to enhance the underlying landscape elements, patterns and processes adjacent to the road corridor. The Stage 2 planting design will seamlessly tie the highway landscape into the surrounding landscape, provide consistency with Stage 1 and create a ‘stitching’ of vegetation patterns across the alignment. Desired landscape design outcomes are;

- Design planting to improve water quality and habitats along streams and rivers.
- Design stormwater treatment devices to minimise impact on water quality (addressing cultural concerns).
- Restore connections between areas of native vegetation to increase habitat and biodiversity levels.
- Make use of natural regeneration processes.
- Make reference to natural vegetation patterns e.g. streamside corridors. Consider opportunities for establishing larger native forest pockets and clusters of native trees in larger designation areas. These will provide stepping stones between bush areas (forming habitat corridors) and natural features which will enhance the ecological qualities of the SH16 corridor
- The planting plans will include endemic eco-sourced native species and replacement trees along the rural boundary of the corridor.
- Planting will also consider safety through CPTED:
- Maintain sightlines by setting back planting from edge of pathways and layering plant species to enable clear sightlines.
- Stitch the landscape vertically to reflect the earlier history and the richness of local resources in this primarily estuarine environment. The history could be reflected through interpretation storyboards and artwork.



STORMWATER ELEMENTS

The stormwater strategy will prioritise stormwater treatment devices for the on site management of water from rain events. There will be three types of stormwater devices including bioretention swales, planted conveyance swales and propriety devices. The preferred option is for vegetated bio-retention swales and vegetated swales where space allows. These options will provide stormwater treatment and flow control. The design will focus on the integration of the stormwater system along the alignment and with the surrounding streams and channels. Where space along the corridor is limited propriety stormwater treatment devices will be used to capture and treat stormwater before discharging.



SAFETY

CPTED (Crime Prevention Through Environmental Design):

Throughout the design there will be consideration of CPTED principles. This will be of particular concern at the urban fringes where there will be higher numbers of pedestrians and cyclists. The following principles will be integrated into the preliminary design:

- Provision of low vegetation as required to avoid unsafe hiding areas for people
- Provision of low vegetation to avoid unsafe hiding areas for people
- Enhancement of passive surveillance through plant species choice and maintaining clear sightlines
- Provision of clear demarcation between private and public property
- Lighting provided along the pathway to increase perceived safety
- Landscape design that is high quality and well maintained. In turn this will attract more people to use the corridor and thus support greater surveillance

Sightlines:

- The landscape design will maintain sightlines for motorists described in Austroads. (2021). Guide to Road Design Part 4A: Unsignalised and Signalised Intersections.



CUT AND FILL SLOPES

The landscape design will work within the parameters of the Waka Kotahi guidelines where possible which specify that that mowable cut and fill slopes shall not be steeper than 5H:1V. The current scheme design only allows for 3H:1V slopes and therefore these slopes will be planted across the extent of the project corridor



DESIGN CONSIDERATION FOR PEDESTRIANS AND CYCLISTS AT DRIVEWAYS AND INTERSECTIONS

- Considerations for planting adjacent to path:
- Minimum 500mm planting offset from path edge to prevent trip hazards
 - Phormium tenax not to be planted within 2m of path
 - Plants within 2m of pathway to have maximum height of 1m to enable clear sight lines



CONSIDERATION FOR DRIVEWAY TREATMENTS

- Signage and surface marking to highlight conflict areas to drivers and shared path users
- Plant heights adjacent to driveways to be maximum 1m high to allow for clear sight lines for all users
- For high frequency driveways consider raised speed cushions/ road humps to slow oncoming traffic



CONSIDERATION FOR TRANSITION TREATMENTS

- Clear signage to indicate entrance/exit points for cyclists
- Planting to maximum 1m to enable clear sight lines on and off the road corridor
- Signage and surface marking to highlight conflict areas



ACTIVE MODES

The SH16 shared path will be located along the south of the SH16 corridor. The pathway will provide a separated active travel route between Kumeū and the Brigham Creek roundabout. Review and consideration of the existing and future pedestrian and cycle connections should be undertaken to ensure these are appropriately connected to and across the highway as appropriate.

There is an opportunity to explore ways to enhance the experience for pathway users through the urban and landscape design. These opportunities could include landscape planting, surface treatments and bridge crossings. The pathway also provides a platform to build the cultural narrative and celebrate the history of the area through information boards.

At commercial business and rural driveway accesses priority shall be given to the pathway user. Consideration should be given to the types of planting, signage and surface marking that can be applied at these locations to increase safety and comfort for cyclists and pedestrians.

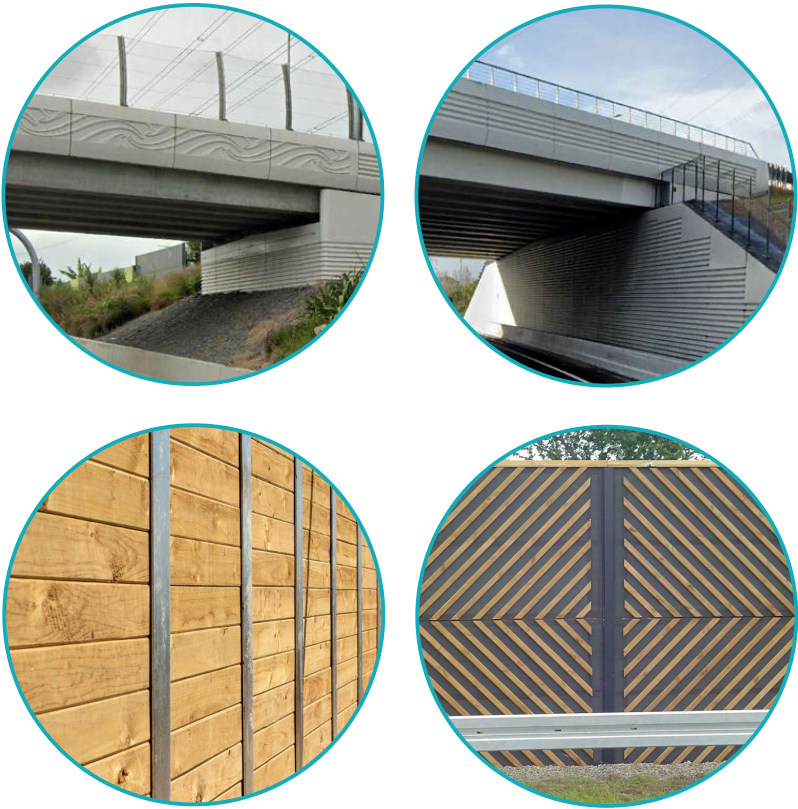


NOISE WALL TREATMENT

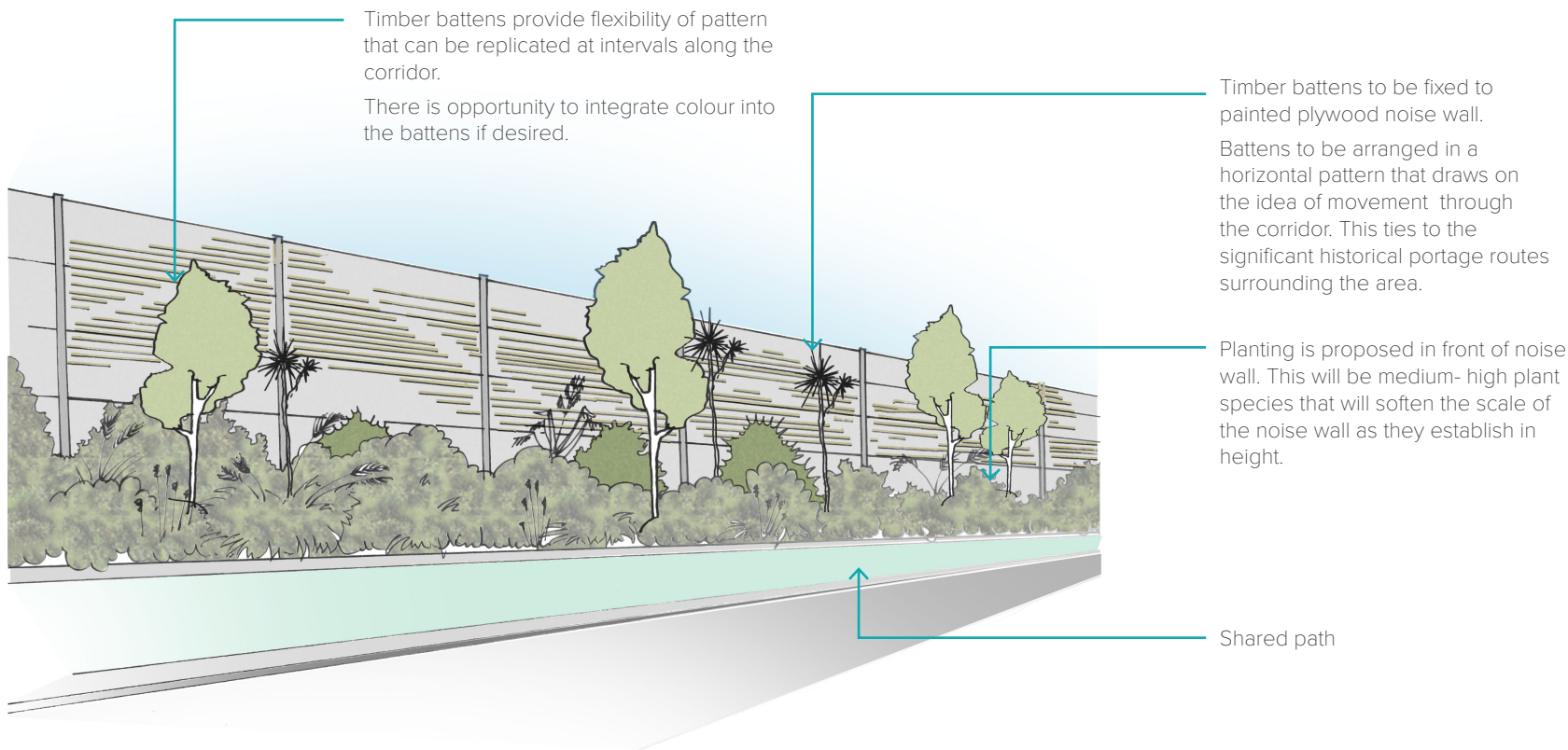
Increased noise outputs will be experienced in some areas along State Highway 16 due to changes to the road corridor. A number of noise walls are proposed to mitigate the existing high noise levels for some adjacent properties along the corridor. Any actual or potential increase in noise levels resulting from the Project will be indiscernible.

When considering the existing rural character of the SH16 corridor, it is important that the materiality of the noise walls is appropriate to reduce the visual prominence of these structures. For these reasons, timber has been proposed as the preferred material for the noise walls. Timber provides a lighter touch to the corridor with less embodied carbon. It is efficient to construct and provides a softer appearance. With support from various planting typologies, there is an opportunity to further reduce the visual effects of the structures through planting species adjacent to the walls.

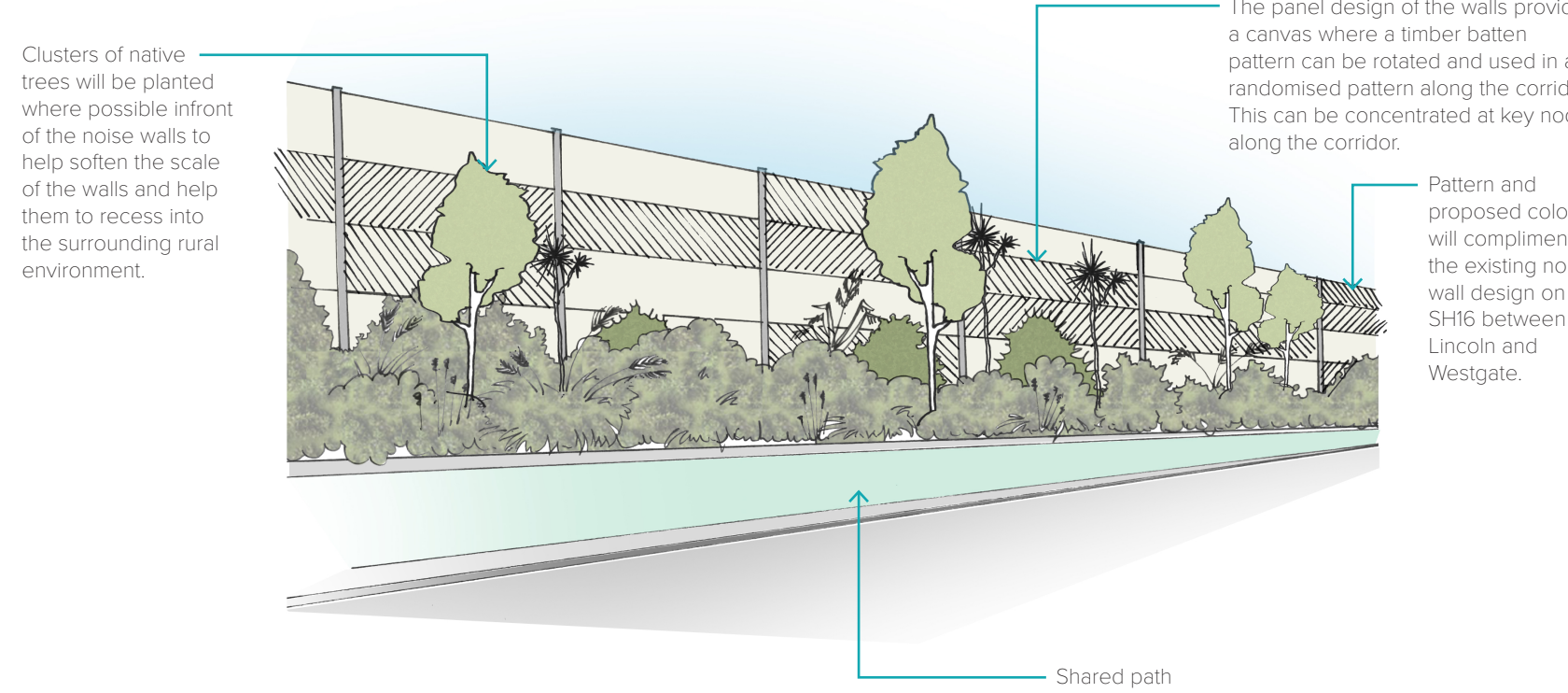
Some maintenance of the structures will be required over time. Much the same as a timber fence this includes replacement of timber as it deteriorates.



CONCEPT 1



CONCEPT 2



ROUNABOUT TREATMENT

The proposal includes a new roundabout at Coatesville- Riverhead Highway. Given the intersection proposes a multi lane approach – consideration for design treatments to encourage speed reduction will increase safety for pedestrians and cyclists crossing the intersection.

The design concept focuses on utilising hard materials such as river rounds, rock rip rap, feature boulders and paved elements to provide a concept that reduces vehicles accessing/parking on the roundabout and long term maintenance. The use of these materials enables clear sightlines across the roundabout and provides a visual cue for speed reduction on approaches to the roundabout.

The concepts provide space to integrate patterns and and/or colour on the outer surface and a central space for cultural artwork or sculptures if desired for this key intersection of the corridor.

Design options and considerations to enable pedestrian and cycle safety at roundabouts include:

Opportunities for speed tables on approaches and departures of roundabouts including:

- 1:30 grade approach ramp, 3m table, 1:40 grade departure ramp
- Edge of departure ramp to be 6m from the limit line (on approach of roundabout)
- Edge of approach ramp to be 6m from outer edge of roundabout circulating lane (exiting the roundabout)

Median islands:

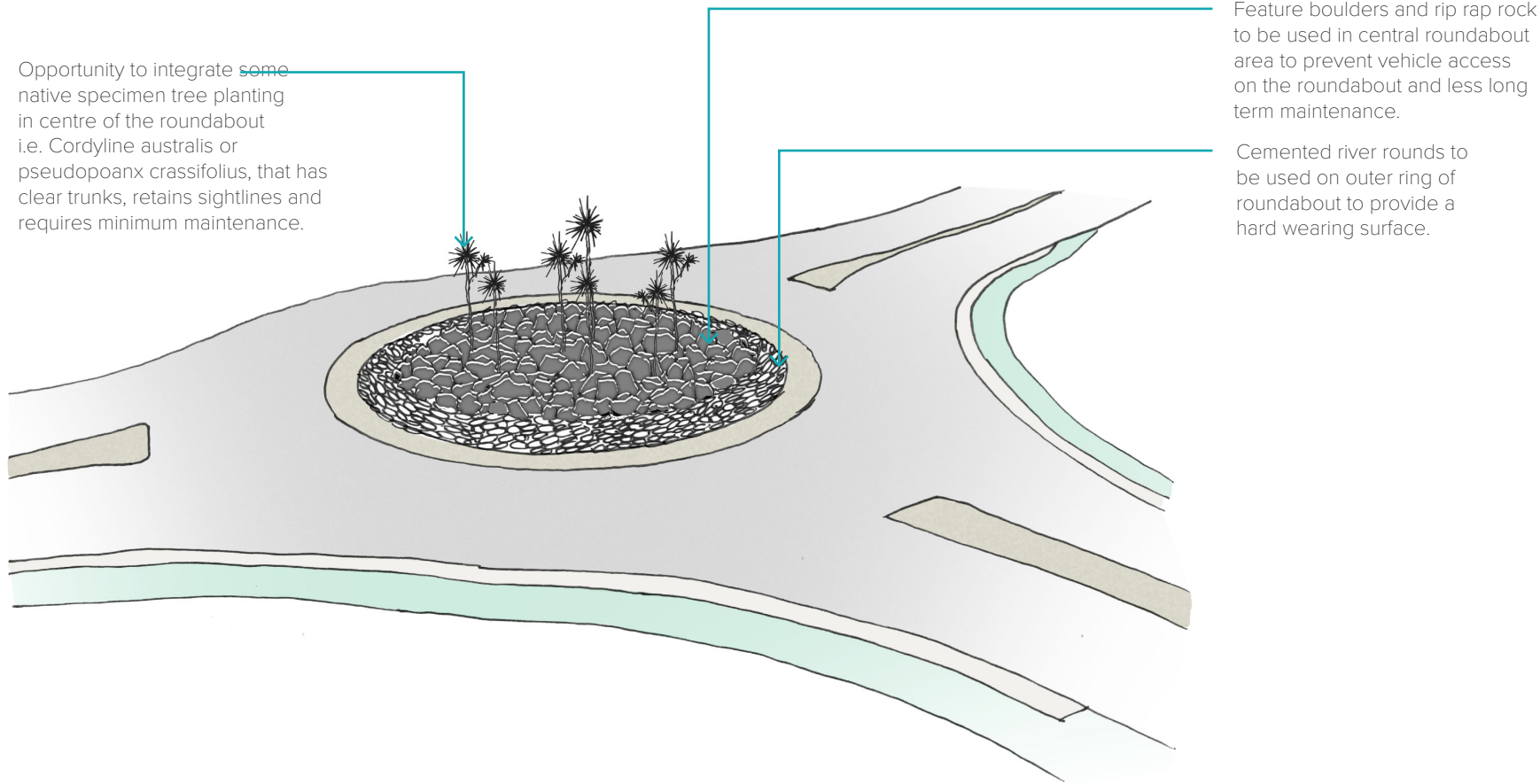
- 2.5m wide where pedestrians/cyclists are expected to wait to complete crossing

Pavement marking:

- 'Slow' threshold marking where the graded 'hump' advance warning signs are positioned
- Signs are to have a white background.



CONCEPT 1



CONCEPT 2

