

# Drury Arterial Network Urban Design Framework and Evaluation

January 2021

Version 1

**Document Status**

Responsibility	Name
<b>Author</b>	Elaine Chen
<b>Reviewer</b>	Stuart Bowden

## Table of Contents

<b>1</b>	<b>Glossary of acronyms and defined terms.....</b>	<b>vii</b>
<b>2</b>	<b>Executive Summary.....</b>	<b>ix</b>
2.1	Summary of urban design outcomes sought.....	ix
2.2	Background.....	2
2.3	Drury Package.....	2
2.4	Purpose and Scope of this Report.....	3
<b>3</b>	<b>The Design Context.....</b>	<b>4</b>
<b>4</b>	<b>NoR D1: Alteration to Designation 6707 - State Highway 22 Upgrade.....</b>	<b>6</b>
4.1	State Highway 22 Upgrade contextual analysis.....	6
4.1.1	Existing environment.....	8
4.1.2	Likely future environment.....	9
4.2	SH22 Upgrade - form and function.....	10
4.3	NOR D1: SH22 Upgrade - Evaluation against the Design Framework principles.....	13
4.4	Summary of urban design evaluation and recommendations for SH22 Upgrade.....	20
4.5	SH22 Upgrade – Urban design outcomes and opportunities.....	22
<b>5</b>	<b>NoR D2: Jesmond to Waihoehoe West FTN Upgrade.....</b>	<b>23</b>
5.1	Jesmond Road FTN Upgrade contextual analysis.....	25
5.1.1	Existing environment.....	27
5.1.2	Likely future environment.....	28
5.2	Jesmond Road FTN Upgrade - form and function.....	29
5.3	Bremner Road FTN Upgrade contextual analysis.....	30
5.3.1	Existing environment.....	32
5.3.2	Likely future environment.....	33
5.4	Bremner Road FTN - form and function.....	34
5.5	Waihoehoe Road West FTN Upgrade contextual analysis.....	36
5.5.1	Existing environment.....	37
5.5.2	Likely future environment.....	38
5.6	Waihoehoe Road West FTN - form and function.....	39
5.7	NOR D2: Jesmond to Waihoehoe West FTN Upgrade - Evaluation against the Design Framework principles.....	40
5.8	Summary of urban design evaluation and recommendations for Jesmond to Waihoehoe Road West FTN Upgrade.....	48

5.9	Jesmond Road FTN Upgrade - Urban design outcomes and opportunities.....	50
5.10	Bremner Road FTN Upgrade - Urban design outcomes and opportunities .....	51
5.11	Waihoehoe Road West FTN Upgrade - Urban design outcomes and opportunities .....	52
<b>6</b>	<b>NoR D3: Waihoehoe Road East Upgrade.....</b>	<b>53</b>
6.1	Waihoehoe Road East Upgrade contextual analysis.....	53
6.1.1	Existing environment .....	54
6.1.2	Likely future environment.....	55
6.2	Waihoehoe Road East Upgrade- form and function .....	56
6.3	NOR D3: Waihoehoe Road East Upgrade - Evaluation against the Design Framework Principles .....	57
6.4	Summary of urban design evaluation and recommendations for Waihoehoe Road East Upgrade.....	62
6.5	Waihoehoe Road East Upgrade - Urban design outcomes and opportunities.....	64
<b>7</b>	<b>NoR D4: Ōpāheke North-South FTN.....</b>	<b>65</b>
7.1	Ōpāheke North-South FTN corridor contextual analysis.....	65
7.1.1	Existing environment .....	67
7.1.2	Likely future environment.....	68
7.2	Ōpāheke North-South FTN – form and function .....	70
7.3	NOR D4: Ōpāheke North-South FTN corridor - Evaluation against the Design Framework principles .....	71
7.4	Summary of urban design evaluation and recommendations for the Ōpāheke North-South FTN Arterial .....	76
7.5	Ōpāheke North-South FTN Arterial – Urban design outcomes and opportunities.....	78
<b>8</b>	<b>NoR D5: Ponga and Ōpāheke Road Upgrade .....</b>	<b>80</b>
8.1	Ponga Road Upgrade contextual analysis .....	82
8.1.2	Likely future environment.....	83
8.2	Ponga Road Upgrade - form and function.....	84
8.3	Ōpāheke Road (Rural) Upgrade contextual analysis.....	86
8.3.1	Existing environment .....	86
8.3.2	Likely future environment.....	87
8.4	Ōpāheke Road (Rural) Upgrade - form and function .....	88
8.5	Ōpāheke Road (Urban) contextual analysis.....	90
8.5.1	Existing environment .....	90
8.5.2	Likely future environment.....	92
8.6	Ōpāheke Road (Urban) Upgrade - form and function.....	92

8.7 NOR D5: Ponga and Ōpāheke Road (Rural) Upgrade - Evaluation against the Design Framework principles .....	93
8.8 Ōpāheke Road (Urban) Upgrade - Evaluation against the Design Framework principles ...	99
8.8.1 General corridor arrangement and alignment .....	99
8.8.2 Ōpāheke Settlement roundabout arrangement and alignment .....	99
8.9 Summary of urban design evaluation and recommendations for Ponga and Ōpāheke Road Upgrade.....	100
8.10 Ponga Road Upgrade – Urban design outcomes and opportunities.....	102
8.11 Ōpāheke Road (Rural) Upgrade - Urban design outcomes and opportunities.....	103
8.12 Ōpāheke Road (Urban) Upgrade – Urban design outcomes and opportunities.....	104

## Tables

Table 1-1: Glossary of technical terms / acronyms .....	vii
Table 1-2: Glossary of defined terms .....	viii
Table 2-1: Drury Package: Notices of Requirement and Projects.....	ix
Table 4-1: Urban Design Evaluation for SH22 Upgrade.....	13
Table 5-1: Urban Design Evaluation for Jesmond to Waihoehoe West FTN Upgrade .....	41
Table 6-1: Urban Design Evaluation for Waihoehoe Road East Upgrade.....	58
Table 7-1: Urban Design Evaluation for Ōpāheke N-S FTN Arterial.....	71
Table 8-1: Urban Design Evaluation for Ponga and Ōpāheke Road (Rural) Upgrade.....	93

## Figures

Figure 2-1: Drury Package Projects and Notices of Requirement .....	1
Figure 4-1 Overview of SH22 Upgrade .....	7
Figure 4-2 SH22 upgrade project area .....	9
Figure 4-3 AUPOIP Zoning SH22 Upgrade .....	10
Figure 4-4 SH22 Upgrade typical town centre cross-section.....	11
Figure 4-5 SH22 Upgrade typical arterial cross-section .....	12
Figure 4-6 SH22 Upgrade urban design outcomes and opportunities .....	22
Figure 5-1 Overview of NoR D2 .....	24
Figure 5-2 Overview of Jesmond Road FTN Upgrade project area.....	26
Figure 5-3 Jesmond Road FTN Upgrade project area .....	28
Figure 5-4 AUPOIP Zoning Jesmond Road FTN upgrade section .....	29
Figure 5-5 Jesmond Road FTN upgrade section typical cross section .....	30
Figure 5-6 Overview of Bremner Road FTN Upgrade Section .....	31
Figure 5-7 Bremner Road FTN Upgrade project area.....	33
Figure 5-8 AUPOIP zoning for Bremner Road FTN .....	34
Figure 5-9 Bremner Road FTN Upgrade section typical cross-section .....	36
Figure 5-10 Overview of Waihoehoe Road West FTN Upgrade Section .....	37
Figure 5-11 Waihoehoe Road West FTN Upgrade Project area .....	38
Figure 5-12 AUPOIP zoning for Waihoehoe Road West FTN .....	39
Figure 5-13 Waihoehoe Road West FTN typical cross section .....	40
Figure 5-14 Jesmond Road FTN Upgrade urban design outcomes and opportunities.....	50
Figure 5-15 Bremner Road FTN Upgrade urban design outcomes and opportunities.....	51
Figure 5-16 Waihoehoe Road West FTN Upgrade urban design outcomes and opportunities .....	52

Figure 6-1 Overview of Waihoehoe Road East Upgrade .....	53
Figure 6-2 Waihoehoe Road East Upgrade project area .....	55
Figure 6-3 AUPOIP zoning for Waihoehoe Road East Upgrade .....	56
Figure 6-4 Waihoehoe Road East Upgrade typical cross section.....	57
Figure 6-5 Waihoehoe Road East Upgrade urban design outcomes and opportunities .....	64
Figure 7-1 Overview of Ōpāheke N-S FTN Arterial project area .....	66
Figure 7-2 Overview of Ōpāheke N-S FTN Arterial.....	68
Figure 7-3 AUPOIP Zoning for Ōpāheke N-S FTN Arterial .....	69
Figure 7-4 Ōpāheke N-S FTN Arterial typical cross section.....	70
Figure 7-5 Ōpāheke N-S FTN corridor urban design outcomes and opportunities – Sheet 1.....	78
Figure 7-6 Ōpāheke N-S FTN corridor urban design outcomes and opportunities– Sheet 2.....	79
Figure 8-1 Overview of NoR D5.....	81
Figure 8-2 Overview of Ponga Road Upgrade section.....	82
Figure 8-3 Ponga Road Upgrade section project area.....	83
Figure 8-4 AUPOIP Zoning for Ponga Road Upgrade Section.....	84
Figure 8-5 Ponga Road Upgrade typical cross section .....	85
Figure 8-6 Overview of Ōpāheke Road Rural Upgrade section.....	86
Figure 8-7 Ōpāheke Road (Rural) Upgrade section project area .....	87
Figure 8-8 AUPOIP Zoning for Ōpāheke Road (Rural) Upgrade section .....	88
Figure 8-9 Ōpāheke Road (Rural) Upgrade section typical cross section.....	89
Figure 8-10 Overview of Ōpāheke Road (Urban) Upgrade section .....	90
Figure 8-11 Ōpāheke Road (Urban) Upgrade section project area .....	91
Figure 8-12 AUPOIP Zoning for Ōpāheke Road (Urban) Upgrade section.....	92
Figure 8-13 Ōpāheke Road (Urban) Upgrade section typical cross section .....	93
Figure 8-14 Ponga Road Upgrade urban design outcomes and opportunities.....	102
Figure 8-15 Ōpāheke Road (Rural) Upgrade additional urban design outcomes and opportunities .	103
Figure 8-16 Ōpāheke Road (Urban) Upgrade urban design outcomes and opportunities.....	104

# 1 Glossary of acronyms and defined terms

Table 1-1: Glossary of technical terms / acronyms

Acronym	Term
<b>AEE</b>	Assessment of Effects on the Environment
<b>AT</b>	Auckland Transport
<b>AUPOIP</b>	Auckland Unitary Plan Operative in Part
<b>FTN</b>	Frequent Transit Network
<b>FUZ</b>	Future Urban Zone
<b>NIMT</b>	North Island Main Trunk
<b>NoR</b>	Notice of Requirement (under the Resource Management Act 1991)
<b>NZUP</b>	New Zealand Upgrade Programme
<b>SH1</b>	State Highway 1
<b>SH22</b>	State Highway 22
<b>Waka Kotahi</b>	Waka Kotahi NZ Transport Agency
<b>ULDMP</b>	Urban and Landscape Design Management Plan
<b>SEA</b>	Significant Ecological Area
<b>ONL</b>	Outstanding Natural Landscape
<b>ONF</b>	Outstanding Natural Feature
<b>ONC</b>	Outstanding Natural Character
<b>RMA</b>	Resource Management Act 1991
<b>UDFE</b>	Urban Design Framework and Evaluation
<b>THAB</b>	Terraced Housing and Apartment Building
<b>PT</b>	Public Transport

**Table 1-2: Glossary of defined terms**

<b>Auckland Council</b>	<b>Means the unitary authority in the Auckland Region.</b>
<b>Drury Package</b>	Five Notices of Requirement for the Drury Arterial Network for Auckland Transport and Waka Kotahi NZ Transport Agency.
<b>Design Framework</b>	Te Tupu Ngātahi Design Framework
<b>Designation Boundary</b>	The extent of the proposed designation.
<b>Project area</b>	Refers to the land being developed within the boundary of each NoR. Includes the carriageway, batter slopes, intersections, bridging, landscape mitigation planting and street trees and construction laydown areas.
<b>Drury Arterial Network</b>	State Highway 22 Upgrade (NoR D1) Jesmond to Waihoehoe West FTN Upgrade (NoR D2) Waihoehoe Road East Upgrade (NoR D3) Ōpāheke North-South FTN Arterial (NoR D4) Ponga Road and Ōpāheke Road Upgrade (NoR D5)
<b>Main Centre</b>	Main centre located east of SH1 as per the Drury – Ōpāheke Structure Plan 2019
<b>Western Centre</b>	Located on the north side of SH22 (Karakā Road) between Jesmond Road and Burberry Road as per the Drury – Ōpāheke Structure Plan 2019
<b>Blue-Green Network</b>	A green infrastructure proposal that combines the Auckland wide policies of Section E3, with specific landscape values of the Drury-Ōpāheke area. Proposed by Auckland Council in the Drury-Ōpāheke Structure Plan to guide future urban growth.



## 2 Executive Summary

This Drury Arterial Network Urban Design Framework and Evaluation (UDFE) has been prepared for the Drury Arterial Network Notices of Requirement (NoRs) for Auckland Transport (AT) and Waka Kotahi NZ Transport Agency (Waka Kotahi) (the “Drury Package”). The five NoRs are described in Table 2-1 and illustrated in Figure 2-1. The NoRs are to designate land for future strategic transport corridors as part of the Supporting Growth Programme to enable the future construction, operation and maintenance of transport infrastructure in the Drury-Ōpāheke area of Auckland.

**Table 2-1: Drury Package: Notices of Requirement and Projects**

Notice	Project
<b>NoR D1</b>	Alteration to NZ Transport Agency designation 6707 - State Highway 22 (SH22) Upgrade
<b>NoR D2</b>	Jesmond to Waihoehoe West FTN Upgrade
<b>NoR D3</b>	Waihoehoe Road East Upgrade
<b>NoR D4</b>	Ōpāheke North-South FTN Arterial
<b>NoR D5</b>	Ponga Road and Ōpāheke Road Upgrade

This UDFE contains an evaluation section for each Drury Package project which has been prepared based on the guidance and principles established in the programme wide document - Te Tupu Ngātahi Design Framework (Design Framework or Design Framework Principles). The UDFE provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design opportunities should be considered in future design stages. These recommendations could form the basis of an urban design specific designation condition, and where there is an overlap of urban design outcomes with other considerations (for example ecological, landscape, visual or water quality related recommendations) they could be integrated within the relevant specialist conditions.

The recommendations are summarised as urban design outcomes sought and where additional urban design opportunities have been identified during the evaluation, they are also mapped for each NoR for consideration either by the requiring authorities or other parties at future stages of design and development of the Project. These opportunities are not however required to mitigate the anticipated urban design effects of the Projects.

### 2.1 Summary of urban design outcomes sought

Overall, the Drury package projects have been found to be generally supportive of the Design Framework principles.

The preparation of an **Urban and Landscape Design Management Plan (ULDMP)** in future delivery stages is recommended for all Projects to further develop the urban design outcomes recommended for each Project as summarised below.

Where additional urban design opportunities have been identified during the evaluation, they are also mapped for each NoR for consideration either by the requiring authorities or other parties at future

stages of design and development of the Project. These opportunities are not however required to mitigate the anticipated urban design effects of the Projects.

### 2.1.1.1 NoR D1 – SH22

The ULDM should include the following Project specific outcomes:

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities. For example, active mode priority and connectivity between the proposed Drury West Station across and along SH22 to the Western Centre.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections. For example, the Jesmond Road and SH22 intersection will require future definition to ensure connectivity between the proposed Drury West Station to SH22.
- An urban interface approach within the corridor that;
  - provides an appropriate interface to the proposed Western Centre and local centre and enables buildings and spaces to positively address and integrate with the SH22 corridor,
  - responds to the spatial character of proposed centre environments and supports quality public realm infrastructure, ample pedestrian footpath width, frequent pedestrian crossing points and street trees for shade and amenity,
  - recognises the transition of densities from THAB to mixed housing urban to mixed housing suburban and provides a corridor interface that supports permeable pedestrian access and responds to the changing built form interface and spatial character of adjacent future development,
  - supports the integration of the proposed Drury West rail station and surrounding land uses.
- The identification of urban and landscape design drivers related to the Ngakoroa Stream, Ngakoroa Reserve, and the Drury Sports Complex and how the corridor has responded to and integrated with these character drivers.
- In future design stages, Mana Whenua shall be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- A landscape plan that considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement and treatment of batter slopes. The landscape plan should also demonstrate integration of the Ngakoroa Stream and terrestrial SEA where the corridor intersects with the proposed Blue-Green Network. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed greenways and the wider walking and cycling network.
- Integration of the stormwater wetlands (SH22 wetland 1 and 2) to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned high density.

- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

### 2.1.1.2 NoR D2 – Jesmond to Waihoehoe West FTN Upgrade

The ULDMP should include the following Project specific outcomes:

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.
- A corridor urban identity and placemaking approach that identifies;
  - the cultural significance of 27 Bremner Road and the Ngakoroa Stream
  - the heritage significance of the Aroha Cottage, the Commissariat Redoubt / Ōtūwairoa Stream Wharf and St John's Anglican Church and Cemetery
  - the heritage significance of multiple historic heritage sites on Great South Road adjacent to the railway, concentrated around Norrie Road and the eastern side of Ngakoroa Stream
- The identification of urban and landscape design drivers related to the Ngakoroa Stream, Ngakoroa Reserve, the Drury Sports Complex and the Drury Domain and how the corridor has responded to and integrated with these character drivers;
- An urban interface approach within the corridor that;
  - provides an appropriate interface to the proposed Main Centre and enables buildings and spaces to positively address and integrate with the corridor,
  - responds to the spatial character of the town centre environment by supporting quality public realm infrastructure, ample pedestrian footpath widths, frequent pedestrian crossing points and providing street trees for shade and amenity,
  - recognises the transition from Main Centre to THAB zoned areas and provides a corridor interface that supports permeable pedestrian access and responds to the changing built form interface and spatial character of adjacent future development.
  - considers the interface of bridging structures to built form particularly around the proposed Main Centre in Drury Central and the adjacent THAB zoned areas
- In future design stages, Mana Whenua shall be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- A landscape plan that considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement, treatment of batter slopes. The landscape plan should also demonstrate integration of the Ngakoroa and Hingaia Streams and adjacent marine and terrestrial SEAs, particularly where the corridor integrates

with the Blue-Green Network. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed Greenways and the wider walking and cycling network.

- Integration of the Jesmond Road stormwater wetlands to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned high density.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

### 2.1.1.3 NoR D3 – Waihoehoe Road East Upgrade

The ULDMMP should include the following Project specific outcomes:

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as open spaces and community facilities and between areas of high density.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.
- The identification of urban and landscape design drivers related to the Hunua Ranges, Drury Hills Esplanade Reserve, the proposed open space at the intersection of Cossey Road Complex and how the corridor have responded to and integrated with these character drivers.
- In future design stages, Mana Whenua shall be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- An urban interface approach within the corridor that recognises the transition of densities from THAB to mixed housing urban to mixed housing suburban. The urban interface approach should respond to the changing built form interface, respond to the spatial character of adjacent development and demonstrate permeable pedestrian access between the corridor and adjacent development.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

### 2.1.1.4 NoR D4 – Ōpāheke North-South FTN Arterial

The ULDMMP should include the following Project specific outcomes:

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.
- An urban interface approach within the corridor that recognises the transition of densities from THAB to mixed housing urban to mixed housing suburban. The urban interface approach

should respond to the changing built form interface, respond to the spatial character of adjacent development and demonstrate permeable pedestrian access between the corridor and adjacent development.

- In future design stages, Mana Whenua shall be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- The identification of urban and landscape design drivers related to the Waipokapū and Waihoehoe Streams, the adjacent notable ecological area as well as the proposed local centre and open space at the intersection of Ponga Road. The future corridor design should demonstrate an appropriate response and integration with these character drivers.
- A landscape plan that considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement, treatment of batter slopes. The landscape plan should also demonstrate integration with the Waipokapū and Waihoehoe Streams, particularly where the corridor integrates with the Blue-Green Network. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed Greenways and the wider walking and cycling network.
- Integration of the Ōpāheke stormwater wetlands to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned medium density.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

### 2.1.1.5 NoR D5 – Ponga Road and Ōpāheke (Rural) Road Upgrade

The ULDMP should include the following Project specific outcomes:

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.
- An urban interface approach within the corridor that recognises the transition of densities and land uses from residential, industrial and local centre. The urban interface approach should respond to the changing built form interface, respond to the spatial character of adjacent development and demonstrate permeable pedestrian access between the corridor and adjacent development.
- The identification of urban and landscape design drivers related to the Mangapū and Ōtūwairoa Streams, the Ōpāheke Reserve, as well as the proposed local centre and open space at the intersection of Ōpāheke and Ponga Road. The future corridor design should demonstrate an appropriate response and integration with these character drivers.

- In future design stages, Mana Whenua shall be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- A landscape plan that:
  - Considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement and treatment of batter slopes.
  - Integrates with the Mangapū and Ōtūwairoa Streams where the corridor intersects with the proposed Blue-Green Network.
  - Reinforces the wider vegetation patterns of the local landscape and create connections to proposed greenways and the wider walking and cycling network.
  - Provides an appropriate interface to the Papakura Cemetery through the planting type, scale and arrangement.
- Integration of the Ponga and Ōpāheke stormwater wetlands to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned medium density.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

# Drury Arterial Network

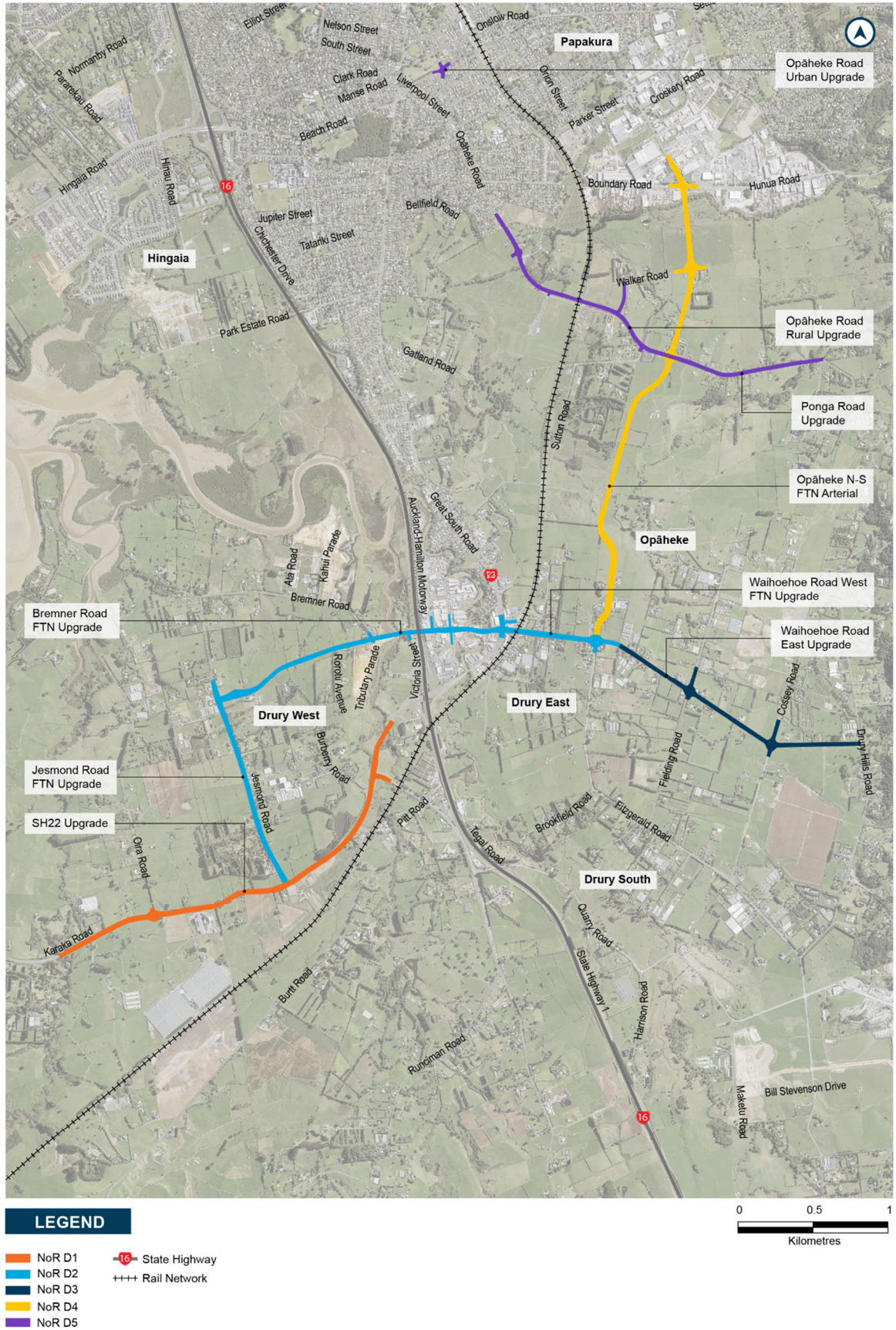


Figure 2-1: Drury Package Projects and Notices of Requirement

### 2.2 Background

Auckland is New Zealand's largest city, home to approximately 1.65 million people. In 2017, Auckland attracted 36,800 new residents; more than the rest of the country combined. The Auckland Plan 2050 – Development Strategy signals that Auckland could grow by 720,000 people to reach 2.4 million over the next 30 years. This will generate demand for more than 400,000 additional homes and require land for 270,000 more jobs.<sup>1</sup> Most of this growth will go into existing urban areas. However, around a third will go into future urban zone (FUZ) as identified in the Auckland Unitary Plan: Operative in Part (AUPOIP). The FUZ areas are “greenfields”, that is, generally rural land identified to be urbanised over time.

The Supporting Growth Programme is a collaboration between AT and Waka Kotahi to plan transport investment in Auckland's future urban zoned areas over the next 10 to 30 years. AT and Waka Kotahi have partnered with Auckland Council, Manawhenua and KiwiRail Holdings Limited (KiwiRail) and are working closely with stakeholders and the community to develop the strategic transport network to support Auckland's growth areas.

The key objective of the Supporting Growth Programme is to protect land for future implementation of the required strategic transport corridors/infrastructure. As a form of route protection, designations will identify and appropriately protect the land necessary to enable the future construction, operation and maintenance of these required transport corridors/infrastructure. A designation is important as it provides certainty for the Requiring Authority that it can implement the work. It also provides property owners, businesses and the community with increased certainty regarding future infrastructure, so they can make informed decisions (if confirmed it will be identified in the AUPOIP). It can also significantly reduce long-term costs for local and central government and enable more effective land use and transport outcomes.

### 2.3 Drury Package

The Drury Package proposes an arterial network to support the expected future growth in Drury-Ōpāheke. The Drury Package comprises five separate projects which together form the Drury Arterial Network. The network includes provision for general traffic, walking and cycling, and frequent public transport. Overall, the Drury Package aims to improve connectivity within and through the Drury-Ōpāheke area, providing high quality, safe and attractive transport environments. Each Project within the Drury Package will be designated separately as follows:

- **NoR D1:** Alteration to Waka Kotahi NZ Transport Agency designation 6707 - State Highway 22 (SH22) Upgrade
- **NoR D2:** Jesmond to Waihoehoe West FTN Upgrade
- **NoR D3:** Waihoehoe Road East Upgrade
- **NoR D4:** Ōpāheke North-South FTN Arterial (Ōpāheke N-S FTN Arterial)
- **NoR D5:** Ponga Road and Ōpāheke Road Upgrade

---

<sup>1</sup> Draft Auckland Plan 2050 Development Strategy: <https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/development-strategy/future-auckland/Pages/what-auckland-look-like-future.aspx>



### 2.4 Purpose and Scope of this Report

This urban design evaluation and framework provides an overview of the urban design considerations and inputs during option development and refinement as well as an evaluation and identification of future transport and land use integration opportunities for the Drury Arterial Network.

The key sections addressed for each project are:

- Corridor contextual analysis
  - Existing environment
  - Likely future environment
- Urban design considerations - form and function
- Evaluation against the Te Tupu Ngātahi Design Framework principles
- Summary of urban design evaluation and recommendations
- Map of urban design outcomes and opportunities

### 3 The Design Context

This urban design framework contains an evaluation section which has been prepared for each of the projects based on the guidance and principles established in the programme wide document - Te Tupu Ngātahi Design Framework (Design Framework or Design Framework Principles).

The Design Framework takes a systems approach as the basis on which urban areas are organised and understood and pulls these apart as a series of layers; environment, social, built form, movement and land use, with cultural and sustainability values underpinning and spanning across these. In this way transport networks are not seen in isolation rather in terms of how they can contribute to the urban system as a whole.

There are twenty design principles that have been established within these layers to provide high level guidance on the attributes of responsive, resilient, sustainable, vibrant and high-quality urban environments. Each of the principles describe what 'good looks like' and what to aim for in the design of transport networks. The principles sit within an integrated system across the various layers, to be prioritised and applied according to desired outcomes articulated in the strategic policy direction and the unique needs of each context.

The Design Framework principles are relevant across the Supporting Growth Programme as they contribute to the understanding of the development of route options in terms of; place context, built form interfaces, movement functions and modal priorities. They also inform the design development of route options at each phase with specific urban design considerations including;

- Land use and corridor interface
- Connectivity and access
- Character and sense of place
- Integration with future development
- Response to topography

The Design Framework sits within the context of a range of established strategic plans, policies and design guidance that guide urban development outcomes at the:

- National level (e.g. NPS on Urban Development, GPS on Land Transport, NZ Transport Agency Bridging the Gap, Regional Land Transport Plan); and
- Local level (e.g. Auckland Plan 2050, ATAP, Auckland Transport Roads and Streets Framework, Transport Design Manual, Auckland Unitary Plan, AT Sustainability Framework, Auckland Transport Code of Practice).

The established strategic plans and guidance outlined above informed the development of the Design Framework content and they are referenced in general terms as they relate to the attributes that will contribute to healthy, connected and sustainable communities. Where more recent design guidance was available that did not form part of these published reports, the Design Framework included more detail, e.g. the approach to the location of rail, rapid transit and the role of active modes.

#### **National Policy Statement on Urban Development 2020 (NPS-UD)**

The NPS-UD came into effect on 20 August 2020 and sets out a list of things that local authorities must do to give effect to the objectives and policies defined within the NPS-UD. The NPS-UD does not explicitly address or refer to urban design but sets out the characteristics and rationale for well-

## Drury Arterial Network

---

functioning urban environments that enable all communities to provide for their social, economic, and cultural well-being and for their health and safety, now and into the future. This includes, amongst other requirements, the enabling of:

- increased commercial and residential activity around centre zones;
- areas with employment opportunities; and
- areas that are well serviced by existing or planned public transport or where there is high demand for housing or business.

This aligns with the Design Framework principle of increasing density in and around centres to create vibrant walkable/cyclable communities that support public transport, the creation of a compact urban form and creating a community focal point and sense of place.

### Auckland Council

At a local level, the key urban design considerations and provisions of the AUPOIP relevant to the Drury Arterial Network include:

- Regional Policy Statement B2: Urban Growth and Form;
- Regional Policy Statement B3: Infrastructure Transport and Energy;
- Regional Policy Statement B4: Natural Heritage (E38: Urban Subdivision);
- Chapter E38: Subdivision;
- Chapter H: Zones (including structure planned zones);
- Chapter I: Precincts (Drury 1 SHA); and
- Chapter M: Appendix 1 Structure plan guidelines.

The urban design specific commentary within the corridor evaluations in the sections below broadly address the objectives and policies of the relevant sections of the Regional Policy Statement and Chapters of the AUPOIP as listed above.

In addition, the Auckland Plan 2050 sets the vision and direction for Auckland and the Design Framework directly references this plan. It illustrates how the outcomes of the Auckland Plan are linked to the design principles set out for the Supporting Growth Programme in the Framework.

## 4 NoR D1: Alteration to Designation 6707 - State Highway 22 Upgrade

### 4.1 State Highway 22 Upgrade contextual analysis

The State Highway 22 (SH22) Upgrade (NoR D1) consists of the widening of SH22 to a four-lane arterial with separated walking and cycling facilities. The Project extends approximately 3.08km from the State Highway 1 (SH1) Drury Interchange in the east, and the extent of the FUZ between Woodlyn Drive and Oira Road in the west. The intersections at Jesmond Road and Great South Road will be signalised and a roundabout is proposed at Oira Road. An overview of the concept design is provided in Figure 4-1.

As the surrounding area is urbanised over time and alternative routes are implemented (particularly the proposed Pukekohe Expressway), the function of SH22 will change from a rural state highway to provide an appropriate urban arterial connecting the growth areas of Drury West to the wider network and centres, including providing a frequent transport bus network. This is likely to include a reduction in the speed limit to 50kph. SH22 will improve future connectivity to the proposed Drury West train station which currently forms part of the New Zealand Upgrade Programme (NZUP) project.

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.



Figure 4-1 Overview of SH22 Upgrade

### 4.1.1 Existing environment

#### 4.1.1.1 Urban/built features

The existing land use surrounding the SH22 Upgrade is largely rural consisting of low density rural residential dwellings and a few rural based businesses including transportation and logistics, horticulture and a show home. Passive and active recreational land use is prominent at the north eastern end of the alignment including the Ngakoroa Reserve and the Drury Sports Complex.

The closest schools currently are Farmhouse Preschool, Karaka School and Wesley College which are all west of the project corridor on or just off SH22. Drury Village and Paerata Village are the closest villages to the north and south of the project on the same corridor and provide some community amenities including halls, local shops and library (Drury Village). These facilities are outside of the proposed designation footprint.

The existing transport function of the SH22 Upgrade is characterised by:

- a two-lane state highway with sealed shoulders;
- containing no formal walking or cycling facilities;
- having no public transport services or facilities;
- containing limited private land access points / driveways; and
- a 70kph speed limit east of the intersection with Burberry Road and a 100kph speed limit west of the intersection with Burberry Road.

#### 4.1.1.2 Physical features

The landform along and surrounding the SH22 Upgrade area is dominated by gently rolling and undulating topography and a network of riparian corridors and associated overland flow paths. Key watercourses in the Project area include Ngakoroa Stream at the eastern end of the corridor and Oira Creek which is situated just west of the corridor's western extent. Ngakoroa Stream runs through the Ngakoroa Reserve and crosses the alignment under an existing bridge structure.

There are a number of existing flood prone areas alongside SH22 where overland flow paths drain towards Ngakoroa Stream including flooding in the Ngakoroa Reserve and overtopping of the existing Ngakoroa Bridge.

The existing vegetation is highly modified and is dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting. However, small areas of native or mixed exotic vegetation occur with areas of planted native vegetation and within exotic wetland areas.

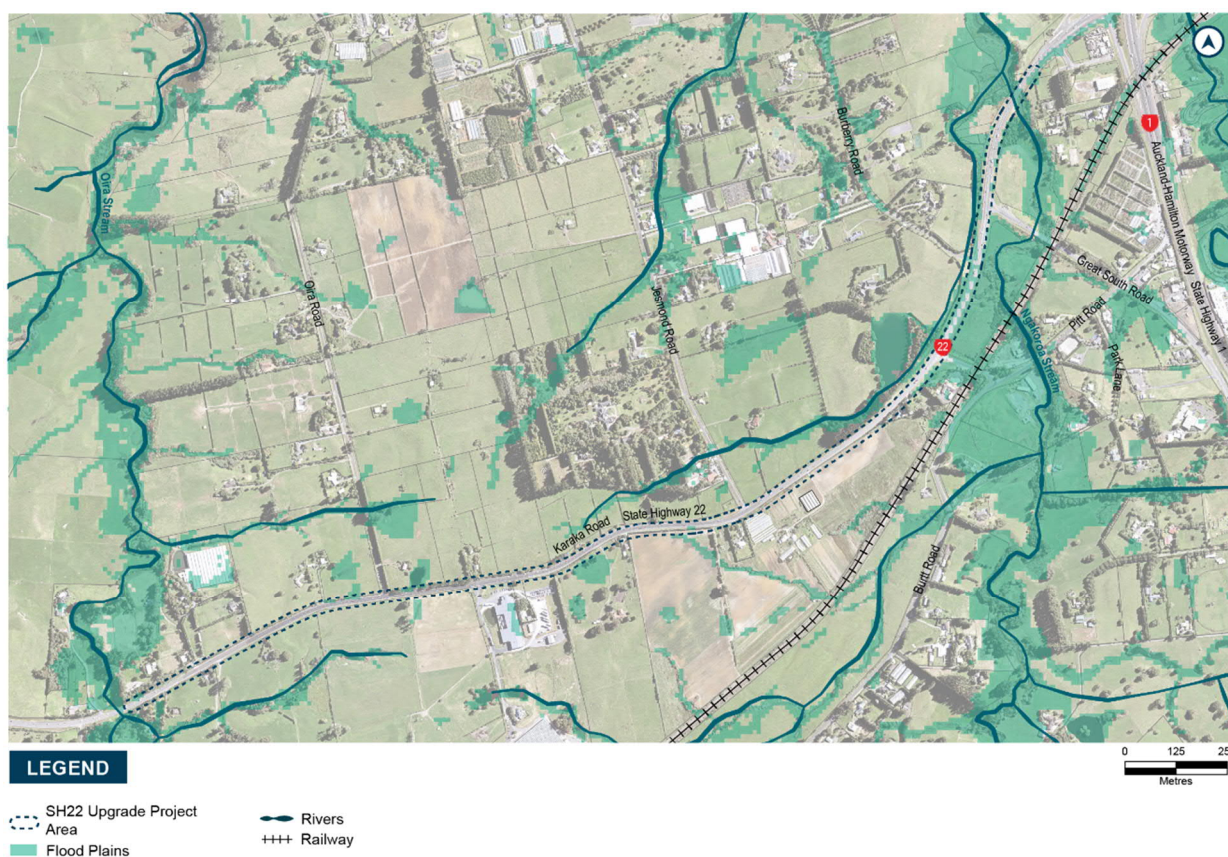
There are a number of SEAs identified under the AUPOIP adjacent to the Project area that are considered as a continuum, following the transition of the Ngakoroa Stream mouth from freshwater to saline dominated habitats.

### Blue-Green Network

The proposed Blue-Green Network for the Drury-Ōpāheke area (as per the Drury-Ōpāheke Structure Plan) signals an integrated approach to address the 'blue' aspects of the Drury – Ōpāheke area such as the rivers, floodplains, and coastal environments; and the 'green' aspects of the environment, such as areas of indigenous biodiversity and ecological significance, and the parks and reserves to

compliment the emerging urban landscape. The project intersects with the proposed Blue-Green network at the following locations, providing future opportunities for a complimentary design response.

- Southern extent near the Oira Creek crossing
- The boundary of 6 Karaka Road
- The Ngakoroa Stream crossing.



**Figure 4-2 SH22 upgrade project area**

### 4.1.2 Likely future environment

The project area will undergo significant changes from rural to urban land use and character over the next 30 years. The key land use features that will comprise the likely future urban environment include:

- Western Centre - Located on the north side of SH22 (Karaka Road) between Jesmond Road and Burberry Road.
- Residential – Terraced Housing and Apartment Building (THAB) zoned land concentrated around the commercial centre, to both sides of NoR D1.
- A small local centre at Oira Road.
- Residential – Mixed Housing Urban surrounding the centre to both the north and south of SH22.

## Drury Arterial Network

- Residential – Mixed Housing Suburban to the western end of NoR D1.
- Industrial zoned land to the eastern end of NoR D1 adjacent to SH1.

Future transport projects surrounding the NoR D1 corridor include proposed new rail stations at Drury Central and Drury West (New Zealand Upgrade Programme (NZUP) projects), a regional north-south active mode route between Drury and Pukekohe, the FTN network upgrades proposed on Jesmond, Bremner and Waihoehoe Roads and a future collector road network indicated in the structure plan within structure planned areas.

The existing recreational land uses are anticipated to remain; however it is expected they may be developed to support the expanding urbanised area. Additional passive recreation uses such as walking, cycling along the local paths/greenways and along future stream esplanades are also proposed within the structure plan.

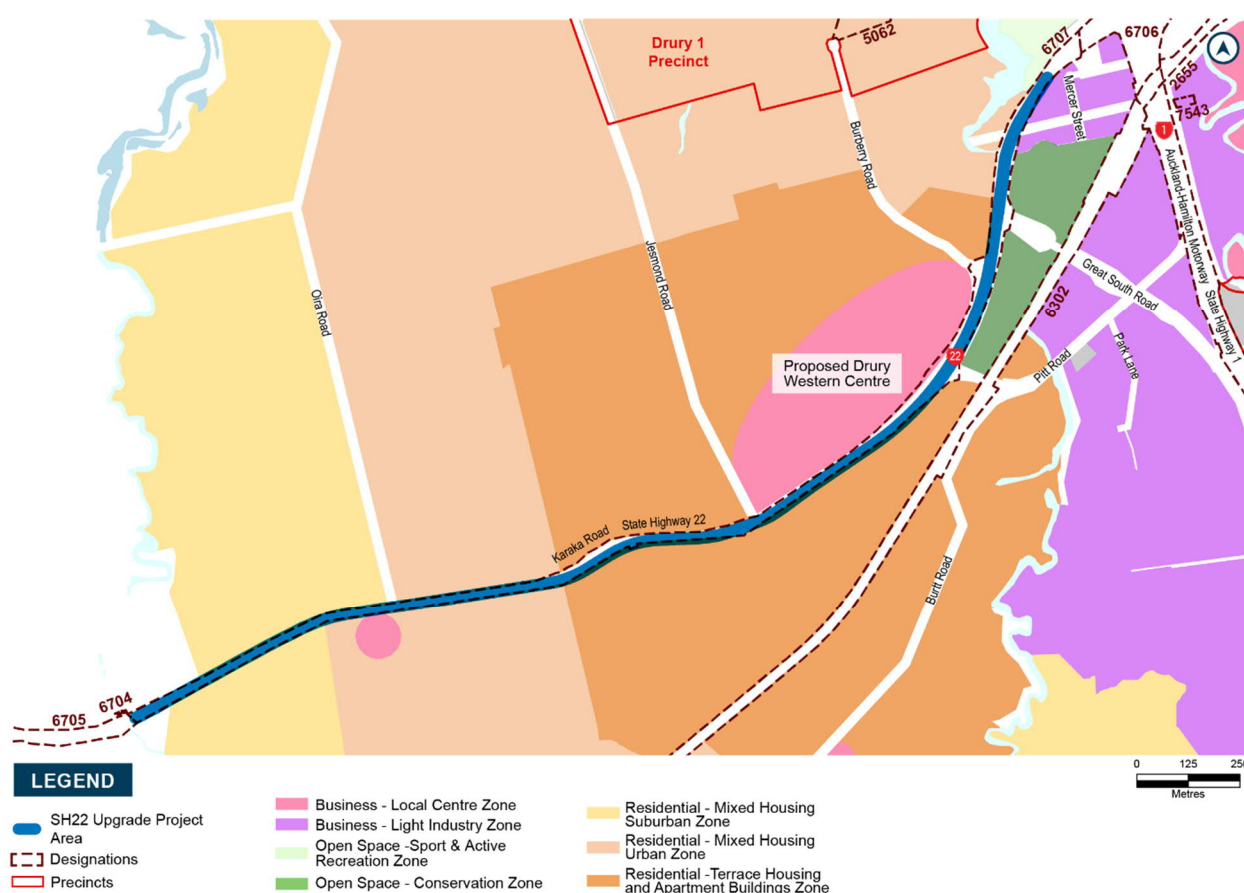


Figure 4-3 AUPOIP Zoning SH22 Upgrade

### 4.2 SH22 Upgrade - form and function

This project consists of the widening of the existing two-lane SH22 alignment to a four-lane arterial corridor between the SH1 Drury Interchange and the extent of the FUZ between Woodlyn Drive and Oira Road.

As the surrounding area is urbanised over time, the function of SH22 will change from a high speed movement oriented rural state highway to an urban arterial road that will balance the movement and



## Drury Arterial Network

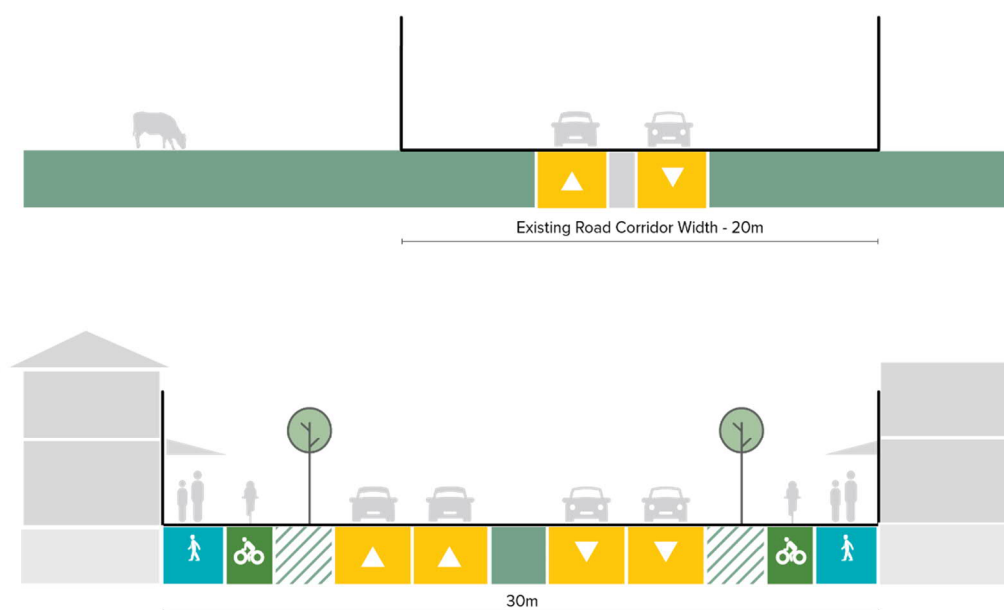
place functions across its length. The typical cross section will likely change along the corridor depending on its adjacent context which will include; town centre, local centre and THAB.

It is envisaged that the new 30m wide four lane urban arterial will provide new footpaths and dedicated cycleways on both sides of the road as well as safe and permeable cross corridor access. This fine grain accessibility and permeability is essential in areas zoned THAB, and particularly at the northern end of the corridor where direct access is provided to key destinations such as the proposed Western Centre, the Ngakoroa reserve and the proposed Drury West rail station.

The upgrade will generally require an additional 10m of road reserve, with the location of the widening varying along the alignment (to the north east, south west or widening both sides) to minimise impacts on identified environmental constraints. The original posted speed of 100kph was recently reduced to 80kph and will likely be reduced again when the project is implemented to a posted speed of 50kph.

Other features of the proposed upgrade include the following:

- Localised widening around the existing intersections to accommodate for vehicle stacking and tie-ins and walking and cycling facilities/crossings. The intersections at Jesmond Road and Great South Road will be signalised and a roundabout is proposed at Oira Road.
- Limited vehicular access.
- Three proposed stormwater wetlands for the treatment and attenuation of stormwater from the new corridor.
- Demolition and reconstruction of the existing Ngakoroa Stream Bridge.
- Proposed new and extended culverts.
- Batter slopes and retaining to enable widening of the corridor, and associated cut and fill activities.



**Figure 4-4 SH22 Upgrade typical town centre cross-section**

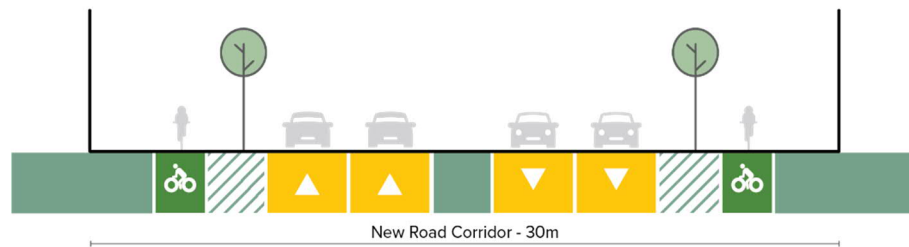


Figure 4-5 SH22 Upgrade typical arterial cross-section

### 4.3 NOR D1: SH22 Upgrade - Evaluation against the Design Framework principles

This evaluation considers the proposed SH22 Upgrade against the relevant Design Framework Principles. It provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design outcomes should be considered in future design stages. These recommendations could form the basis of an urban design specific designation condition, and where there is an overlap of urban design outcomes with other considerations (for example ecological, landscape, visual or water quality related recommendations) they could be integrated within the relevant specialist conditions.

**Table 4-1: Urban Design Evaluation for SH22 Upgrade**

Principle	Explanation	Application to SH22 Upgrade
<b>ENVIRONMENT</b>		
<b>1.1</b> <b>Support and enhance ecological corridors and biodiversity</b>	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors	<ul style="list-style-type: none"> <li>The proposed upgrade to the SH22 corridor arrangement and alignment provides spatial provisions (at boundaries and within berms) that have the potential to support ecological connectivity and biodiversity in the local environment by providing contiguous space for diverse planting responses.</li> <li>The crossing of the Ngakoroa Stream incorporates a new bridge structure, which will be raised to improve flooding resilience, minimise stream interruptions and enables a connected natural system.</li> <li>Ngakoroa Stream and its margins (north and directly west of the existing bridge) are classified in the AUPOIP as a SEA – Terrestrial habitat (SEA_T_530b). Through the alternatives assessment, impacts on terrestrial SEAs at the Ngakoroa Stream have been reduced by proposing to widen the existing alignment to the south east. An area of SEA directly west of the bridge crossing is within the proposed designation boundary.</li> <li>The construction area for the bridge construction is proposed to be located outside of the SEA to avoid any impacts.</li> </ul>
<b>1.2</b> <b>Support water conservation and enhance water quality in a watershed</b>	Take into account and work with the existing watershed as part of a whole system.	<ul style="list-style-type: none"> <li>The proposed upgrade to the SH22 corridor cross section allows spatial provisions to provide natural drainage to stormwater wetlands as a way to address water quality and reduce hard engineering solutions. Water quality and detention/retention will be decided in future regional consents.</li> </ul>

Principle	Explanation	Application to SH22 Upgrade
		<ul style="list-style-type: none"> <li>• Further refinement of SH22 Wetland 1 during the detailed design stage is recommended to define the wetland's final form and how the wetland will interface with the surrounding land uses. For example, wetlands should be configured in a naturally shaped manner and fully integrated with existing natural drainage features and vegetation.</li> <li>• There is also an opportunity for the wetland design to integrate with and complement the Ngakoroa Stream through planting arrangement and types.</li> </ul>
<p><b>1.3</b> <b>Minimise land disturbance, conserve resources and materials</b></p>	<p>Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.</p>	<ul style="list-style-type: none"> <li>• The SH22 upgrade concept design utilises an existing corridor and demonstrates a close and connected alignment to the existing landform, generally balancing earthworks while minimising unnecessary disturbance and materials.</li> <li>• The upgraded corridor demonstrates a generally efficient alignment in relation to existing property boundaries along the corridor, minimising land impacts and inefficient residual land portions.</li> </ul>
<p><b>1.4</b> <b>Adapt to a changing climate and respond to the microclimatic factors of each area</b></p>	<p>Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.</p>	<ul style="list-style-type: none"> <li>• The SH22 upgrade corridor design, including the crossing of Ngakoroa Stream and tributaries, adopts a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice. The Ngakoroa Bridge level has been raised to improve flooding resilience of SH22 and provides mitigation for flood levels upstream.</li> <li>• The SH22 corridor design provides for street tree planting zones that, when delivered, will contribute to reducing urban heat island effects in the more intensively urbanised Western centre and THAB zoned areas where 'islands' of higher temperatures can be caused by high concentrations of structures such as buildings roads and infrastructure in one area.</li> <li>• The SH22 corridor provides for active modes and accommodates public transport options to support modal shift and reduce transport related climate change contributions.</li> </ul>

Principle	Explanation	Application to SH22 Upgrade
<b>SOCIAL</b>		
<p><b>2.1</b> <b>Identity and place</b></p>	<p>The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.</p>	<ul style="list-style-type: none"> <li>• The SH22 corridor currently passes through a largely existing rural environment and while this is planned to change to mixed and more intense land uses, the proposed cross section has spatial flexibility that can respond to a range of identity drivers that may arise from this change.</li> <li>• In areas of high density or mixed use centres the proposed cross section can provide support for active edges (where there is visual engagement between the built form and the street) , permeable access for pedestrians, and vegetation appropriately scaled to built form.</li> <li>• Improved connectivity and interface to the Ngakoroa Stream (as per the indicative greenways shown in the Drury-Opaheke Structure Plan), the Drury Sports Complex and the Ngakoroa Reserve could provide opportunities to enhance their distinctive landscape qualities (character drivers) for the community.</li> <li>• Consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.</li> <li>• In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> <li>• <b>Sites of historic value</b> Identification of the sites below provides opportunities for future development to explore and celebrate the inherent heritage character drivers for the area. Further details of these are referenced in the Assessment of Historic Heritage Effects.</li> <li>• There is one pre-European Māori site recorded within 200 m of the designation near the Ngakoroa Stream, further details of this is referenced in the Assessment of Historic Heritage Effects. The SH22 upgrade does not affect this site.</li> </ul>
<p><b>2.2</b></p>	<p>Acknowledge significant sites and features in the layout of</p>	<ul style="list-style-type: none"> <li>• There are no sites of significance to Manawhenua under the AUP:OIP that have been identified along or in proximity to the</li> </ul>

Principle	Explanation	Application to SH22 Upgrade
<p><b>Respect culturally significant sites and landscapes</b></p>	<p>movement corridors including ridgelines or horizons.</p>	<p>SH22 Upgrade corridor. However Manawhenua have strong ties with the Ngakoroa Stream. Through the alternatives assessment, which Manawhenua provided input on, widening of SH22 is proposed to the south east to reduce impacts on the Ngakoroa Stream SEA.</p> <ul style="list-style-type: none"> <li>In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> </ul>
<p><b>2.3 Adaptive corridors</b></p>	<p>Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.</p>	<ul style="list-style-type: none"> <li>The proposed SH22 corridor cross section has the spatial provisions to be flexible, re-configurable and adapted at a detailed design stage for changing transport needs. For example, future bus priority measures at intersections, additional bus stops, future expansion of cycling networks and wider footpaths that can be accommodated within the corridor.</li> <li>The proposed SH22 corridor cross section has the spatial provisions to be flexible, re-configurable and adapted at a detailed design stage for changing contextual needs. For example, town centre corridors with strong place functions can accommodate wider footpaths and wider berms for street tree planting.</li> <li>The SH22 cross section also provides space for all modes, with spatial provisions at the corridor edges that accommodate active frontages and provide permeability for access to adjacent land uses and movement corridors.</li> </ul>
<p><b>2.4 Social cohesion</b></p>	<p>Provide clear, effective and legible connectivity between community and social functions.</p>	<ul style="list-style-type: none"> <li>The proposed SH22 upgrade cross section supports the creation of spaces where seamless cross corridor connectivity can be provided through a permeable interface at the corridor boundary.</li> <li>The SH22 corridor upgrade can deliver a positive contribution to the sense of belonging and participation, as well as community resilience by supporting direct access to the; proposed local centre, proposed Western centre, the Drury Sports Complex and the Ngakoroa Reserve.</li> </ul>

Principle	Explanation	Application to SH22 Upgrade
		<ul style="list-style-type: none"> <li>Further development of midblock crossings at a detailed design stage particularly across the proposed future Jesmond Road extension will ensure equitable cross corridor connectivity and access to the proposed Drury west rail station.</li> </ul>
<b>2.5</b> <b>Safe corridors</b>	Provide a safe and convenient network of routes accessible to people of all ages and abilities.	<ul style="list-style-type: none"> <li>The SH22 corridor upgrade can deliver a greater level of safety, access and movement to future local communities that will promote a sense of personal safety particularly for pedestrians and cyclists.</li> <li>The proposed configuration and alignment accommodates the universal design approach and accessibility to all parts of user journeys.</li> <li>The active travel solutions (walking and cycling) are proposed as fully segregated and prioritised with signalised intersections at Jesmond Road and at Great South Road.</li> <li>Further design detail of safe prioritised active modes crossings at the Oira Road roundabout should be addressed at subsequent detail design stages.</li> </ul>
<b>BUILT FORM</b>		
<b>3.1</b> <b>Align corridors with density</b>	Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.	<ul style="list-style-type: none"> <li>The proposed SH22 upgrade corridor alignment and arrangement provides a safe and connected walking and cycling network for the proposed growth areas within Drury.</li> <li>The corridor directly addresses the proposed Western centre and the THAB zoning with its prioritised walking and cycling facilities as well as providing for connections to the proposed Drury West station.</li> </ul>
<b>3.2</b> <b>Corridor scaled to the surrounding context and urban structure</b>	Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).	<ul style="list-style-type: none"> <li>The function of SH22 will change from a high speed rural state highway to an urban arterial with a likely speed reduction to 50kph. The corridor has been appropriately scaled in terms of speed and functionality to connect the growth areas of Drury West to the wider network and centres, as well as providing a frequent transport bus network.</li> <li>The SH22 corridor scale and configuration also provides an appropriate response to the potential needs of the adjacent precinct</li> </ul>

Principle	Explanation	Application to SH22 Upgrade
		<p>functions, for example through efficient localised movement, alignment with higher density living (THAB zones) and the provision of mixed mode travel.</p> <ul style="list-style-type: none"> <li>The corridor alignment provides a flexible interface that acknowledges and accommodates known precinct planning and private development land use proposals for Auranga.</li> </ul>
<p><b>3.3</b> Facilitate an appropriate interface between place and movement</p>	<p>Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)</p>	<ul style="list-style-type: none"> <li>The SH22 upgrade cross section provides a flexible platform to address the opportunity for place as well as movement function with clear allocation of street space, for example separated pedestrian and cycle facilities and potential road median spaces that provide safe waiting zones for pedestrians. In the absence of medians, signalized or legal crossings, spaced appropriately for the adjacent land-uses and pedestrian desire routes involved, should be considered.</li> <li>The corridor cross section also provides flexibility in supporting appropriate public private interfaces and connectivity at a fine grain (pedestrian) level, for example direct pedestrian access from THAB or other higher density living is accommodated and encouraged by placing pedestrian circulation closest to the corridor boundary.</li> <li>Direct private vehicular access is not accommodated, however the interface at the corridor boundary will support a pedestrian permeable interface or active frontage interface where adjacent to the future THAB zone (or where required).</li> </ul>
<p><b>MOVEMENT</b></p>		
<p><b>4.1</b> Connect nodes</p>	<p>Provide tangible connectivity between identified activity nodes.</p>	<ul style="list-style-type: none"> <li>The corridor alignment provides tangible and direct connectivity between complementary destinations, for example the proposed Western centre / THAB zones, Drury west employment areas, proposed Drury West and Drury Central stations and the proposed Main centre.</li> </ul>
<p><b>4.2</b> Connect modes</p>	<p>Provide for choice in travel and the ability to connect at interchanges between modes.</p>	<ul style="list-style-type: none"> <li>The SH22 Upgrade corridor provides simple but complete connectivity for all modes (walking, cycling, public transport and private vehicle).</li> </ul>



Principle	Explanation	Application to SH22 Upgrade
		<ul style="list-style-type: none"> <li>The corridor provides a direct active mode and potential PT connection to the proposed Drury Central and Drury West stations as well as a link to State Highway 1 via the interchange.</li> </ul>
<b>4.3</b> <b>Support access to employment and industry</b>	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.	<ul style="list-style-type: none"> <li>The corridor alignment provides direct and legible access to the Drury west employment area.</li> </ul>
<b>4.4</b> <b>Prioritise active modes and public transport</b>	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.	<ul style="list-style-type: none"> <li>The SH22 corridor cross sections accommodate high-quality active travel facilities, for example separated pedestrian and cycle pathways.</li> <li>As the area urbanises and other transport networks are implemented, for example the proposed Pukekohe Expressway, this will relieve some of the longer distance travel using SH22 (for example to and from Pukekohe) so that public transport priority opportunities can be implemented.</li> <li>Further development of modal priority at intersections and roundabouts at the detailed design stage will provide a higher level of service and enable modal shift.</li> </ul>
<b>4.5</b> <b>Support inter-regional connections and strategic infrastructure</b>	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, waste water, water) to the network.	<ul style="list-style-type: none"> <li>The SH22 corridor is a strategic corridor that provides a key link through the centre of the Drury west future urban zone and provides regional connectivity to communities located further west such as Karaka as well as connectivity south to Paerata.</li> </ul>
<b>4.6</b> <b>Support legible corridor function</b>	Consider how areas can be clearly navigated and understood by users moving from place to place.	<ul style="list-style-type: none"> <li>The SH22 upgrade typical corridor cross section accommodates a range of modes with clear allocation of street spaces and inherently supports future community connectivity, mobility and travel choice.</li> <li>Further development of midblock crossings and future bus stops along the corridor at the detailed design stage will provide clear and legible cross corridor access and connectivity between areas of high density and centres.</li> </ul>
<b>LANDUSE</b>		
<b>5.1</b> <b>Public transport directed and integrated into centres</b>	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and	<ul style="list-style-type: none"> <li>The SH22 Upgrade corridor alignment can accommodate future public transport connections between the proposed Western centre and the proposed Main Centre and State Highway 1.</li> </ul>

Principle	Explanation	Application to SH22 Upgrade
	provide modal choice to a larger number of users.	
<b>5.2 Strategic corridors as urban edges</b>	Strategic corridors as potential definers of a land use edge.	<ul style="list-style-type: none"> <li>This principle is not relevant to the SH22 Upgrade.</li> </ul>

#### 4.4 Summary of urban design evaluation and recommendations for SH22 Upgrade

Overall, the proposed SH22 Upgrade corridor design and configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 4-5 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 4-5:

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities. For example, active mode priority and connectivity between the proposed Drury West Station across and along SH22 to the Western Centre.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections. For example, the Jesmond Road and SH22 intersection will require future definition to ensure connectivity between the proposed Drury West Station to SH22.
- An urban interface approach within the corridor that;
  - provides an appropriate interface to the proposed Western Centre and local centre and enables buildings and spaces to positively address and integrate with the SH22 corridor,
  - responds to the spatial character of proposed centre environments and supports quality public realm infrastructure, ample pedestrian footpath width, frequent pedestrian crossing points and street trees for shade and amenity,
  - recognises the transition of densities from THAB to mixed housing urban to mixed housing suburban and provides a corridor interface that supports permeable pedestrian access and responds to the changing built form interface and spatial character of adjacent future development,
  - supports the integration of the proposed Drury West rail station and surrounding land uses.
- The identification of urban and landscape design drivers related to the Ngakoroa Stream, Ngakoroa Reserve, and the Drury Sports Complex and how the corridor has responded to and integrated with these character drivers.

- In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- A landscape plan that considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement and treatment of batter slopes. The landscape plan should also demonstrate integration of the Ngakoroa Stream and terrestrial SEA where the corridor intersects with the proposed Blue-Green Network. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed greenways and the wider walking and cycling network.
- Integration of the stormwater wetlands (SH22 wetland 1 and 2) to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned high density.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

Further urban design opportunities in the Project area have also been identified in Figure 4-5 and shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

### 4.5 SH22 Upgrade – Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 4.4 above. Opportunities that have been identified are shown in orange below.

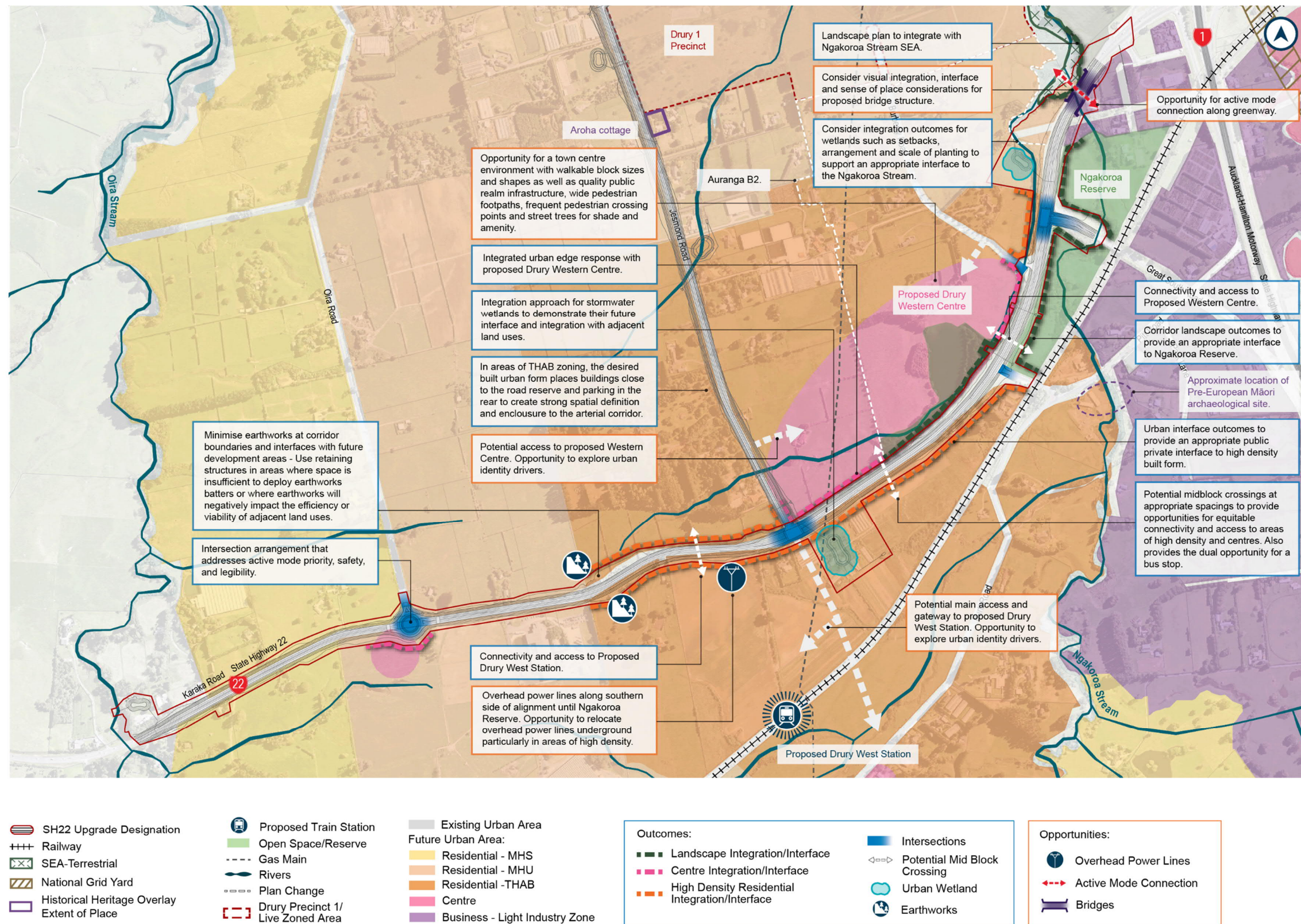


Figure 4-6 SH22 Upgrade urban design outcomes and opportunities

### 5 NoR D2: Jesmond to Waihoehoe West FTN Upgrade

The Jesmond to Waihoehoe West FTN Project (NoR D2) includes, an approximately 4.1km long four-lane FTN arterial route along Jesmond Road, through a new greenfields link between Jesmond Road and the existing Bremner Road, Bremner Road, Norrie Road and Waihoehoe Road West. It primarily involves upgrading and widening existing transport corridors with the exception of the new link between Jesmond Road and the existing Bremner Road and the new bridge connection over Hingaia Stream. The functional intent of the Project is to provide an appropriate urban arterial connecting the growth areas of Drury West to the wider network and centres, including the provision of a frequent transport bus network. Generally, a 30m wide transport corridor will be provided with two general traffic lanes, two bus lanes and separated walking and cycling facilities on both sides of the road corridor. The urban arterials will have a likely speed limit of 50kph.

For assessment purposes, the Project has been separated into three sections, as shown in Figure 5-1, including:

- Jesmond Road FTN Upgrade;
- Bremner Road FTN Upgrade (including the Jesmond to Bremner link through the Auranga Development, Bremner Road and Norrie Road); and
- Waihoehoe Road West FTN Upgrade including the Great South Road intersection.

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.

Further details of each Project section are provided below.

# Drury Arterial Network

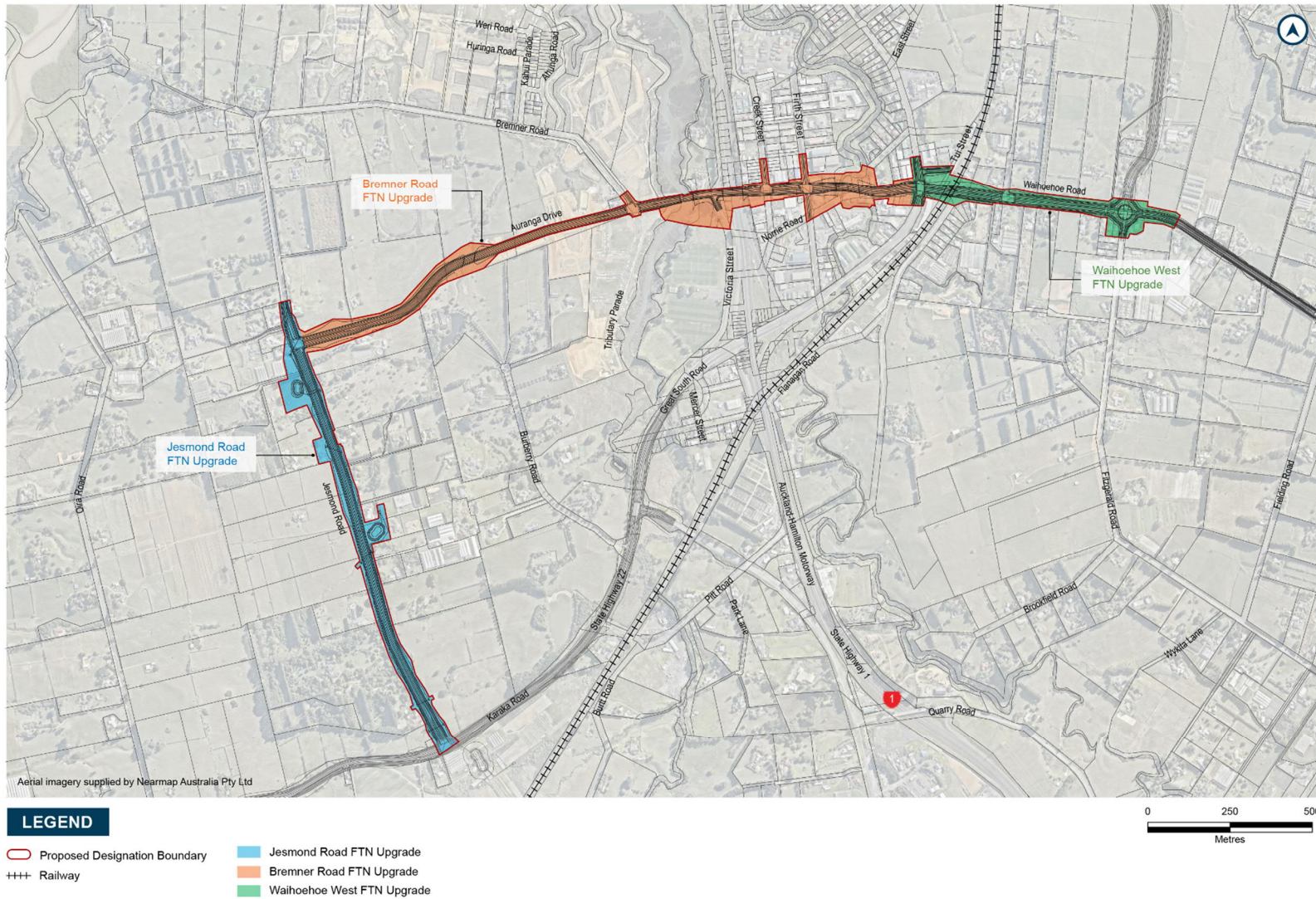


Figure 5-1 Overview of NoR D2

## Jesmond Road FTN Upgrade

### 5.1 Jesmond Road FTN Upgrade contextual analysis

The Jesmond Road FTN Upgrade section provides greater accessibility via a north-south link that connects Jesmond Road to the proposed Drury West Station and Western centre, forming a key public transport and active mode spine through Drury West.

An overview of the proposed design is provided in Figure 5-2.

The key features of the Jesmond Road FTN upgrade section include:

- Signalised intersections at SH22 and the new Jesmond to Bremner Link
- New and extended pipe culverts for cross drainage
- Two stormwater wetlands.



Figure 5-2 Overview of Jesmond Road FTN Upgrade project area



### 5.1.1 Existing environment

#### 5.1.1.1 Urban features

The existing land use surrounding the Jesmond Road FTN upgrade section is largely rural, consisting of low density rural residential dwellings and a few rural based businesses, horticultural and commercial business operations.

The Auranga (Drury) 1 Precinct is located in the north east of the Project area and is zoned for urban development. While no development is currently active in the Drury 1 Precinct adjacent to Jesmond Road, development of low to medium density housing has begun further to the east within the Drury 1 Precinct along Bremner Road.

The existing transport function of the Jesmond Road FTN upgrade section is characterised by:

- a rural two-lane secondary road;
- containing no formal walking or cycling facilities;
- having no public transport services or facilities;
- containing limited private land access points / driveways; and
- an 80kph speed limit.

There are no schools immediately adjacent to the Jesmond Road FTN upgrade section. Schools and preschools in the wider area include Farmhouse Preschool, Karaka School, Drury School and Drury Christian School. A MoE designated site (Designation 5062, Drury West Primary School) is located within Auranga 1 Precinct to the east of Jesmond Road. Within Auranga development there are also plans for a retirement village and day care centre.

#### 5.1.1.2 Physical features

The existing physical features along and surrounding the Jesmond Road FTN upgrade section is characterised as gently rolling and undulating topography crossed by several riparian corridors with associated overland flow paths. Key watercourses in the Project area shown in Figure 5-3 include Ngakoroa Stream to the east of the corridor and Oira Creek to the west.

The existing vegetation is highly modified and is dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting. However, small areas of native or mixed exotic vegetation occur with areas of planted native vegetation and within exotic wetland areas.

### Proposed Blue-Green Network

The project intersects with the proposed Blue-Green network at the following locations, providing future opportunities for a complimentary design response.

- A tributary of the Ngakoroa Stream in the south (131 Jesmond Road).
- A tributary of the Ngakoroa Stream in the north (235-221 Jesmond Road).
- The Makomako Plant Centre (64 Jesmond Road), where a potential neighbourhood park (0.3-0.5ha) is indicated.



Figure 5-3 Jesmond Road FTN Upgrade project area

### 5.1.2 Likely future environment

The Ōpāheke-Drury Structure Plan identifies future land use change to the entire length of the Jesmond Road FTN upgrade section (see Figure 5-4). The key land use features that will comprise the future urban environment include:

- A future Western centre at the southeast end of Jesmond Road.
- A small local centre proposed at the northern end of Jesmond Road.
- Residential – Terraced Housing and Apartment Building (THAB) zoned land concentrated around the future Western centre on the southeast and southwest of Jesmond Road FTN upgrade section.
- Residential – Mixed Housing Urban surrounding the Terraced Housing and Apartment Building zoned land on either side of the Jesmond Road FTN upgrade section to the northeast and northwest.

Future transport projects surrounding the Jesmond Road FTN upgrade section include:

- Proposed new rail stations at Drury Central and Drury West;
- a proposed regional north-south active mode route between Drury and Pukekohe; and
- the SH22 Drury-to-Paerata (Safe Network Programme) which is already underway.

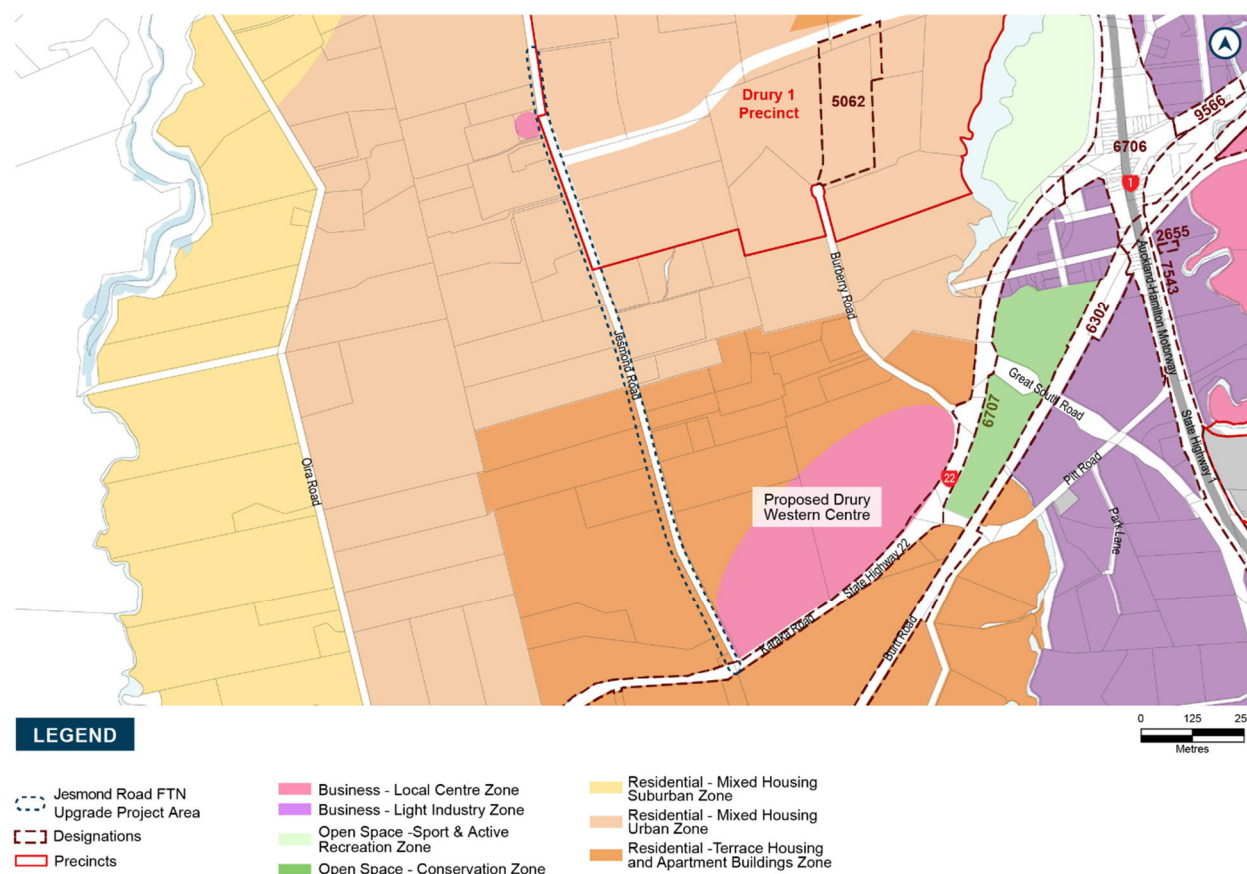


Figure 5-4 AUPOIP Zoning Jesmond Road FTN upgrade section

## 5.2 Jesmond Road FTN Upgrade - form and function

The functional intent of the Jesmond Road FTN Upgrade section of the Project is to provide north-south connectivity through the centre of the Drury West future urban area, and to form part of the Southern FTN connecting to the rail network at the proposed Drury West Station

Currently, the Jesmond Road corridor is a two lane rural highway with no walking, cycling or public transport facilities. It is the only north south link through Drury West providing connectivity between Bremner Road and SH22, serving mainly a rural catchment. It is envisaged that as the area urbanises, the corridor will become a four lane urban arterial that will provide separated walking and cycling facilities as well as prioritised public transport. The corridor will interface with highly urbanised future land uses such as the proposed Western centre, and residential developments zoned THAB and mixed housing urban. Once established the corridor will support both movement and place priorities.

Key features of the Jesmond Road FTN Upgrade section include:

- A typically 30m wide road with four lanes and separated walking and cycling facilities.
- Localised widening around the existing intersections to accommodate for vehicle stacking and tie-ins and walking and cycling facilities/crossings.
- Proposed signalised intersections with SH22 and the proposed Bremner Road FTN upgrade section.

- Two stormwater wetlands.
- Batter slopes and retaining to enable widening of the corridor and/or wetland construction, and associated cut and fill activities.
- Areas identified for construction related activities including site compounds, construction laydown, bridge works area, the re-grade of driveways and construction traffic manoeuvring.

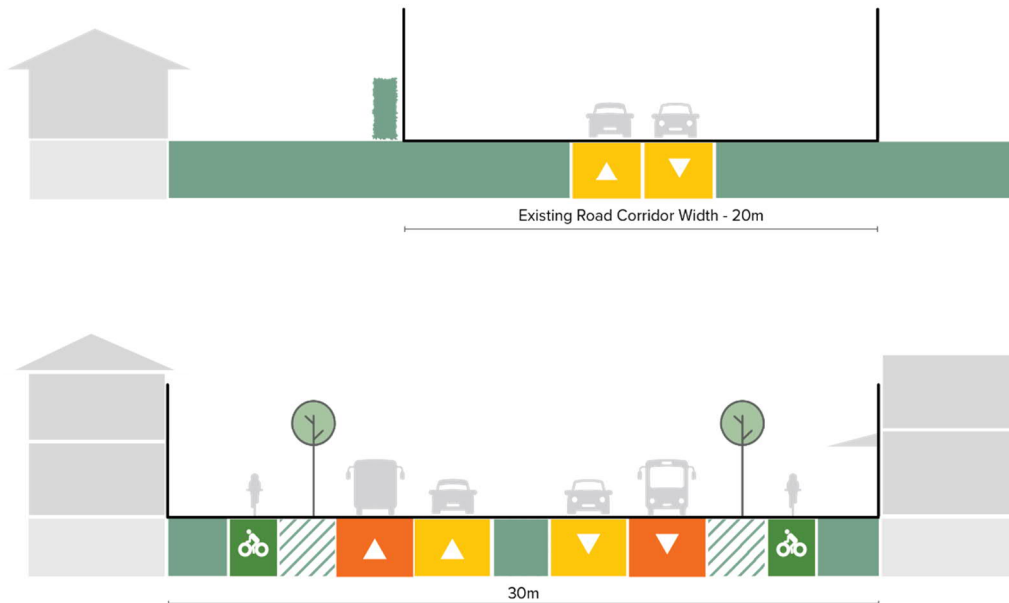


Figure 5-5 Jesmond Road FTN upgrade section typical cross section

## Bremner Road FTN Upgrade

### 5.3 Bremner Road FTN Upgrade contextual analysis

The Bremner Road FTN Upgrade section extends from Jesmond Road in the west, approximately 1.98km to the end of Norrie Road in the east. This section involves the construction of a new road from Jesmond Road to the existing Bremner Road referred to as the “Jesmond to Bremner Link” and widening, and direct connection via a new bridge over Hingaia Stream, of Bremner Road and Norrie Road to enable the four-lane FTN arterial.

An overview of the concept design is provided in Figure 5-6 **Error! Reference source not found..**

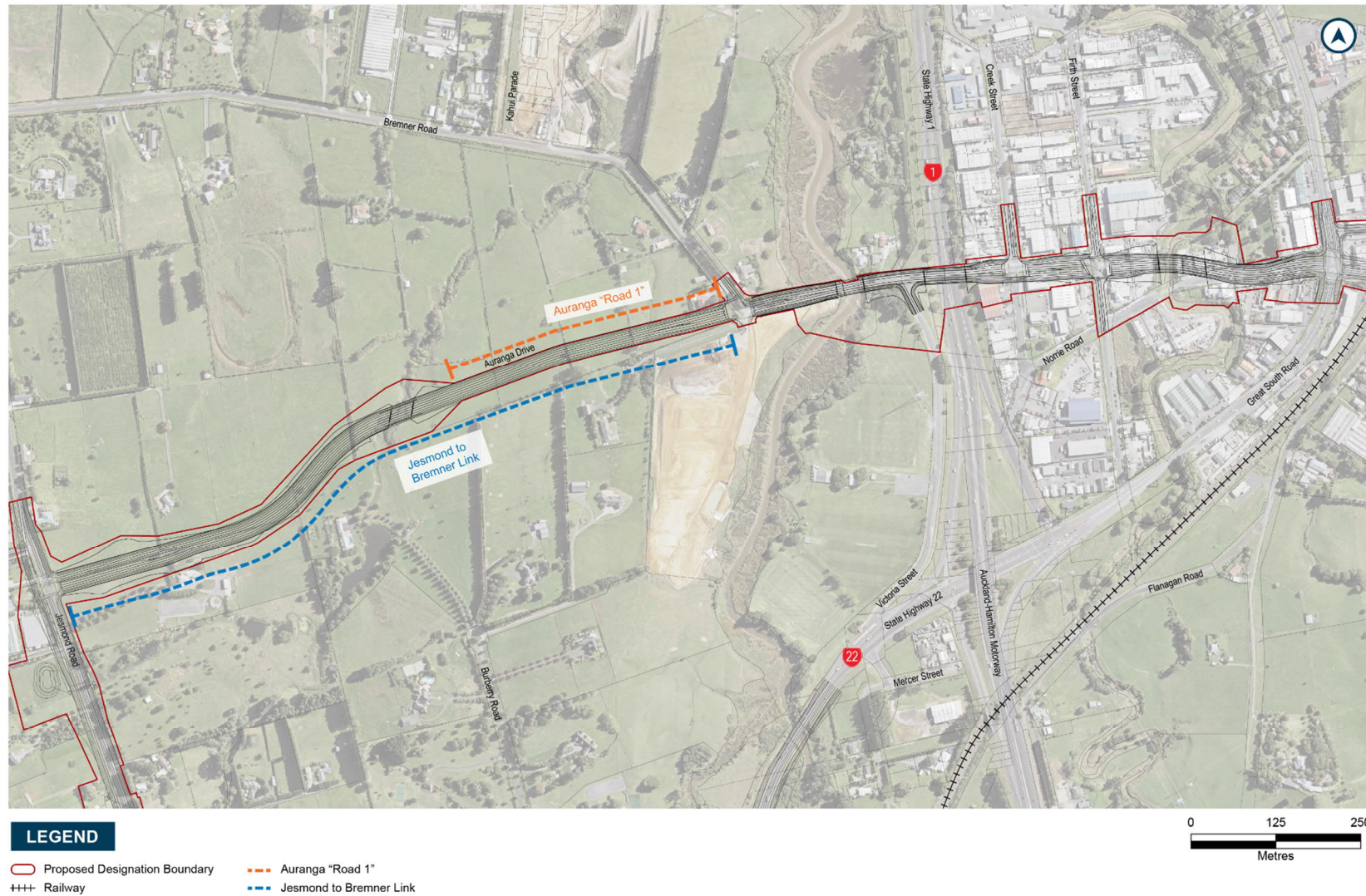


Figure 5-6 Overview of Bremner Road FTN Upgrade Section

### 5.3.1 Existing environment

#### 5.3.1.1 Urban features

The existing land use to the western end of the Bremner Road FTN Upgrade section is generally rural, consisting of low density rural residential dwellings and a few rural based businesses including transportation and logistics, horticultural and a few commercial business operations.

Immediately to the west of Ngakoroa Stream, the Auranga (Drury) 1 Precinct has recently become live zoned through Plan Change 6. Development in the precinct has begun with the construction of low to medium density residential dwellings.

In the centre of the Bremner Road FTN Upgrade section, to the east of SH1, there is a mix of light industrial businesses such as concreting, automotive maintenance and supplies, fabricators, distribution services, building and machinery supplies. The existing Drury village, surrounding Great South Road, holds a mix of businesses including food outlets, retail, gym, a church and cemetery in the area. Recreational land uses are located to the east of Ngakoroa Stream (Drury Sports Complex) and to the north of Drury village (Drury Domain).

The existing transport function of the Bremner Road FTN Upgrade section is characterised by:

- a rural two-lane secondary collector road along the western end of existing Bremner Road;
- a short section of segregated walking and cycling facilities between the Auranga development up to the Bremner Road bridge;
- a two-lane secondary collector in a spatially constrained environment along the existing Norrie Road;
- containing no formal cycling facilities;
- disconnected footpaths;
- having no public transport services or facilities;
- a roundabout at the intersection of Norrie and Great South Road; and
- containing limited private land access points / driveways.

There are no existing schools immediately adjacent to the Bremner Road FTN Upgrade section. Schools and preschools in the wider area include Farmhouse Preschool, Karaka School, Drury School and Drury Christian School. A MoE designated site (Designation 5062, Drury West Primary School) is currently under construction within the Auranga 1 Precinct, south of the Jesmond to Bremner Link which in the future may be accessed from Burberry Road.

#### 5.3.1.2 Physical features

The existing physical features along and surrounding the Bremner Road FTN Upgrade section are characterised as gently rolling and undulating topography crossed by several riparian corridors with associated overland flow paths. Key watercourses in the Project area include the Ngakoroa and Hingaia Streams. Where the project intersects with the above proposed Blue-Green network there are future opportunities for a complimentary design response.

Two bridge structures allow flood conveyance for the Ngakoroa and Hingaia Streams that discharge towards the Pahurehure Inlet. The west of the Bremner Road FTN Upgrade section lies on a catchment ridgeline with several overland flow paths draining either north or south, away from the existing road.

## Drury Arterial Network

The existing vegetation is highly modified and are dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting. However, small areas of native or mixed exotic vegetation occur with areas of planted native vegetation.

There are a number of SEA's identified under the AUP:OIP adjacent to the Bremner Road FTN Upgrade section that are considered as a continuum following the transition of the Ngakoroa Stream mouth from freshwater to saline dominated habitats. The northern side of the existing Ngakoroa Stream bridge defines the southern extent of the Coastal Marine Area (CMA). A marine 1 SEA (SEA-M1-29b) and several terrestrial SEAs (SEA\_T\_530 / SEA\_T\_530b) are located north and south of the existing Ngakoroa Stream bridge.



Figure 5-7 Bremner Road FTN Upgrade project area

### 5.3.2 Likely future environment

The Ōpāheke-Drury Structure Plan identifies future land use change to the entire length of the Bremner Road FTN Upgrade section (see Figure 5-8Error! Reference source not found.). In the east, construction of the Auranga 1 Precinct will continue, with the rural greenfield areas assumed to be an urban, or the developing urban environment predicted to be largely medium density residential. The key land use features that will comprise the future urban environment include:

- Drury west centre to the south Bremner Road FTN Upgrade section (adjacent to SH22 between Jesmond and Burberry Roads).
- Residential – THAB zoned land concentrated to the northern edge of Bremner Road.

## Drury Arterial Network

- Residential – Mixed Housing Urban to the southern edge and west of the Bremner Road FTN Upgrade section.
- A proposed esplanade reserve open space that crosses the corridor and follows a parallel tributary to the Ngakoroa Stream.

Future transport projects surrounding the Jesmond Road FTN corridor include:

- Proposed new rail stations at Drury Central and Drury West;
- a proposed regional north-south active mode route between Drury and Pukekohe;
- the SH 22 Drury-to-Paerata (Safe Network Programme), which is already underway; and
- the proposed Papakura to Bombay (Waka Kotahi NZUP Project): SH1 Widening project



Figure 5-8 AUPZIP zoning for Bremner Road FTN

### 5.4 Bremner Road FTN - form and function

The functional intent of the Bremner Road FTN Upgrade section is to provide a strategic east-west link that connects Jesmond Road to Great South Road, Drury village, and the proposed Main centre forming a key public transport and active mode spine.

The corridor is formed from 2 sections; a western section comprising a new four lane corridor between Jesmond Road and SH1, and an eastern section where two additional lanes will be added to the existing Bremner Road as part of the FTN. The full corridor will become a four lane urban arterial that will provide separated walking and cycling facilities as well as prioritised public transport. The corridor will interface with a range of land uses including low to medium density housing, the



Ngakoroa Stream, and the existing light industrial areas around Drury Village. Once established the corridor will provide support for both movement and place priorities.

Key features of the Bremner Road FTN Upgrade section include:

- A typically 30m wide road with four lanes and separated walking and cycling facilities.
- Signalised intersections on Bremner Road with Auranga Road 1, Creek Street and Firth Street.
- Between Jesmond and Bremner Roads (Jesmond to Bremner Link):
  - A new road from Jesmond Road to an unnamed stream at the Auranga Development;
  - Forming of two additional lanes for the FTN within the Auranga “Road 1” from the unnamed stream to Bremner Road); and
- A new bridge over an unnamed stream within the Jesmond to Bremner Link.
- Reconstruction and widening of the two existing bridges crossing Ngakoroa Stream and SH1.
- A new bridge connection from Bremner Road to Norrie Road across Hingaia Stream.
- Removal of the Norrie Road Bridge and closure of Norrie Road west.
- Removal of access to Bremner Road from Creek Street (south).
- Proposed signalised intersections with SH22 and the proposed Bremner Road FTN upgrade section.
- Localised widening around the existing intersections to accommodate for vehicle stacking and tie-ins and walking and cycling facilities/crossings.
- Batter slopes and retaining to enable widening of the corridor and/or wetland construction, and associated cut and fill activities.
- Vegetation removal along the existing road corridor.
- Areas identified for construction related activities including site compounds, construction laydown, bridge works area, the re-grade of driveways and construction traffic manoeuvring.

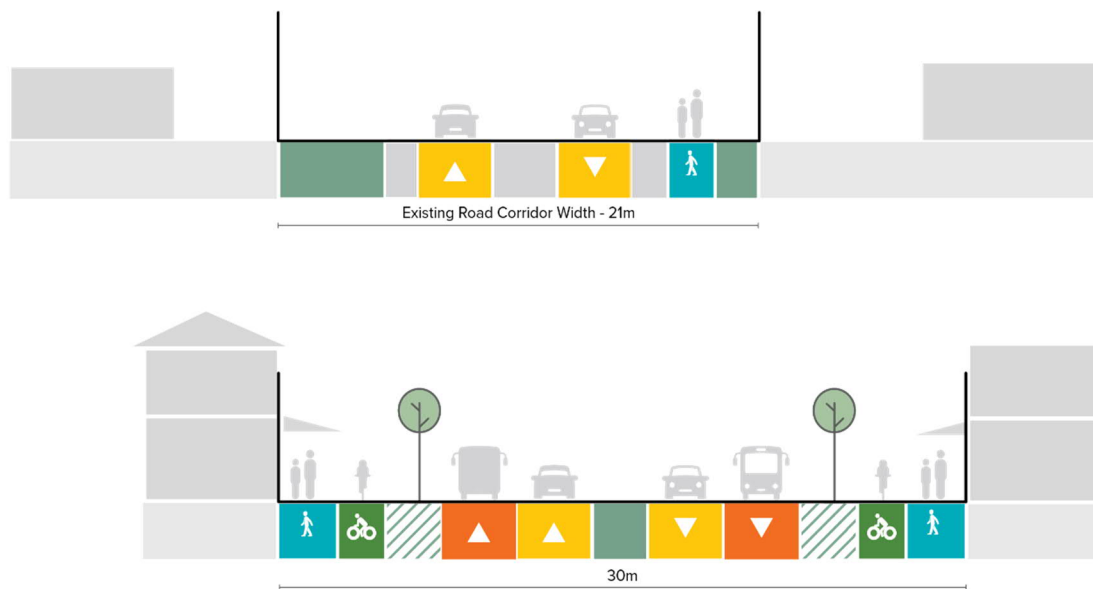


Figure 5-9 Bremner Road FTN Upgrade section typical cross-section

## Waihoehoe Road West FTN Upgrade

### 5.5 Waihoehoe Road West FTN Upgrade contextual analysis

The Waihoehoe Road West FTN Upgrade section extends from Great South Road in the west, approximately 800m east to just past Fitzgerald Road in the east and involves widening the existing two-lane rural road to enable the four-lane FTN arterial. An overview of the concept design is provided in Figure 5-10 **Error! Reference source not found.**



**Figure 5-10 Overview of Waihoehoe Road West FTN Upgrade Section**

### 5.5.1 Existing environment

#### 5.5.1.1 Urban features

The existing land use along the Waihoehoe Road FTN Upgrade section is generally rural, consisting of low density rural residential dwellings and a few rural based businesses in the western portion including transportation and logistics, horticultural and a few commercial business operations.

Drury village, surrounding Great South Road, holds a mix of businesses including food outlets, retail, gym, a church and cemetery in the area. Recreational land uses are located at the Drury Sports Complex (to the east of Ngakoroa Stream) and the Drury Domain (to the north of Drury Village).

The existing transport function of the Waihoehoe Road FTN Upgrade section is characterised by:

- a rural two-lane secondary collector road along the western end of existing Waihoehoe Road;
- a bridged crossing of the rail corridor adjacent to Great South Road;
- containing no formal walking or cycling facilities;
- having no public transport services or facilities;
- a roundabout intersection at the intersection of Waihoehoe and Great South Road; and
- containing limited private land access points / driveways.

There are no schools immediately adjacent to the Waihoehoe Road FTN Upgrade section. Schools and preschools in the wider area include Farmhouse Preschool, Karaka School, Drury School and Drury Christian School.

### 5.5.1.2 Physical features

The existing physical features along and surrounding the Waihoehoe Road FTN Upgrade section is characterised as gently rolling and undulating topography. There are no significant streams and only minor flood prone areas adjacent to the corridor.

The existing vegetation is highly modified and is dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting.



Figure 5-11 Waihoehoe Road West FTN Upgrade Project area

### 5.5.2 Likely future environment

Based on the Drury-Ōpāheke Structure Plan (see Figure 5-15), the land use pattern surrounding the Waihoehoe Road FTN Upgrade section is likely to be largely Terrace Housing and Apartment Buildings, with a newly established Main centre to the western portion adjacent to Great South Road. The anticipated urban form of the existing FUZ area has been assumed based on the outcomes anticipated by each of the zones in the AUP:OIP, summarised below.

- A proposed Main centre adjacent to Great South Road;
- residential – THAB zoned land to the north and south of Waihoehoe Road; and
- a retained local centre and mixed-use zone along Great South Road.

The existing recreational, local centre and light industrial land uses are anticipated to remain, however it is expected they may be developed to support the expanding urbanised area.

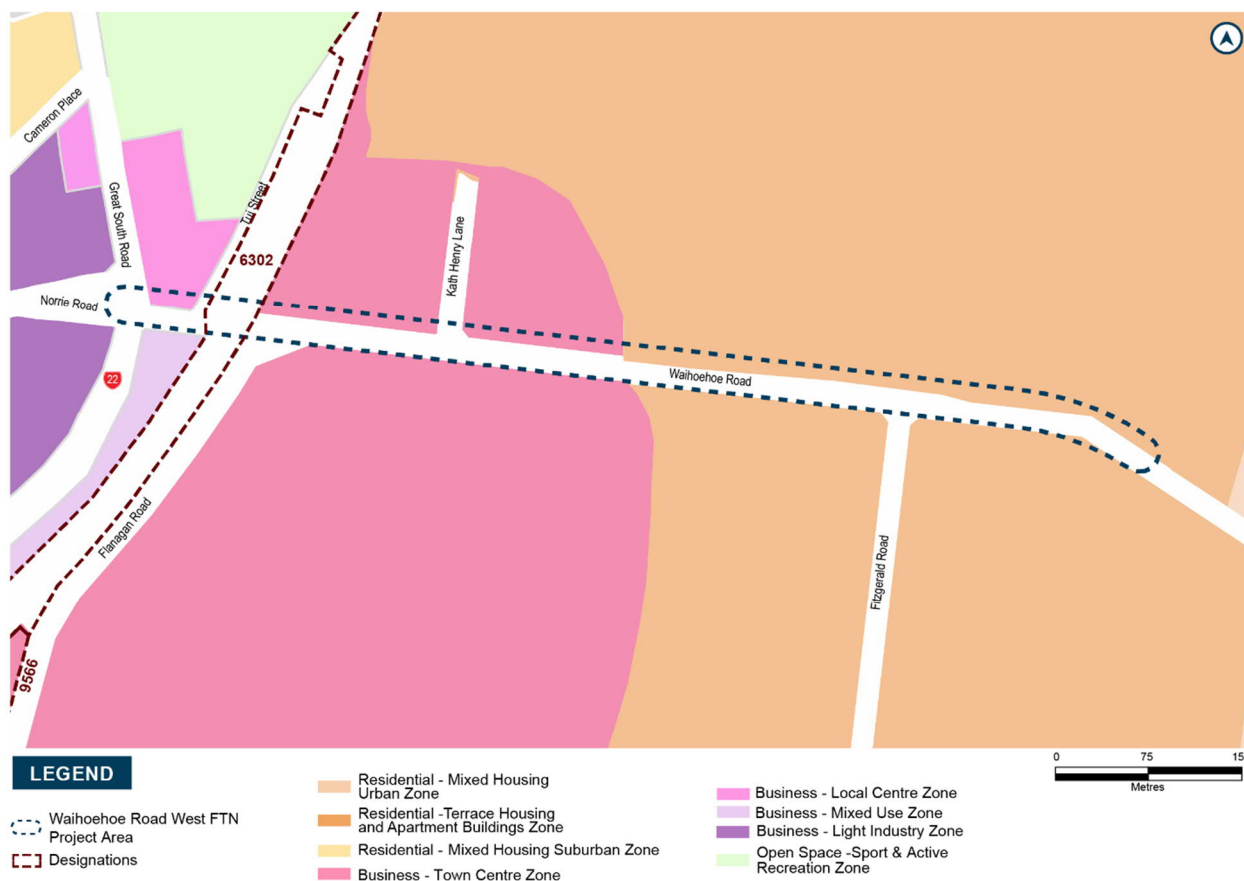


Figure 5-12 AUPOIP zoning for Waihoehoe Road West FTN

### 5.6 Waihoehoe Road West FTN - form and function

The functional intent for the Waihoehoe Road West FTN is to provide a strategic east west connection between the north-south (Ōpāheke N-S FTN) and east-west (Bremner Road FTN ) corridors. The corridor provides direct access to the proposed Drury Central Station (and associated park and ride facilities) and the proposed Main Centre, forming a key public transport and active mode spine through the Drury Central future urban zone.

The project consists of the widening of the existing two-lane corridor to a four-lane urban arterial with new footpaths and dedicated cycleways on both sides of the road as well as safe and legible cross corridor connectivity. The corridor cross section will provide support for active edge permeability and an appropriate interface to the proposed Main centre and the Drury Central Station.

Key features of the Waihoehoe Road West FTN corridor include:

- A typically 30m wide road with four lanes and separated walking and cycling facilities.
- Realignment of Tui Street to Great South Road.
- Upgraded and signalised intersection at Great South Road.
- Reconstruction of the bridge crossing the NIMT rail line.
- Relocation of the Waikato 1 watermain - Location to be agreed with Watercare at future detailed design.

- Localised widening around the existing intersections to accommodate for vehicle stacking and tie-ins and walking and cycling facilities/crossings.
- Batter slopes and retaining to enable widening of the corridor and/or wetland construction, and associated cut and fill activities.
- Vegetation removal along the existing road corridor.
- Areas identified for construction related activities including site compounds, construction laydown, bridge works area, the re-grade of driveways and construction traffic manoeuvring.

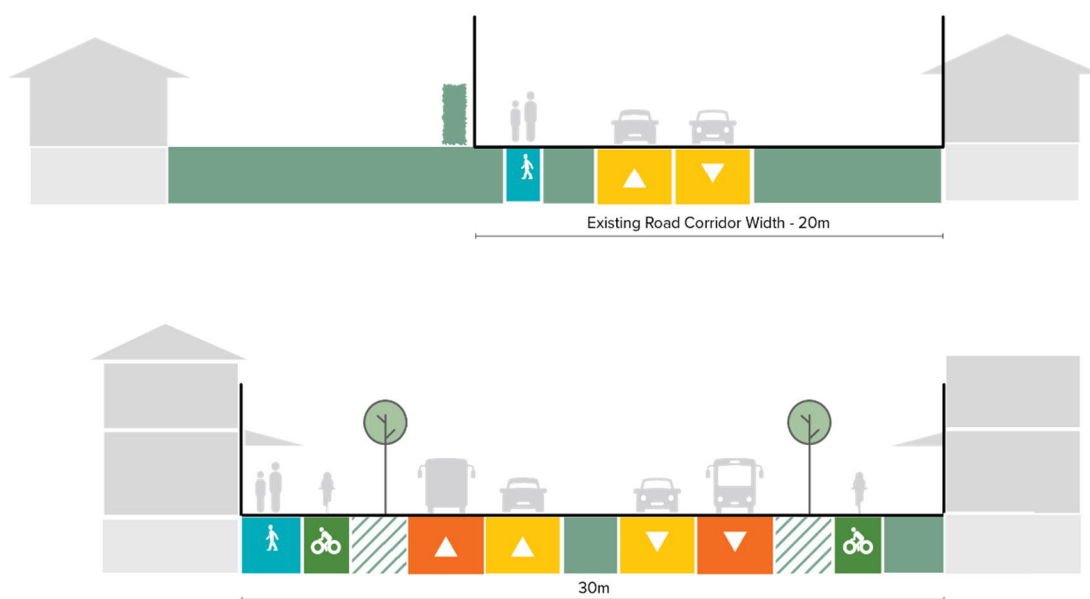


Figure 5-13 Waihoehoe Road West FTN typical cross section

### 5.7 NOR D2: Jesmond to Waihoehoe West FTN Upgrade - Evaluation against the Design Framework principles

This evaluation considers the application of the established Design Framework Principles against the proposed Jesmond to Waihoehoe West FTN Upgrade. It provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design outcomes should be considered in future design stages. These recommendations can form the basis of an urban design specific designation condition, and where there is an overlap of urban design outcomes with other considerations (for example ecological, landscape, visual or water quality related recommendations) they can be integrated within the relevant specialist conditions.

Table 5-1: Urban Design Evaluation for Jesmond to Waihoehoe West FTN Upgrade

Principle	Explanation	Application to the Jesmond to Waihoehoe West FTN Upgrade
<b>ENVIRONMENT</b>		
<p><b>1.1</b> Support and enhance ecological corridors and biodiversity</p>	<p>Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors</p>	<ul style="list-style-type: none"> <li>The proposed arrangement and alignment of the corridors provide spatial provisions (at boundaries and within berms) that have the potential to support ecological connectivity and biodiversity in the local environment by providing contiguous space for diverse planting responses. Through the alternatives assessment, effects on high value natural wetlands were minimised.</li> <li>The crossings of the Hingaia and Ngakoroa Stream (and tributaries) along Bremner Road incorporates four bridging structures, which are preferred from an urban design perspective where they might serve to reinforce broader connectivity outcomes for ecology and biodiversity.</li> <li>A Marine 1 SEA (SEA-M1-29b) and several terrestrial SEAs (SEA_T_530 / SEA_T_530b) are located north and south of the existing Ngakoroa Stream bridge. Particular care has been taken to widen the bridge over the Ngakoroa Stream to the south to reduce impacts on the marine SEA.</li> </ul>
<p><b>1.2</b> Support water conservation and enhance water quality in a watershed</p>	<p>Take into account and work with the existing watershed as part of a whole system.</p>	<ul style="list-style-type: none"> <li>The proposed typical corridor cross sections allow spatial provisions to provide natural drainage to stormwater wetlands as a way to address water quality and reduce hard engineering solutions. Water quality and detention/retention will be decided in future regional consents.</li> <li>Further refinement of the wetlands along Jesmond Road during the detailed design stage is recommended to define the wetland's final form and how the wetlands will interface with the surrounding land uses as well as exploring opportunities to be a part of an integrated system. For example, wetlands should be configured in a naturally shaped manner and fully integrated with existing natural drainage features and vegetation.</li> </ul>
<p><b>1.3</b> Minimise land disturbance, conserve resources and materials</p>	<p>Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse</p>	<ul style="list-style-type: none"> <li>The concept design utilises some existing corridors and demonstrates a close and connected alignment to the existing landform, generally balancing earthworks while minimising unnecessary disturbance and materials.</li> <li>Bremner Road traverses across undulating land, the Hingaia and Ngakoroa Streams, as well as their respective tributaries. Further vertical integration adjacent to the four bridging structures should be developed at a detailed design stage to allow an</li> </ul>

Principle	Explanation	Application to the Jesmond to Waihoehoe West FTN Upgrade
	effects of activities on the environment.	<p>appropriate transition and interface to adjacent built form.</p> <ul style="list-style-type: none"> <li>• The proposed corridors demonstrate a generally efficient alignment in relation to existing property boundaries along the corridors, minimising land impacts and inefficient residual land portions.</li> <li>• If practicable, explore opportunities at future detailed design stages to;                             <ul style="list-style-type: none"> <li>○ redefine and integrate residual land around the stormwater wetlands with the adjacent land uses</li> <li>○ integrate land parcels adjacent to the Hingaia stream bridge, at the Great South Road intersection, the Ōpāheke North-South intersection and parcel sandwiched between Tui Street and Waihoehoe Road.</li> </ul> </li> </ul>
<p><b>1.4</b> Adapt to a changing climate and respond to the microclimatic factors of each area</p>	Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.	<ul style="list-style-type: none"> <li>• The corridor designs adopt vertical geometries that accommodate stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.</li> <li>• The corridors provide for active modes and prioritises public transport to support modal shift and reduce transport related climate change contributions.</li> <li>• The corridors provide for street tree planting zones that, when delivered, will contribute to reducing urban heat island effects in the more intensively urbanised Western centre and THAB zoned areas where 'islands' of higher temperatures can be caused by high concentrations of structures such as buildings, roads and infrastructure in one area.</li> </ul>
<b>SOCIAL</b>		
<p><b>2.1</b> Identity and place</p>	<ul style="list-style-type: none"> <li>• The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.</li> </ul>	<ul style="list-style-type: none"> <li>• The corridors pass through a largely existing rural edge environment along Jesmond Road, Bremner Road to a light industrial and commercial environment where Bremner Road joins Waihoehoe Road West. While this is planned to change to mixed and more intense land uses, the proposed cross section has spatial flexibility that is capable of responding to a range of characteristics (identity drivers) that may arise from this change.</li> <li>• In areas of high density or mixed use centres the cross sections can provide support for active edges (where there is visual engagement between the built form and the street), permeable access for pedestrians, and vegetation appropriately scaled to built form.</li> <li>• The future development of the proposed Drury Central station south of Waihoehoe Road will provide an opportunity to explore urban identity drivers (transport</li> </ul>



Principle	Explanation	Application to the Jesmond to Waihoehoe West FTN Upgrade
		<p>orientated characteristics) for the Waihoehoe Road West section of NOR2 such as street-activating uses along street edges and more urbanised spaces and plazas.</p> <ul style="list-style-type: none"> <li>• Consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.</li> <li>• In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> <li>• <b>Sites of historic value</b> Identification of the sites below provides opportunities for future development to explore and celebrate the inherent heritage character drivers for the area. Further details of these are referenced in the Assessment of Historic Heritage Effects.</li> <li>• There is one site on Jesmond Road identified as Historic Heritage Extent of Place under the AUP:OIP; Aroha Cottage/ Paymasters House) that interfaces with the corridor. The cottage was built in Papakura for the government forces in 1860-1861 (Heritage New Zealand Pouhere Taonga 1983). It served as a residence for the office for the Army Paymaster. The corridor alignment reduces impacts on the site by including only the driveway of Aroha Cottage in the proposed designation boundary.</li> <li>• There are two sites along Bremner Road identified as Historic Heritage Extent of Place under the AUP:OIP; Commissariat Redoubt / Ōtūwairoa Stream Wharf and St John's Anglican Church and Cemetery (The church was built in 1862/63 from the timber of a single kauri).</li> <li>• The alignment of the corridor has been carefully considered to avoid impact on the scheduled sites.</li> <li>• There are also multiple historic heritage sites on Great South Road adjacent to the railway, concentrated around Norrie Road and the eastern side of Ngakoroa Stream.</li> </ul>
<p><b>2.2</b> <b>Respect culturally significant sites and landscapes</b></p>	<p>Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.</p>	<ul style="list-style-type: none"> <li>• There is one site of significance to Manawhenua (27 Bremner Road) under the AUP:OIP (Plan Change 22) which is unaffected by the Project, but access to the site is provided from Bremner Road.</li> <li>• In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> </ul>

Principle	Explanation	Application to the Jesmond to Waihoehoe West FTN Upgrade
<p><b>2.3</b> <b>Adaptive corridors</b></p>	<p>Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.</p>	<ul style="list-style-type: none"> <li>• The proposed corridor cross sections have the spatial provisions to be flexible, re-configurable and adaptable for changing transport needs. For example, future bus priority measures at intersections, additional bus stops and future expansion of any walking and cycling networks can be accommodated within the corridor.</li> <li>• The proposed SH22 corridor cross section has the spatial provisions to be flexible, re-configurable and adapted at a detailed design stage for changing contextual needs. For example, town centre corridors with strong place functions can accommodate wider footpaths and wider berms for street tree planting.</li> <li>• The cross sections provide space for all modes, with spatial provisions at the corridor edges that accommodate active frontages, provide permeability for access to adjacent land use types, especially for the proposed Main Centre to the east.</li> </ul>
<p><b>2.4</b> <b>Social cohesion</b></p>	<p>Provide clear, effective and legible connectivity between community and social functions.</p>	<ul style="list-style-type: none"> <li>• The proposed corridors support the creation of spaces where seamless cross corridor connectivity can be provided through a permeable interface at the corridor boundary.</li> <li>• The proposed corridor alignments and functionality can deliver a positive contribution to the sense of belonging and participation, as well as community resilience by supporting direct and localised access to; <ul style="list-style-type: none"> <li>○ the proposed Western Centre on Jesmond Road,</li> <li>○ the Drury Sports Complex and Bremner Esplanade Reserve on Bremner Road,</li> <li>○ the proposed Drury Central station, proposed Main Centre and Drury Domain on Waihoehoe Road West.</li> </ul> </li> <li>• Further development at a detailed design stage of midblock crossings near the centre and within the THAB zones will ensure equitable local connectivity and cross corridor access to the above destinations.</li> </ul>
<p><b>2.5</b> <b>Safe corridors</b></p>	<p>Provide a safe and convenient network of routes accessible to people of all ages and abilities.</p>	<ul style="list-style-type: none"> <li>• The proposed corridors can deliver a greater level of access and movement to future local communities that will promote a sense of personal safety particularly for pedestrians and cyclists.</li> <li>• The proposed configuration and alignment accommodates the universal design approach and accessibility to all parts of user journeys.</li> <li>• The active travel solutions are proposed as fully segregated and prioritised with signalised intersections at;</li> </ul>

Application to the Jesmond to Waiheohoe West FTN Upgrade		
Principle	Explanation	
		<ul style="list-style-type: none"> <li>○ SH22/ and Jesmond Road</li> <li>○ Jesmond Road and Bremner Road</li> <li>○ Bremner Road</li> <li>○ Bremner Road and Creek Street,</li> <li>○ Bremner Road and Firth Street;</li> <li>○ Bremner Road and Great South Road; and</li> <li>○ Waiheohoe Road West and Kath Henry Lane</li> </ul> <ul style="list-style-type: none"> <li>● Further development at a detailed design stage of the final crossing points across the intersections will reinforce the sense of personal safety.</li> <li>● Further design detail for safe prioritised active mode crossings across the multi-lane Ōpāheke North-South roundabout should be addressed at subsequent detail design stages.</li> </ul>
BUILT FORM		
<p><b>3.1</b> Align corridors with density</p>	<p>Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.</p>	<ul style="list-style-type: none"> <li>● The alignment and arrangement of the proposed corridors provides a safe, connected walking and cycling network, and a prioritised FTN network for the proposed growth areas within Drury.</li> <li>● The corridors provide support for a range of mixed uses and densities and directly interfaces with the proposed Main Centre, Western Centre, THAB zoned areas and employment zones located in the industrial areas.</li> </ul>
<p><b>3.2</b> Corridor scaled to the surrounding context and urban structure</p>	<p>Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).</p>	<ul style="list-style-type: none"> <li>● The proposed configuration and scale of the corridors provide an appropriate response to the potential needs of the adjacent precinct functions, for example through efficient localised movement, alignment with higher density living (THAB zones) and the provision of mixed mode travel.</li> <li>● The corridor alignment provides a flexible interface that acknowledges and accommodates known precinct planning and private development land use proposals for;                             <ul style="list-style-type: none"> <li>○ Drury 1 Precinct (Auranga development)</li> <li>○ Waiheohoe</li> <li>○ Drury centre plan changes</li> </ul> </li> </ul>
<p><b>3.3</b> Facilitate an appropriate interface between place and movement</p>	<p>Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)</p>	<ul style="list-style-type: none"> <li>● The proposed cross section of the corridors provide a flexible platform to address the opportunity for place as well as movement function, for example separated pedestrian and cycle facilities, potential road median spaces that provide safe waiting zones for pedestrians. In the absence of medians, signaled or legal crossings, spaced appropriately for the adjacent land-</li> </ul>

Principle	Explanation	Application to the Jesmond to Waihoehoe West FTN Upgrade
		<p>uses and pedestrian desire routes involved, should be considered.</p> <ul style="list-style-type: none"> <li>The proposed cross section also provides flexibility in supporting appropriate public private interfaces and connectivity at a fine grain (pedestrian) level. For example, direct pedestrian access to the Drury Sports Complex, THAB zones or other higher density living is accommodated and encouraged by placing pedestrian circulation closest to the corridor boundary.</li> <li>Direct private vehicular access is not accommodated, however the interface at the corridor boundary will support a pedestrian permeable interface or active frontage interface where adjacent to the future THAB zone (or where required).</li> <li>Further vertical integration adjacent to the bridging structures particularly around the Jesmond Road intersection, and the rail line is recommended to improve potential for active edge permeability and an appropriate interface with the proposed Main Centre and adjacent residential land uses.</li> </ul>
<b>MOVEMENT</b>		
<p><b>4.1</b> <b>Connect nodes</b></p>	<p>Provide tangible connectivity between identified activity nodes.</p>	<ul style="list-style-type: none"> <li>The proposed corridor alignment provides tangible and direct connectivity between complementary destinations in; <ul style="list-style-type: none"> <li>Drury West future urban zone - between the Western Centre, proposed Drury West station and future local centre north of Jesmond Road.</li> <li>Drury Central future urban zone – between the employment areas, Drury Sports Complex, the proposed Drury Central station and the proposed Main Centre.</li> </ul> </li> </ul>
<p><b>4.2</b> <b>Connect modes</b></p>	<p>Provide for choice in travel and the ability to connect at interchanges between modes.</p>	<ul style="list-style-type: none"> <li>The corridors provide simple but complete connectivity for all modes (walking, cycling, public transport and private vehicle).</li> <li>The corridors provide a direct active mode and prioritised PT connection between the proposed centres and the Drury West and Central stations.</li> </ul>
<p><b>4.3</b> <b>Support access to employment and industry</b></p>	<p>Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.</p>	<ul style="list-style-type: none"> <li>The Bremner Road alignment provides direct and legible access to the existing and proposed employment /industrial areas adjacent to the corridor.</li> </ul>

Principle	Explanation	Application to the Jesmond to Waihoehoe West FTN Upgrade
		<ul style="list-style-type: none"> <li>The Waihoehoe Road alignment provides direct and legible access to the proposed Main Centre and the employment opportunities located in this centre.</li> </ul>
<b>4.4 Prioritise active modes and public transport</b>	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.	<ul style="list-style-type: none"> <li>The cross section proposed for the corridors accommodates high-quality PT and active travel facilities, for example separated pedestrian, cycle pathways and a FTN bus route.</li> <li>Further development of modal priority at intersections at the detailed design stage will provide a higher level of service and enable modal shift.</li> </ul>
<b>4.5 Support inter-regional connections and strategic infrastructure</b>	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, waste water, water) to the network.	<ul style="list-style-type: none"> <li>The Jesmond, Bremner and Waihoehoe road corridors will form a part of the strategic FTN network that provides a key north south link through Drury West future urban zone and east west link through the Drury Central future urban zone</li> <li>The corridors also provide regional connectivity to communities via SH22 and SH1. As well as regional connectivity to the future Mill Road corridor towards the east.</li> </ul>
<b>4.6 Support legible corridor function</b>	Consider how areas can be clearly navigated and understood by users moving from place to place.	<ul style="list-style-type: none"> <li>The proposed cross section for the corridors accommodates a range of modes with clear allocation of street spaces, and inherently supports future community connectivity, mobility and travel choice.</li> <li>Further development at the detailed design stage, of intersection crossings, midblock crossings and future bus stops along the corridor will provide clear and legible cross corridor access and connectivity between areas of high density and centres.</li> </ul>
<b>LANDUSE</b>		
<b>5.1 Public transport directed and integrated into centres</b>	Locate rapid transit interchanges within centres (local, town and metropolitan) to support a mix of uses and provide modal choice to a larger number of users.	<ul style="list-style-type: none"> <li>The corridors provide a direct and prioritised public transport connection as part of the FTN network that connects between the proposed Drury West station and Western Centre to the proposed Drury Central station and proposed Main Centre.</li> </ul>
<b>5.2 Strategic corridors as urban edges</b>	Strategic corridors as potential definers of a land use edge.	<ul style="list-style-type: none"> <li>This principle is not relevant to these corridors.</li> </ul>

### 5.8 Summary of urban design evaluation and recommendations for Jesmond to Waihoehoe Road West FTN Upgrade

Overall, the proposed Jesmond to Waihoehoe Road West FTN Upgrade design and configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 5-14 to 5-16 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 5-14, 5-15 and 5-16;

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.
- A corridor urban identity and placemaking approach that identifies;
  - the cultural significance of 27 Bremner Road and the Ngakoroa Stream
  - the heritage significance of the Aroha Cottage, the Commissariat Redoubt / Ōtūwairoa Stream Wharf and St John's Anglican Church and Cemetery
  - the heritage significance of multiple historic heritage sites on Great South Road adjacent to the railway, concentrated around Norrie Road and the eastern side of Ngakoroa Stream
- The identification of urban and landscape design drivers related to the Ngakoroa Stream, Ngakoroa Reserve, the Drury Sports Complex and the Drury Domain and how the corridor has responded to and integrated with these character drivers;
- An urban interface approach within the corridor that;
  - provides an appropriate interface to the proposed Main Centre and enables buildings and spaces to positively address and integrate with the corridor,
  - responds to the spatial character of the town centre environment by supporting quality public realm infrastructure, ample pedestrian footpath widths, frequent pedestrian crossing points and providing street trees for shade and amenity,
  - recognises the transition from Main Centre to THAB zoned areas and provides a corridor interface that supports permeable pedestrian access and responds to the changing built form interface and spatial character of adjacent future development.
  - considers the interface of bridging structures to built form particularly around the proposed Main Centre in Drury Central and the adjacent THAB zoned areas
- In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.

- A landscape plan that considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement, treatment of batter slopes. The landscape plan should also demonstrate integration of the Ngakoroa and Hingaia Streams and adjacent marine and terrestrial SEAs, particularly where the corridor integrates with the Blue-Green Network. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed Greenways and the wider walking and cycling network.
- Integration of the Jesmond Road stormwater wetlands to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned high density.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

Further urban design opportunities in the Project area have also been identified in Figure 5-14 to 5-16 and shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

### 5.9 Jesmond Road FTN Upgrade - Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 5.8 above. Opportunities that have been identified are shown in orange below.

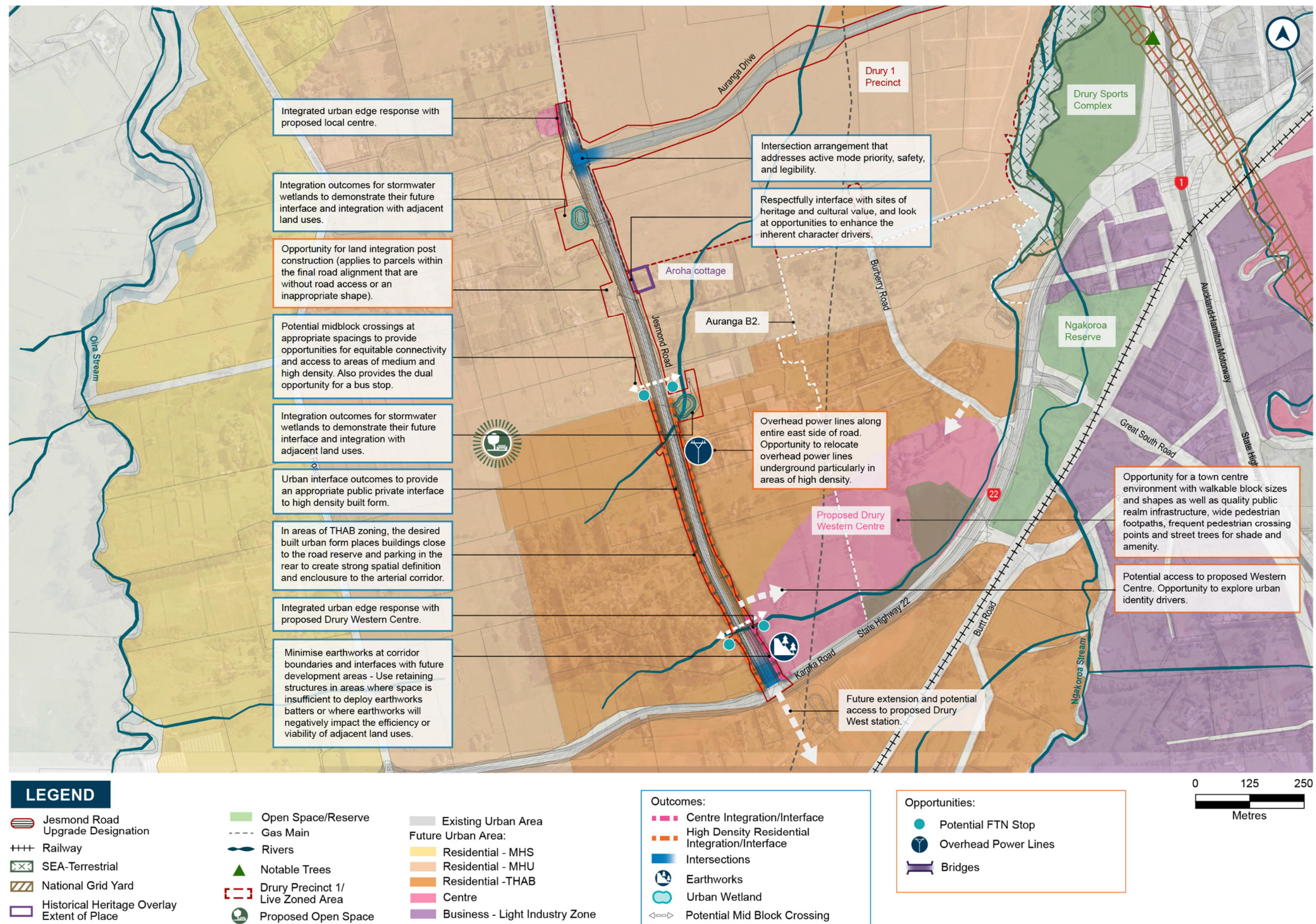


Figure 5-14 Jesmond Road FTN Upgrade urban design outcomes and opportunities



### 5.10 Bremner Road FTN Upgrade - Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 5.8 above. Opportunities that have been identified are shown in orange below.

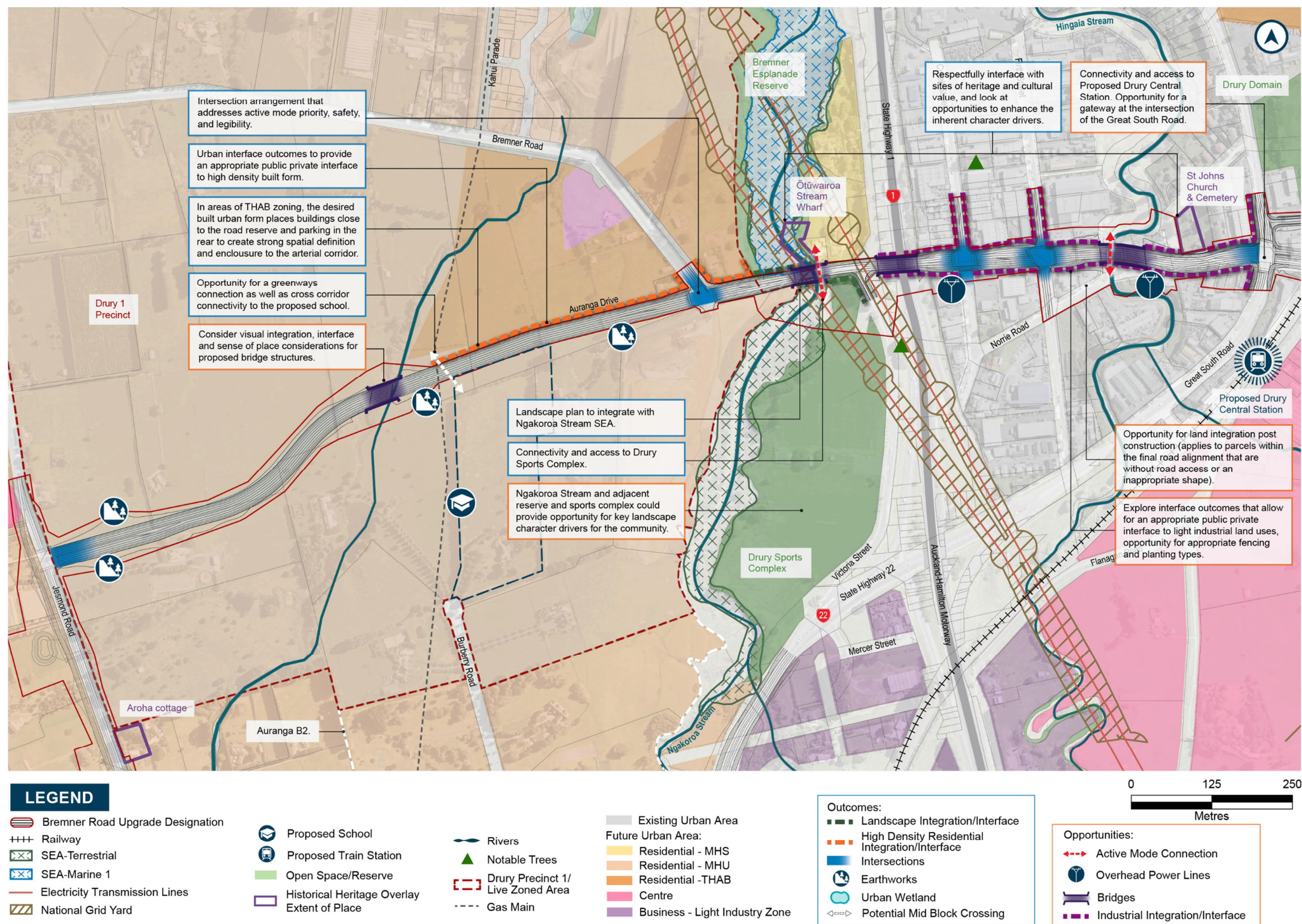


Figure 5-15 Bremner Road FTN Upgrade urban design outcomes and opportunities

### 5.11 Waihoehoe Road West FTN Upgrade - Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 5.8 above. Opportunities that have been identified are shown in orange below.

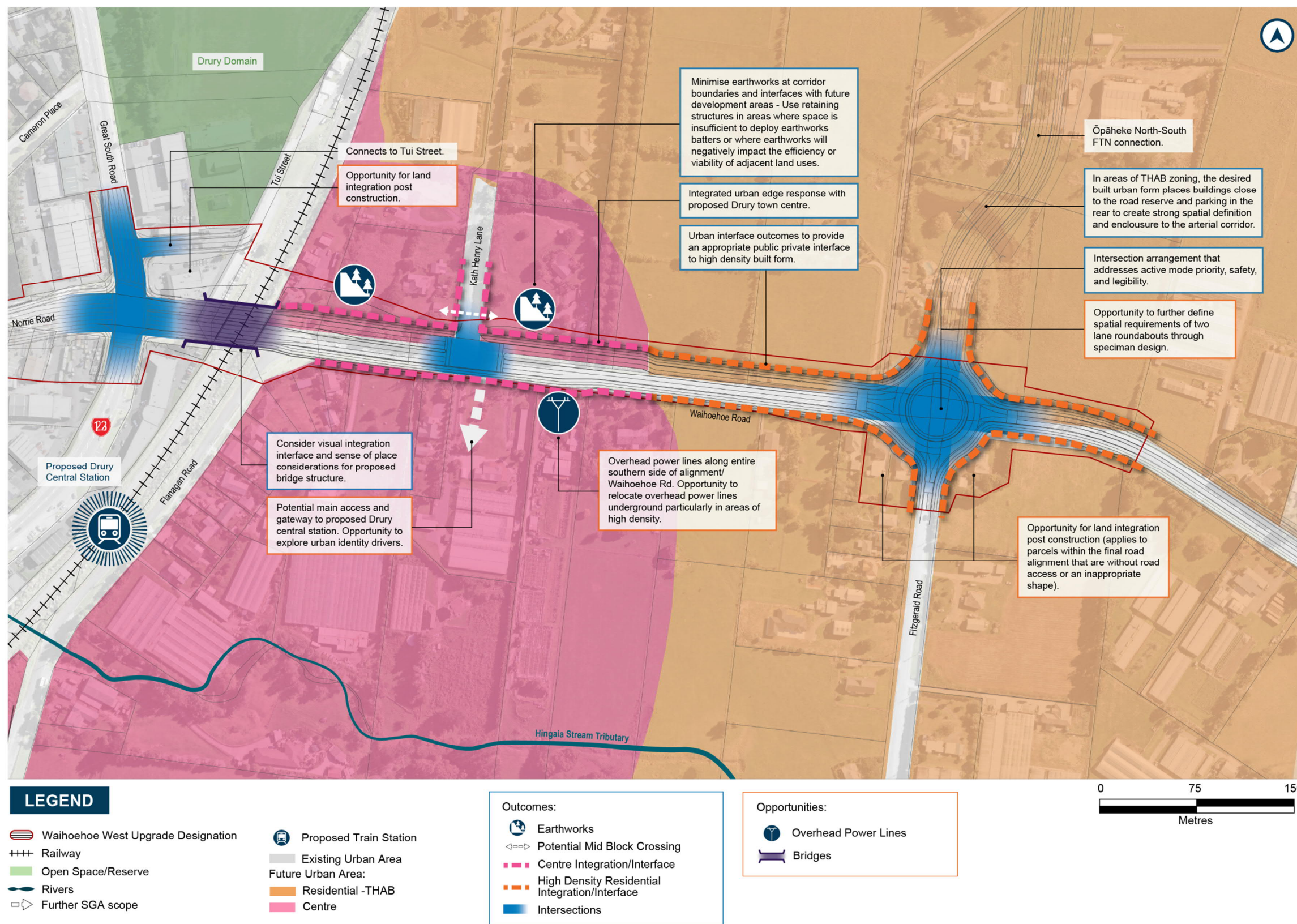


Figure 5-16 Waihoehoe Road West FTN Upgrade urban design outcomes and opportunities

## 6 NoR D3: Waihoehoe Road East Upgrade

### 6.1 Waihoehoe Road East Upgrade contextual analysis

The Waihoehoe Road East Upgrade (NoR D3) consists of the widening of the existing Waihoehoe Road to a two-lane arterial with walking and cycling facilities from the proposed intersection with Ōpāheke North-South FTN Arterial in the east, to Drury Hills Road in the east.

The eastern extent of the Project will tie into the future Mill Road corridor which forms a separate NZUP project. The intersection with the Ōpāheke N-S Upgrade is proposed to be signalised, but this work forms part of NoR D2. Roundabouts are proposed at the intersections with Appleby Road and Cossey Road. The road will be an urban arterial with a likely reduced speed limit of 50kph. An overview of the proposed design is provided in Figure 6-1 below.

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.



Figure 6-1 Overview of Waihoehoe Road East Upgrade

### 6.1.1 Existing environment

#### 6.1.1.1 Urban Features

The existing land use along the Waihoehoe Road East Upgrade corridor is generally rural, consisting of low density rural residential dwellings and a few rural based businesses in the western portion including transportation and logistics, horticultural and a few commercial business operations.

The existing transport function of Waihoehoe Road is characterised by:

- a rural two-lane secondary collector road;
- containing no formal walking or cycling facilities;
- having no public transport services or facilities; and
- containing limited private land access points / driveways.

There are no schools immediately adjacent to the Waihoehoe Road FTN Upgrade section. Schools and preschools in the wider area include Farmhouse Preschool, Karaka School, Drury School and Drury Christian School.

#### 6.1.1.2 Physical Features

The Waihoehoe Road East Upgrade corridor crosses no known watercourses, however, it runs approximately parallel to Hingaia Stream and an unnamed stream along the full length of the alignment. The corridor lies on a ridge with several overland flow paths draining either north or south, away from the road. There are no significant floodplains identified near the proposed road corridor.

The existing vegetation is highly modified and is dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting.

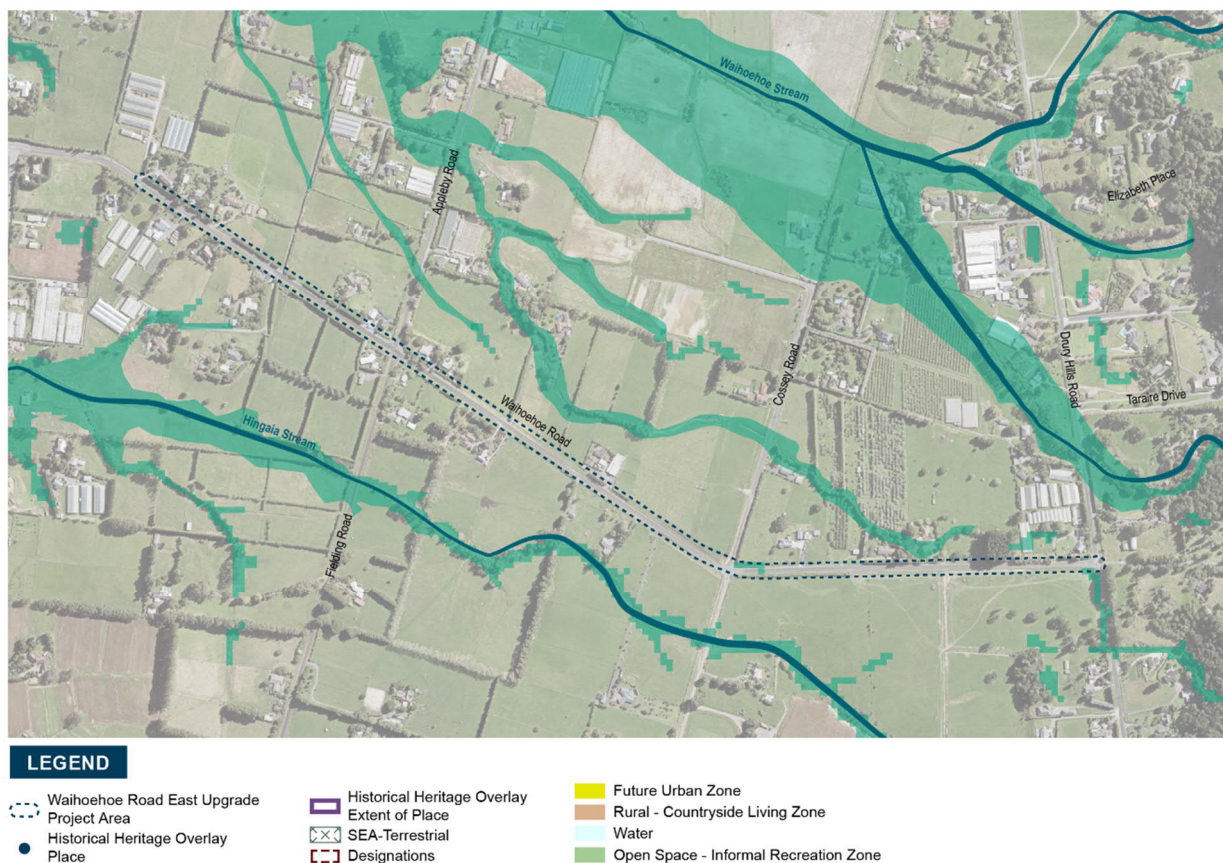


Figure 6-2 Waihoehoe Road East Upgrade project area

### 6.1.2 Likely future environment

The likely future land use environment in which the Waihoehoe Road East Upgrade corridor will operate is assumed to be an urban or developing urban environment. Based on the Drury-Ōpāheke Structure Plan, the land use pattern surrounding the corridor will be residential, reducing in density progressively from west (THAB zoning) to east (Mixed Housing Suburban zoning) (see Figure 6-3).

The eastern end of the corridor meets the Rural Urban Boundary (RUB) with land further to the east remaining as Countryside Living Zone.

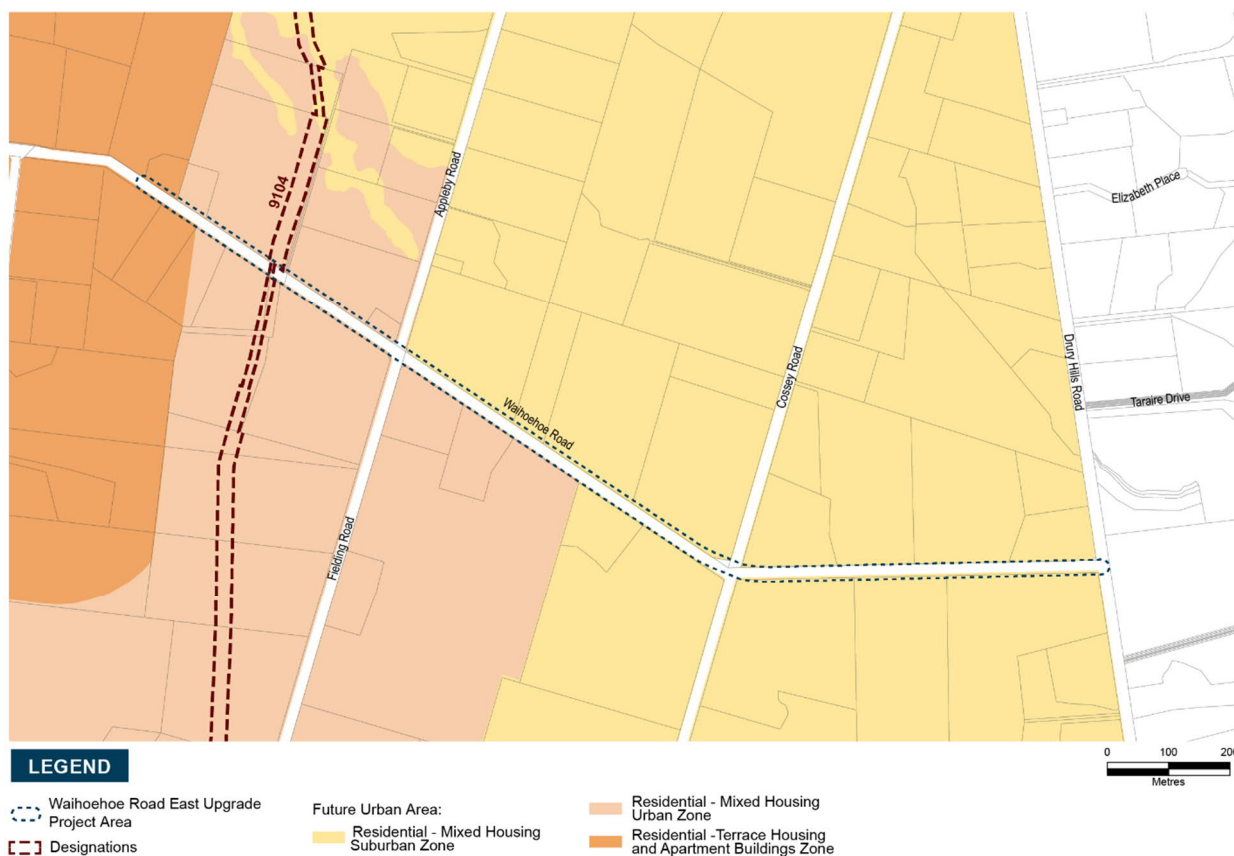


Figure 6-3 AUPOIP zoning for Waihoehoe Road East Upgrade

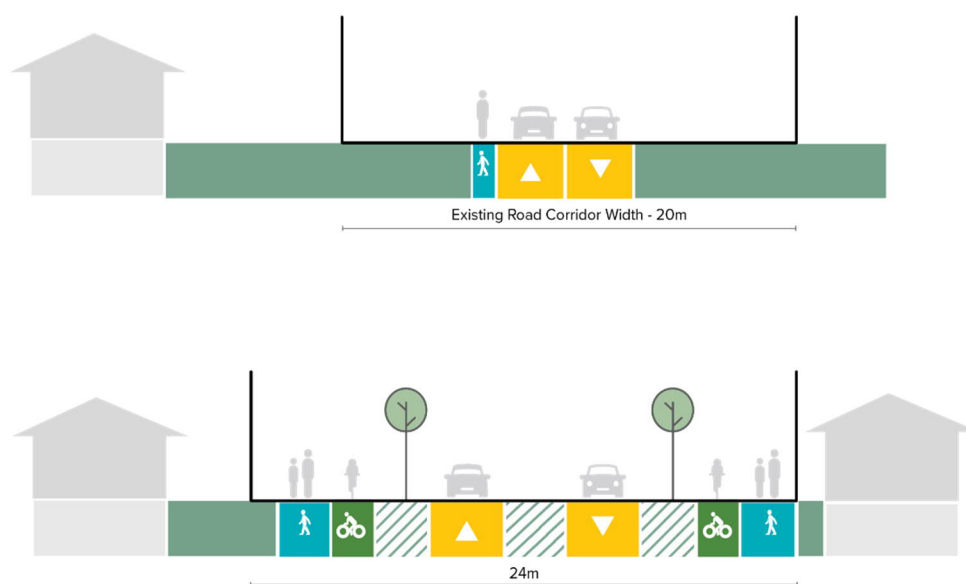
## 6.2 Waihoehoe Road East Upgrade- form and function

The functional intent of the Project is to provide strategic east-west connectivity between the strategic north-south corridors (Great South Road, the Ōpāheke N-S FTN Upgrade (NoR D4) and Mill Road), providing multi-modal access to the wider network for the planned growth areas as well as providing access to the existing Drury township and proposed rail station at Drury Central (an NZUP project).

Currently, the Waihoehoe Road East corridor is a two lane rural highway with no walking, cycling or public transport facilities. It is a key east west link through Drury Central and Drury East serving mainly a rural catchment. It is envisaged that as the area urbanises, the existing corridor will be upgraded to a two lane urban arterial that will provide separated walking and cycling facilities. The corridor will interface with a range of residential land uses including THAB, mixed housing urban and mixed housing suburban.

Key features of the proposed Waihoehoe Road East corridor include:

- Widening of Waihoehoe Road from its current general width of 20m to enable a 24m wide two-lane cross-section including separated walking and cycling facilities.
- Localised widening around the existing intersections to accommodate for the two proposed roundabouts.
- Batter slopes to enable widening of the corridor, and associated cut and fill activities;
- Vegetation removal along the existing road corridor.
- Areas identified for construction related activities including site compounds, construction laydown, the re-grade of driveways and construction traffic manoeuvring.



**Figure 6-4 Waihoehoe Road East Upgrade typical cross section**

### 6.3 NOR D3: Waihoehoe Road East Upgrade - Evaluation against the Design Framework Principles

This evaluation considers the application of the established Design Framework Principles against the proposed Waihoehoe Road East Upgrade. It provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design outcomes should be considered in future design stages. These recommendations can form the basis of an urban design specific designation condition, and where there is an overlap of urban design outcomes with other considerations (for example ecological, landscape, visual or water quality related recommendations) they can be integrated within the relevant specialist conditions.

Table 6-1: Urban Design Evaluation for Waihoehoe Road East Upgrade

Principle	Explanation	Application to Waihoehoe Road East Upgrade
<b>ENVIRONMENT</b>		
<b>1.1</b> <b>Support and enhance ecological corridors and biodiversity</b>	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors	<ul style="list-style-type: none"> <li>The proposed corridor arrangement and alignment provides spatial provisions (at boundaries and within berms) that have the potential to support ecological connectivity and biodiversity in the local environment by providing contiguous space for diverse planting responses.</li> </ul>
<b>1.2</b> <b>Support water conservation and enhance water quality in a watershed</b>	Take into account and work with the existing watershed as part of a whole system.	<ul style="list-style-type: none"> <li>The proposed typical corridor cross section allows spatial provisions to provide natural drainage to stormwater wetlands as a way to address water quality and reduce hard engineering solutions. Water quality and detention/retention will be decided in future regional consents.</li> </ul>
<b>1.3</b> <b>Minimise land disturbance, conserve resources and materials</b>	Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.	<ul style="list-style-type: none"> <li>The corridor concept design utilises an existing corridor and demonstrates a close and connected alignment to the existing landform, generally balancing earthworks while minimising unnecessary disturbance and materials.</li> <li>The proposed corridor demonstrates a generally efficient alignment in relation to existing property boundaries along the corridor minimising land impacts and inefficient residual land portions.</li> <li>If practicable future land integration should be considered for parcels located adjacent to the Appleby and Fielding Road roundabout.</li> </ul>
<b>1.4</b> <b>Adapt to a changing climate and respond to the microclimatic factors of each area</b>	Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.	<ul style="list-style-type: none"> <li>The proposed corridor design adopts a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.</li> <li>The proposed corridor design provides for street tree planting that, when delivered, will contribute to the amenity of the area by providing shade and microclimatic cooling qualities.</li> <li>The proposed corridor provides for active modes to support modal shift and reduce transport related climate change contributions.</li> </ul>
<b>SOCIAL</b>		
<b>2.1</b> <b>Identity and place</b>	The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a	<ul style="list-style-type: none"> <li>The proposed corridor passes through a largely existing rural environment and while this is planned to change to suburban residential land uses, the flexible cross-section potentially provides support for any new identity drivers that may be established in adjacent development sites. These can include; vegetation, fencing and setbacks scaled to low and medium density built form.</li> </ul>



Principle	Explanation	Application to Waihoehoe Road East Upgrade
	sense of continuity and contribute to our collective memory.	<ul style="list-style-type: none"> <li>Proximity to the foothills of the Hunua Ranges provides opportunities for broader landscape character drivers for the corridor.</li> <li>Consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.</li> <li>In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> <li>There are no historic heritage sites recorded within or in close proximity to the proposed corridor.</li> </ul>
<b>2.2</b> <b>Respect culturally significant sites and landscapes</b>	Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.	<ul style="list-style-type: none"> <li>There are no sites of significance to Mana Whenua under the AUP:OIP that have been identified along or in close proximity to the proposed corridor. However, in future design stages, Mana Whenua will be invited to provide input into other relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> <li>There are several SEAs beyond the corridor, to the east of the Drury Hills road in the foothills of the Hunua Ranges.</li> </ul>
<b>2.3</b> <b>Adaptive corridors</b>	Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.	<ul style="list-style-type: none"> <li>The proposed typical corridor cross section has the spatial provisions to be flexible, re-configurable and adaptable for changing transport needs. For example future expansion of any walking and cycling networks can be accommodated within the corridor.</li> <li>The cross section also provides space for all modes, with spatial provisions at the corridor edges that accommodate active frontages and provide permeability for access to adjacent land uses and movement corridors.</li> </ul>
<b>2.4</b> <b>Social cohesion</b>	Provide clear, effective and legible connectivity between community and social functions.	<ul style="list-style-type: none"> <li>The proposed corridor cross section supports the creation of spaces where seamless cross corridor connectivity can be provided through a permeable interface at the corridor boundary.</li> <li>Further development of the crossing points across intersections at the detailed design stage will ensure equitable local connectivity and cross corridor access. For example, access to the proposed open space on Cossey Road (as per the structure plan).</li> </ul>

Principle	Explanation	Application to Waihoehoe Road East Upgrade
<p><b>2.5</b> <b>Safe corridors</b></p>	<p>Provide a safe and convenient network of routes accessible to people of all ages and abilities.</p>	<ul style="list-style-type: none"> <li>• The proposed configuration and alignment will accommodate the universal design approach and accessibility to all parts of user journeys.</li> <li>• With the provision of fully segregated active travel solutions, the corridor can deliver a greater level of safety, access and movement to future local communities that will promote a sense of personal safety particularly for pedestrians and cyclists.</li> <li>• Further design detail of safe prioritised active modes crossings for the two roundabouts at Appleby and Cossey Roads should be addressed at subsequent detail design stages.</li> </ul>
<p><b>BUILT FORM</b></p>		
<p><b>3.1</b> <b>Align corridors with density</b></p>	<p>Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.</p>	<ul style="list-style-type: none"> <li>• The proposed corridor alignment and arrangement provides an even and easy access network for the proposed growth areas to the south east of Drury Central, supporting mixed housing urban and suburban land uses adjacent to the corridor.</li> </ul>
<p><b>3.2</b> <b>Corridor scaled to the surrounding context and urban structure</b></p>	<p>Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).</p>	<ul style="list-style-type: none"> <li>• The corridor alignment provides a flexible interface that acknowledges and accommodates known precinct planning and private development land use proposals for the proposed Drury East plan changes.</li> <li>• The corridor configuration and scale proposed provides an appropriate response to the potential needs of the adjacent precinct functions (access to and from adjacent built form and general spatial layout). Examples include efficient localised movement, alignment with mixed housing land uses and the provision of mixed mode travel.</li> </ul>
<p><b>3.3</b> <b>Facilitate an appropriate interface between place and movement</b></p>	<p>Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)</p>	<ul style="list-style-type: none"> <li>• The proposed cross section of the corridors provide a flexible platform to address the opportunity for place as well as movement function, for example separated pedestrian and cycle facilities, potential road median spaces that provide safe waiting zones for pedestrians. In the absence of medians, signalized or legal crossings, spaced appropriately for the adjacent land-uses and pedestrian desire routes involved, should be considered.</li> <li>• The proposed corridor cross section also provides flexibility in supporting appropriate public private interfaces and connectivity at a fine grain (pedestrian) level, for example direct pedestrian access from high and medium density living is</li> </ul>

Principle	Explanation	Application to Waihoehoe Road East Upgrade
		<p>accommodated and encouraged by placing pedestrian circulation closest to the corridor boundary.</p> <ul style="list-style-type: none"> <li>Direct private vehicular access is not accommodated, however a pedestrian permeable interface or active frontage interface is supported where adjacent to the future areas zoned as THAB and mixed housing urban.</li> </ul>
MOVEMENT		
<b>4.1</b> <b>Connect nodes</b>	Provide tangible connectivity between identified activity nodes.	<ul style="list-style-type: none"> <li>The proposed corridor alignment provides tangible and direct connectivity to the proposed Main Centre and rail station at Drury Central.</li> </ul>
<b>4.2</b> <b>Connect modes</b>	Provide for choice in travel and the ability to connect at interchanges between modes.	<ul style="list-style-type: none"> <li>The proposed corridor provides simple but complete connectivity for walking and cycling and does not preclude the potential for future public transport.</li> <li>The proposed corridor provides a direct active mode connection to the proposed Main Centre and rail station at Drury Central.</li> </ul>
<b>4.3</b> <b>Support access to employment and industry</b>	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.	<ul style="list-style-type: none"> <li>The proposed corridor alignment provides direct and legible access to the employment opportunities within the proposed Main Centre, as well as a link to the existing employment/industry zones off Bremner Road.</li> </ul>
<b>4.4</b> <b>Prioritise active modes and public transport</b>	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.	<ul style="list-style-type: none"> <li>The proposed corridor cross section accommodates high-quality active travel facilities, for example separated pedestrian and cycle pathways.</li> <li>Further development of modal priority at intersections and roundabouts at the detailed design stage will provide a higher level of service and enable modal shift.</li> </ul>
<b>4.5</b> <b>Support inter-regional connections and strategic infrastructure</b>	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, waste water, water) to the network.	<ul style="list-style-type: none"> <li>The proposed corridor is a strategic corridor that is a part of a key east west link through to the proposed Drury Central station and proposed Main Centre. It also provides some regional connectivity to the future Mill road corridor.</li> </ul>
<b>4.6</b> <b>Support legible corridor function</b>	Consider how areas can be clearly navigated and understood by users moving from place to place.	<ul style="list-style-type: none"> <li>The proposed typical corridor cross section accommodates a range of modes with clear allocation of street spaces, and inherently supports future community connectivity, mobility and travel choice.</li> <li>Further development of the intersection crossings at the detailed design stage will provide safe, clear and legible cross corridor access and connectivity between areas of higher density.</li> </ul>

Principle	Explanation	Application to Waihoehoe Road East Upgrade
<b>LANDUSE</b>		
<b>5.1 Public transport directed and integrated into centres</b>	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and provide modal choice to a larger number of users.	<ul style="list-style-type: none"> <li>The proposed corridor cross section is able to accommodate future local public transport connections to the proposed Main centre and rail station.</li> </ul>
<b>5.2 Strategic corridors as urban edges</b>	Strategic corridors as potential definers of a land use edge.	<ul style="list-style-type: none"> <li>This principle is not relevant to this corridor.</li> </ul>

## 6.4 Summary of urban design evaluation and recommendations for Waihoehoe Road East Upgrade

Overall, the proposed Waihoehoe Road East Upgrade design and corridor configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 6-5 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 6-5;

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as open spaces and community facilities and between areas of high density.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.
- The identification of urban and landscape design drivers related to the Hunua Ranges, Drury Hills Esplanade Reserve, the proposed open space at the intersection of Cossey Road Complex and how the corridor have responded to and integrated with these character drivers.
- In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- An urban interface approach within the corridor that recognises the transition of densities from THAB to mixed housing urban to mixed housing suburban. The urban interface approach should respond to the changing built form interface, respond to the spatial character of adjacent development and demonstrate permeable pedestrian access between the corridor and adjacent development.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

## Drury Arterial Network

---

Further urban design opportunities in the Project area have also been identified in Figure 6-5 and shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

### 6.5 Waihoehoe Road East Upgrade - Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 6.4 above. Opportunities that have been identified are shown in orange below.

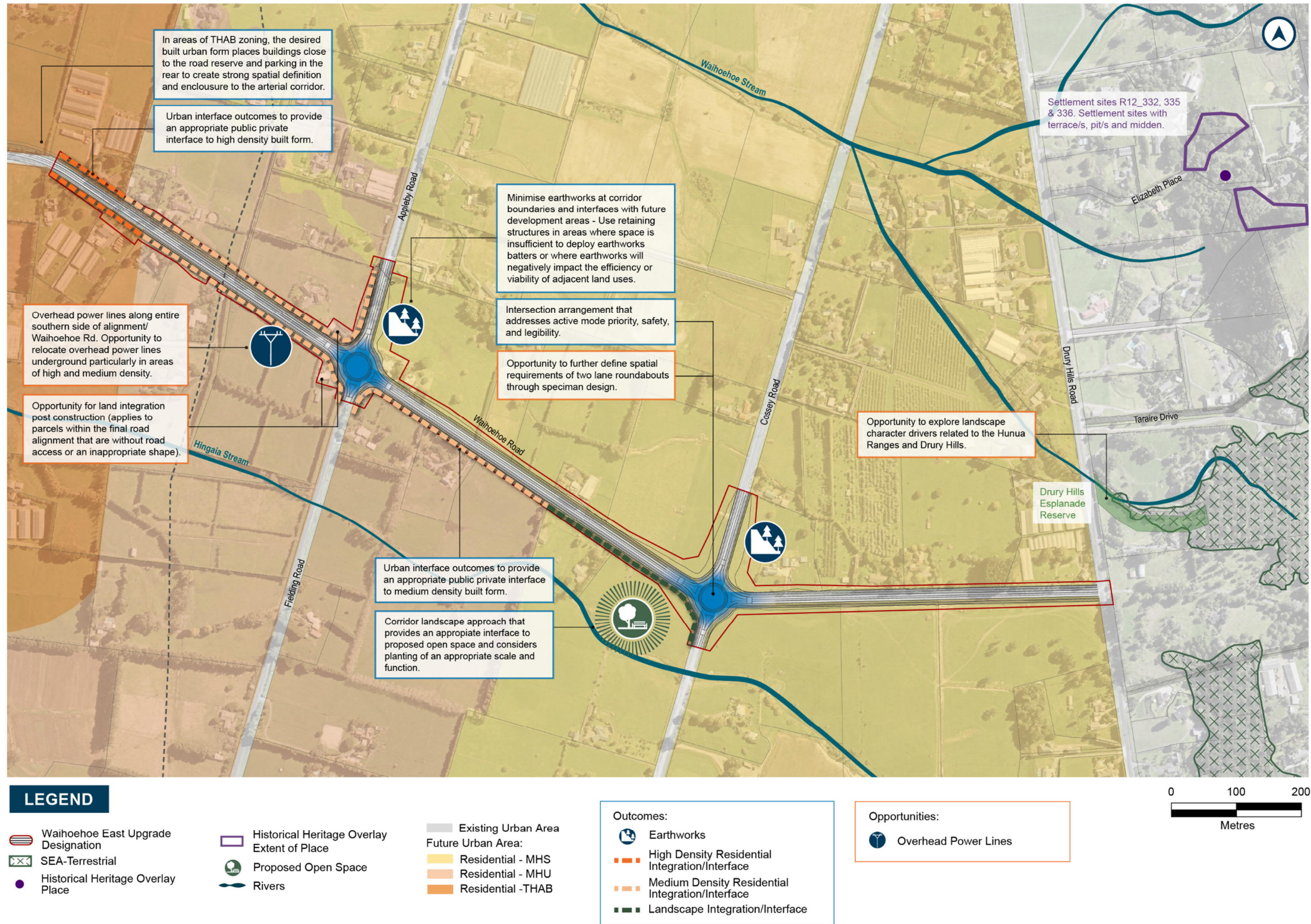


Figure 6-5 Waihoehoe Road East Upgrade urban design outcomes and opportunities

## 7 NoR D4: Ōpāheke North-South FTN

### 7.1 Ōpāheke North-South FTN corridor contextual analysis

The Ōpāheke North-South FTN corridor is a new 30m four-lane north south corridor that provides separated walking and cycling facilities, and prioritised public transport between Hunua Road in the north and Waihoehoe Road in the south. The road will be an urban arterial with a likely speed limit of 50kph.

The road traverses greenfields zoned FUZ, crossing approximately seven streams (or tributaries of streams) and areas of flood plain, providing a new north-south connection between Drury and Papakura. The intersection with Hunua/Boundary Roads will be signalised, and roundabouts are proposed at Ōpāheke Road / Ponga Road, Walker Road and Waihoehoe Road. The intersection at Waihoehoe Road is not included in this project extent (it is included within NoR D2). An overview of the proposed design is provided in Figure 7-1.

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.



**LEGEND**

- Proposed Designation Boundary
- +++ Railway

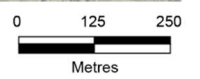


Figure 7-1 Overview of Ōpāheke N-S FTN Arterial project area



### 7.1.1 Existing environment

#### 7.1.1.1 Urban Features

The existing land use surrounding the proposed Ōpāheke N-S FTN corridor is largely rural farming consisting of low density rural residential dwellings and greenfields or farmland with a few rural based businesses including accommodation (homesteads/ cottages), engineering and utility facilities. At the northern extent of the proposed designation, land use is heavy industrial with business types including manufacturing and engineering. There are no existing recreational or community facilities along the proposed Ōpāheke N-S FTN corridor, nor provided at the Project extents or intersections.

#### 7.1.1.2 Physical Features

The proposed Ōpāheke N-S FTN corridor crosses a wide area of flood prone land. Key watercourses within the area include Waipokapū Stream, Waihoehoe Stream and several overland flow paths that join the eastern side into Ōtūwairoa Stream. The alignment crosses an existing pond north of Waihoehoe Road that discharges into a tributary of Waihoehoe Stream.

Several overland flow paths and streams cross the site, and flood prone areas are evident at some of these crossings. The existing 100year ARI flood mapping indicate an 80m wide floodplain over Waipokapū Stream and a ± 690 m wide floodplain over Waihoehoe Stream.

The existing vegetation is highly modified and is dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting.

#### **Blue-Green Network**

The Project alignment traverses the Waihoehoe floodplain landscape which forms part of the proposed Blue-Green Network, providing future opportunities for a complimentary design response. Refer to Figure 7-2.

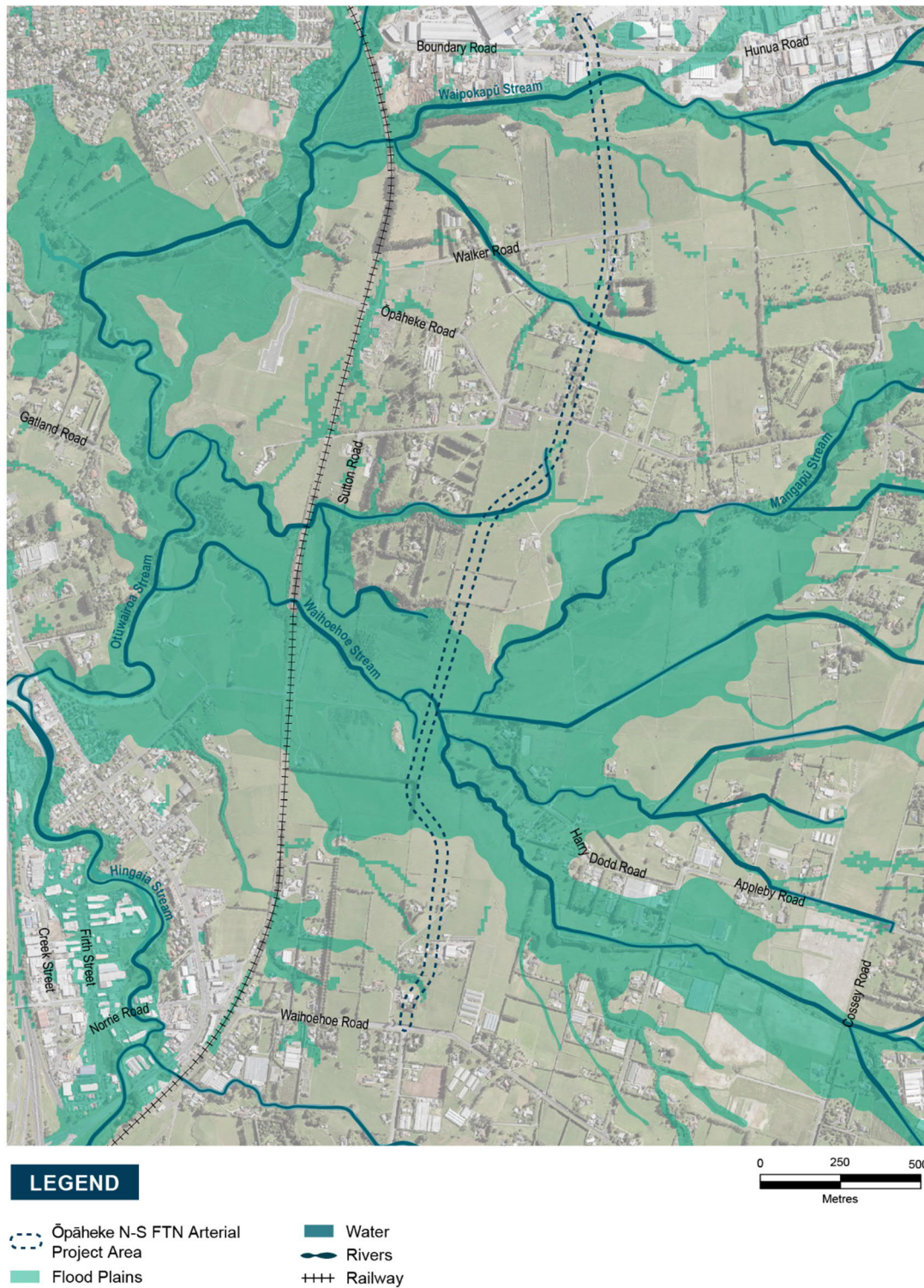


Figure 7-2 Overview of Opāheke N-S FTN Arterial

### 7.1.2 Likely future environment

The likely future land use environment in which the Opāheke N-S FTN corridor will operate is assumed to be an urban or developing urban environment. Based on the existing zoning and Drury-Opāheke Structure Plan, the land use pattern surrounding the corridor is expected to be:

## Drury Arterial Network

- THAB Zone in the south of the corridor.
- Mixed Housing Suburban Zone in the open flood plain area.
- Mixed Housing Urban Zone to the north of the corridor.
- A Local Centre at Ponga Road.
- A mix of Heavy and Light Industry Zones to the northern end of the corridor.

The existing industrial land use is anticipated to remain as existing, expanding south to support the expanding urbanised area.

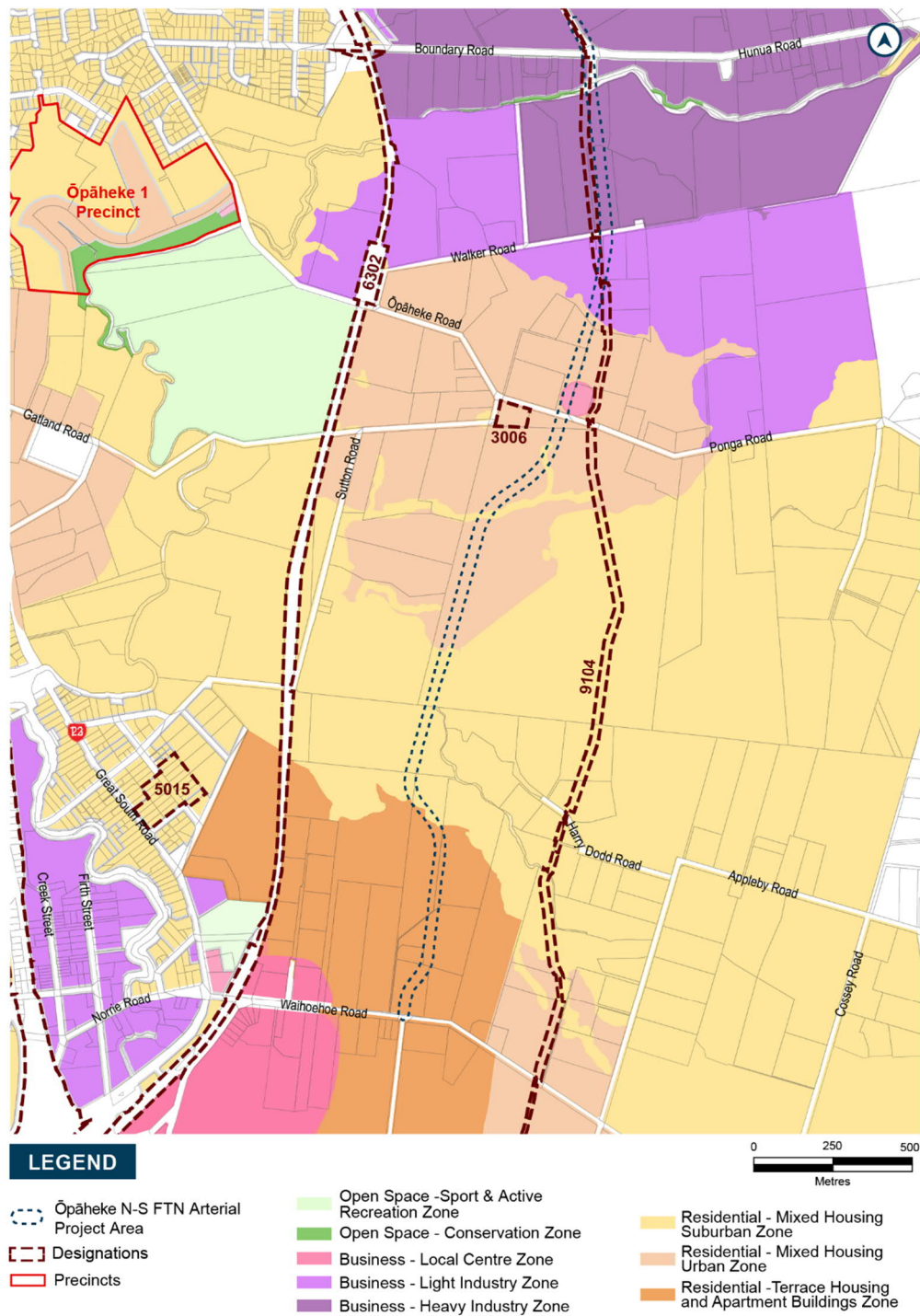


Figure 7-3 AUPZIP Zoning for Ōpāheke N-S FTN Arterial

## 7.2 Ōpāheke North-South FTN – form and function

The functional intent of the new Ōpāheke North-South FTN corridor is to support the Drury future growth area by providing separated walking and cycling facilities, prioritised public transport and a direct and legible connection to the proposed Drury Central station and proposed Main Centre .

The Project will also inherently support SH1, Great South Road and the proposed Mill Road corridor by providing a new corridor which will cater more to local north-south trips in Drury.

It is envisaged that as the area urbanises, the corridor will interface with a full range of land uses including a transition from high to medium and low density housing, a proposed local centre, and light industrial / employment areas. Once established the corridor will play a crucial role in balancing both movement and place priorities through the new growth area.

Key features of the Ōpāheke N-S FTN corridor include:

- A new road to enable a 30m wide four-lane cross section including bus lanes and separate walking and cycling facilities.
- Localised widening around intersections with existing roads to accommodate for vehicle stacking and tie-ins and walking and cycling facilities/crossings.
- Proposed new culverts.
- Four proposed stormwater wetlands.
- Two proposed bridges over Waipokapū Stream (approximately 120m) and Waihoehoe Stream and floodplain (approximately 265m).
- Batter slopes and retaining to enable construction of the corridor, and associated cut and fill activities.
- Vegetation removal.
- Areas identified for construction related activities including site compounds, construction laydown, bridge works area, the re-grade of driveways and construction traffic manoeuvring.

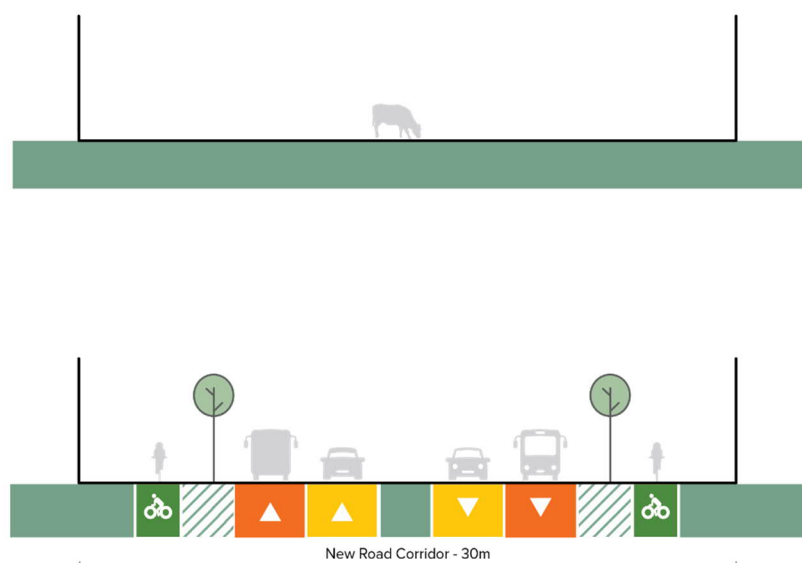


Figure 7-4 Ōpāheke N-S FTN Arterial typical cross section

### 7.3 NOR D4: Ōpāheke North-South FTN corridor - Evaluation against the Design Framework principles

This evaluation considers the application of the established Design Framework Principles against the proposed Ōpāheke N-S FTN corridor. It provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design outcomes should be considered in future design stages. These recommendations can form the basis of an urban design specific designation condition, and where there is an overlap of urban design outcomes with other considerations (for example ecological, landscape, visual or water quality related recommendations) they can be integrated within the relevant specialist conditions.

**Table 7-1: Urban Design Evaluation for Ōpāheke N-S FTN Arterial**

Principle	Explanation	Application to Ōpāheke N-S FTN Arterial
<b>ENVIRONMENT</b>		
<b>1.1 Support and enhance ecological corridors and biodiversity</b>	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors	<ul style="list-style-type: none"> <li>The proposed corridor arrangement and alignment provides spatial provisions (at boundaries and within berms) that have the potential to support ecological connectivity and biodiversity in the local environment by providing contiguous space for diverse planting responses.</li> <li>There are multiple stream crossings along this corridor and through the alternatives assessment and option selection, impacts on ecological features such as the stream crossings and indigenous vegetation were avoided or reduced where possible.</li> <li>There are 2 bridge crossings proposed along the corridor; over the Waipokapū Stream and the Waihoehoe Stream. Both crossings incorporate bridging structures to reinforce broader connectivity outcomes for ecology and water quality by minimising stream interruptions and ensuring a connected natural system.</li> </ul>
<b>1.2 Support water conservation and enhance water quality in a watershed</b>	Take into account and work with the existing watershed as part of a whole system.	<ul style="list-style-type: none"> <li>The proposed typical corridor cross section allows spatial provisions to provide natural drainage to stormwater wetlands as a way to address water quality and reduce hard engineering solutions. Water quality and detention/retention will be decided in future regional consents.</li> <li>Further refinement of the wetlands during the detailed design stage is recommended to define the wetland's final form and how the wetland will interface with the surrounding land uses. For example, wetlands should be configured in a naturally shaped manner and fully integrated with existing natural drainage features and vegetation.</li> <li>There is also an opportunity for the wetlands located near the Waipokapū and Waihoehoe Streams to be integrated with and complement the streams through planting arrangement and planting types.</li> </ul>

Principle	Explanation	Application to Ōpāheke N-S FTN Arterial
<b>1.3</b> <b>Minimise land disturbance, conserve resources and materials</b>	Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.	<ul style="list-style-type: none"> <li>The proposed corridor demonstrates a generally efficient alignment in relation to existing property boundaries along the corridor minimising land impacts and inefficient residual land portions.</li> <li>If practicable, explore opportunities at future detailed design stages to redefine and integrate residual land around the wetlands with the adjacent land uses.</li> <li>The proposed corridor traverses across undulating land, the Waipokapū Stream and the Waihoehoe Stream, as well as culverted stream tributaries. Further vertical integration adjacent to the four bridging structures should be developed at a detailed design stage to allow an appropriate transition and interface to adjacent built form.</li> </ul>
<b>1.4</b> <b>Adapt to a changing climate and respond to the microclimatic factors of each area</b>	Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.	<ul style="list-style-type: none"> <li>The proposed corridor design, including stream crossings of Waipokapū and Waihoehoe Streams, adopt a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.</li> <li>The proposed corridor design provides for street tree planting that, when delivered, will contribute to the amenity of the area by providing shade and microclimatic cooling qualities.</li> <li>The proposed corridor provides for active modes and prioritises public transport options to support modal shift and reduce transport related climate change contributions.</li> </ul>

## SOCIAL

Principle	Explanation	Application to Ōpāheke N-S FTN Arterial
<b>2.1</b> <b>Identity and place</b>	The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.	<ul style="list-style-type: none"> <li>The proposed corridor passes through a largely existing rural environment and while this is planned to change to mixed and more intense land uses, the proposed cross section has spatial flexibility that is capable of responding to a range of characteristics (identity drivers) that may arise from this change.</li> <li>In areas of high density or mixed use centres the cross section can provide support for active edges (where there is visual engagement between the built form and the street), permeable access for pedestrians, and vegetation appropriately scaled to built form.</li> <li>There is opportunity to improve connectivity and interface to the Waipokapū and Waihoehoe Streams to enhance their distinctive landscape qualities (character drivers) for the community.</li> <li>Consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.</li> </ul>

Principle	Explanation	Application to Ōpāheke N-S FTN Arterial
		<ul style="list-style-type: none"> <li>In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> <li><b>Sites of historic value</b> Identification of the sites below provides opportunities for future development to explore and celebrate the inherent heritage character drivers for the area. Further details of these are referenced in the Assessment of Historic Heritage Effects.</li> <li>There is one historic heritage site (Utility Building, CHI) recorded in close proximity to the proposed corridor. At 31 Ponga Road, a brick building stands near the roadside. Both the field survey from this assessment and the CHI record estimates that the building dates to the 1940s. It was used as a substation.</li> </ul>
<p><b>2.2</b> <b>Respect culturally significant sites and landscapes</b></p>	<p>Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.</p>	<ul style="list-style-type: none"> <li>There are no sites of significance to Mana Whenua under the AUP:OIP that have been identified along or in close proximity to the proposed corridor. However, in future design stages, Mana Whenua will be invited to provide input into other relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> <li>The corridor alignment has been developed to avoid impact on a notable ecological area located north west of the Waihoehoe Stream.</li> </ul>
<p><b>2.3</b> <b>Adaptive corridors</b></p>	<p>Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.</p>	<ul style="list-style-type: none"> <li>The proposed typical corridor cross section has the spatial provisions to be flexible, re-configurable and adaptable for changing transport needs. For example, future bus priority measures at intersections, additional bus stops and future expansion of any walking and cycling networks can be accommodated within the corridor.</li> <li>The proposed cross section provides space for all modes, with spatial provisions at the corridor edges that accommodate active frontages, provide permeability for access to adjacent land use types and movement corridors.</li> </ul>
<p><b>2.4</b> <b>Social cohesion</b></p>	<p>Provide clear, effective and legible connectivity between community and social functions.</p>	<ul style="list-style-type: none"> <li>The proposed corridor cross section supports the creation of spaces where seamless cross corridor connectivity can be provided through a permeable interface at the corridor boundary.</li> <li>The proposed corridor alignment and function can deliver a positive contribution to the sense of belonging and participation, as well as community</li> </ul>

Principle	Explanation	Application to Ōpāheke N-S FTN Arterial
		<p>resilience by supporting direct access to the proposed local centre and open space located east of the Ponga Road intersection.</p> <ul style="list-style-type: none"> <li>To enable equitable local connectivity and cross corridor access to the proposed local centre and areas of high density, further development at the detailed design stage should be undertaken of crossing points for multi-lane intersections and midblock crossings.</li> </ul>
<b>2.5 Safe corridors</b>	Provide a safe and convenient network of routes accessible to people of all ages and abilities.	<ul style="list-style-type: none"> <li>The proposed corridor can deliver a greater level of access and movement to future local communities, with the provision of fully segregated active travel solutions.</li> <li>Further design detail of safe prioritised active modes crossings across multi-lane roundabouts should be addressed at subsequent detail design stages.</li> <li>The proposed configuration and alignment accommodates the universal design approach and accessibility to all parts of user journeys.</li> </ul>
<b>BUILT FORM</b>		
<b>3.1 Align corridors with density</b>	Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.	<ul style="list-style-type: none"> <li>The proposed corridor alignment and arrangement provides a safe and well connected network to support the proposed growth areas of Drury Central future urban zone.</li> <li>The corridor prioritises public transport and active modes to provide direct access to and support for the following; <ul style="list-style-type: none"> <li>the existing industrial /employment areas to the north of the corridor;</li> <li>the proposed local centre off Ponga Road; and</li> <li>the THAB zoned areas to the south of the corridor.</li> </ul> </li> </ul>
<b>3.2 Corridor scaled to the surrounding context and urban structure</b>	Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).	<ul style="list-style-type: none"> <li>The corridor configuration and scale proposed provides an appropriate response to the potential needs of the adjacent area functions (access to and from adjacent built form and general spatial layout). Examples include efficient localised movement, alignment with mixed housing land uses and the provision of mixed mode travel.</li> <li>The corridor alignment provides a flexible interface that accommodates known precinct planning and private development land use proposals for Waihoehoe. The alignment position provides direct integration with the proposed future urban form shown in the proposed Oyster Capital Ltd. plan change.</li> </ul>



Principle	Explanation	Application to Ōpāheke N-S FTN Arterial
<p><b>3.3</b> Facilitate an appropriate interface between place and movement</p>	<p>Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)</p>	<ul style="list-style-type: none"> <li>The proposed corridor cross section provides a flexible platform to address the opportunity for place as well as movement function with clear allocation of street space, for example separated pedestrian and cycle facilities and potential road median spaces that provide safe waiting zones for pedestrians. In the absence of medians, signalized or legal crossings, spaced appropriately for the adjacent land-uses and pedestrian desire routes involved, should be considered.</li> <li>Direct private vehicular access is not accommodated, however a pedestrian permeable interface or active frontage interface is supported where adjacent to the future THAB zone (or where required).</li> <li>Further vertical integration adjacent to the bridging structures particularly around the Waihoehoe Stream is recommended to improve potential for active edge permeability and an appropriate interface with adjacent residential land uses.</li> </ul>
<p><b>MOVEMENT</b></p>		
<p><b>4.1</b> Connect nodes</p>	<p>Provide tangible connectivity between identified activity nodes.</p>	<ul style="list-style-type: none"> <li>The proposed corridor alignment provides tangible and direct connectivity between the existing industrial/employment areas to the north and the proposed Main Centre and rail station at Drury Central.</li> </ul>
<p><b>4.2</b> Connect modes</p>	<p>Provide for choice in travel and the ability to connect at interchanges between modes.</p>	<ul style="list-style-type: none"> <li>The proposed corridor provides simple but complete future connectivity for all modes (walking, cycling, public transport and private vehicle).</li> <li>The corridor provides a direct and prioritised active mode and PT connection to the proposed Main Centre and rail station at Drury Central.</li> </ul>
<p><b>4.3</b> Support access to employment and industry</p>	<p>Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.</p>	<ul style="list-style-type: none"> <li>The proposed corridor alignment provides direct and legible access the industrial / employment areas in Drury north.</li> </ul>
<p><b>4.4</b> Prioritise active modes and public transport</p>	<p>Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.</p>	<ul style="list-style-type: none"> <li>The proposed corridor cross section accommodates high-quality PT and active travel facilities, for example separated pedestrian, cycle pathways and a FTN bus route.</li> <li>Further development of modal priority at intersections at the detailed design stage will provide a higher level of service and enable modal shift.</li> </ul>

Principle	Explanation	Application to Ōpāheke N-S FTN Arterial
<b>4.5 Support inter-regional connections and strategic infrastructure</b>	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, waste water, water) to the network.	<ul style="list-style-type: none"> <li>The proposed corridor is a key north south strategic corridor through the spine of the Drury Central future urban zone.</li> <li>The corridor also provides some regional connectivity to Papakura.</li> </ul>
<b>4.6 Support legible corridor function</b>	Consider how areas can be clearly navigated and understood by users moving from place to place.	<ul style="list-style-type: none"> <li>The proposed cross section for the corridors accommodate a range of modes with clear allocation of street spaces and inherently supports future community connectivity, mobility and travel choice.</li> <li>Further development at the detail design stage, of intersection crossings, midblock crossings and future bus stops along the corridor will provide clear and legible cross corridor access and connectivity between areas of high density and centres.</li> </ul>

## LANDUSE

Principle	Explanation	Application to Ōpāheke N-S FTN corridor
<b>5.1 Public transport directed and integrated into centres</b>	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and provide modal choice to a larger number of users.	<ul style="list-style-type: none"> <li>The proposed corridor alignment provides a direct and prioritised public transport connection as part of the FTN network to the proposed Main Centre and rail station at Drury Central.</li> </ul>
<b>5.2 Strategic corridors as urban edges</b>	Strategic corridors as potential definers of a land use edge.	<ul style="list-style-type: none"> <li>This principle is not relevant to the corridor.</li> </ul>

## 7.4 Summary of urban design evaluation and recommendations for the Ōpāheke North-South FTN Arterial

Overall, the proposed Ōpāheke North-South FTN design and corridor configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 7-5 and 7-6 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 7-5 and 7-6;

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.

- An urban interface approach within the corridor that recognises the transition of densities from THAB to mixed housing urban to mixed housing suburban. The urban interface approach should respond to the changing built form interface, respond to the spatial character of adjacent development and demonstrate permeable pedestrian access between the corridor and adjacent development.
- In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- The identification of urban and landscape design drivers related to the Waipokapū and Waihoehoe Streams, the adjacent notable ecological area as well as the proposed local centre and open space at the intersection of Ponga Road. The future corridor design should demonstrate an appropriate response and integration with these character drivers.
- A landscape plan that considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement, treatment of batter slopes. The landscape plan should also demonstrate integration with the Waipokapū and Waihoehoe Streams, particularly where the corridor integrates with the Blue-Green Network. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed Greenways and the wider walking and cycling network.
- Integration of the Ōpāheke stormwater wetlands to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned medium density.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

Further urban design opportunities in the Project area have also been identified in Figure 7-5 and 7-6 are shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

### 7.5 Ōpāheke North-South FTN Arterial – Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 7.4 above. Opportunities that have been identified are shown in orange below.

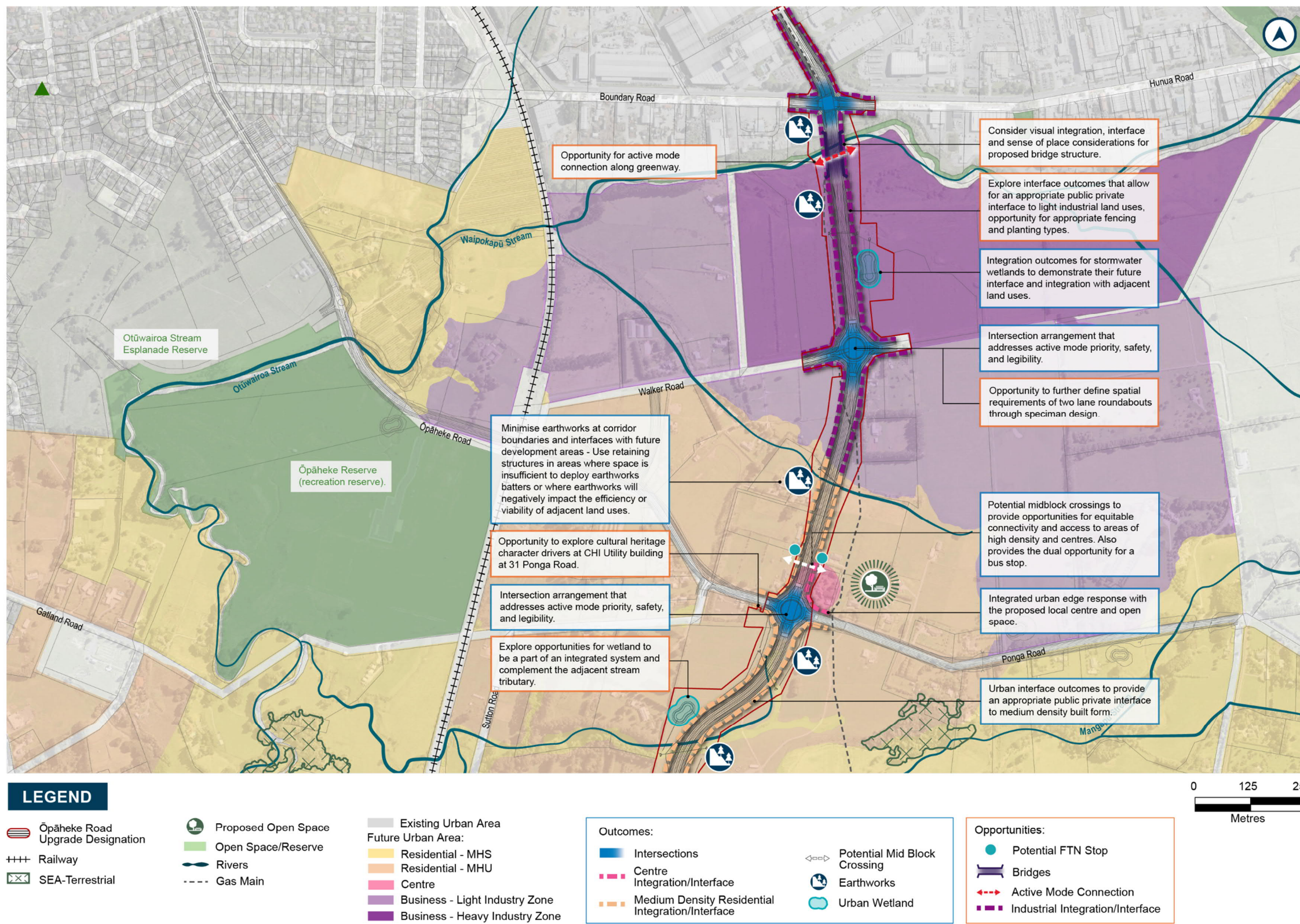
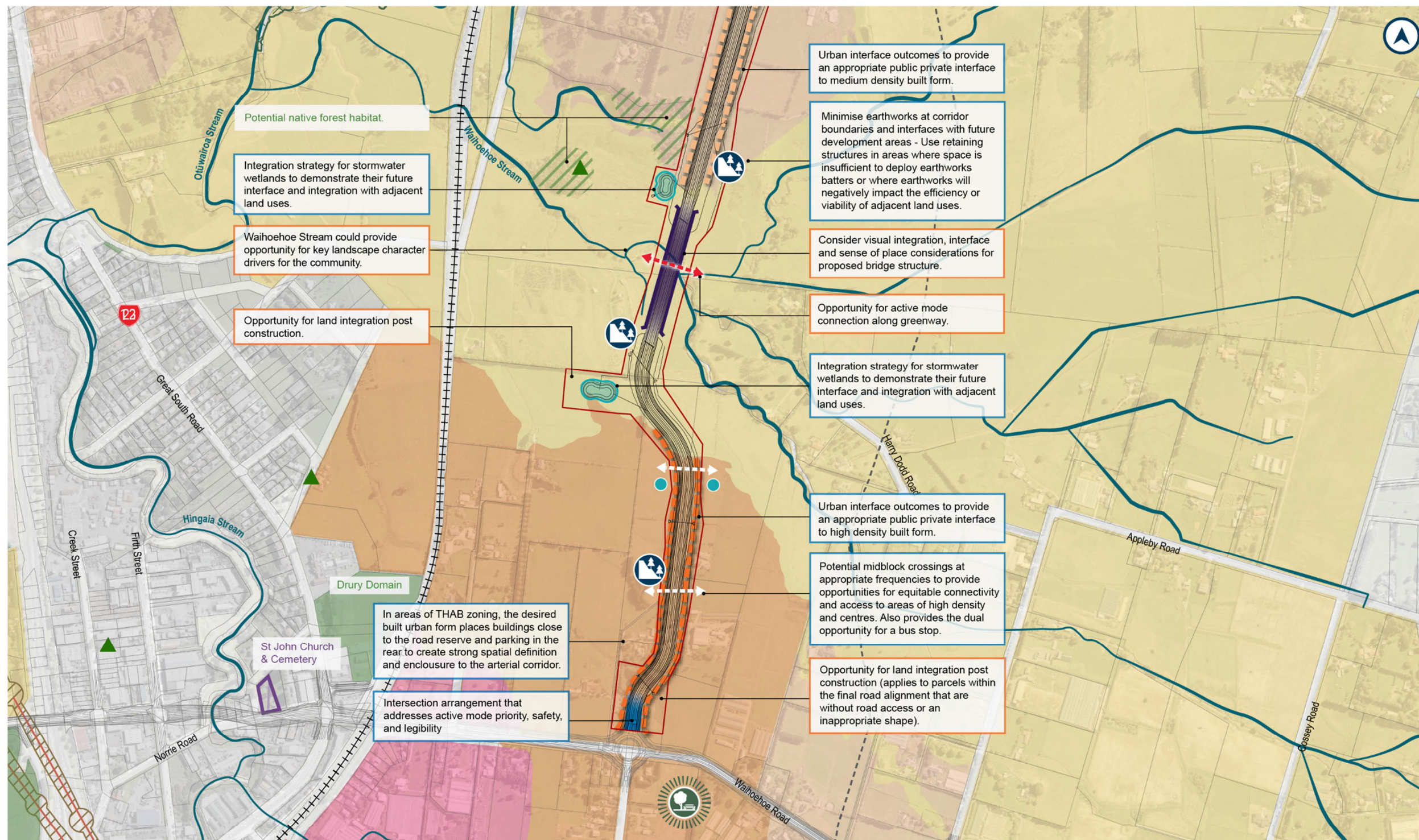


Figure 7-5 Ōpāheke N-S FTN corridor urban design outcomes and opportunities – Sheet 1



**LEGEND**

Ōpāheke Road Upgrade Designation	Rivers	Existing Urban Area
Railway	Open Space/Reserve	<b>Future Urban Area:</b>
National Grid Yard	Notable Trees	Residential - MHS
Electricity Transmission Lines	Proposed Open Space	Residential - MHU
Historical Heritage Overlay	Gas Main	Residential -THAB
Extent of Place		Centre

<b>Outcomes:</b>	Urban Wetland
Medium Density Residential Integration/Interface	Earthworks
High Density Residential Integration/Interface	Potential Mid Block Crossing
Intersections	

<b>Opportunities:</b>
Proposed FTN Stop
Bridges
Grade Separated Crossing

Figure 7-6 Ōpāheke N-S FTN corridor urban design outcomes and opportunities– Sheet 2

## 8 NoR D5: Ponga and Ōpāheke Road Upgrade

As the Drury-Ōpāheke area is urbanised it is proposed to upgrade a 4.15km section of Ponga Road and Ōpāheke Road, from Great South Road in the north, to Jack Paterson Road and the future Mill Road corridor (which forms a separate NZUP project) in the southeast, to a two-lane arterial with separated walking and cycling facilities. The Project has been separated into three sections as shown in **Error! Reference source not found.**:

- Ponga Road Upgrade: from Ōpāheke Road to Jack Paterson Road
- Ōpāheke Road Rural Upgrade: from the northern extent of the FUZ to Ponga Road
- Ōpāheke Road Urban Upgrade: north of the FUZ
  - While the overall plan for the urban area of Ōpāheke Road is to upgrade the walking and cycling facilities from Ōpāheke Road Rural Upgrade in the south to Great South Road, Papakura in the north, generally, the upgrade can fit within the existing road reserve, therefore only the areas affecting land outside the existing road reserve are proposed to be designated.

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.

Further details of each Project section are provided below.

# Drury Arterial Network

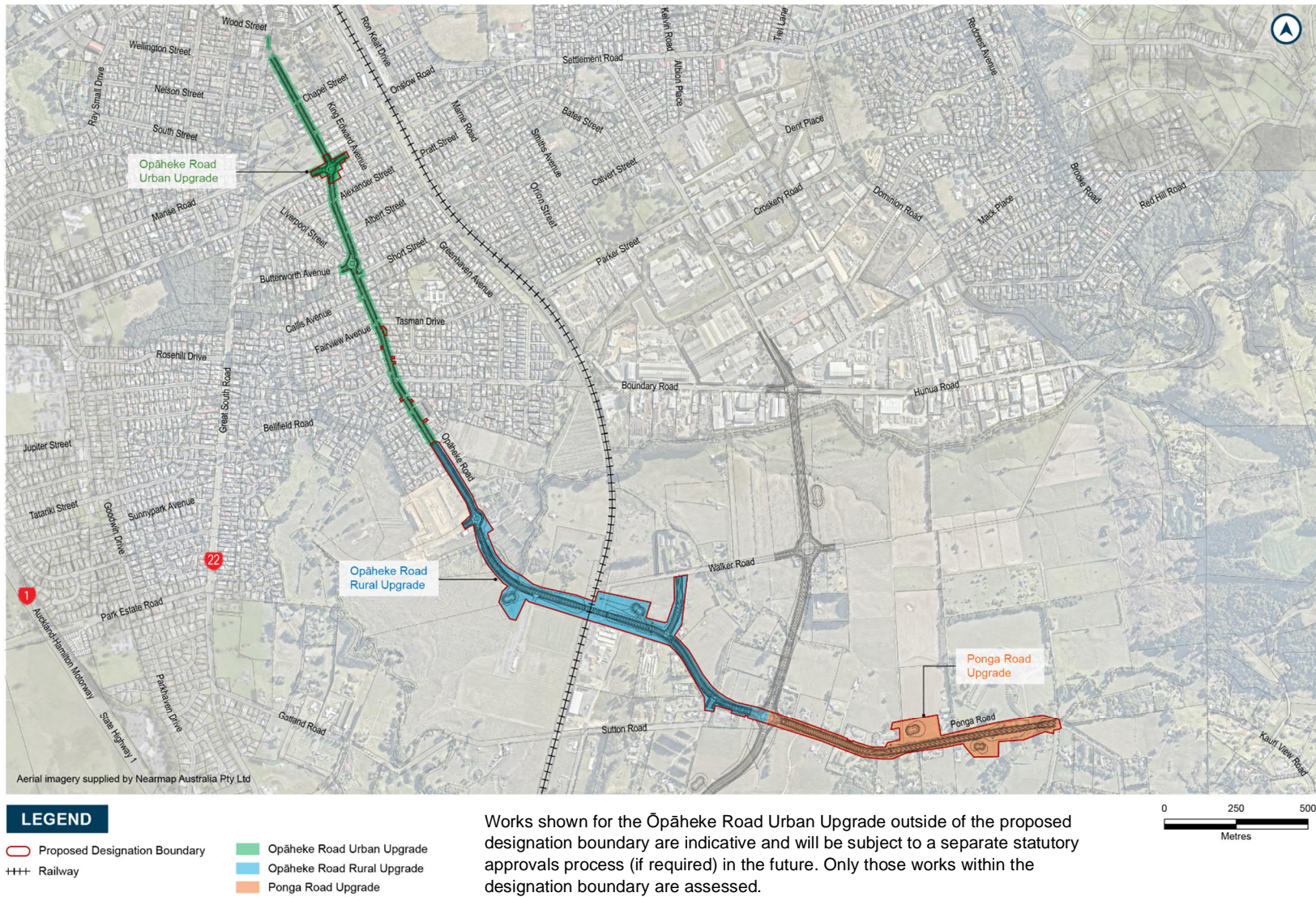
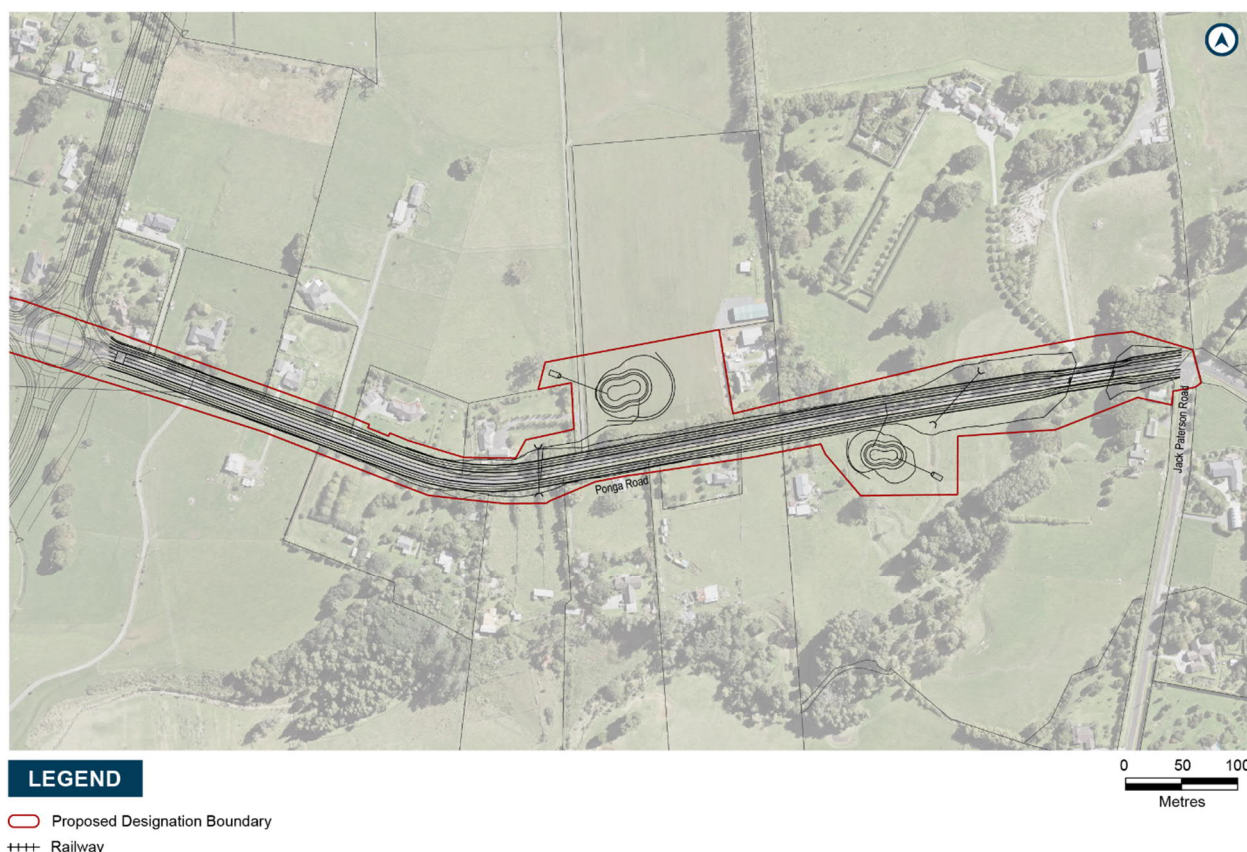


Figure 8-1 Overview of NoR D5

## Ponga Road Upgrade

### 8.1 Ponga Road Upgrade contextual analysis

The Ponga Road Upgrade section is a 1km long upgrade extending from the proposed intersection with Ōpāheke North-South FTN Arterial in the west, to Jack Paterson Road in the east. In the future, Ponga Road will tie into the proposed Mill Road corridor, which forms a separate NZUP project. An overview of the concept design is provided in **Error! Reference source not found.**



**Figure 8-2 Overview of Ponga Road Upgrade section**

#### 8.1.1.1 Urban features

The existing land use along Ponga Road is semi-rural with low density housing/lifestyle blocks, home businesses (i.e. bed and breakfasts) and rural businesses including a storage facility and farming. Passive and active recreational land use is prominent in the vicinity including the Ōpāheke Reserve which has recently undergone upgrades.

The existing transport function of the Ponga Road Upgrade section is characterised by:

- a rural two-lane primary collector road (80kph);
- containing no formal walking or cycling facilities;
- having no public transport services or facilities; and
- containing limited private land access points / driveways.



### 8.1.1.2 Physical Features

The broader landscape of the area is characterised as a flat, open environment within a broader wide flood plain at Ōtūwairoa Stream to the north west. The existing roads and some properties are subject to flood inundation including Ponga Road at the Mangapū Stream crossing to the corridors western end. The project intersects with the proposed Blue-Green network at Mangapū Stream providing future opportunities for a complimentary design response.

The existing vegetation is highly modified and is dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting.



Figure 8-3 Ponga Road Upgrade section project area

### 8.1.2 Likely future environment

The likely future land use environment in which the Ponga Road Upgrade section will operate is assumed to be an urban or developing urban environment. Existing recreational uses are anticipated to remain however it is expected intensification and redevelopment will occur to support the expanding urbanised area.

#### Blue-Green Network

The proposed Blue-Green Network is indicated to intersect with the Project area through the Mangapū Stream floodplain in the east.

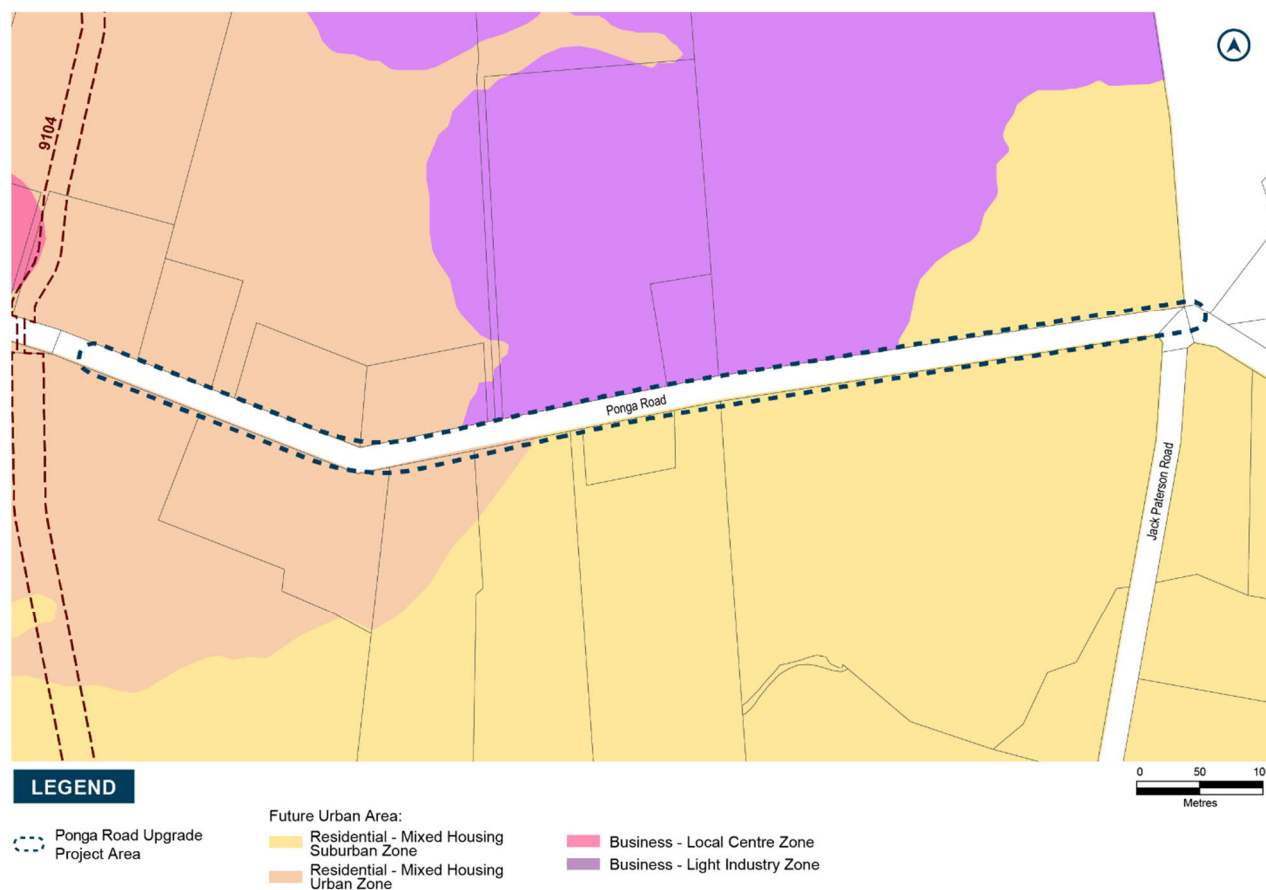


Figure 8-4 AUPOIP Zoning for Ponga Road Upgrade Section

## 8.2 Ponga Road Upgrade - form and function

The functional intent of the Ponga Road Upgrade section is to support the Drury north future growth area by providing separated walking and cycling facilities, and form the key east west link with Ōpāheke Road (Rural) and Ōpāheke Road (Urban). The full corridor will provide a direct and legible connection to the proposed Mill Road corridor, FUZ areas in Papakura and employment areas to the north.

Currently, the corridor is a narrow rural two-lane collector road with no walking, cycling or public transport facilities. It is the eastern section of the proposed east west Ōpāheke – Ponga link through Drury North future urban zone and serves a mainly rural catchment. It is envisaged that as the area urbanises, the existing corridor will be upgraded to a two lane urban arterial that will provide separated walking and cycling facilities and has the potential for future public transport facilities. The corridor will interface with a range of land uses including mixed housing urban and suburban, a proposed industrial/employment zone and a proposed local centre.

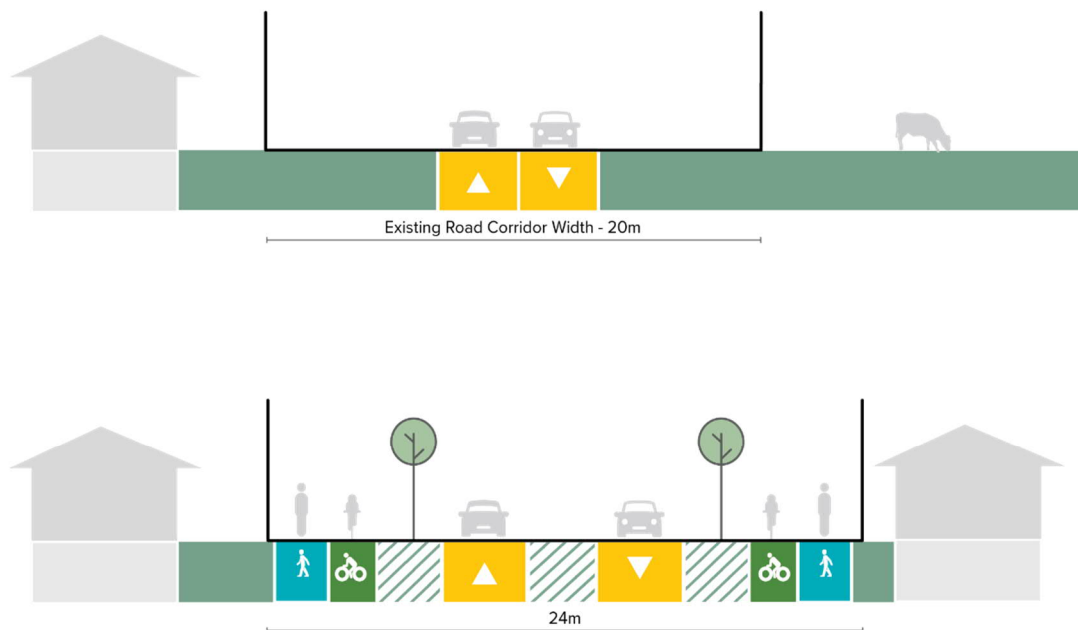
The key features of the Ponga Road Upgrade section include:

- A typically 24m wide road with two lanes and separated walking and cycling facilities.
- Likely posted speed of 50kph.
- Localised widening around the existing intersections to accommodate for vehicle stacking and tie-ins and walking and cycling facilities/crossings.

## Drury Arterial Network

---

- Roundabout tying into the proposed Ōpāheke N-S FTN Arterial and Ōpāheke Road Rural Upgrade.
- A bridge over Mangapū Stream.
- Extension of existing pipe culverts.
- Two stormwater wetlands.
- Batter slopes and retaining to enable widening of the corridor and/or wetland construction, and associated cut and fill activities.
- Vegetation removal along the existing road corridor.
- Areas identified for construction related activities including site compounds, construction laydown, bridge works area, the re-grade of driveways and construction traffic manoeuvring.



**Figure 8-5 Ponga Road Upgrade typical cross section**

## Ōpāheke Road (Rural) Upgrade

### 8.3 Ōpāheke Road (Rural) Upgrade contextual analysis

It is proposed to widen, and realign a portion of, the existing road within the Ōpāheke Road Rural Upgrade section to a 24m urban arterial. The Ōpāheke Road Rural Upgrade section extends 1.6km from the extent of the FUZ in the north to Ponga Road in the south. An overview of the concept design is provided in Figure 8-6 **Error! Reference source not found.**



Figure 8-6 Overview of Ōpāheke Road Rural Upgrade section

#### 8.3.1 Existing environment

##### 8.3.1.1 Urban features

The existing land use along Ōpāheke Road (Rural) Upgrade section is semi-rural with low density housing/lifestyle blocks, home businesses (i.e. bed and breakfasts) and rural businesses including a storage facility and farming. Passive and active recreational land use is prominent in the vicinity including the Ōpāheke Reserve which has recently undergone upgrades.

The existing transport function of the Ōpāheke Road (Rural) Upgrade section is characterised by:

- a rural two-lane primary collector road (80kph);
- containing no formal walking or cycling facilities;
- having no public transport services or facilities; and
- containing limited private land access points / driveways.

### 8.3.1.2 Physical Features

The broader landscape of the area is characterised as a flat, open environment within a broader wide floodplain at Ōtūwairoa Stream to the north west of the corridor. The existing roads and some properties are subject to flood inundation including Ōpāheke Road at the Ōtūwairoa Stream crossing to the corridors eastern end.

The existing vegetation is highly modified and is dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting.

### Blue-Green Network

The proposed Blue-Green Network intersects with the Project area through the Ōtūwairoa Stream corridor providing future opportunities for a complimentary design response.



Figure 8-7 Ōpāheke Road (Rural) Upgrade section project area

### 8.3.2 Likely future environment

Based on the existing zoning and Drury-Ōpāheke Structure Plan, the land use pattern surrounding the corridor is expected to be:

- Mixed Housing Suburban Zone in the open flood plain area.
- Mixed Housing Urban Zone to the west of the corridor.
- A Local Centre at Ponga Road.
- A mix of Heavy and Light Industry Zones to the north / northwest of the corridor.

On the north side of Ōtūwairoa Stream construction of a medium to high density residential development (Bellfield Estate) within the Ōpāheke 1 Precinct has begun. Bellfield Estate is 22 hectares in size and has been master planned to integrate with Ōpāheke Reserve. Bellfield Estate is currently being prepared for 500 new homes, both terraced housing and standalone housing.

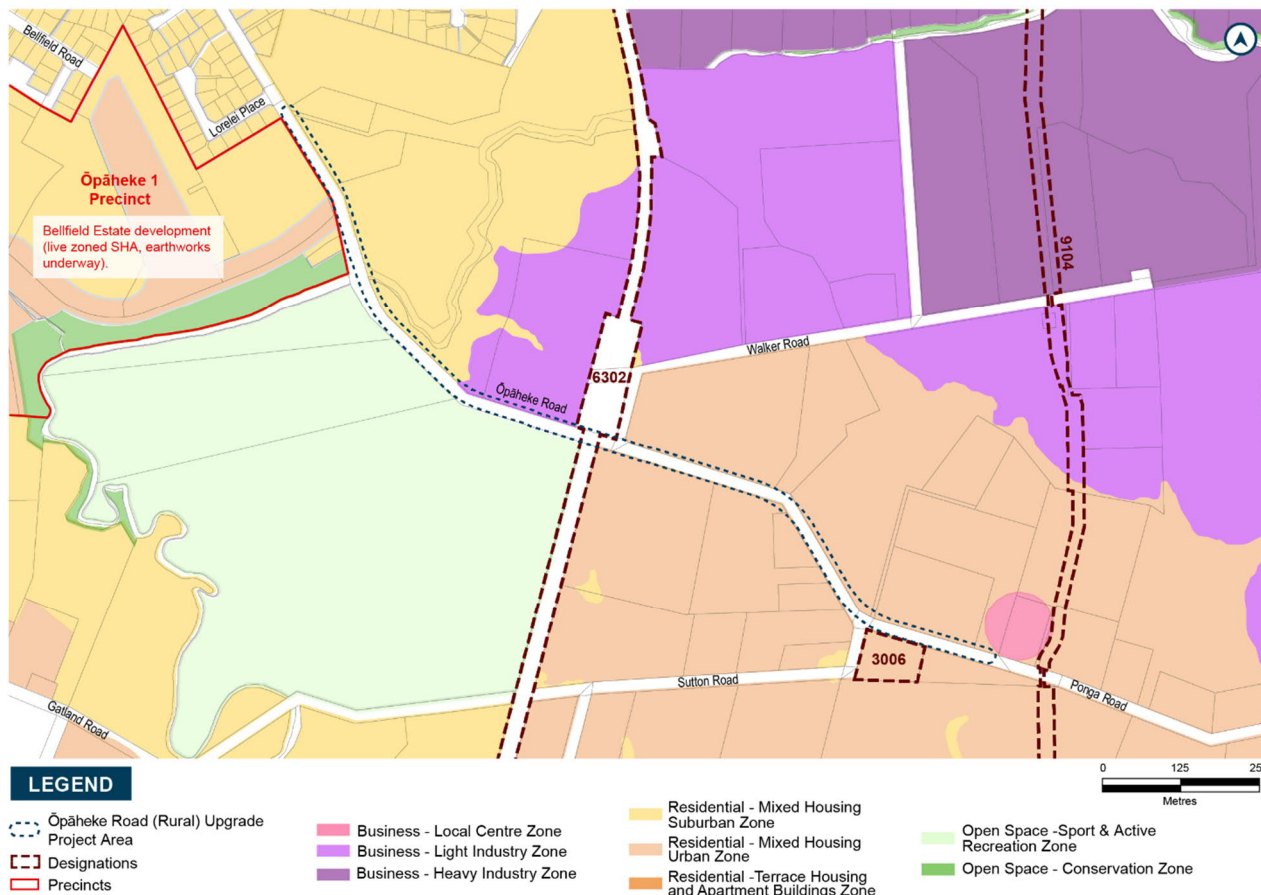


Figure 8-8 AUPZIP Zoning for Ōpāheke Road (Rural) Upgrade section

### 8.4 Ōpāheke Road (Rural) Upgrade - form and function

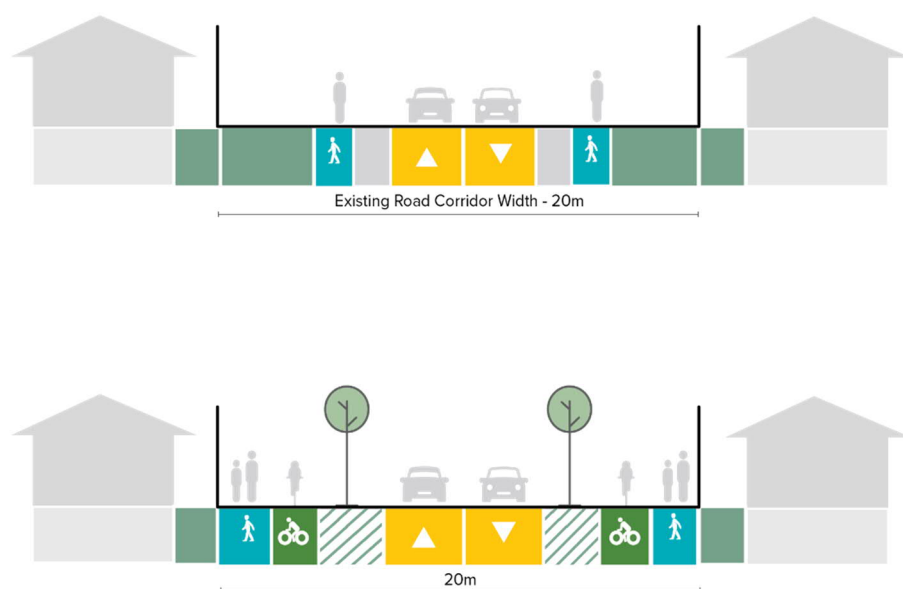
The functional intent of the Ōpāheke Road (Rural) Upgrade section is to support the Drury north future growth area as the central section of the east west link with Ōpāheke Road (Urban) and Ponga Road. The full corridor will provide a direct and legible connection to the proposed Mill Road corridor, FUZ areas in Papakura and employment areas to the north.

Currently, the corridor is a narrow rural two-lane collector road with no walking, cycling or public transport facilities. It is the middle section of the proposed east west Ōpāheke – Ponga link through Drury North and serves a mainly rural catchment.

It is envisaged that as the area urbanises, the existing corridor will be upgraded to a two lane urban arterial that will provide separated walking and cycling facilities and has the potential for future public transport facilities. The corridor will interface with a range of land uses including mixed housing urban and suburban, a proposed industrial/employment zone and the Ōpāheke reserve.

The key features of the Ōpāheke Road (Rural) Upgrade section include:

- A typically 24m wide road with two lanes and separated walking and cycling facilities.
- Likely posted speed of 50kph.
- Localised widening around the existing intersections to accommodate for vehicle stacking and tie-ins and walking and cycling facilities/crossings.
- Roundabouts at Bellfield Estate and Ōpāheke N-S FTN / Ponga Road.
- Realignment of a section of Ōpāheke Road and grade separation of the NIMT to avoid the Waikato 1 watermain and Ōpāheke Sports Fields and to allow the bridge to be constructed offline.
- New road connection to Walker Road (and closure of a section of the existing Ōpāheke Road – replaced by the new NIMT bridge).
- Two walking and cycling bridges adjoining each side of the existing Ōtūwairoa Stream road bridge.
- Two stormwater wetlands. One is an extension of an existing wetland located within Ōpāheke Reserve.
- Batter slopes and retaining to enable widening of the corridor and/or wetland construction, and associated cut and fill activities.
- Vegetation removal along the existing road corridor.
- Areas identified for construction related activities including site compounds, construction laydown, bridge works area, the re-grade of driveways and construction traffic manoeuvring.



**Figure 8-9 Ōpāheke Road (Rural) Upgrade section typical cross section**

## Ōpāheke Road (Urban) Upgrade

### 8.5 Ōpāheke Road (Urban) contextual analysis

While the overall plan for the urban area of Ōpāheke Road is to upgrade the walking and cycling facilities from Ōpāheke Road Rural Upgrade in the south to Great South Road, Papakura in the north, only the areas affecting land outside the existing road reserve are proposed to be designated and assessed as part of this assessment. The Ōpāheke Road (Urban) Upgrade section of NoR D5 includes the regrading of nine driveways along Ōpāheke Road and the upgrade of the Ōpāheke Road / Settlement Road intersection to a roundabout. An overview of the proposed designation areas is provided in Figure 8-10 **Error! Reference source not found.**



Figure 8-10 Overview of Ōpāheke Road (Urban) Upgrade section

#### 8.5.1 Existing environment

##### 8.5.1.1 Urban Features

The existing land use along Ōpāheke Road (Urban) Upgrade section is largely established low to medium density residential with a few local shops. Papakura Cemetery is located at the intersection of Ōpāheke Road and Settlement Road.

The existing transport function of the Ōpāheke Road (Urban) Upgrade section is characterised by:

- an urban two-lane primary collector road (50kph);
- containing basic walking facilities but no formal cycling facilities;



## Drury Arterial Network

- All the intersections within the Ōpāheke Road (Urban) corridor, apart from the intersection at Settlement Road and Ōpāheke Road, are priority controlled with no safe walking and cycling crossing facilities; and
- Local access roads to neighbouring areas consist of Jack Paterson Road, Sutton Road, Walker Road and Settlement Road with a number of direct property accesses along the corridor.

### 8.5.1.2 Physical Features

The Ōpāheke Road (Urban) Upgrade section is dominated by established low density urban development, it has a flat, open underlying topography within a broader wide floodplain at Ōtūwairoa Stream to the east of the corridor.

The existing vegetation is highly modified and is dominated by mixed suburban amenity planting associated with the existing housing.



Figure 8-11 Ōpāheke Road (Urban) Upgrade section project area

### 8.5.2 Likely future environment

Existing urban areas and recreational uses are anticipated to remain however it is expected that some intensification and redevelopment will occur to support the expanding urbanised area.

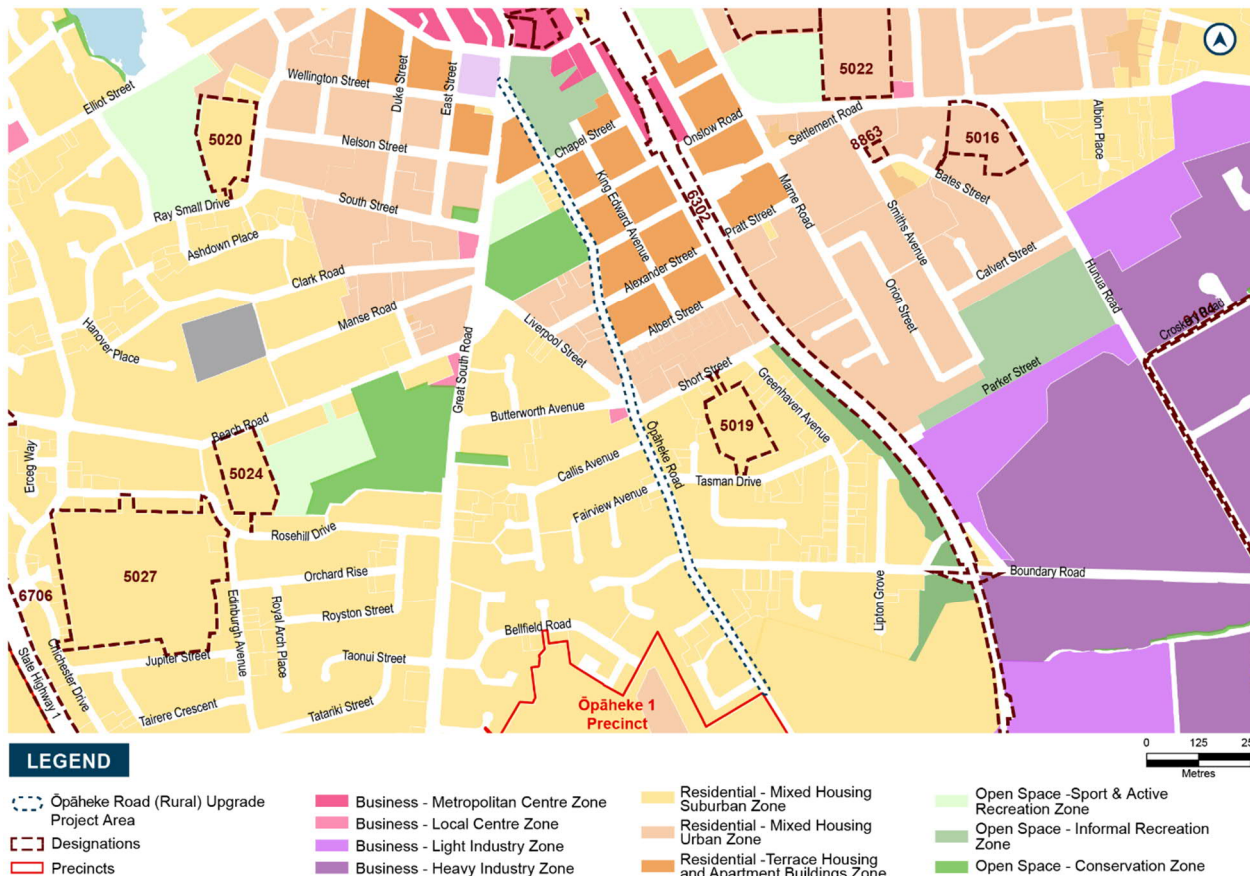


Figure 8-12 AUPZIP Zoning for Ōpāheke Road (Urban) Upgrade section

### 8.6 Ōpāheke Road (Urban) Upgrade - form and function

The Ōpāheke Road (Urban) Upgrade section is a section of corridor comprising of two vehicular lanes with footpaths on both sides, passing through an established low density residential environment.

The upgrade of the existing corridor to a two lane urban arterial is contained within the existing 20m carriageway. The established corridor will provide separated walking and cycling facilities, an upgrade of the Ōpāheke Road / Settlement Road intersection to a roundabout and the regrading of nine affected driveways.

The functional intent of the Ōpāheke Road (Urban) Upgrade section is to improve the north western section of the Ponga - Ōpāheke Road (rural) link. The full corridor, once established will provide support for the growth areas in Drury North and connect to the proposed Mill Road corridor, the Ōpāheke North-South FTN corridor, and to the Papakura township.

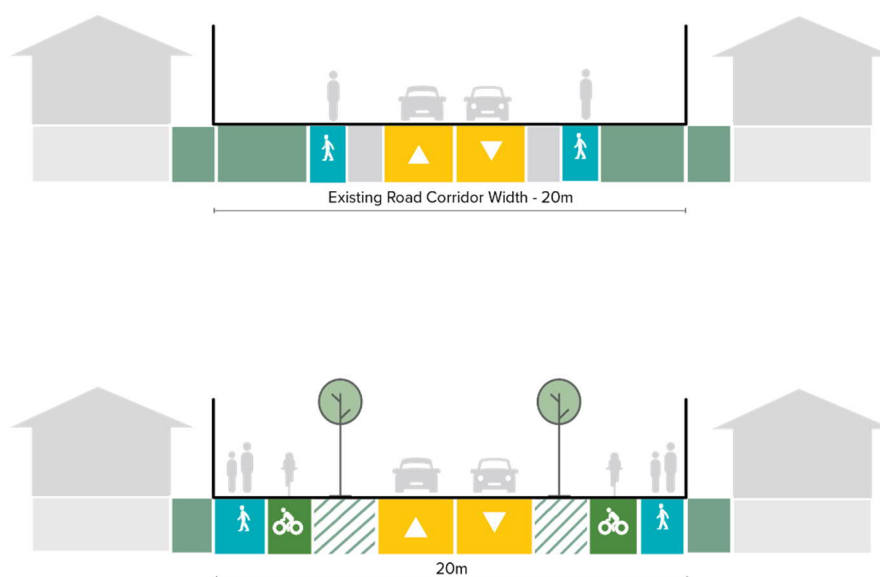


Figure 8-13 Ōpāheke Road (Urban) Upgrade section typical cross section

## 8.7 NOR D5: Ponga and Ōpāheke Road (Rural) Upgrade - Evaluation against the Design Framework principles

This evaluation considers the application of the established Design Framework Principles against the proposed Ponga Road and Ōpāheke Road (Rural Upgrade section. It provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design opportunities should be considered in future design stages. These recommendations can form the basis of an urban design specific designation condition, and where there is an overlap of urban design outcomes with other considerations (for example ecological, landscape, visual or water quality related recommendations) they can be integrated within the relevant specialist conditions.

Table 8-1: Urban Design Evaluation for Ponga and Ōpāheke Road (Rural) Upgrade

Principle	Explanation	Application to Ponga and Ōpāheke Road (Rural) Upgrade
<b>ENVIRONMENT</b>		
<b>1.1 Support and enhance ecological corridors and biodiversity</b>	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors	<ul style="list-style-type: none"> <li>The proposed arrangement and alignment of the corridors provide spatial provisions (at boundaries and within berms) that have the potential to support ecological connectivity and biodiversity in the local environment by providing contiguous space for diverse planting responses.</li> <li>The proposed crossing of the Mangapū Stream and Ōtūwairoa Stream incorporates bridging structures, which enable broader connectivity outcomes for ecology and water quality and minimise stream interruptions.</li> </ul>

Application to Ponga and Ōpāheke Road (Rural) Upgrade		
Principle	Explanation	
<p><b>1.2</b> Support water conservation and enhance water quality in a watershed</p>	<p>Take into account and work with the existing watershed as part of a whole system.</p>	<ul style="list-style-type: none"> <li>The proposed typical corridor cross sections allow spatial provisions to provide natural drainage to stormwater wetlands as a way to address water quality and reduce hard engineering solutions. Water quality and detention/retention will be decided in future regional consents.</li> <li>Further refinement of the wetlands during the detailed design stage is recommended to define the wetland's final form and how the wetlands will interface with the surrounding land uses. For example, wetlands should be configured in a naturally shaped manner and fully integrated with existing natural drainage features and vegetation.</li> </ul>
<p><b>1.3</b> Minimise land disturbance, conserve resources and materials</p>	<p>Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.</p>	<ul style="list-style-type: none"> <li>The concept design of the corridors utilises existing corridors and demonstrates a close and connected alignment to the existing landform, generally balancing earthworks while minimising unnecessary disturbance and materials.</li> <li>If practicable, explore opportunities at future detailed design stages to;                             <ul style="list-style-type: none"> <li>redefine and integrate residual land around the wetlands with the adjacent land uses</li> <li>integrate land parcels post construction</li> </ul> </li> <li>Further vertical integration adjacent to bridging structures should be developed at a detailed design stage to allow an appropriate transition and interface to adjacent built form. For example the interface with the Mangapū Stream, the rail overbridge and the Walker Road overbridges.</li> </ul>
<p><b>1.4</b> Adapt to a changing climate and respond to the microclimatic factors of each area</p>	<p>Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.</p>	<ul style="list-style-type: none"> <li>The corridor designs including Mangapū Stream and Ōtūwairoa Stream crossings which adopt a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.</li> <li>The corridor designs provide for street tree planting zones that, when delivered, will contribute to the amenity of the area by providing shade and microclimatic cooling qualities.</li> <li>The corridors provide for active modes and accommodates future public transport options to support modal shift and reduce transport related climate change contributions.</li> </ul>
<p><b>SOCIAL</b></p>		
<p><b>2.1</b></p>	<p>The identity or spirit of place is generally acknowledged</p>	<ul style="list-style-type: none"> <li>The corridors pass through a largely existing rural environment and while this is planned to change to a</li> </ul>

Principle	Explanation	Application to Ponga and Ōpāheke Road (Rural) Upgrade
<p><b>Identity and place</b></p>	<p>as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.</p>	<p>mix of land uses including light industry, mixed housing urban and suburban, the proposed cross section has spatial flexibility that is capable of responding to a range of characteristics (identity drivers) that may arise from this change.</p> <ul style="list-style-type: none"> <li>• In areas of higher density or adjacency to centres the proposed cross section of the corridors can provide support for active edges (where there is visual engagement between the built form and the street), permeable access for pedestrians, and vegetation appropriately scaled to built form.</li> <li>• Improved connectivity and interface to the Mangapū Stream, the Ōtūwairoa Stream and the adjacent Ōpāheke Reserve could provide opportunities to enhance their distinctive landscape qualities (character drivers) for the community.</li> <li>• Consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.</li> <li>• In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> <li>• <b>Sites of historic value</b> Identification of the sites below provides opportunities for future development to explore and celebrate the inherent heritage character drivers for the area. Further details of these are referenced in the Assessment of Historic Heritage Effects.</li> <li>• There are three historic heritage sites that interface with the Ponga road corridor at 61, 154 and 174 Ponga Road. Historic villas are located at number 61 and 174. Number 154 marks the site of the 1942 Ōpāheke East Camp of the US Military.</li> <li>• There are three historic heritage sites that interface with the Ōpāheke Road (rural) corridor. These include at 231 and 211 Ōpāheke Road (CHI site 17016, US Military Camp) and two at the junction between the rail bridge and Ōpāheke Road (CHI site 17176, Ōpāheke Railway Station and CHI site 16004, Ōpāheke Sale Yards).</li> </ul>

Principle	Explanation	Application to Ponga and Ōpāheke Road (Rural) Upgrade
<p><b>2.2</b> <b>Respect culturally significant sites and landscapes</b></p>	<p>Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.</p>	<ul style="list-style-type: none"> <li>There are no sites of significance to Mana Whenua under the AUP:OIP that have been identified along or in close proximity to the proposed corridor. However In future design stages, Mana Whenua will be invited to provide input into other relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.</li> </ul>
<p><b>2.3</b> <b>Adaptive corridors</b></p>	<p>Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.</p>	<ul style="list-style-type: none"> <li>The proposed corridor cross sections present a flexible, re-configurable and adaptable environment for changing transport needs, For example the future expansion of any walking and cycling networks can be accommodated within the corridor.</li> <li>The proposed cross sections provide space for all modes, with spatial provisions at the corridor edges that accommodate active frontages, provide permeability for access to adjacent land use types and movement corridors.</li> </ul>
<p><b>2.4</b> <b>Social cohesion</b></p>	<p>Provide clear, effective and legible connectivity between community and social functions.</p>	<ul style="list-style-type: none"> <li>The proposed corridors support the creation of spaces where seamless cross corridor connectivity can be provided through a permeable interface at the corridor boundary.</li> <li>The proposed alignment and function of the corridors can deliver a positive contribution to the sense of belonging and participation, as well as community resilience by supporting direct access to;             <ul style="list-style-type: none"> <li>the proposed industrial/employment area off Ponga Road;</li> <li>The proposed local centre and open space at the intersection of Ponga Road and the Ōpāheke north south FTN</li> <li>Ōpāheke reserve and the employment area north of Walker Road.</li> </ul> </li> <li>To enable equitable local connectivity and cross corridor access to the proposed local centre and the Ōpāheke Reserve, further development at the detailed design stage should be undertaken of crossing points for multi-lane intersections and midblock crossings.</li> </ul>
<p><b>2.5</b> <b>Safe corridors</b></p>	<p>Provide a safe and convenient network of routes accessible to people of all ages and abilities.</p>	<ul style="list-style-type: none"> <li>The proposed corridor can deliver a greater level of access and movement to future local communities, that will promote a sense of personal safety particularly for pedestrians and cyclists.</li> <li>Further development of the final crossing points across the intersections at the detailed design stage will reinforce the sense of personal safety.</li> </ul>

Principle	Explanation	Application to Ponga and Ōpāheke Road (Rural) Upgrade
		<ul style="list-style-type: none"> <li>The proposed configuration and alignment accommodates the universal design approach and accessibility to all parts of user journeys.</li> </ul>
<b>BUILT FORM</b>		
<p><b>3.1</b> <b>Align corridors with density</b></p>	<p>Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.</p>	<ul style="list-style-type: none"> <li>The proposed corridor alignment and arrangement provides an even and easy access network for the proposed north Drury future urban zone and directly supports a range of mixed uses and densities adjacent to the corridor including the proposed local centre, industrial/employment areas and mixed housing urban and suburban zoned areas.</li> </ul>
<p><b>3.2</b> <b>Corridor scaled to the surrounding context and urban structure</b></p>	<p>Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).</p>	<ul style="list-style-type: none"> <li>The proposed corridor configuration and scale provide an appropriate response to the potential needs of the adjacent precinct functions, for example through efficient localised movement, alignment with the local centre, medium density living and the provision of mixed mode travel.</li> <li>The corridor alignments provide flexible interfaces that acknowledge and accommodate known precinct planning which is currently under construction within the Ōpāheke 1 Precinct.</li> </ul>
<p><b>3.3</b> <b>Facilitate an appropriate interface between place and movement</b></p>	<p>Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)</p>	<ul style="list-style-type: none"> <li>The proposed corridor cross section provides a flexible platform to address the opportunity for place as well as movement function, for example separated pedestrian and cycle facilities and potential road median spaces that provide safe waiting zones for pedestrians. In the absence of medians, signalized or legal crossings, spaced appropriately for the adjacent land-uses and pedestrian desire routes involved, should be considered.</li> <li>The proposed cross section also provides flexibility in supporting appropriate public private interfaces and connectivity at a fine grain (pedestrian) level, for example direct pedestrian access to the proposed local centre and the Ōpāheke Reserve is accommodated and encouraged by placing pedestrian circulation closest to the corridor boundary.</li> <li>Direct private vehicular access is not accommodated, however a pedestrian permeable interface or active frontage interface is supported for areas of medium density living.</li> </ul>

Principle	Explanation	Application to Ponga and Ōpāheke Road (Rural) Upgrade
		<ul style="list-style-type: none"> <li>Further vertical integration adjacent to the bridging structures around the Mangapū Stream, the rail and Walker Road overbridges are recommended to improve potential for active edge permeability and an appropriate interface with adjacent residential land uses.</li> </ul>
<b>MOVEMENT</b>		
<b>4.1 Connect nodes</b>	Provide tangible connectivity between identified activity nodes.	<ul style="list-style-type: none"> <li>The proposed alignments of the corridors provide tangible and direct connectivity between the Drury north employment areas, the proposed local centre and the Papakura town centre.</li> </ul>
<b>4.2 Connect modes</b>	Provide for choice in travel and the ability to connect at interchanges between modes.	<ul style="list-style-type: none"> <li>The proposed corridors provide simple but complete future connectivity for all modes (walking, cycling, future local public transport and private vehicle).</li> <li>The proposed corridors provide a direct active mode connection to Papakura town centre and rail station.</li> </ul>
<b>4.3 Support access to employment and industry</b>	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.	<ul style="list-style-type: none"> <li>The proposed alignments of the corridors provide direct and legible access between industrial / employment areas in Drury north and employment areas within Papakura town centre.</li> </ul>
<b>4.4 Prioritise active modes and public transport</b>	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.	<ul style="list-style-type: none"> <li>The proposed corridor cross sections accommodate high-quality active travel facilities such as separated pedestrian and cycle pathways.</li> <li>Further development of modal priority at intersections and roundabouts at the detailed design stage will provide a higher level of service and enable modal shift.</li> </ul>
<b>4.5 Support inter-regional connections and strategic infrastructure</b>	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, waste water, water) to the network.	<ul style="list-style-type: none"> <li>The proposed corridors form a part of the key east west link through the northern part of Drury to Papakura. The corridors also provide regional connectivity to the future Mill Road corridor.</li> </ul>
<b>4.6 Support legible corridor function</b>	Consider how areas can be clearly navigated and understood by users moving from place to place.	<ul style="list-style-type: none"> <li>The cross sections proposed for the corridors accommodate a range of modes with clear allocation of street spaces and inherently supports future community connectivity, mobility and travel choice.</li> </ul>
<b>LANDUSE</b>		
<b>5.1 Public transport directed and integrated into centres</b>	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and provide modal choice to a larger number of users.	<ul style="list-style-type: none"> <li>The proposed alignments of the corridors can accommodate future local public transport connections to the Papakura town centre and rail station.</li> </ul>



Principle	Explanation	Application to Ponga and Ōpāheke Road (Rural) Upgrade
<b>5.2 Strategic corridors as urban edges</b>	Strategic corridors as potential definers of a land use edge.	<ul style="list-style-type: none"> <li>This principle is not relevant to the corridor.</li> </ul>

## 8.8 Ōpāheke Road (Urban) Upgrade - Evaluation against the Design Framework principles

The Ōpāheke Road (Urban) Upgrade section of NoR D5 includes the regrading of nine driveways along Ōpāheke Road and the upgrade of the Ōpāheke Road / Settlement Road intersection to a roundabout. The commentary below provides 'lite' evaluation against the upgrade of the existing corridor with a focus on the proposed Ōpāheke Settlement intersection and its urban interface considerations.

### 8.8.1 General corridor arrangement and alignment

The proposed corridor upgrade utilises an existing corridor and demonstrates a close and connected alignment to the existing landform, minimising unnecessary disturbance and materials.

The proposed corridor cross section provides spatial provisions of up to 2.5m in aggregate to adopt the use of natural drainage and provide for street tree planting within the berms that, when delivered, will contribute to the amenity of the area by providing shade and microclimatic cooling qualities. The corridor cross section arrangement also accommodates a range of modes and inherently supports future community connectivity, mobility and choice through the provision of separated pedestrian and cycle pathways. The upgrade delivers a greater level of access and movement to local communities by providing a direct active mode connection between the new Drury Central future urban zone to the Papakura town centre and proposed train station.

Future consideration will need to be made to ensure an appropriate public private interface between the proposed corridor and adjacent residential land uses, particularly areas where there are zones of high density living. Furthermore, corridor legibility and the provision of safe and prioritised access for pedestrian and cyclists across local driveways along the corridor will need further detail and future resolution. This will ensure a greater level of access and movement priority that will promote a sense of personal safety.

### 8.8.2 Ōpāheke Settlement roundabout arrangement and alignment

#### 8.8.2.1 Interface considerations

The proposed roundabout arrangement and alignment respectfully avoids impact on the Papakura Cemetery, a place of community value and a CHI item (17016). Each of the major religious denominations owned their own block of land in this cemetery with many early settlers buried here. The residual land to the south of the cemetery boundary will allow the opportunity for an appropriate landscape interface that provides a physical and visual buffer between the corridor and the cemetery.

Future consideration will be required to provide an appropriate public private interface between the corridor and built form, particularly the areas of high density living adjacent to the roundabout. An

urban interface strategy that accommodates localised earthworks and provides permeable access edges, appropriate setbacks, vegetation scaled to medium and high density built form should be considered.

A land integration strategy will also be required for the residual lots situated south of the roundabout at 18 Opāheke Road and 21 Settlement Road. Future development of these sites will provide support for the proposed THAB and mixed housing urban zoning, however consideration will need to be given to the interface with future built forms. The strategy should provide for a direct and permeable pedestrian access, an appropriate public private interface, placement of shared driveway access and in particular the relationship and viability of the residual attached dwelling at 21 Settlement Road.

### 8.8.2.2 Movement and access considerations

The proposed roundabout will provide support for prioritized active mode crossings and connectivity to the proposed pedestrian and cycle network along Opāheke Road. However further development and design detail of modal priority across the roundabout at a later stage will enable a higher level of service and safety.

Future design detail will be required to ensure clear and prioritised modal interactions between pedestrian and cycle paths and local driveway access. This will ensure clear legibility for movement priority and safe crossings.

## 8.9 Summary of urban design evaluation and recommendations for Ponga and Opāheke Road Upgrade

Overall, the proposed Ponga and Opāheke Road Upgrade design and corridor configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 8-14, 8-15 and 8-16 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 8-14, 8-15, and 8-16:

- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as centres, transport interchanges, open spaces and community facilities.
- Legibility, modal priority for active modes and connectivity demands are addressed at intersections.
- An urban interface approach within the corridor that recognises the transition of densities and land uses from residential, industrial and local centre. The urban interface approach should respond to the changing built form interface, respond to the spatial character of adjacent development and demonstrate permeable pedestrian access between the corridor and adjacent development.
- The identification of urban and landscape design drivers related to the Mangapū and Ōtūwairoa Streams, the Opāheke Reserve, as well as the proposed local centre and open

space at the intersection of Ōpāheke and Ponga Road. The future corridor design should demonstrate an appropriate response and integration with these character drivers.

- In future design stages, Mana Whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- A landscape plan that:
  - Considers recommendations from the landscape and visual, arboricultural and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement and treatment of batter slopes.
  - Integrates with the Mangapū and Ōtūwairoa Streams where the corridor intersects with the proposed Blue-Green Network.
  - Reinforces the wider vegetation patterns of the local landscape and create connections to proposed greenways and the wider walking and cycling network.
  - Provides an appropriate interface to the Papakura Cemetery through the planting type, scale and arrangement.
- Integration of the Ponga and Ōpāheke stormwater wetlands to ensure an appropriate interface with adjacent land uses, specifically where wetlands are proposed in areas zoned medium density.
- Measures to demonstrate that the project has adapted to the changing climate such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks.

Further urban design opportunities in the Project area have also been identified in Figure 8-14, 8-15 and 8-16 shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

### 8.10 Ponga Road Upgrade – Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 8.9 above. Opportunities that have been identified are shown in orange below.

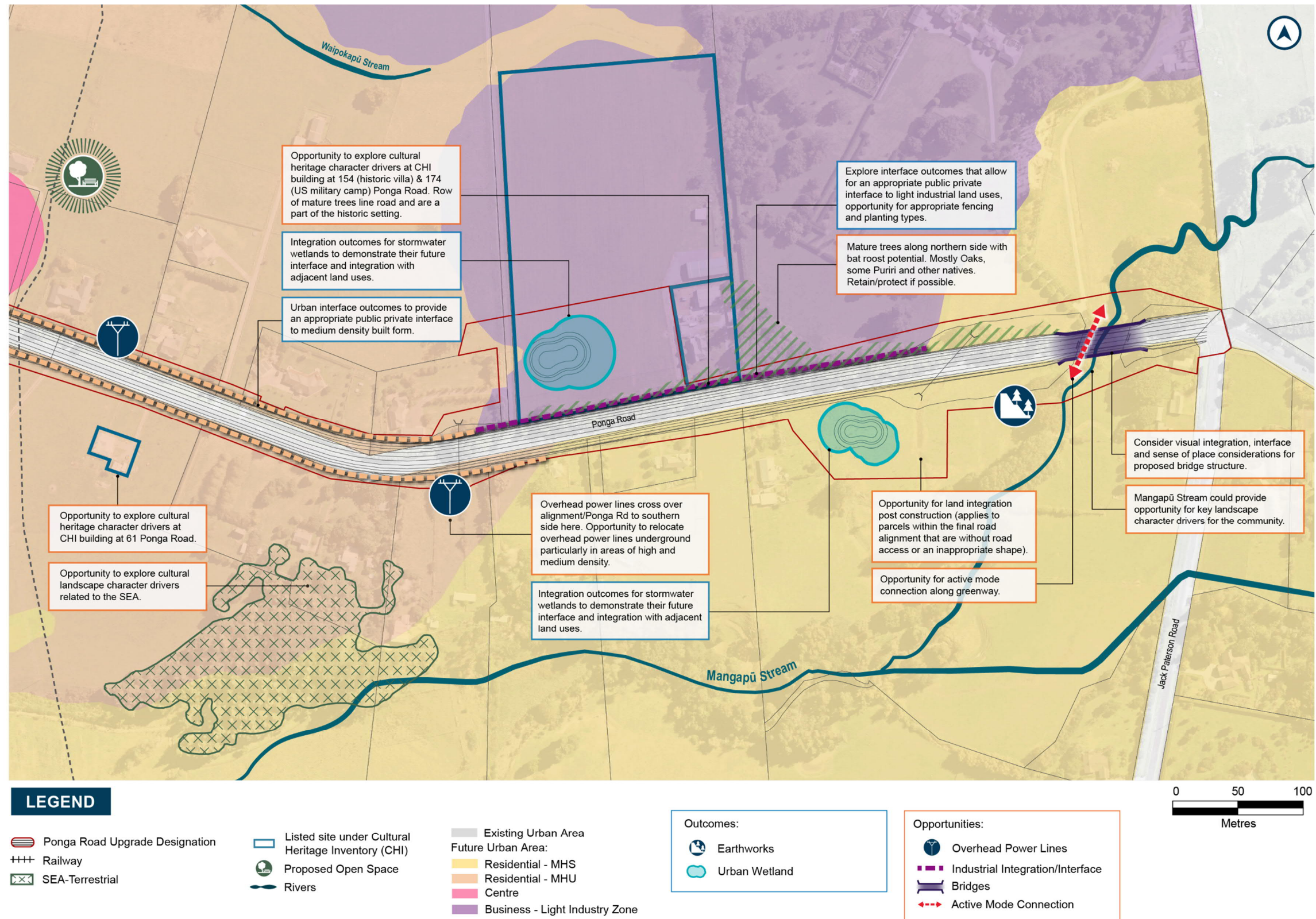


Figure 8-14 Ponga Road Upgrade urban design outcomes and opportunities

### 8.11 Ōpāheke Road (Rural) Upgrade - Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 8.9 above. Opportunities that have been identified are shown in orange below.

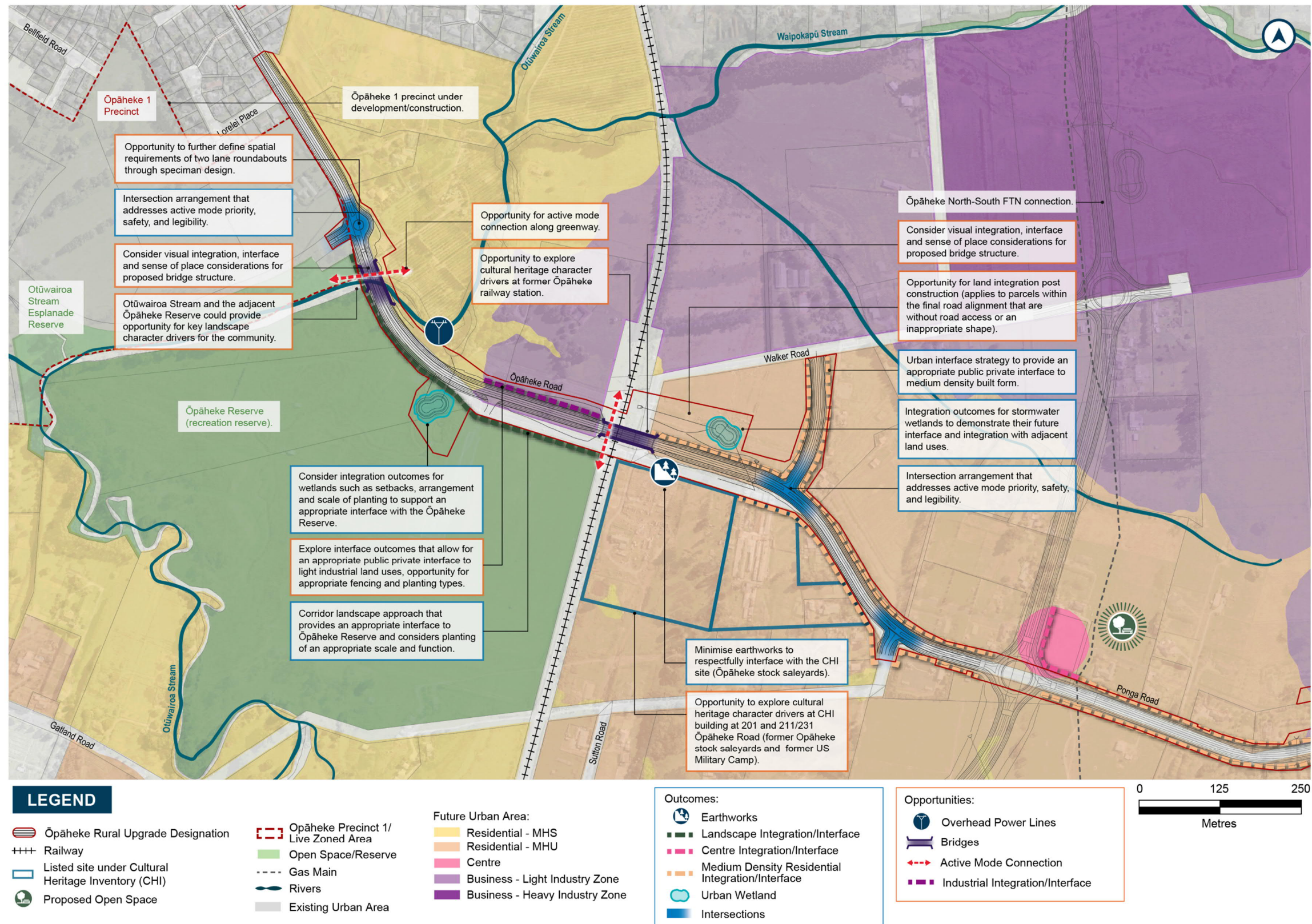


Figure 8-15 Ōpāheke Road (Rural) Upgrade additional urban design outcomes and opportunities

## 8.12 Ōpāheke Road (Urban) Upgrade – Urban design outcomes and opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 8.9 above. Opportunities that have been identified are shown in orange below.

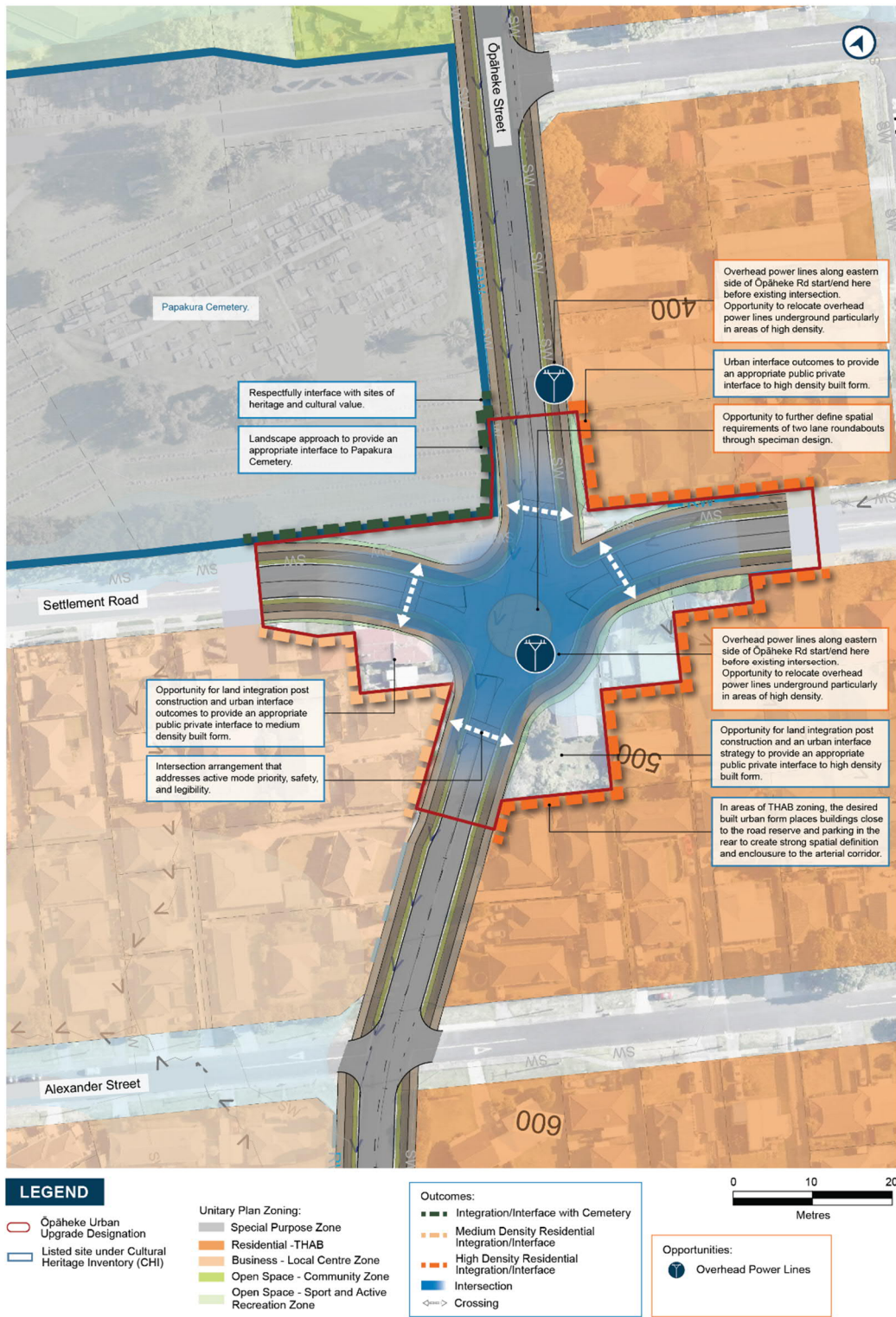


Figure 8-16 Ōpāheke Road (Urban) Upgrade urban design outcomes and opportunities