TE TUPU NGĀTAHI
SUPPORTING GROWTH

North West Local Arterials Assessment of Effects on the Environment

Volume 2

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Version 1

WAKA KOTAHI NZ TRANSPORT AGENCY

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Document Status

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Table of Contents

Appendices

Figures

Tables

Glossary and Abbreviations

Acronym/Term	Description
Active Mode	Walking and Cycling
ADT	Annual Daily Traffic
AEE	Assessment of Effects on the Environment (this report)
AGRD	Austroads Guide to Road Design
ARI	Average Recurrence Interval
AT	Auckland Transport
ATAP	Auckland Transport Alignment Project
AUP:OP	Auckland Unitary Plan: Operative in Part
BPO	Best Practicable Option
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CHI	(Auckland Council) Cultural Heritage Inventory
CIA	Cultural Impact Assessment
CMA	Coastal Marine Area
CNVMP	Construction Noise and Vibration Management Plan
CTMP	Construction Traffic Management Plan
DBC	Detailed Business Case
DSIs	Deaths and serious injuries
FTN	Frequent Transit Network
FULSS	Auckland Future Urban Land Supply Strategy (2017)
FUZ	Future Urban Zone
GPS	Government Policy Statement
HHMP	Historic Heritage Management Plan
HIF	Housing Infrastructure Fund
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
IBC	Indicative Business Case
ITP	Auckland's Integrated Transport Programme
LGACA	Local Government (Auckland Council) Act 2009

Acronym/Term	Description
MOD	Ministry of Defence
MSM	Macro Strategic Model
NES	National Environmental Standards
NES-FW	National Environmental Standards for Freshwater
NLTP	National Land Transport Programme
NOR	Notice of Requirement
North West Transport Network	The following Te Tupu Ngātahi packages: • NW Local Arterials Package • NW Strategic Package
NPS-ET	National Policy Statement for Electricity Transmission 2008
NPS-HPL	National Policy Statement on Highly Productive Land 2022
NPS-UD	National Policy Statement on Urban Development 2020
NW Local Arterials	The North West Local Arterials network comprising the following extended and / or upgraded transport corridors: • Trig Road (North) • Māmari Road • Brigham Creek Road • Spedding Road • Hobsonville Road • Don Buck Road • Fred Taylor Drive • Coatesville-Riverhead Highway
PPF	Protected Premises and Facilities
PWA	Public Works Act 1981
Redhills Riverhead Package	The package comprising the following upgraded transport corridors: • Don Buck Road • Fred Taylor Drive • Coatesville-Riverhead Highway
RLTP	Auckland Regional Land Transport Plan
RMA	Resource Management Act 1991
RNZAF	Royal New Zealand Air Force
RPS	Regional Policy Statement
RPTP	Auckland Regional Public Transport Plan 2018-2028
RTC	Rapid Transit Corridor

Acronym/Term	Description
RTN	Rapid Transit Network
RUB	Rural Urban Boundary
SCEMP	Stakeholder Communication and Engagement Management Plan
SEA	Significant Ecological Areas
SH16	State Highway 16
SH18	State Highway 18
TAR	Threatened or At Risk species
TDM	Transport Design Manual
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth Programme
TfUG	Transport for Urban Growth (now known as the Supporting Growth Programme)
THAB	Terrace Housing and Apartment Buildings Zone
UDE	Urban Design Evaluation
ULDMP	Urban and Landscape Design Management Plan
Waka Kotahi	Waka Kotahi NZ Transport Agency
Whenuapai Package	The package comprising the following extended and / or upgraded transport corridors: • Trig Road (North) • Māmari Road • Spedding Road • Brigham Creek Road • Hobsonville Road

PART A

Background and receiving environment

1 Explanation of the following Parts of this Report

The NW Local Arterials Package comprises three areas – Whenuapai, Redhills and Riverhead. The Assessment of Effects on the Environment (**AEE**) discusses common elements and the receiving environment for the NW Local Arterials Package (**Part A**) and then discusses each specialist topic (**Part B**). Each area is discussed where there are shared effects, then as necessary, each Notice of Requirement (NOR) is discussed where it differentiates, to consider corridor specific effects.

Due to the scale of the proposed transport corridors, a topic-based structure (rather than NOR-based) has been adopted to reduce reporting duplication between corridors, without sacrificing the nuances. To avoid further duplication, where the matter is satisfactorily covered in the specialist or a supporting document, this will be cross referenced to the relevant section. In summary, Parts A to B comprise:

Part A – Background and receiving environment

- Introduction
- Background and context
- The recommended network and the project objectives
- Lapse period sought and rationale
- Assessment of alternatives
- Design and assessment approach
- Receiving environment
- Engagement

Part B – Assessment of effects on the environment

- Assessment of effects under sections 171 and 181(2):
- Positive effects of the Local Arterials network
- Traffic and Transportation
- Traffic Noise and Vibration
- Construction Noise and Vibration
- Network Utilities
- Natural Hazards – Flooding
- Terrestrial Ecology
- Landscape and Visual
- Historic Heritage
- Māori Culture, Values and Aspirations
- Community
- Property and Land Use
- Urban Design Evaluation
- Proposed measures to manage adverse effects
- Statutory assessment against section 171 and Part 2
- Other statutory approvals required

Part C - Appendices

- Appendix A: Assessment of Alternatives
- Appendix B: NOR Conditions

2 Introduction

2.1 Te Tupu Ngātahi Supporting Growth Programme

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[1]. Most of this growth will go into existing urban areas. However, around a third will go into future urban zoned areas (greenfields) as identified in the Auckland Unitary Plan: Operative in Part (AUP:OP).

Te Tupu Ngātahi is a collaboration between Auckland Transport (AT) and Waka Kotahi NZ Transport Agency (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, which are shown in .

The key objective of Te Tupu Ngātahi 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 increased 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. It can also significantly reduce long-term costs for local and central government and enable more effective land use and transport outcomes.

The North West Transport Network consists of the Local Arterials Package (subject of this report), the NW Strategic Package and Housing Infrastructure Fund (HIF) package (separate AEEs). The network is designed to support the North West growth area as shown in Figure 2-1.

[1] 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

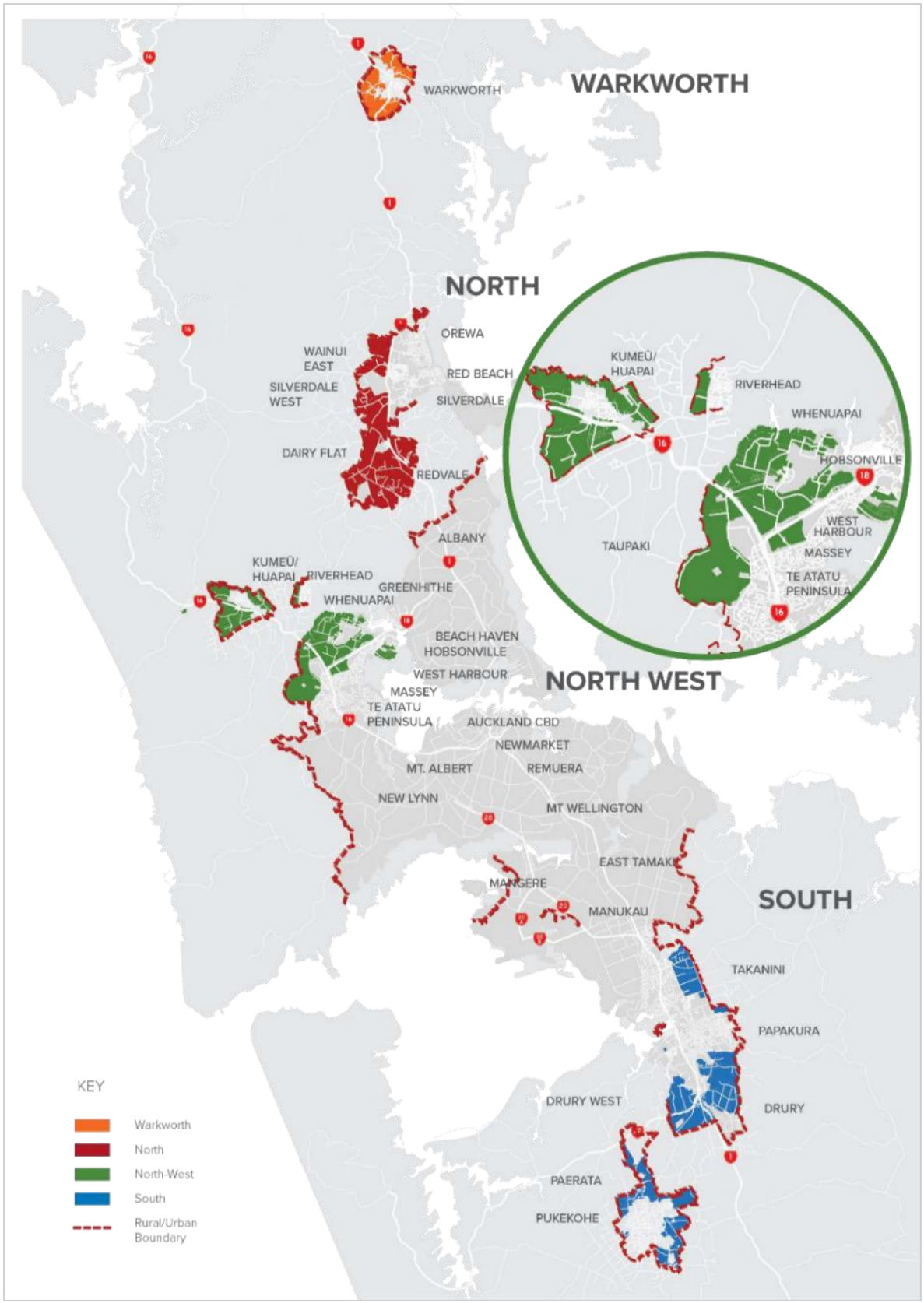


Figure 2-1: Future Urban Areas of Auckland, Highlighting the North West Growth Area (Green)

2.2 Previous programme phases

Te Tupu Ngātahi North West Local Arterials recommended network follows an extensive business case process that commenced in 2015. The programme involved collaboration between Auckland Council, Waka Kotahi and Auckland Transport – see Figure 2-2.

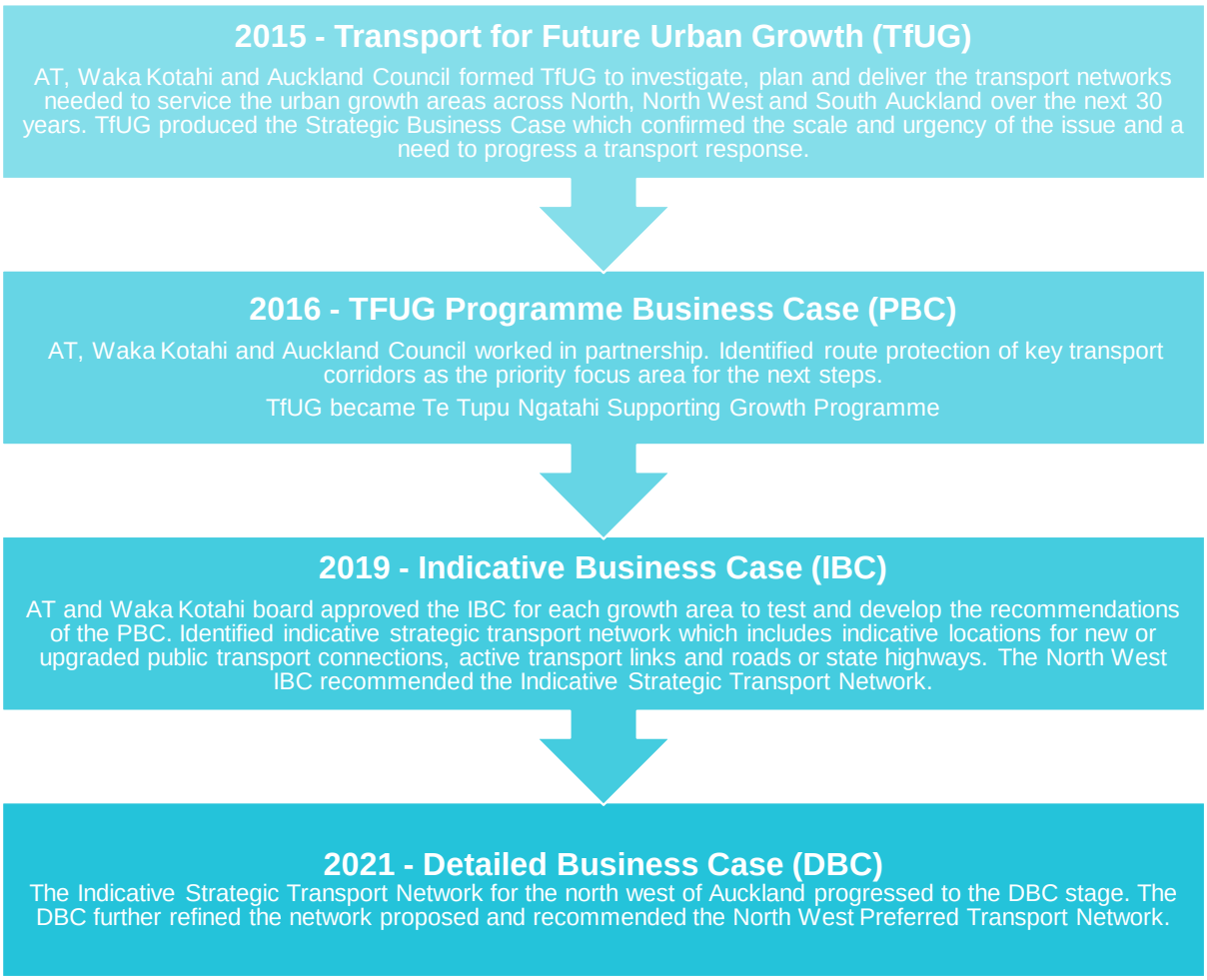


Figure 2-2: Te Tupu Ngātahi earlier programme phases

The North West Detailed Business Case (DBC) was approved by the AT Board and the Waka Kotahi Board in December 2021. As part of the board approval the decision was made to prepare NORs for the extended and / or upgraded transport corridors within the NW Local Arterials Package and within the NW Strategic Package.

The transport corridors within each package are shown in Figure 2-3.

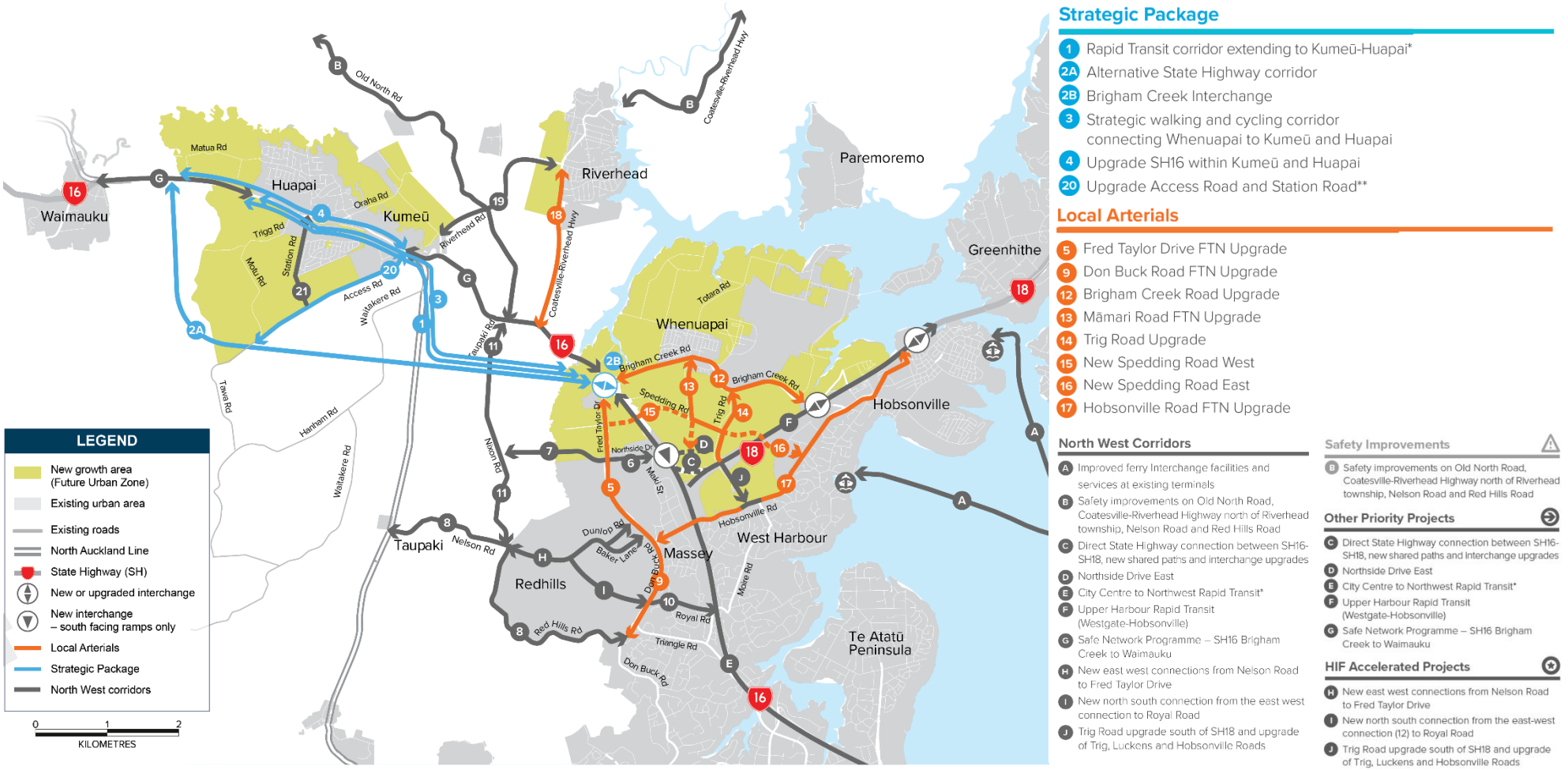


Figure 2-3: NW Local Arterials Package (subject of this application) and NW Strategic Package (a separate application) against wider North West Transport Network

3 The recommended network

3.1 Existing challenges and constraints

Table 3-1 sets out the key drivers and issues NORs in the NW Local Arterials Package will address.

Table 3-1: Drivers and need for the North West Local Arterial Package

Existing Corridor	Key Issues / Reason for Project
Whenuapai Area	
Trig Road (North)	• A lack of high quality and attractive active mode and public transport facilities along Trig Road (North) will result in more private vehicles trips as growth occurs • Future growth and a lack of separated, and safe active mode facilities will result in inappropriate quality of service on Trig Road (North) corridor • The current form and function of Trig Road (North) does not support future growth and will constrain access to economic and social opportunities in Whenuapai.
Māmari Road	• As transport demands grow on Māmari Road, public transport, high occupancy vehicles and freight will experience unreliability • A lack of high quality and attractive active mode and public transport facilities on Māmari Road will result in more private vehicle trips as growth occurs • Future growth and a lack of separated and safe active mode facilities will result in inappropriate quality of service on Māmari Road • The current form and function of Māmari Road does not support future growth and will constrain access to economic and social opportunities in Whenuapai.
Brigham Creek Road	• As transport demand grows, as a result of growth, on Brigham Creek Road public transport, high occupancy vehicles and freight will experience unreliability • A lack of high quality and attractive active mode and public transport facilities along Brigham Creek Road will result in more private vehicle trips as growth occurs • Future growth and a lack of separated and safe active mode facilities will result in inappropriate quality of service on Brigham Creek Road • A lack of amenity and existing safe and attractive connections across Brigham Creek Road will be exacerbated by growth resulting in poor urban outcomes • The current form and function of Brigham Creek Road does not support future growth and will constrain access to economic and social opportunities in Whenuapai.
Spedding Road	• Access to economic and social opportunities in Whenuapai will be limited if Spedding Road is not extended and upgraded • Public transport and private vehicles will experience unreliability and increased susceptibility to network incidents if Spedding Road is not provided • A lack of direct and safe active mode and public transport facilities for Whenuapai will result in more private vehicle trips as growth occurs. Future growth and a lack of separated and safe active mode facilities will result in an inappropriate quality of service on Spedding Road.

Existing Corridor	Key Issues / Reason for Project
Hobsonville Road	• As transport demands grow on Hobsonville Road, public transport and high occupancy vehicles will experience delay • A lack of high quality and attractive active mode and public transport facilities along Hobsonville Road will result in more private vehicle trips as growth occurs • Future growth and a lack of separated and safe active mode facilities will result in inappropriate quality of service on Hobsonville Road • A lack of amenity and existing safe and attractive connections across Hobsonville Road will be exacerbated by growth resulting in poor urban outcomes • The current form and function of Hobsonville Road does not support future growth and will constrain access to economic and social opportunities in Whenuapai and Hobsonville.
Redhills and Riverhead area	
Don Buck Road	• As transport demands grow on the Don Buck Road corridor, public transport will experience unreliability • A lack of high quality and attractive active mode and public transport facilities along Don Buck Road will result in more private vehicle trips as growth occurs • Future growth and a lack of separated and safe active mode facilities will result in inappropriate quality of services on Don Buck Road • A lack of amenity and existing safe and attractive connections across Don Buck Road will be exacerbated by growth resulting in poor urban outcomes • The current form and function of the Don Buck Road corridor does not support future growth and will constrain access to economic and social opportunities in Redhills and Westgate.
Fred Taylor Drive	• As transport demands grow on Fred Taylor Drive public transport, high-occupancy vehicles and freight will experience unreliability • A lack of high quality and attractive active mode and public transport facilities along Fred Taylor Drive will result in more private vehicle trips as growth occurs • Future growth, and a lack of separated, and safe active mode facilities will result in inappropriate quality of service on Fred Taylor Drive • A lack of amenity and existing safe and attractive connections across Fred Taylor Drive will be exacerbated by growth resulting in poor urban outcomes • The current form and function of Fred Taylor Drive does not support future growth and will constrain access to economic and social opportunities in and between Redhills, Whenuapai and Kumeū-Huapai.
Coatesville-Riverhead Highway	• The current form and function of the Coatesville-Riverhead Highway (between State Highway 16 (SH16) and Riverhead) does not support future growth and will constrain active mode access to economic and social opportunities in and between Riverhead, Kumeū-Huapai and Westgate • A lack of dedicated active mode facilities along Coatesville-Riverhead Highway will result in more private vehicle trips as growth occurs • Future growth, and a lack of separated and safe active mode facilities will result in inappropriate quality of service on Coatesville Riverhead Highway.

3.2 Project objectives

Section 171(1)(c) of the Resource Management Act 1991 (RMA) states that: *When considering a requirement and any submissions received, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to—*

(c) whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought;

The project objectives for each NOR have been developed with section 171(1)(c) tests in mind.

Having regard to the above, the following project objectives have been developed. Figure 3-1 below illustrates the line of sight between the Indicative Business Case (IBC) and DBC investment objectives, and Figure 3-2 and Figure 3-3 between project objectives and objective themes:

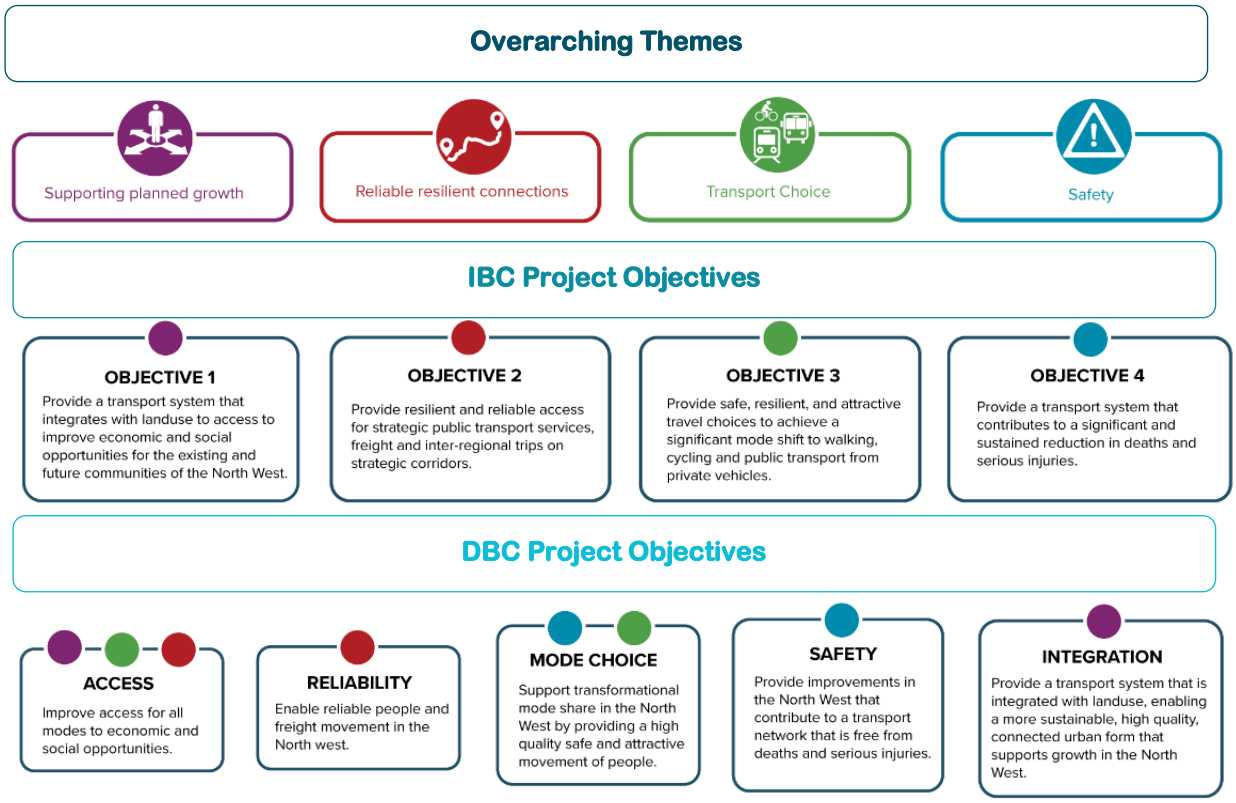


Figure 3-1: Business case objectives and key themes

Trig Road (North)
Enable the provision of a transport corridor that:
a) Improves connectivity through Whenuapai and by connecting Whenuapai to the State Highway.
b) Integrates with and supports planned urban growth and the future transport network in Whenuapai.
c) Contributes to mode shift by providing dedicated facilities for active modes.
d) Is safe for all users.
e) Improves network resilience for all users

Māmari Road
Enable the provision of a transport corridor that:
a) Improves connectivity within Whenuapai and by connecting Whenuapai to Westgate, via the future Northside Drive extension.
b) Integrates with and supports planned urban growth and the future transport network in Whenuapai.
c) Contributes to mode shift by providing dedicated facilities for public transport and active modes.
d) Is safe for all users.
e) Improves network resilience for all users.

Brigham Creek Road
Enable the provision of a transport corridor that:
a) Improves connectivity through Whenuapai and to the strategic transport network.
b) Integrates with and supports planned urban growth and the future transport network in Whenuapai.
c) Contributes to mode shift by providing dedicated facilities for active modes.
d) Is safe for all users.
e) Improves network resilience for all users.

Spedding Road
Enable the provision of a transport corridor that:
a) Improves connectivity through Whenuapai and between Redhills North and Hobsonville.
b) Integrates with and supports planned urban growth and the future transport network in Whenuapai.
c) Contributes to mode shift by providing dedicated facilities for active modes.
d) Is safe for all users.
e) Improves network resilience for all users.

Hobsonville Road
Enable the provision of a transport corridor that:
a) Improves connectivity along the corridor to Whenuapai and to Westgate.
b) Integrates with and supports planned urban growth and the future transport network in Whenuapai.
c) Contributes to mode shift by providing dedicated facilities for active modes.
d) Is safe for all users.
e) Improves network resilience for all users.

Figure 3-2: Whenuapai Project objectives line of sight to business case objectives

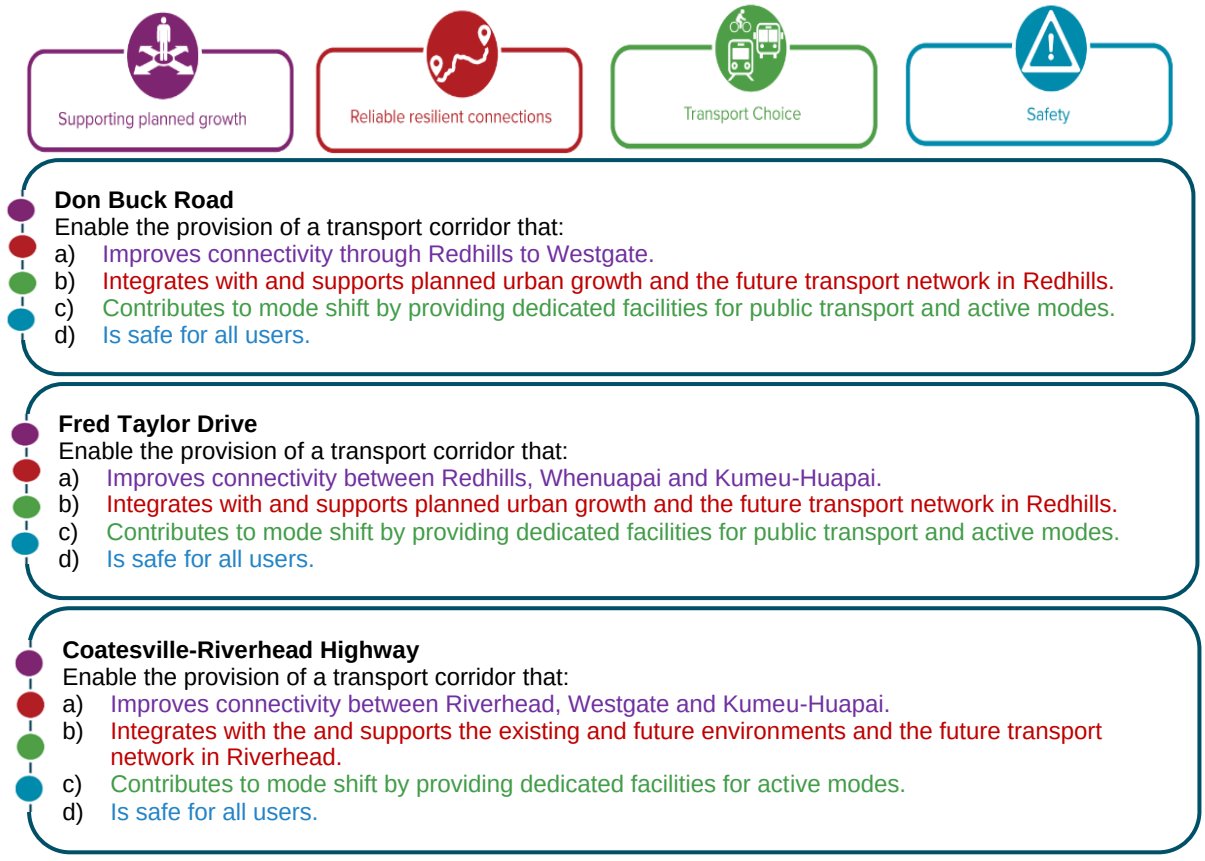


Figure 3-3: Redhills and Riverhead Project objectives line of sight to business case objectives

3.3 Local arterials proposed for upgrade

This AEE supports the NW Local Arterial Network Assessment Package (NW Local Arterials Package). The NW Local Arterials Package consists of the future extended and / or upgraded transport corridors in Whenuapai, Redhills and Riverhead.

AT is the requiring authority under the RMA for each of the NOR. The notices are to designate land for future local arterial transport corridors as part of the Te Tupu Ngātahi Supporting Growth (Te Tupu Ngātahi) Programme to enable the future construction, operation and maintenance of transport infrastructure in the North West area of Auckland. A separate AEE has been prepared for the NW Strategic Package which forms part of the wider North West Transport Network.

Each NOR in the Whenuapai Package is listed in Table 3-2 and shown in Figure 3-4.

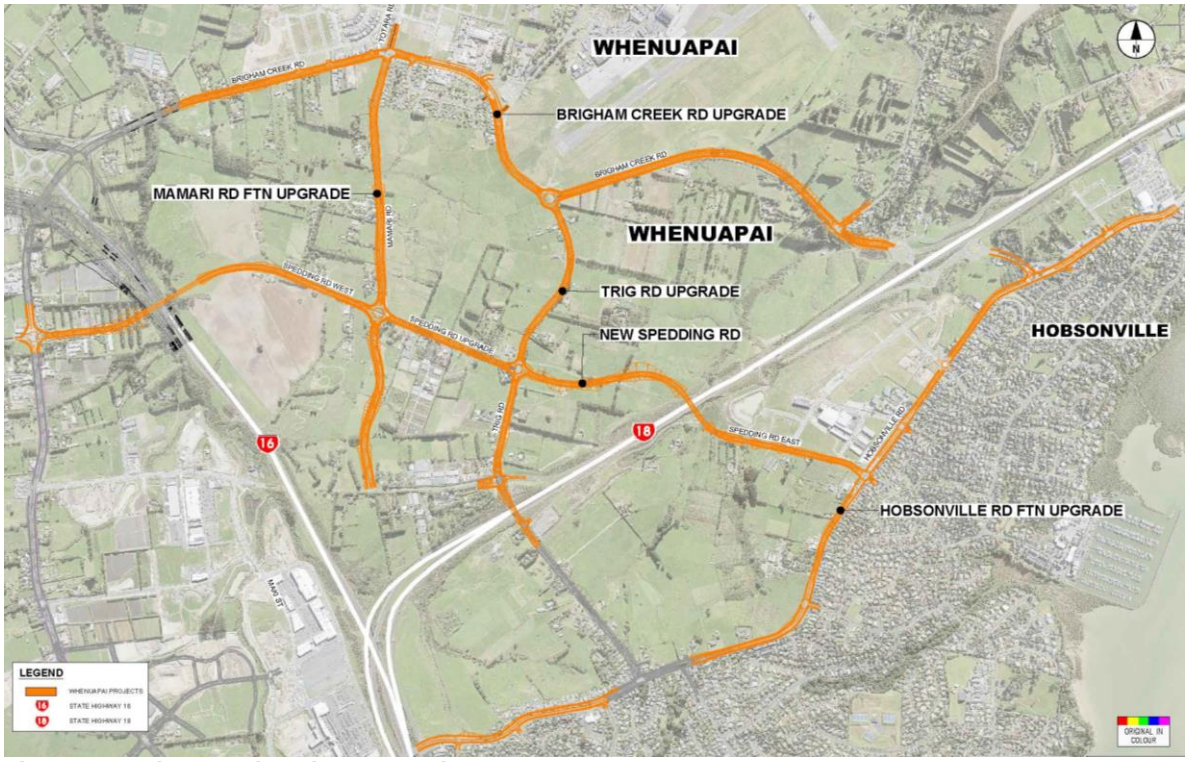


Figure 3-4: Whenuapai Package Overview

Table 3-2: Whenuapai – Transport Corridors and Notice Reference

Project	Notice	Description
Trig Road (North)	NOR W1	Upgrade of Trig Road (North) corridor to a 24m wide two-lane urban arterial cross-section with separated active mode facilities on both sides of the corridor.
Māmari Road	NOR W2	Extension and upgrade of Māmari Road corridor to a 30m wide four-lane urban arterial cross-section providing bus priority lanes and separated active mode facilities on both sides of the corridor.
Brigham Creek Road	NOR W3	Upgrade of Brigham Creek Road corridor to a 30m wide four-lane arterial cross-section with separated active mode facilities on both sides of the corridor.

Project	Notice	Description
Spedding Road	NOR W4	Upgrade of the existing Spedding Road corridor and new east and west extensions to form a 24m wide two-lane arterial with separated active mode facilities on both sides of the corridor.
Hobsonville Road	NOR W5 (alteration to existing designation 1437)	Alteration of the existing Hobsonville Road designation 1437 to provide for the widening of the Hobsonville Road corridor between Oriel Avenue and Memorial Park Lane. Upgrade of sections of Hobsonville Road corridor to a 30m wide four-lane cross section with separated active mode facilities on both sides of the corridor. Upgrade of sections of Hobsonville Road corridor to a 24m wide two-lane cross section with separated active mode facilities on both sides of the corridor.

Each NOR in the Redhills area is listed in Table 3-3 and shown in Figure 3-5.

Figure 3-5: Redhills Area Overview

Table 3-3: Redhills – Transport Corridors and Notice Reference

Project	Notice	Description
Don Buck Road	NOR RE1	Upgrade of Don Buck Road corridor to a 30m wide four-lane cross-section providing bus priority lanes and separated active mode facilities on both sides of the corridor.

Project	Notice	Description
Fred Taylor Drive (alteration to existing designation 1433)	NOR RE2	Upgrade of Fred Taylor Drive corridor to a 30m wide four-lane cross-section providing bus priority lanes and separated active mode facilities on both sides of the corridor.

The single NOR in the Riverhead area is listed in Table 3-4 and are shown in Figure 3-6.

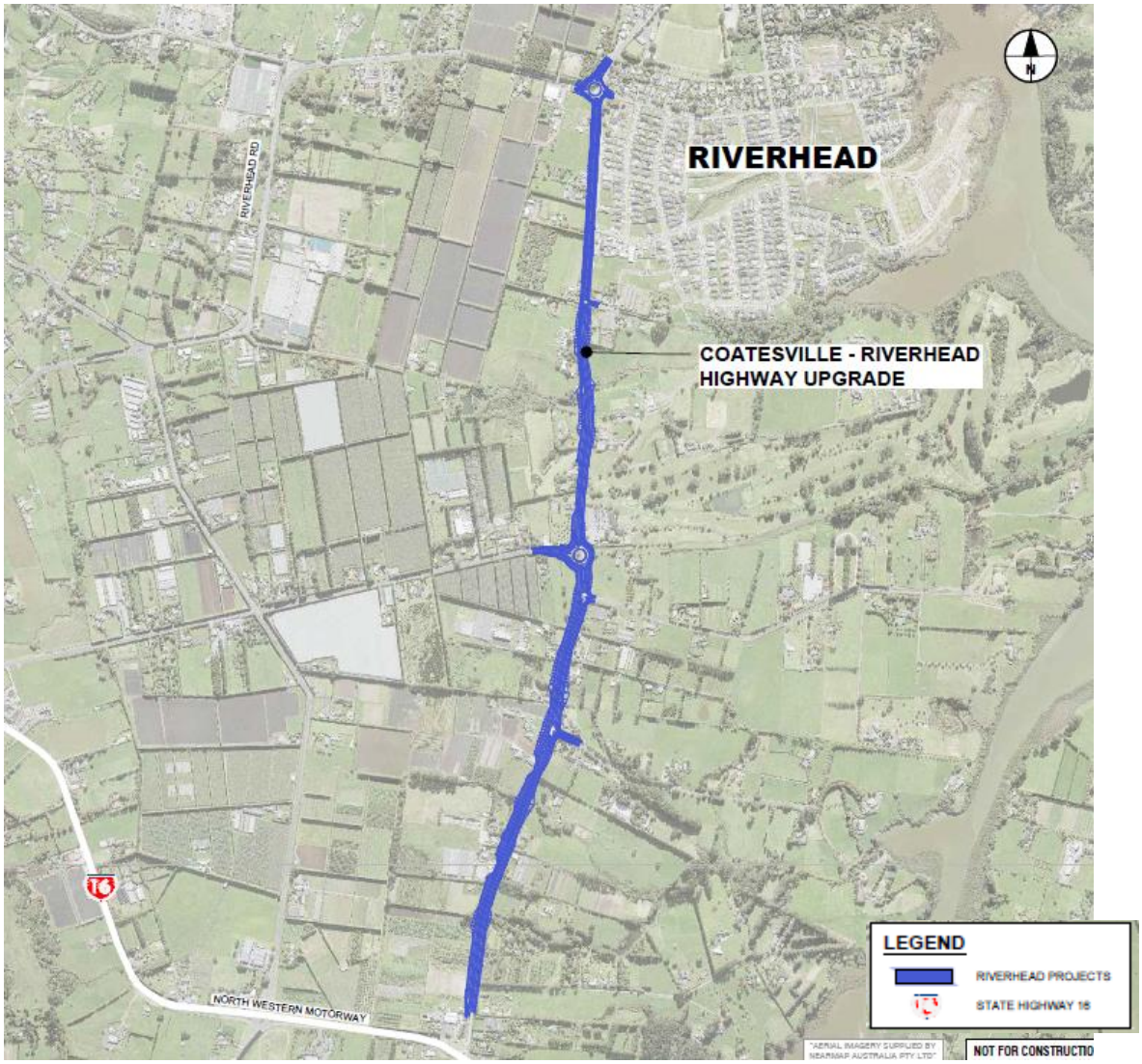


Figure 3-6: Riverhead Area Overview

Table 3-4: Riverhead – Transport Corridor and Notice Reference

Project	Notice	Description
Coatesville – Riverhead Highway	NOR R1	Upgrading the southern section of the corridor to a 33m two-lane low speed rural arterial cross-section with active mode facilities on the western side, and upgrading the northern section of the corridor to a 24m two-lane urban arterial cross-section with active mode facilities on both sides of the corridor.

3.4 Requiring authority status

AT is financially responsible for Auckland's land transport network and services (excluding state highways), including roads, footpaths, cycleways, parking and public transport services. AT is a Council Controlled Organisation under the Local Government (Auckland Council) Act 2009 (LGACA), which states that AT's purpose is to *"contribute to an effective, efficient and safe Auckland land transport system in the public interest".*

AT's functions are identified in section 45 of the LGACA. The functions include managing and controlling the Auckland transport system in accordance with the LGACA, including performing the statutory functions and exercising the statutory powers set out in section 46 as if AT were a local authority or other statutory body, and acting as a Requiring Authority under section 167 of the RMA.

Under section 47(1) of the LGACA, AT is deemed to be approved as a requiring authority as a network utility operator, under section 167 of the RMA for the purpose of *"constructing or operating or proposing to construct or operate roads in relation to the Auckland transport system"* and *"the carrying out of an activity or a proposed activity (other than an activity described in paragraph (a)) in relation to the Auckland transport system for which it or the Auckland Council has financial responsibility".* Subsequently, AT may designate land to construct, operate and maintain roads and any other activities in relation to the Auckland transport system that Council has financial responsibility for.

4 Supporting Growth Programme

4.1 Programme context

In July 2017, the Future Urban Land Supply Strategy (2017) (FULSS) was updated in line with AUP:OP zonings, with 15,000 hectares of land allocated for future urbanisation. The FULSS provides for sequenced and accelerated greenfield growth in ten areas of Auckland.

The significant growth anticipated will pose a number of future transport challenges for the region. Given the scale and duration of the growth proposed, the early route protection of critical transport corridors provides the required certainty for AT, Waka Kotahi, stakeholders and the community. The implementation of the strategic transport network required to support the growth will be staged over the next 30 years. A key part of this integrated approach is collaborating with Auckland Council as it develops Structure Plans and works towards progressing subsequent plan changes to rezone land in the future urban areas.

The required transport networks will play a vital role in the success of new neighbourhoods by providing safe, accessible and sustainable travel choices that connect communities and encourage a transformational shift from private vehicles to public transport and active transport. Section 4.1 sets out the FULSS anticipated development readiness and the DBC transport modelling for the North West that identifies the anticipated build out of the network.

4.2 Land use and transport staging

The North West growth areas are approximatively 30 kilometres north west of Auckland's central city. It makes a significant contribution to the future growth of Auckland's population by providing for approximately 42,355 new dwellings and employment activities that will contribute 13,000 new jobs across the North West. The growth areas are as follows:

- Kumeū-Huapai[2]
- Whenuapai
- Redhills and Redhills North
- Riverhead

Staging was based on the FULSS and tested in the DBC modelling to confirm assumptions based on growth need and related projects delivery. Table 4-1 dates show the FULSS predictions of when areas will be development ready. DBC staging is specific to the North West area and accounted for:

- Other strategic network projects (outside scope of Te Tupu Ngātahi) including implementation of the NW rapid transit network from the Central Business District (CBD) to Westgate, connecting at a future Brigham Creek station. Squadron Drive interchange west facing ramps; SH16/State Highway 18 (SH18) Connections Project and SH18 Rapid Transit Network (RTN) from Westgate to Constellation
- Transport demand using the regional transport model (the Macro Strategic Model (MSM)), as well as the Strategic Active Modes Model (SAMM) used for the assessment of the active modes demands and SATURN based traffic models (using MSM outputs)

[2] (Note: Proposed NORs in Kumeū-Huapai are assessed as part of a separate AEE)

- I11v5 Population Growth Forecasts setting out residents and employments forecasts, with a 2048+ forecast year.

Table 4-1: North West Local Arterials modelled growth and staging

Transport Project	FULSS Staging	DBC Model Staging
Whenuapai		
Trig Road (North)	**2018-22 -** 1st half, Decade 1	**2028-32 -** Align with assumed North West Rapid Transit Corridor Full Implementation and State Highway 16 (SH16)/ State Highway 18 (SH18) Connections
Māmari Road	**2028-32** - Aligns planned growth in Whenuapai Stage 2 (1st Half, Decade 2)	
Brigham Creek Road	**2028-32** - Aligns planned growth in Whenuapai Stage 2 (1st Half, Decade 2)	
Spedding Road Māmari Road to SH16 section Māmari Road to SH18	**2028-32 -** Aligns planned growth in Whenuapai Stage 2 (1st Half, Decade 2) **2018-22** - Aligns planned growth in Whenuapai Stage 1 (1st Half, Decade 1)	**2028-32 -** Align with assumed SH18 RTN and SH16/SH18 Connections
Hobsonville Road	**2018-22** - Aligns planned growth in Whenuapai Stage 1 (1st Half, Decade 1)	**2028-32** - Align with assumed North West Rapid Transit Corridor Full Implementation and SH16/SH18 Connections
Redhills and Riverhead		
Don Buck Road	**2028-32** - 1st half, Decade 2	**2023-27** - Align with expected growth in Redhills Live-zoned
Fred Taylor Drive	**2028-32** - 1st half, Decade 2	**2023-27 -** Align with expected growth in Redhills Live-zoned and North
Coatesville-Riverhead Highway	**2028-32** - Aligns planned growth in Riverhead (1st Half, Decade 2)	**2033-37 -** Aligned with Alternative State Highway - assumes delayed growth in Riverhead

The DBC modelling shows that with exception of Redhills, the extended and / or upgraded transport corridors are expected to be required later than anticipated under the FULSS. Table 4-1 notes the reasons or assumptions behind the change in timeframes.

In practice, the development rate will be influenced by market attractiveness, the owner/developer willingness to develop and underlying, regional growth trends meaning it could be many years before each of the areas is fully developed. These timeframes have informed the project lapse dates discussed in Section 5.

4.3 Need for project route protection

The need for route protection of the transport network in the Whenuapai growth area is driven by the rate and scale of committed developments, including the planned release of land by Auckland Council and pressure from developers proposing to accelerate urban growth. This is demonstrated by approved private Plan Change 69 and the development which is progressing along Hobsonville Road.

The need for route protection of the Redhills transport network is driven by the rate and scale of committed and planned developments within the existing live zoned area and anticipated development within Redhills Future Urban Zone in Redhills North. The existing routes requires route protection of land to enable the construction and delivery of a cohesive corridor.

The need for route protection of the Coatesville-Riverhead Highway is driven by rate and scale of planned developments, in particular applications to bring forward the area under the COVID-19 Recovery (Fast-Track Consenting) Act 2020 and Riverhead Future Urban Zone (FUZ) developer plan change applications with Auckland Council.

If the transport corridors are not protected ahead of development, this may result in:

- Uncertainty for private development investment
- Significant disruption to future communities (e.g., if the corridor is built into prior to delivery)
- Reduced ability to influence good urban form and land use integration
- Compromised ability to deliver a comprehensive transport network which supports public transport and active modes.

5 Lapse period sought and rationale

In accordance with section 184 of the RMA, a designation lapses on the expiry of five years after the date on which it is included in the district plan unless:

a) It has been given effect to before the end of the at period; or
b) Within three months before the expiry of that period, the territorial authority determines that substantial progress or effort has been and continues to be made towards giving effect to the designation, and fixes a longer period; or
c) The designation specifies a different lapse period when incorporated in the plan.

A key objective of the Te Tupu Ngātahi Programme is to identify and protect land now for future transport networks, to enable build out aligned with urbanisation. AT considers an extended lapse period to be a method that is reasonably necessary to achieve this key objective as it provides statutory protection of the future transport corridors in a manner that enables a flexible and efficient infrastructure response to land use. As enabled by section 184(c) of the RMA, lapse periods between 15 and 20 years are required for the network, see Table 5-1.

Table 5-1: Summary of Proposed Lapse Periods for the Local Arterials

Notice	Extended and / or Upgraded Transport Corridor	Lapse Period
Whenuapai		
NOR W1	Trig Road (North)	15 years
NOR W2	Māmari Road	15 years
NOR W3	Brigham Creek Road	15 years
NOR W4	Spedding Road	15 years
NOR W5	Hobsonville Road (alteration to existing designation 1437)	Not applicable as existing designation has already been given effect to
Redhills and Riverhead		
NOR RE1	Don Buck Road	15 years
NOR RE2	Fred Taylor Drive (alteration to existing designation 1433)	Not applicable as existing designation has already been given effect to
NOR R1	Coatesville-Riverhead Highway	20 years

5.1 Rationale of extended lapse date

The rationale for lapse dates consider the modelled land use demands (see Table 4-1) and account for uncertainty of urbanisation and funding timeframes.

In the context of the Projects, extended lapse periods are considered necessary for the following reasons:

a) It provides statutory protection of the land required for transport infrastructure to support future growth in a manner that recognises the uncertainty associated with the timing of that growth. As discussed in greater detail below, there is a high degree of uncertainty as to when urbanisation of the FUZ will occur.
b) It supports efficient land use and transport integration by enabling the efficient delivery of transport infrastructure at a time and in a way that is integrated with future urbanisation.
c) It provides the Requiring Authorities sufficient time to:

- Undertake the detailed design of the projects
- Obtain the necessary resource consents
- Procure funding
- Undertake tendering / procurement
- Undertake property and access negotiations and other processes associated with the Project construction

d) It provides property owners, businesses and the community certainty on where transport routes will be located (i.e., within the designation boundaries) and within what timeframe (the end lapse date).

We also note that:

- An extended lapse period does not mean that the designation will not be given effect to until the end of the lapse period sought. A lapse period is a limit and not a target. In other words, if urbanisation were to be confirmed within the lapse period being sought it is likely that the designation will be implemented to enable appropriate integration with development
- It is not uncommon for infrastructure projects to have a longer lapse period and this has been confirmed on recent projects such as Southern Links (Waka Kotahi), the Northern Interceptor Wastewater Pipeline (Watercare) and the Hamilton Ring Road (Waikato District Council, Hamilton City Council)
- Setting an unrealistically short lapse period would not be a significant factor in facilitating earlier availability of funding than is planned at the time the NOR is sought
- Setting an unrealistically short lapse period will likely result in an inadequate suite of conditions to manage any uncertainty if the Requiring Authorities are likely seek to extend the lapse period through the application of section 184 of the RMA.

When considering an extended lapse period, it is appropriate to balance the need for that lapse period against the potential prejudicial or "blighting" effects, the effects of which are considered in Section 25 Property.

6 Section 171 of the Resource Management Act 1991

Section 171 of the RMA sets out the matters that a territorial authority must (subject to Part 2), have particular regard to when considering the effects of allowing a Requirement. These matters are set out in Table 6-1 below:

Table 6-1: Section 171 RMA matters to consider when allowing a requirement

Matter to consider	Section of the AEE where the matter is primarily addressed
Whether particular regard has been had of any relevant provision of[3]: • A national policy statement; • A New Zealand coastal policy statement; • A regional policy statement or proposed regional policy statement; • A plan or proposed plan.	Refer to Section 28 Resource Management Amendment Act 2020 To date, the overlap between the RMA regime and climate change has been limited as sections 104E and 70A of the RMA have constrained the ability of local authorities to account for climate change considerations in exercising their roles and functions. However, the amendment to the RMA that came into effect on 30 November 2022 is intended to better align the RMA with the CCRA. The Resource Management Amendment Act 2020 repeals the restrictions under the RMA in relation to climate change with the following consequences: • The repeal of section 104E means that effects on climate change of a discharge to air of greenhouse gases can in future be considered in the context of an application for a discharge permit or coastal permit to do something that would otherwise contravene section 15 or section 15B. • The repeal of section 70A means that when making a rule to control the discharge into air of greenhouse gases a regional council may now have regard to the effects of such a discharge on climate change. • An amendment to section 74(2)(c) means that when preparing or changing a district plan, a territorial authority must now have regard to any ERP or national adaptation plan made in accordance with the CCRA. The above RMA amendments do not directly affect the North West Local Arterial Package NORs as no resource consent is sought or required for the discharge of contaminants to air. The control of discharges of contaminants into air remains a regional council function in accordance with s 30(1)(f) of the RMA. As such, the effects associated with a discharge to air will remain a regional plan matter. The proposed implementation timeframe for the NW Local Arterial Package (15-20 years) means that only

[3] Section 171(1)(a) of the RMA

Matter to consider	Section of the AEE where the matter is primarily addressed
	designations are proposed at this stage and the designations will not authorise regional plan consenting requirements. Resource consents will be required in the future to authorise activities controlled under the regional plan matters of the AUP:OP or the relevant planning document that applies at the time of implementation. Assessment against section 171 and Part 2.
Whether adequate consideration has been given to alternative sites, routes or methods of undertaking the work if[4]: • The requiring authority does not have an interest in the land sufficient for undertaking the work; or • It is likely that the work will have a significant adverse effect on the environment.	Refer to Section 7 and Appendix A Assessment of Alternatives for discussion of alternatives sites, routes and methods. Refer to Sections 15 to 27 for the assessment of effects.
Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought[5].	Refer to Section 8.

For any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement[6], refer to applicable report and or section.

[4] Section 171(1)(b) of the RMA
[5] Section 171(1)(c) of the RMA
[6] Section 171 (1)(d) of the RMA

7 Assessment of Alternatives

7.1 Statutory requirement to consider alternatives

Section 171(1)(b) of the RMA requires a territorial authority to have particular regard to whether adequate consideration has been given to alternative sites, routes or methods of undertaking the work in circumstances where:

a) The requiring authority does not have an interest in the land sufficient for undertaking the work; or
b) It is likely that the work will have significant adverse effects on the environment.

There are several principles and key considerations for a requiring authority to apply and adhere to when undertaking an assessment of alternatives and identifying a preferred option. Of note are the following:

a) The process should be adequately transparent and robust, and clearly recorded so that it can be understood by others;
b) An appropriate range of alternatives should be considered; and
c) The extent of options considered, and the assessment of these options, should be proportional to the potential effects of the options being considered.

The requiring authority does not have sufficient interest in the land required for each NOR and as such is required to give adequate consideration to alternatives. AT has considered an appropriately broad range of possible alternative routes and other methods for extending and / or upgrading the transport corridors which are the subject of the NORs. A summary of the assessment of alternatives is provided below. Appendix A of this report sets out the assessment in detail.

7.2 Assessment of alternatives methodology

This section provides an overview of the assessment of alternatives methodology used to develop and assess route options for the North West Transport Network and ultimately determine the preferred option(s). This methodology was applied to both the IBC and the DBC processes. In some instances, where the process deviated from the alternative's methodology, this was identified and described in the relevant sections of the Assessment of Alternatives Report (refer to Appendix A).

The methodology used for the assessment of alternatives involved the following steps below and as shown in Figure 7-1:

a) Development of the multi-criteria assessment framework
b) Constraint mapping to inform option development
c) Option development
d) Pre-scoring of options
e) Interdisciplinary workshops
f) Analysis and testing of outcomes from workshops
g) Identification of technical preferred options
h) Engagement with partners and stakeholders
i) Analysis and testing of preferred options following feedback received through engagement
j) Recommendation by the Project Team
k) Gap analysis of recommendation at each new phase of assessment (IBC to DBC)

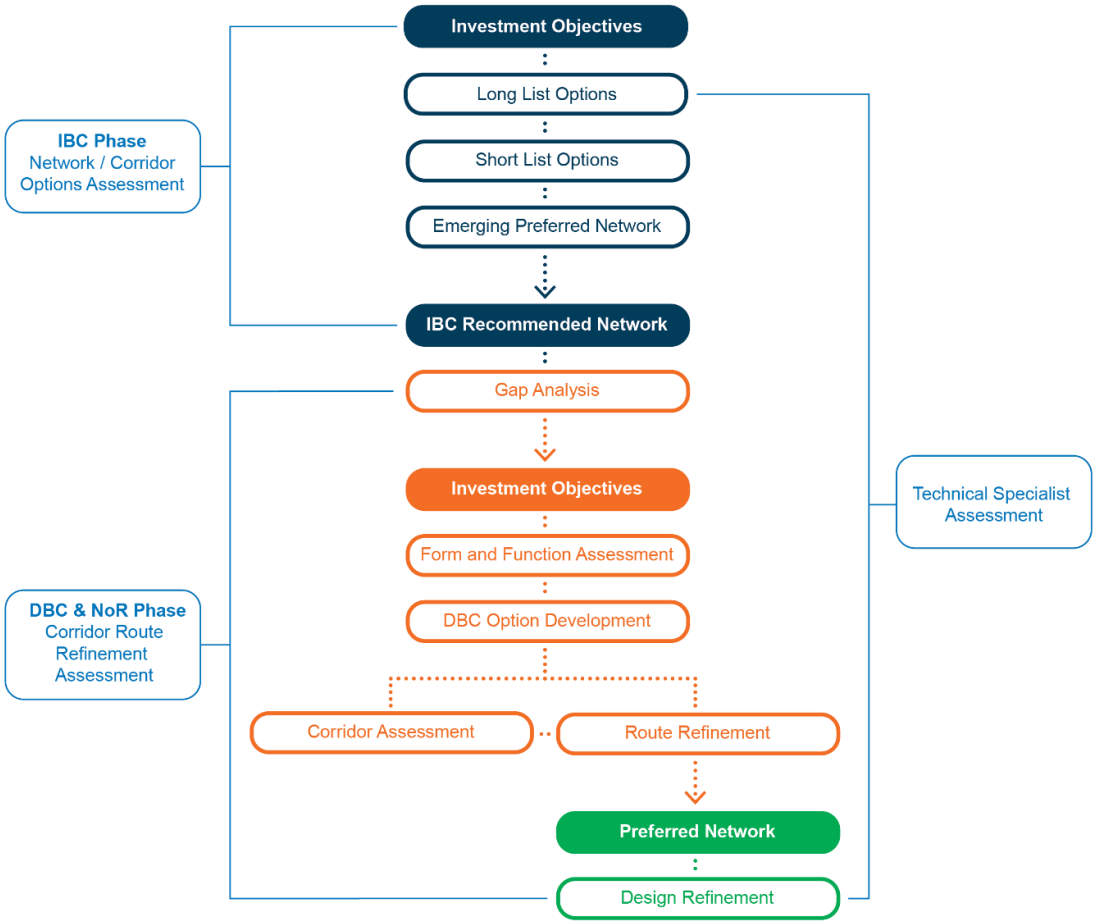


Figure 7-1: Alternative assessment process

7.3 Consideration of alternative methods

As part of the consideration of alternatives, an evaluation of alternative methods was undertaken. This focused on methods that enabled route protection and future implementation of projects and were considered in light of a number of contextual elements including project importance, urgency, and complexity. An assessment of a range of methods was undertaken, including:

a) Unitary Plan Overlay
b) Resource consents
c) Plan changes and structure planning (initiated or submitted on)
d) Landowner/developer negotiations
e) Traditional property acquisition
f) Designations (inc. alterations to existing)

The methods were considered for each NOR in its unique context refer to Appendix A, Assessment of Alternatives. In summary, they were discounted for the following reasons:

- **AUP:OP overlays** whilst identifying the network publicly, overlays do not protect the land required to implement the projects from development or enable authorisation of district plan matters
- **Resource consents** could grant approval under the RMA for the project but would also not enable protection of the land from buildout and would not publicly show the corridors

- **Plan changes** and structure planning were considered, however the Whenuapai area has already been structure planned, and Redhills is live zoned, with the Coatesville-Riverhead Highway largely within rural area (not to be structure planned). The route protection afforded by plan changes and certainty of design outcomes (to meet growth needs) is not high
- **Landowner and developer negotiations** were considered, however where numerous owners are present this can be time prohibitive and any route protection piecemeal if agreement cannot be reached with all parties. The route remains unprotected during the period of negotiation
- **Traditional property acquisition**, property is typically purchased in the few years leading to construction when detailed design is available. Purchasing land ahead of detailed design may result in too much or too little land being required which would need to be corrected at delivery or compromise the design. Traditional acquisition would also not protect temporary construction areas or provide route protection until following acquisition, leaving routes with multiple owners vulnerable to buildout in the interim.

Designations (new or alterations to existing) were generally identified as the preferred method in the context of an upgraded transport network as these were considered to be the most logical and effective method to protect transport corridors in an evolving environment for the following reasons:

a) A designation provides certainty to parties including the community and affected landowners
b) It is a well-recognised and understood tool for route protection which also enables land acquisition processes through the link to the Public Works Act 1981 (PWA)
c) Maximises flexibility for future implementation
d) Negates the need for additional land use consents to implement works authorised under the district plan (section 9(3) of the RMA)
e) Will continually provide for future operation and maintenance requirements.

Assessment of each project and method is detailed in Appendix A. Table 7-1 summarises the preferred methods for transport corridors:

Table 7-1: Preferred methods for the Projects

Ref	Transport Corridor	Preferred Method
Whenuapai		
NOR W1	Trig Road (North)	NOR
NOR W2	Māmari Road	NOR
NOR W3	Brigham Creek Road	NOR
NOR W4	Spedding Road	NOR
NOR W5	Hobsonville Road	Alteration to existing AT Designation 1437
Redhills and Riverhead		
NOR RE1	Don Buck Road	NOR
NOR RE2	Fred Taylor Drive	Alteration to existing AT Designation 1433
NOR R1	Coatesville-Riverhead Highway	NOR

7.4 Summary

The sites, routes and methods chosen will achieve the overarching purpose, which is to identify the required strategic transport network needed to support identified growth of the North West Auckland over the next 30 years, provide certainty to transport authorities, partners, infrastructure providers, the community and investors/developers of the location and form of the strategic transport network. It will also enable long term integrated planning and investment, and route protect the required land and corridor, enabling phased delivery in line with land release and funding.

The preferred option for each NOR has been based on a comprehensive and robust optioneering process considering specialist assessment and feedback from Manawhenua, stakeholders and landowners and the community. As such it is concluded that adequate consideration has been given to alternative sites, routes and methods for undertaking the work, satisfying the requirements of section 171(1)(b) of the RMA.

8 Whether the work and designation are reasonably necessary for achieving the objectives

Section 171(1)(c) of the RMA requires a territorial authority to have particular regard to whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought. Table 8-1 outlines why the work and designation are reasonably necessary for achieving the project objectives:

Table 8-1: Projects reasonably necessary to achieve the Project objectives

NOR	Project Objective	Project achieves objectives by
Whenuapai		
W1 Trig Road (North)	Enable the provision of a transport corridor that: a) Improves connectivity through Whenuapai and by connecting Whenuapai to the State Highway b) Integrates with and supports planned urban growth and the future transport network in Whenuapai c) Contributes to mode shift by providing dedicated facilities for active modes d) Is safe for all users e) Improves network resilience for all users.	• Connecting users in Whenuapai to Trig Road SH18 on ramp with upgrade to intersection • Enabling an urban standard corridor to support growth and integrate with key transport corridors (Brigham Creek Road, Spedding Road, SH18 and Trig Road (south) • Providing for active mode facilities along full length and at intersections • Supporting Vision Zero and road safety outcomes • Improving resilience by providing a local alternative to link Hobsonville and Whenuapai.
W2 Māmari Road	Enable the provision of a transport corridor that: a) Improves connectivity within Whenuapai and by connecting Whenuapai to Westgate, via the future Northside Drive extension b) Integrates with and supports planned urban growth and the future transport network in Whenuapai c) Contributes to mode shift by providing dedicated facilities for public transport and active modes d) Is safe for all users e) Improves network resilience for all users.	• Connecting users from Brigham Creek Road and within Whenuapai to future Northside Drive extension, which will connect to Westgate • Enabling an urban standard corridor to support growth and integrating with future Brigham Creek Road, Spedding Road and Northside Drive extension • Providing for active mode facilities along full length and at intersections and capacity for public transport • Supporting Vision Zero and road safety outcomes • Improving resilience by providing an alternative north-south corridor through Whenuapai.
W3 Brigham Creek Road	Enable the provision of a transport corridor that: a) Improves connectivity through Whenuapai and to the strategic transport network	• Upgrading Brigham Creek Road corridor, the key east-west connection in Whenuapai • Enabling an urban standard corridor to support growth and integrating with upgrades at Māmari Road, Trig Road (North), and Hobsonville Road via SH18

NOR	Project Objective	Project achieves objectives by
	b) Integrates with and supports planned urban growth and the future transport network in Whenuapai c) Contributes to mode shift by providing dedicated facilities for active modes d) Is safe for all users e) Improves network resilience for all users.	• Providing for active modes along full length and at intersections • Supporting Vision Zero and road safety outcomes • Increasing capacity along the corridor, improving network resilience.
W4 Spedding Road	Enable the provision of a transport corridor that: a) Improves connectivity through Whenuapai and between Redhills North and Hobsonville b) Integrates with and supports planned urban growth and the future transport network in Whenuapai c) Contributes to mode shift by providing dedicated facilities for active modes d) Is safe for all users e) Improves network resilience for all users.	• Connecting through Whenuapai and crossing over SH16/18 to Redhills and Hobsonville Road • Enabling an urban standard corridor to support growth and integrating with proposed north-south routes at Māmari Road and Trig Road (North) • Providing for active modes along full length and at intersections. • Supporting Vision Zero and road safety outcomes • Providing an alternative east-west corridor in the strategic road network.
W5 Hobsonville Road	Enable the provision of a transport corridor that: a) Improves connectivity along the corridor to Whenuapai and to Westgate b) Integrates with and supports planned urban growth and the future transport network in Whenuapai c) Contributes to mode shift by providing dedicated facilities for active modes d) Is safe for all users e) Improves network resilience for all users.	• Linking to strategic routes from Whenuapai at Spedding Road, and Brigham Creek Road and providing for access to Westgate • Enabling an urban standard corridor to support growth and integrating with Spedding Road and connecting to Brigham Creek Road via SH18 • Providing for active modes along full length and at intersections • Supporting Vision Zero and road safety outcomes • Increasing capacity of the corridor for users and reducing pinch points.
Redhills and Riverhead		
RE1 Don Buck Road	Enable the provision of a transport corridor that: a) Improves connectivity through Redhills to Westgate b) Integrates with and supports planned urban growth and the future transport network in Redhills c) Contributes to mode shift by providing dedicated facilities for public transport and active modes d) Is safe for all users.	• Providing consistent form along Don Buck Road, the key north-south connection to Westgate • Enabling an urban standard corridor to support growth and integrating with local transport network, including at Fred Taylor Drive • Providing for active modes along full length and at intersections and capacity for public transport priority

NOR	Project Objective	Project achieves objectives by
		• Supporting Vision Zero and road safety outcomes.
RE2 Fred Taylor Drive	Enable the provision of a transport corridor that: a) Improves connectivity between Redhills, Whenuapai and Kumeū-Huapai b) Integrates with and supports planned urban growth and the future transport network in Redhills c) Contributes to mode shift by providing dedicated facilities for public transport and active modes d) Is safe for all users.	• Forming key north-south corridor through Redhills, with links at Brigham Creek Road, Spedding Road and Don Buck Road • Enabling an urban standard corridor to support growth and integrating with strategic corridor at Don Buck Road • Providing for active modes along full length and at intersections and capacity for public transport priority • Supporting Vision Zero and road safety outcomes.
R1 Coatesville - Riverhead Highway	Enable the provision of a transport corridor that: a) Improves connectivity between Riverhead, Westgate and Kumeū-Huapai b) Integrates with the existing and future environments and with the future transport network in Riverhead c) Contributes to mode shift by providing dedicated facilities for active modes d) Is safe for all users.	• Enabling a safer road form to connect Riverhead via SH16 with Westgate and Kumeū-Huapai • Enabling a corridor standard consistent with urban and rural interface to integrate with upgrades at SH16 • Providing for active modes along full length and at intersections • Supporting Vision Zero and road safety outcomes.

9 Design and assessment approach

As discussed in Section 4, it is anticipated that the NW Local Arterials Package will not be constructed for some time. As such the Te Tupu Ngātahi approach to design and assessment of effects has been developed in a manner that reflects the long-term implementation of the extended and / or upgraded transport networks within environments that are likely to change significantly. Regional consent applications and Outline Plans of Work will be prepared prior to construction.

9.1 Approach to design

The design of the future North West Transport Network has focused on developing an indicative design of the transport network that is sufficient to inform the proposed designation footprint and to assess an envelope of effects whilst recognising the need for flexibility required due to the uncertainty of the future urban environment.

The NW Local Arterials Package alignments are included in the drawing set in Volume 3. These have informed the proposed designation footprint and include ancillary components, such as construction areas and stormwater requirements. The detailed design will be undertaken before construction and an Outline Plan or Plans (as the Outline Plans may be staged to reflect project phases or construction sequencing) will be submitted to Council as set out in section 176A of the RMA. Regional resource consents will also need to be applied for in the future.

The final design of the NW Local Arterials Package (including the design and location of ancillary component and associated works including bridges, culverts, stormwater management systems, soil disposal sites, signage, lighting at interchanges, landscaping, realignment of access points to local roads, and maintenance facilities), will be refined and confirmed at the detailed design stage.

The drawing set contained in Volume 3 for each NOR includes the following:

- General arrangement plan, including proposed designation boundary
- Typical cross-sections
- Bridge typical cross-section (as relevant)

While the design and effects assessment has focussed on the ultimate form of the transport infrastructure this approach does not preclude the ability for an interim development of part of the transport corridor to take place to support development. For example, private developers could construct a two-lane collector road with active mode provision on one side of the corridor before the four-lane arterial with active mode provision on both sides of the corridor is required, to service the full level of anticipated future growth.

9.1.1 Design input and standards

The design philosophy that informed the indicative designs for route protection is summarised in the following sections. Refer to the supporting technical reports (Volume 4) for standards adopted in the design philosophy for the NW Local Arterial Network, key transport standards included:

- Transport Design Manual (TDM) – Auckland Transport
- Austroads Guide to Road Design (AGRD)

9.1.2 Designing the arterial corridor

Geometric Design

The indicative design of the NW Local Arterials Package was developed in line with a range of geometric design standards such as:

- A design speed of 60km/h was adopted for all the arterial roads with a posted speed of 50km/h
- The horizontal alignment was designed to best accommodate each corridor taking into account the existing topography and future land use
- Normal crossfall of 3% is provided on all roads in accordance with the TDM and AGRD.
- A minimum desirable vertical gradient of 0.5% and a maximum vertical gradient of 6.0% was adopted for the alignments. Where possible, grades have followed the existing ground and are as flat as possible, consistent with the longitudinal drainage requirements
- Generally, unless constrained, 1V:3H slopes have been adopted as the default batter for cut and fill slopes to meet maintenance requirements. 1V:2H spill through slopes have been adopted as the default approach for abutments at bridge locations, radially transitioning to 1V:3H side batter slopes
- Bridge skew angles are limited to a maximum of 30 degrees relative to the service being crossed
- The proposed designation footprints allow sufficient space for segregated active mode facilities and active mode crossings at intersections
- Given the limited geotechnical information available, retaining walls are detailed as typical. Final wall types will be confirmed during subsequent design phases.

Sections of the existing Brigham Creek Road, Hobsonville Road, and Fred Taylor Drive and Don Buck Road and Coatesville-Riverhead Highway are existing over-dimension routes. The proposed designation footprint will accommodate freight movements and over-dimension or overweight movements within these sections.

Intersections and local road tie-ins

The general approach to intersections is as follows:

- New intersections are located on straights where possible or large constant elements such as a single large horizontal radius
- Intersection approach angles are limited between 70° and 110° from the main alignment
- Intersection layouts take into consideration the input from traffic modelling data to inform the lane configuration
- Intersections are graded to match the road profile and longitudinal grade of the main through road.

Tie-ins with side roads are as close to the intersection as possible whist maintaining the safety to the road users. Vertically, the grade on the side road approach is between 0.5% and 8% to help avoid unnecessary earthworks and minimise tie in lengths.

Typical Cross-Sections

The cross-section design incorporates AT Urban Street and Road Design Guide and Vision Zero design features. Typical cross-sections have been developed for the extended and / or upgraded transport corridors within the NW Local Arterials Package which generally incorporate the following elements:

- Berm space and duct for utilities
- Footpath and separated cycleway

- Traffic lanes with a solid or flush median
- Bus lanes Frequent Transit Network (FTN) only and space for bus stop facilities
- Stormwater management

Cross sections for each transport corridor are provided in each NOR section of this report. Final cross-sections will be produced at detailed design and be submitted as part of the relevant Outline Plan(s).

9.1.3 Design elements not developed

Utilities

The utilities that are potentially affected have been identified and discussed with the respective owners. Engagement during the design development was undertaken with Transpower, Refining NZ, Watercare, First Gas Ltd, Spark and Vector.

Specific recommendations identified during discussions with utility providers are described in more detail in AEE Section 18 (Network Utilities). Impacts on utilities will be reviewed at detailed design, a process for engagement with affected utility providers is covered in AEE Section 18.6 and the proposed conditions (Appendix B).

Elements that do not affect designation boundary *or effects*

Development of the design for pavements, signs, road markings, bus stop locations, safety barriers and lighting for example, has not been undertaken and will be confirmed at the detailed design stage.

9.1.4 Stormwater design and management

The approach to stormwater management has focussed on identifying feasible stormwater treatment methods and locations to inform the required designation footprint (see Table 9-1). This considered AUP:OP and industry standards, existing stormwater infrastructure and requirements, future discharge and diversion, runoff quality, and flood hazard management. Stormwater treatment for each Project will be further developed at detailed design alongside applications for regional resource consents. Volume 4's Flooding Assessment provides a description of the method and preferred locations for each NOR.

Table 9-1: Stormwater design and management considerations

Element	Input considerations
Stormwater Quality	The footprints allow for stormwater quality treatment in accordance with Auckland Council Guideline GD01 for all existing and proposed impervious areas, except where a corridor only consists of a pedestrian or cycle path. Generally, the indicative designs adopt treatment wetlands or swales, depending on the local conditions and topography.
Retention and Detention	AUP:OP SMAF 1 design criteria for retention and detention measures has been allowed for each corridor in the NW Local Arterial Package that is within the FUZ/greenfield environments, where discharging to freshwater streams. Criteria are summarised as follows: • Provide retention (volume reduction) of at least 5mm runoff depth • Provide detention and a drain-down period of 24 hours for the difference between the pre- and post-development runoff volumes from the 95th percentile, 24-hour rainfall event minus the 5mm retention.

Element	Input considerations
Flooding	Where required, attenuation storage to match pre-Project peak flows to post-Project peak flows for either or both the 10- year and 100-year rainfall events has been provided. Attenuation will be provided within devices which can be designed to detain larger storm events, including wetlands, ponds and swales. In some instances, diversions or provision of compensatory flood storage is provided. Resilience to flooding was applied through: • Setting the corridor vertical alignment above the 100-year Average Recurrence Interval (ARI) flood plain where practicable • Providing 0.5m freeboard for culverts between the headwater level and edge of the corridor • Providing freeboard to bridges in accordance with the Waka Kotahi Bridge Manual requirements.
Stream Crossings	All existing stream crossings will be maintained through either culverts or bridges. Bridges (existing and/or proposed) are identified at selected locations within the indicative design where appropriate to manage environmental effects. However, the final form of stream crossings with consideration to upstream ponding, erosion protection and fish passage will be confirmed at detailed design and resource consent phase.

9.2 Construction methodology

An indicative construction methodology has been developed for the NW Local Arterials Package and has been used to inform the proposed designation footprints, assess potential effects on the environment, and to identify measures to avoid, remedy or mitigate those effects, as appropriate and relevant to the NORs. The construction methodology includes:

- Sequencing of the main construction activities
- Indicative land required for construction works
- Identification of any significant impacts on stakeholders
- Approximate activities durations and indicative construction programme.

This section is structured to address these inputs as they apply across the NW Local Arterials Package. The construction methodologies have been developed based on the projects design and current land use / landform in which the corridors are located. However, the actual construction detail will be confirmed at detailed design, and will consider, measures required to mitigate effects, the designation and any resource consents conditions. Importantly, timing of implementation of extended and / or upgraded transport networks will dictate what land development is present along the corridors and will inform the final methodology. As such, AT seeks flexibility in each NOR's construction methods to accommodate these factors and retain opportunities to reduce the impact and duration of adverse construction effects at delivery. A condition requiring a construction management plan is therefore proposed for each NOR.

9.2.1 Sequencing of main construction activities

The programme assumes a generally staged construction sequence, starting with site establishment, enabling works, main works and ending with finishing works and demobilisation. The main works assume a staged construction process with exact staging to be determined at detailed design. Construction sequencing is set out in Figure 9-1.

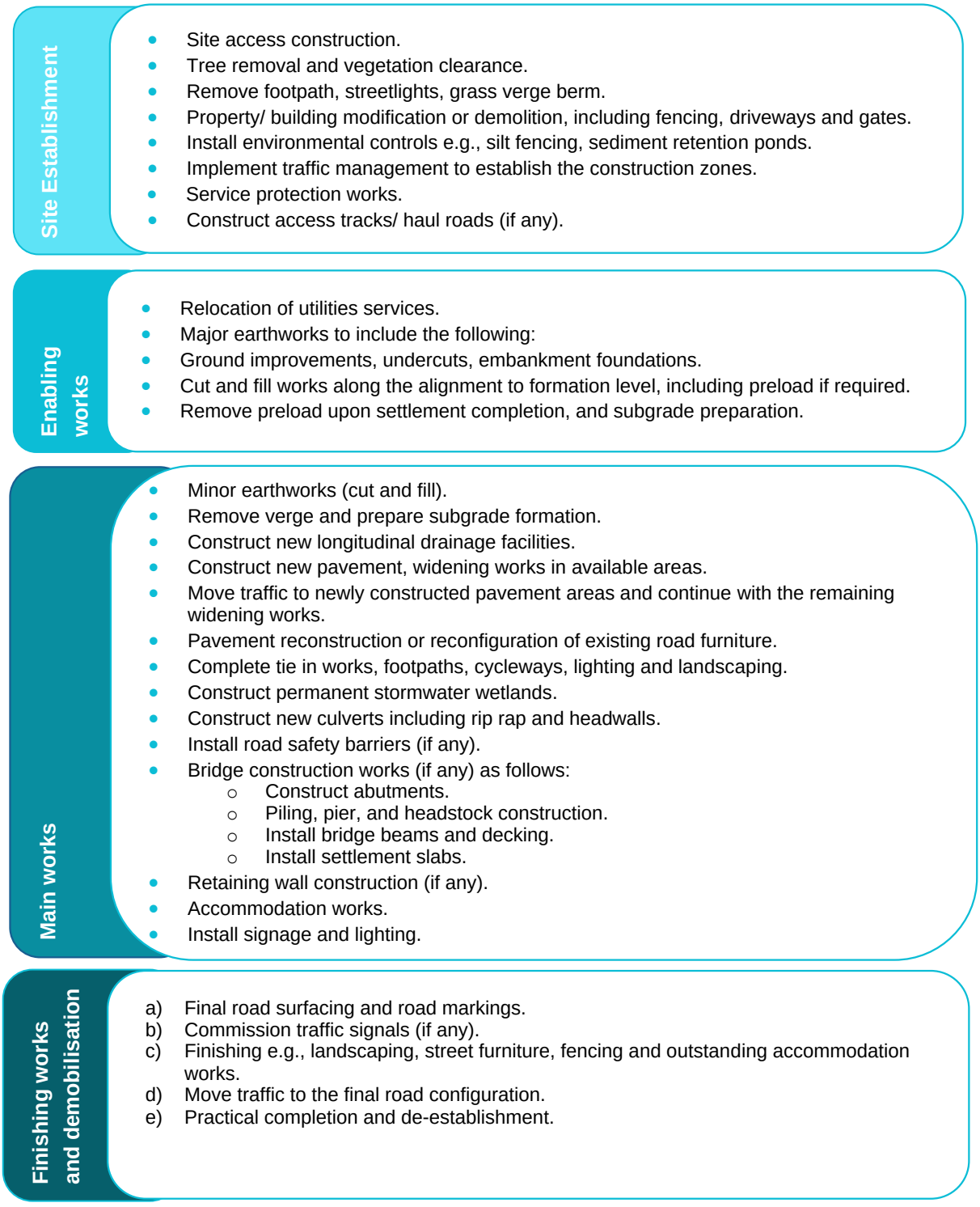


Figure 9-1: Indicative construction sequencing

9.2.2 Identification of land required for construction works

Typical areas required for construction have been identified and applied to the NW Local Arterials NORs. These have informed the extents of the projects and the designation boundaries. The main elements which influence the boundary of the projects are in Table 9-2. Refer to each projects drawings at Volume 3 for the location and application of construction elements:

Table 9-2: Typical construction areas (figures are a guide)

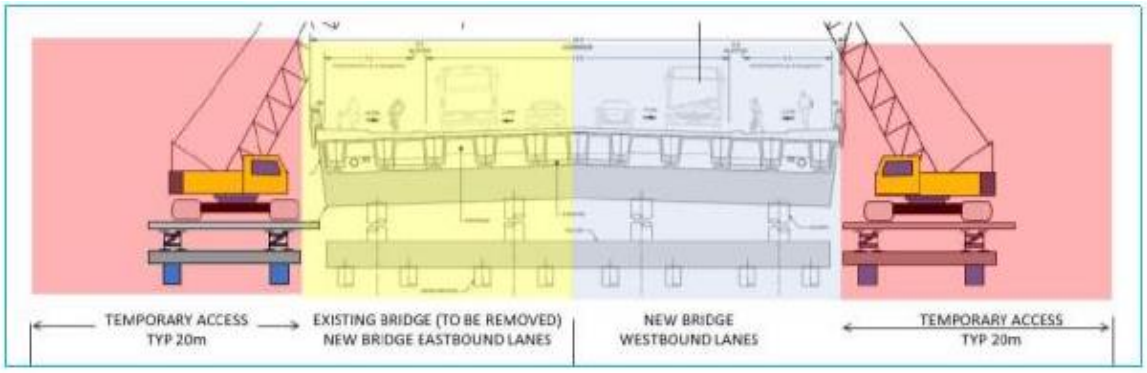
Construction element	Discussion
Construction of batter slopes: • Rural • Urban	For larger earthworks projects, the construction areas will differ significantly to account for the larger plant and equipment likely to be used, construction methodology and temporary works such as haul roads and sediment retention ponds. Typically, 20m from the earthworks batter slopes.
Bridge construction: • Abutments • Piers • Deck	Generally, the design has enabled either a bridge or culvert to be constructed, with the form to be determined at regional consent stage, unless identified in AEE as necessary to address effects on the environment. The bridge construction method shall typically follow conventional bottom-up bridge construction techniques. Once the bridge structure is complete, the temporary staging and accessways can be removed. See Figure 9-2 for typical bridge construction area.
	
Retaining wall construction: • Retaining walls up to 5m high (e.g. timber or blockworks) • Large retaining walls (e.g. secant pile or sheet pile)	Retaining structures are generally located near the project boundary to overcome overspill of earthworks batters or at the bridge abutments. Typically, retaining walls are constructed of MSE walls to contain fill embankments and piled retaining walls and soil nails to retain cut batters. The working area required to construct the retaining walls will largely depend on the design and size of the wall. The specific design will be defined in the future detailed design phase.
Stormwater treatment construction: • Ponds • Diversion drains / Overland Flow Path (OLFP)	New stormwater drains will likely be required on both sides of the proposed road corridors. These will connect to the new stormwater wetlands. Additionally, new discharge lines are required from the proposed stormwater wetlands to a suitable discharge point. The size of the working area will vary depending on the size of culvert being installed, the topography of the area, and volume of water being diverted. Works on the new culvert construction may require flow diversion or over

Figure 9-2: Typical new bridge construction area

Construction element	Discussion
• Culvert headwalls and scour protection	pumping. Further investigations will be required to confirm the flow volumes and ecological requirements for the diversions. Access track will also be required for delivery of plant and materials. This requirement may change depending on the final design and scope of works, terrain and topography of the respective culvert location. Regional consents (including for earthworks and stream works) will be sought in the future before construction commences.
Temporary works: • Sediment retention ponds • Haul roads and construction access roads	Surface water running through the earthwork sites will need to be treated prior to discharge. The typical method for doing this is to contain the water from the earthworks areas and channel it into temporary sediment retention ponds. Locating the ponds at the low point of the zones and outside of the permanent works area is ideal so it can be operational and maintained throughout the construction works. Where possible temporary and permanent ponds have been co-located, so that at the end of construction the pond can be reinstated as a permanent device. Haul roads are typically required for large earthworks projects for the movement of people, plant and materials along the proposed alignment. These haul roads provide access and connectivity to critical work sites such as the culverts, bridge sites, and main cut and fill sites. These are best constructed outside the earthwork's extent to avoid clashes with the permanent works.
Site facilities: • Main site compound (project office) • Additional / satellite site compound • Construction yards for laydown / stockpile • Construction yards for intersection works	Site compounds and laydown areas are required to support construction along the proposed corridor alignments. The proposed compound site locations identified for each NOR enable easy access to key construction zones and arterial routes. Example of facilities include: • Site offices including lunchrooms and ablution facilities • Services connection (power, water and communications) • Car parking, waste management and refuelling facilities • Laydown areas and lockable storage containers • Workshop space and plant/equipment storage areas and maintenance facilities • Wheel washing and cleaning facilities • Facilities for pre-casting products. The use of these compounds will only be required during the construction period and the site will be reinstated upon completion of the works.
Reconnecting property access • Service lanes • Access roads / driveways	Legal vehicle access will be maintained to all private properties during construction and including reinstatement after works. However, there may be temporary disruptions to access. Where this is proposed, it will be discussed in advance with the affected user/owner. An accessway assessment has been carried out on all legal accesses. As required, accesses are designated to enable reintegration to the permanent corridor. Where it has been determined that legal safe access cannot be reinstated after construction (e.g., due to gradient, angle, proximity), the property in its entirety is included in the proposed designation.

9.2.3 Identification of potential construction impacts

During the construction, environmental controls will be implemented to manage the effects of works on the environment and community. The effects on the environment are discussed in detail in the relevant specialist report. In summary, construction can be expected to have the following impacts which may be managed through the following measures:

Site Clearance, along the corridor enabling works will create a change in the existing environment for stakeholders who remain during works (are not required to move). This will typically include:

- Demolition along the alignment to remove the buildings that clash with the proposed transport corridor alignment and clearance of the sites
- Vegetation and tree removal within the construction corridor, including under bridge structures.

This will have impacts on the existing amenity and landscape for users, although temporary. See the Landscape and Visual Effects Assessment at Volume 4 and AEE Section 21 for detail.

Earthworks, and temporary erosion and sediment release, geotechnical investigations will be required to inform the final design and ratify the assumptions for earthworks slope batters, total earthworks volumes, ground improvements, identifying potential onsite borrow sites or spoil disposal sites. Impacts can be controlled through use of**:**

- Restrictions on bulk earthworks to summer months
- Silt fencing around ponds and earthwork batters
- Temporary sediment ponds to contain and treat runoff
- Mulching of exposed earthworks
- Wheel wash stations for trucks carting spoil
- Stormwater diversion to minimise overland flows across earthworks areas.

Construction noise and vibration (see Construction Noise and Vibration Assessment at Volume 4, and AEE Section 17), can be controlled through use of construction works controls such as:

- Construction operating hours being between 7am and 6pm, Monday to Saturday
- Extended hours during summer earthworks season (e.g., 6am to 8pm, Monday to Sunday)
- Work is only to be undertaken outside these hours and on public holidays if critical works are required (e.g., road closures for culvert construction and road surfacing)
- Night works shall be limited to critical activities. Noise and vibration impacts shall be assessed and monitored.

Generally, construction noise and vibration will be managed to ensure its compliance with the relevant standards through a Construction Noise and Vibration Management Plan (CNVMP), which will be prepared for each NOR.

Network utility works

The extended and / or upgraded transport corridors will require the relocation or realignment of a number of network utilities including gas transmission and distribution, overhead electricity transmission, and telecommunications, some corridors will impact larger regional or national utilities. The types of utilities affected and measures to manage these during construction are set out in AEE Section 18.

Construction air quality impacts (dust and particulates), can be controlled through the use of:

- Water carts to minimise dust during earthworks
- Covered trucks hauling material onto and off site
- Mulching and top soiling of exposed earthworks.

These will be controlled through a Construction Environment Management Plan (CEMP) prepared for each NOR.

Stream works and stormwater

Stormwater will discharge to, and works will be required within, existing water ways. Regional resource consents for diversion and discharge of stormwater and stream works will be sought as part of future resource consent processes.

Culverts will be constructed at the initial phase of construction to ensure surface water flow can be directed through the construction zone without becoming contaminated from the earthwork activities. Works on new culverts may require flow diversion or over pumping. Further investigations will be required during the detailed design and resource consenting phase to confirm the flow volumes and ecological requirements for the diversions. These works and activities will be undertaken in accordance with applicable management and mitigation measures and future regional resource consent conditions.

Construction traffic impacts, construction movements within and outside the site are managed via a temporary Construction Traffic Management Plan (CTMP). The CTMP considers the construction activities and safe integration of the activities on general corridor users during the construction period. The CTMP usually consists of:

- Methods to manage the effects of temporary traffic management activities on traffic;
- Measures to ensure the safety of all transport users
- The estimated numbers, frequencies, routes and timing of traffic movements, including any specific non-working or non-movement hours to manage vehicular and pedestrian traffic near schools or to manage traffic congestion
- Size access routes and access points for all construction vehicles, the size and location of parking areas for plant, construction vehicles, and the vehicles of workers and visitors
- Identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads
- Methods to maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be
- The management approach to loads on heavy construction vehicles, including covering loads of fine material, the use of wheel-wash facilities at site exit points and the timely removal of any material deposited or spilled on public roads
- Methods that will be undertaken to communicate traffic management measures to affected road users (e.g. residents/public/stakeholders/emergency services)
- Auditing, monitoring and reporting requirements relating to traffic management activities which will be undertaken in accordance with relevant Code of Practice for Temporary Traffic Management.

See Transport Assessment at Volume 4 and AEE Section 15 for details of each corridors potential transport impacts during construction and recommended effects management.

Release or disturbance of hazardous substances can be caused by disturbing a piece of land or be introduced from construction equipment. Potential impacts of this can be managed through the use of:

- An asbestos register identifying any locations where asbestos may be present
- Asbestos handling procedures to control demolition, transport and disposal
- Refuelling procedures to ensure no fuel enters waterways or the stormwater system
- An emergency response management plan for environmental incidents
- Correct hazardous substance storage systems
- Standards to ensure fill material meets the specified design and is free from contaminants. Additional fill material required to complete the earthworks would ideally be sourced from a borrow site within the proposed designation.

It is anticipated some unsuitable excavated material can be placed and compacted as non-structural fill outside of the road alignment and where practicable, to utilise excavated material, soil improvement measures, such as cement or lime stabilisation could be used to improve the soil parameters. Alternatively, cut material will be disposed of at a suitable tip site.

The effects on the environment from construction activities are able to be managed through a CEMP. This CEMP will be developed at detailed design and consent stage to address environmental effects specific to the construction of each corridor and the site. The works and activities will also be undertaken in accordance with future National Environmental Standards (NES) and regional resource consent conditions (if required).

9.2.4 Approximate activities duration and construction programme

Table 9-3 sets out each extended and / or upgraded transport corridors expected construction timing and duration. The projects are expected to be constructed in a generally staged method along the corridor, however exact approach will be confirmed at detailed design and Outline Plan stage.

Table 9-3: Transport corridor construction timing and expected duration of programme

Notice	Transport Corridor	Approximate timing of construction	Approximate duration of construction
Whenuapai			
NOR W1	Trig Road (North)	2028-32	2.5 years
NOR W2	Māmari Road	2028-32	2-3 years
NOR W3	Brigham Creek Road	2028-37	3.5 years
NOR W4	Spedding Road	2033-37	2-3 years
NOR W5	Hobsonville Road	2028-32	3.5 years
Redhills and Riverhead			
NOR RE1	Don Buck Road	2023-27	2-3 years
NOR RE2	Fred Taylor Drive	2033-37	2-3 years
NOR R1	Coatesville-Riverhead Highway	2033-37	2-3 years

The construction of the extended and / or upgraded transport corridors will be undertaken within a management plan framework (see Conditions, Appendix B) and will be consistent with the conditions of each of the proposed designations or alteration to designation. If at the time of delivery, contractors are required to undertake activities that are not within the scope of the proposed designations (or future resource consents), additional authorisations may need to be obtained.

9.3 Approach to the assessment of effects

Section 171(1) of the RMA sets out the matters that must be considered by a territorial authority in making a recommendation on a NOR for a new designation. Under section 181(2), those same matters are to be considered 'with all necessary modifications', in relation to a NOR for an alteration to an existing designation, as if it were a notice of requirement for a new designation. The NW Local Arterials Package includes two alterations to existing designations, being NOR W5 Hobsonville Road (Designation 1437) and NOR RE2 Fred Taylor Drive (Designation 1433), the remainder are new notices.

The assessment of effects on the environment has been limited to matters that trigger a district plan consent requirement under the AUP:OP as these are the only activities authorised by the proposed designations and alterations. Where NES or regional plan consenting requirements are triggered, these are not authorised by the designations and alterations and will require future resource consents.

Notwithstanding this, relevant national and regional consenting matters have been considered in the alternatives assessment, in relation to each corridor design and the resulting designation footprints. Consents will be sought when detailed design for each transport corridor is completed to confirm exact consent requirements, to understand the actual or potential effects of activities that require consent and define the measures proposed to manage those adverse effects.

9.4 Approach to assessing the likely receiving environment

As set out in Section 3, the NORs protect the transport network necessary to support the planned urbanisation of Whenuapai, Redhills and Riverhead. Accordingly, it is anticipated that the network will not be constructed and operational until urbanisation of the North West growth area has been confirmed or commenced. Table 9-3 in Section 9.2.4 sets out the expected construction date and estimated duration for each NOR, however construction may occur sooner or later than this date depending on urbanisation.

Due to the time period between designation and construction, assessing the effects on the environment solely as it exists today (i.e., at the time of this assessment) will not provide an accurate reflection of the environment in which construction and operation effects will be experienced.

Within the north west area are a range of existing and future urban zoning patterns, which influence the likely future environment for assessment purposes. Transport corridors within existing urban zoning or rural zoning that are not identified for future urban growth are not likely to materially change in the future (e.g., Riverhead areas). Areas that are recently live zoned, up-zoned or FUZ and are currently rural or peri-urban are likely to experience material change as a result of urbanisation, enabled or anticipated by planning provisions (e.g., Whenuapai, Redhills areas).

Table 9-4 sets our understanding of the current land use zoning, its likelihood of change and its potential future environment.

Table 9-4: Land use likelihood of change based on current and potential future zoning

Land use today	Zoning type	Likelihood of Change for the environment[7]	Likely Future Environment[8]
Residential	Residential	Low	Urban
Business	Business	Low	Urban
Open Space	Open Space	Low	Open Space
Special Purpose	Special Purpose Zone	Low	Special Purpose
Rural	Countryside Living	Low	Rural
	Mixed Rural Use	Low	Rural
Greenfield / rural	Future Urban Zone	High	Urban
Greenfield/rural	Residential or Business	High	Urban

Where transport corridors are within FUZ, it is likely the construction of the corridors will occur ahead of, or in parallel to, the urbanisation of these areas. Accordingly, when considering the environment within which the effects of the construction and operation of the transport corridor are likely to occur, it is important to consider the likely future environment for specific NOR areas. The likely future environment of the FUZ during the operation of the transport corridors has, therefore, been assessed as an urban or a developing urban environment albeit without a confirmed urban land use pattern or form. However, land use outcomes based on the existing or planned AUP:OP zoning are summarised in Table 9-5.

Table 9-5: AUP:OP Zoning Potential Urban Form

Zone	Anticipated Outcomes	Urban Form Visualization
Mixed Housing Suburban	Development is typically two storey detached and attached housing in a variety of types and sizes.	

[7] Based on AUP:OP zoning/policy direction
[8] Based on AUP:OP zoning/policy direction

Zone	Anticipated Outcomes	Urban Form Visualization
Mixed Housing Urban	Development typically up to three storeys in a variety of sizes and forms, including detached dwellings, terrace housing and low-rise apartments.	
Terraced Housing and Apartment Building	Provides for urban residential living in the form of terrace housing and apartments. Buildings are enabled up to five, six or seven storeys.	
Business – Neighbourhood Centre (Redhills only)	Provides for buildings up to three storeys high with mixed use residential on upper floors. Development generally in keeping with nearby residential character. This land use is generally characterised by single corner stores and small shopping strips.	

Zone	Anticipated Outcomes	Urban Form Visualization
Business – Centre Zone	Provides for a wide range of activities including commercial, leisure, residential, tourist, cultural, community and civic services, providing a focus for commercial activities and growth. Provisions vary, but typically enable buildings up to eight storeys (in a town centre zone).	
Business – Light Industry	Anticipates industrial activities that do not generate objectionable odour, dust or noise. This includes manufacturing, production, logistics, storage, transport and distribution activities.	

Where relevant, the urban land use patterns outlined in Auckland Council's Structure Plan for the Whenuapai growth area has been considered together with proposed plan changes informed by how far advanced they are through the plan making process. In Redhills North and Riverhead reference has been had to Auckland Council's Strategic Land Use Framework for Kumeū-Huapai, Riverhead, and Redhills North (NW Spatial Strategy). It is however important to note that it is not a structure plan and is a high-level outline of future land uses.

The likely future environment assessment has also been guided by overlays within the AUP:OP which identify features considered to be of high natural, cultural or heritage value with associated controls that apply to development which may adversely affect those features. The overlays and protective rules provide useful guidance on areas that are likely to remain in the future urban environment.

AEE Part A sets out the receiving environment for each area and NOR within the NW Local Arterials Package. Each specialist has also set out the methodology for assessing effects in the likely future environment and approach in their subject area, see Specialist Reports in Volume 4 and this is summarised in the relevant effects section of the AEE, Part B.

9.5 North West transport projects interface

There are several projects being developed separately in the North West which will integrate with or affect the proposed NW Local Arterials Package. These projects combined with Te Tupu Ngātahi's North West Transport Network form the complete transport response for the North West. Given the long-term delivery of the projects, the assessment considers the operational impacts in the context of full build out of urban areas at 2048+, accounting for wider infrastructure upgrades anticipated and progressed by others.

Table 9-6 summarises these additional projects and demonstrates how their delivery (or not) will affect the NW Local Arterials Package. Figure 9-3 shows the indicative location of the projects to the NW Local Arterials package.

Table 9-6: North West Transport Projects Context

Project	Interface with NW Local Arterials	Status and agent
Non-Te Tupu Ngātahi projects		
North West Rapid Transit Corridor full implementation Short Term – Northwestern Bus Improvements City Centre to Westgate • Medium Term - Northwestern bus improvements. • City Centre to Brigham Creek North West Rapid Transit Corridor full implementation (longer term) Expected outcomes: • Transformational mode shift to connect North West to the City Centre and North Shore through provision of rapid transit.	North West Busway improvements has an interim (short term) solution which includes bus stations as Lincoln Road, Te Atatū and Westgate and buses using shoulders on SH16. This will be later upgraded to a segregated Rapid Transit Corridor (RTC) for the North West from the City Centre to Brigham Creek, with interchanges at Brigham Creek Road, Westgate and Te Atatū/Lincoln Road. NW Local Arterials Package provides the critical supporting road network for public transport and active modes to reach the planned North West RTN stations. Unless people can reliably access the stations (as enabled by NW Local Arterials) mode shift in the NW cannot be fully realised. If the RTC is not fully implemented, the NW Local Arterials will continue to provide for a high-quality network for local PT and active modes.	Indicative Business Case *Delivery date TBC* **Waka Kotahi and AT**
SH16 Safety Improvement Programme Stage 1 (Huapai to Waimauku), not interfacing. Stage 2 (Brigham Creek to Kumeū): *Expected outcomes*: • Additional capacity (two new lanes) between Brigham Creek Road and Taupaki Road • New shared path between two areas • Safety improvements for drivers (barriers, medians) and roundabout at SH16/Coatesville-Riverhead Highway intersection.	The SH16 Brigham Creek to Waimauku stage provides an interim capacity solution on SH16. NOR R1 proposes upgrades to Coatesville-Riverhead Highway which in the future will allow buses to use the four laned SH16 infrastructure to access the Westgate RTN station (see above project). It will also connect to the proposed roundabout at SH16. Proposed active mode upgrades at Fred Taylor Drive, Coatesville-Riverhead Highway and Brigham Creek Road will connect the SH16 Safety Improvement shared path. This will maximise active modes connectivity. If the safety project is not delivered, active mode users on these local corridors will have local connectivity, however there will be a gap in the network in particular between Coatesville-Riverhead Highway and Fred Taylor Drive/Brigham Creek Road.	Detailed Design *Works planned to commence 2024.* **Waka Kotahi**

Project	Interface with NW Local Arterials	Status and agent
SH16/18 Connections project. Expected outcomes: • Direct connections from SH16 to SH18 to remove strategic trips from Brigham Creek Road and increase access for Whenuapai • New Northside Drive city facing ramps to provide a new SH16 connection for Redhills North and Whenuapai • Interim improvements to Brigham Creek Interchange.	The SH16/18 Connection's project will remove strategic trips from Whenuapai. With the removal of strategic trips, the network is able to focus on urbanising key arterials in Whenuapai and Redhills to support intensification of residential and employment land use. NOR W2 Māmari Road will intersect with new Northside Drive, forming a direct link into this project and connection to Redhills and Westgate. If the SH16/18 Connections project is not delivered, there will be greater demand share by strategic through trips and local trips on the NW Local Arterials network. As such, corridors such as Brigham Creek Road will become increasingly critical, further reinforcing the need for the corridor to provide for a range of users.	Investigation stage *Delivery date TBC* **Waka Kotahi**
Other Te Tupu Ngātahi (North West) Projects (separate applications)		
North West Strategic Package Expected outcomes: 1 Network of bulk transport infrastructure to move people through and between the North west and wider network **2** Forms resilient PT and walking and cycling link between Kumeū Huapai, Whenuapai and Redhills.	The NW Strategic Package by Te Tupu Ngātahi has been designed to integrate with the NW Local Arterials Package. The NW Strategic Package delivers bulk infrastructure to link Kumeū-Huapai and wider North West via proposed Rapid Transit to future RTN station at Westgate, and Alternative State Highway to address capacity constraints on SH16. The NW Strategic Package includes upgrade to Brigham Creek roundabout to form an interchange that will interface with Fred Taylor Drive and Brigham Creek Road. The proposed regional active mode corridors will connect to the NW Local Arterials providing a comprehensive active mode network across the North West. If the NW Strategic Package is not in place greater volumes will be expected at the Brigham Creek roundabout.	NOR stage *Varies - staged delivery* **AT and Waka Kotahi**

Project	Interface with NW Local Arterials	Status and agent
HIF Redhills Arterials and Trig Road Expected outcomes: 3 Construction of key arterials through the Redhills basin, connecting growth area to Fred Taylor Drive and Don Buck Road 4 Upgrade of existing Trig Road from bridge at SH18 to Hobsonville Road to urban standard.	The Redhills and Trig Road HIF projects by Te Tupu Ngātahi have been designed to integrate with the North West Local Arterials Package. The Trig Road HIF section will connect to that proposed in NW Local Arterials, seamlessly connecting users. The Redhills basin corridors connect onto Don Buck Road and Fred Taylor Drive. The intersections have been designed to integrate. If the NW HIF projects are not delivered, Trig Road North will still provide a key link between Whenuapai and SH18. Don Buck Road and Fred Taylor will still provide local benefits.	NOR stage *Varies - staged delivery* **AT**

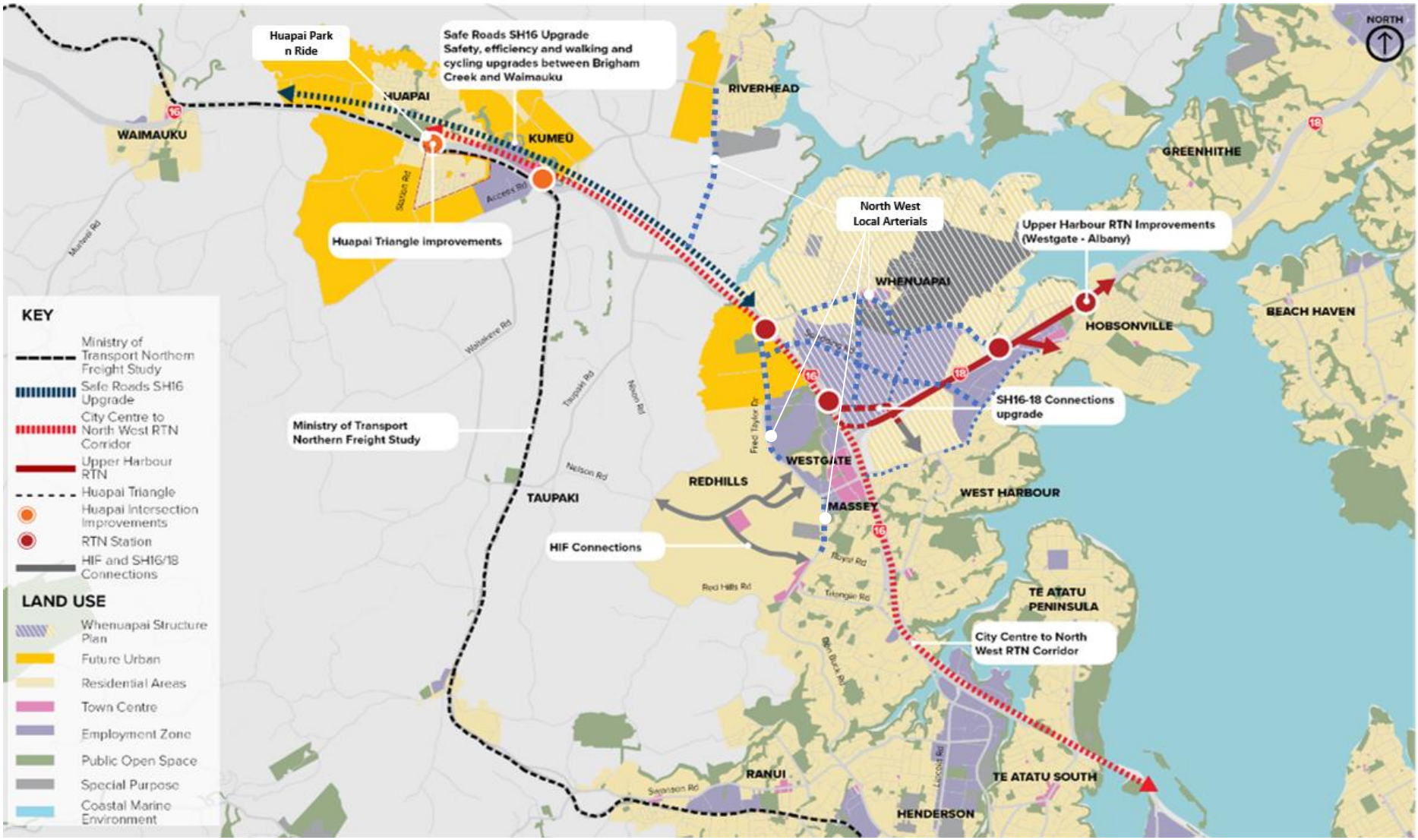


Figure 9-3: NW Local Arterials – Interfacing projects (indicative and only for context)

Whenuapai

Project descriptions and receiving environment

10 Whenuapai Projects and Receiving Environment

Section 10 sets out the overall receiving environment elements common across the Whenuapai area, each Whenuapai NOR is then specifically discussed in Sections 10.2 to 10.6. For detailed discussion of specialist topic, refer to Supporting Technical Documents in Volume 4.

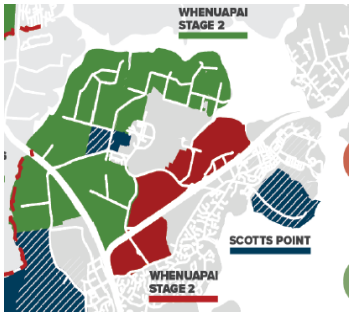
10.1 Planning context

The Whenuapai Package comprises four new NORs and one alteration to an existing NOR at Hobsonville Road. The area is primarily located in the fork of SH16 to the east and north of SH18, except for Spedding Road SH overbridges and Hobsonville Road to the south of SH18. Existing Whenuapai is primarily rural but identified as FUZ, with an existing urban form of established residential around the Whenuapai settlement and south of Hobsonville Road, see Figure 10-1.

Figure 10-1: Whenuapai receiving environment (AUP:OP)

Table 10-1 sets out the anticipated dwelling capacity for Whenuapai identified in the FULSS. Whenuapai will also provide land for business and an expanded local centre. The development readiness of the area is identified through FULSS proposed staging, from existing live zones through Decade One 2018-2022 (now) to Decade Two (2028-2032). Noting that modelling has indicated later build outs than anticipated under the FULSS (see Section 4).

Table 10-1: Whenuapai urban capacity under the FULSS

Area timing	Capacity (approx.)	Area (in ha)	
Live zoned, ready 2012-2017	1,150 dwellings	50 ha	
Ready by 2018-2022	6,000 dwellings	401 ha	
Ready by 2028-2032	11,600 dwellings	745 ha	

10.1.1 Structure Planning

The Whenuapai Structure Plan was adopted by Auckland Council in 2016. The Whenuapai Structure Plan sets out the framework for transforming Whenuapai from a semi-rural environment to an urbanised community over the next 10 to 20 years. The Whenuapai Structure Plan guides future development by defining land use patterns and the location, timing, and provision of infrastructure. The land use will be progressively 'live zoned' through private, and Auckland Council initiated plan changes. Figure 10-2 shows the indicative land uses in the Whenuapai Structure Plan.

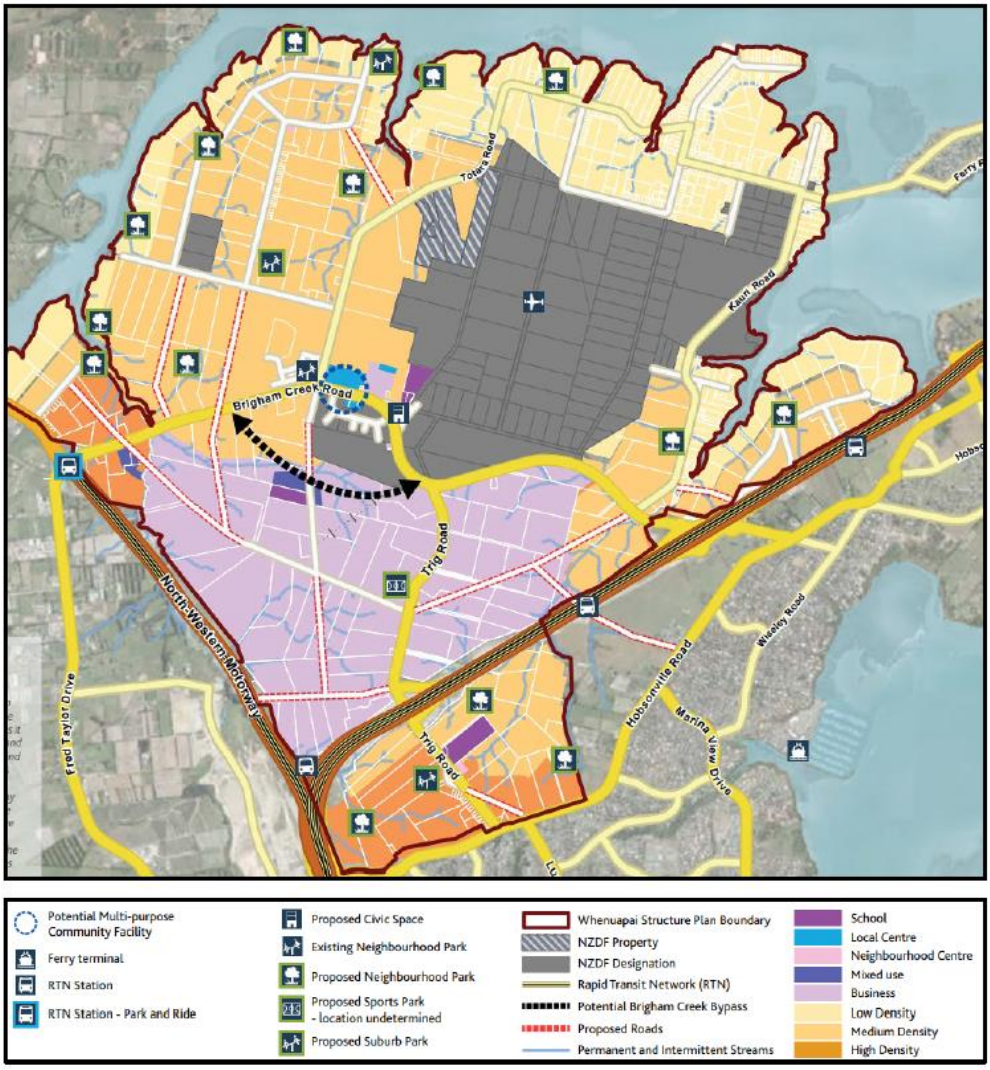


Figure 10-2: Whenuapai Structure Plan (Source: Auckland Council, 2016)

10.1.2 Plan Changes

There are numerous developer interests in the area, with some areas already live zoned and other with lodged plan changes, these include notified Plan Changes 69 and 78. The plan change process is currently underway; however, no Auckland Council decisions have been made on either yet.

Approved Plan Change 69 (Spedding Block): aligns with the FULSS, which identifies land within Whenuapai as development ready between 2028 and 2032. It seeks to rezone approximately 52 hectares of land at 23-27 & 31 Brigham Creek Road and 13 & 15-19 Spedding Road, Whenuapai from FUZ to Business – Light Industry Zone. The plan change could expedite growth in Whenuapai and advance requirements for delivery of supporting infrastructure if approved and implemented.

Proposed Plan Change 78 (Intensification) has been prepared in response to the National Policy Statement on Urban Development (NPS-UD) and requirements of the RMA to enable more intensive development in and around neighbourhood, local, town and city centres and rapid transit stops and incorporate Medium Density Residential Standards into the AUP:OP. Areas of residentially zoned land adjacent to Māmari Road, Brigham Creek Road and Hobsonville Road are proposed to be up-zoned from Single House Zone to Mixed Housing Urban Zoned and Mixed Housing Urban Zone to Terrace Housing and Apartment Building Zone.

Proposed Plan Change 86 (41-43 Brigham Creek Road) seeks to rezone 5.2 Hectares of land at 41-43 Brigham Creek Road, Whenuapai from FUZ to Residential Mixed Housing Urban. The land is identified within Whenuapai as being development ready by 2028-2032. In conjunction with this private plan change, the Applicant has lodged a consent application for 230-unit residential development and subdivision of the site.

Proposed Plan Change 5 was withdrawn by Auckland Council in June 2022. The plan change had sought to 'live zone' approximately 360 hectares of mostly FUZ land within the southern part of Whenuapai for residential and business uses.

10.1.3 Whenuapai Airbase Noise Environment

The Whenuapai Royal New Zealand Air Force (RNZAF) base located in Whenuapai is designated (Designation 4310) by the Minister of Defence for Defence purposes… air base ('airbase'). The designation sets aircraft noise controls (see Figure 10-3) crossing NORs W1, W2, W3, W4 and W5.

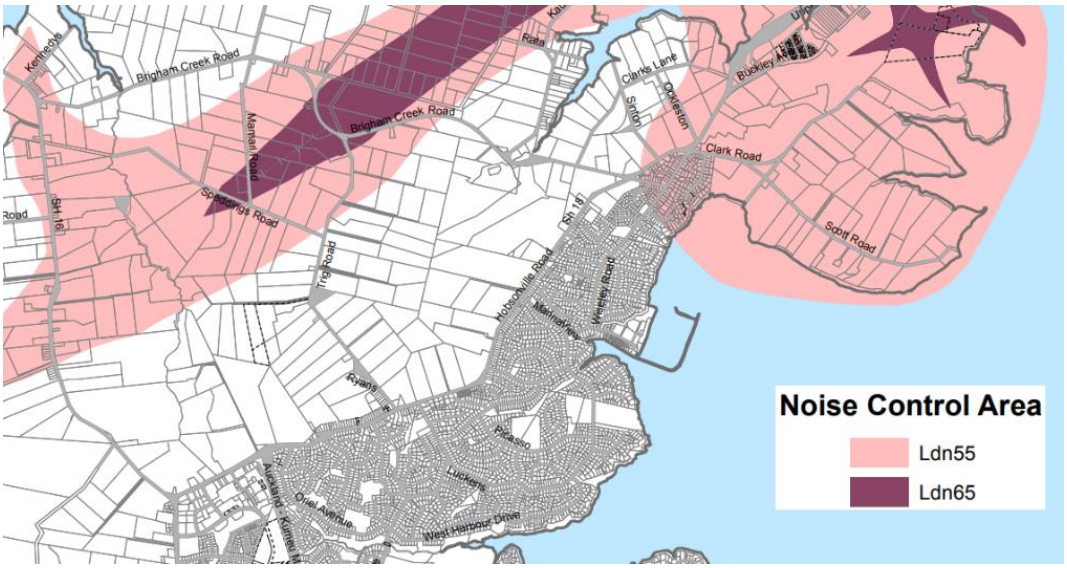


Figure 10-3: Whenuapai RNZAF Base noise contours

10.1.4 Hydrological and Flooding Environment

The extended and / or upgraded transport corridors are located within the Whenuapai Catchment. The catchment size is approximately 1,900 ha and is drained by numerous creeks and streams. This includes Brigham Creek which forms the area's north-western boundary and the Waiarohia Inlet which forms the area's north-eastern boundary. The catchment has two primary stream catchments, namely Totara Creek flowing to Brigham Creek and Waiarohia Stream flowing to the Waiarohia Inlet, see Figure 10-4 for the flooding environment. The receiving environment for the catchment is the Waitematā Harbour.

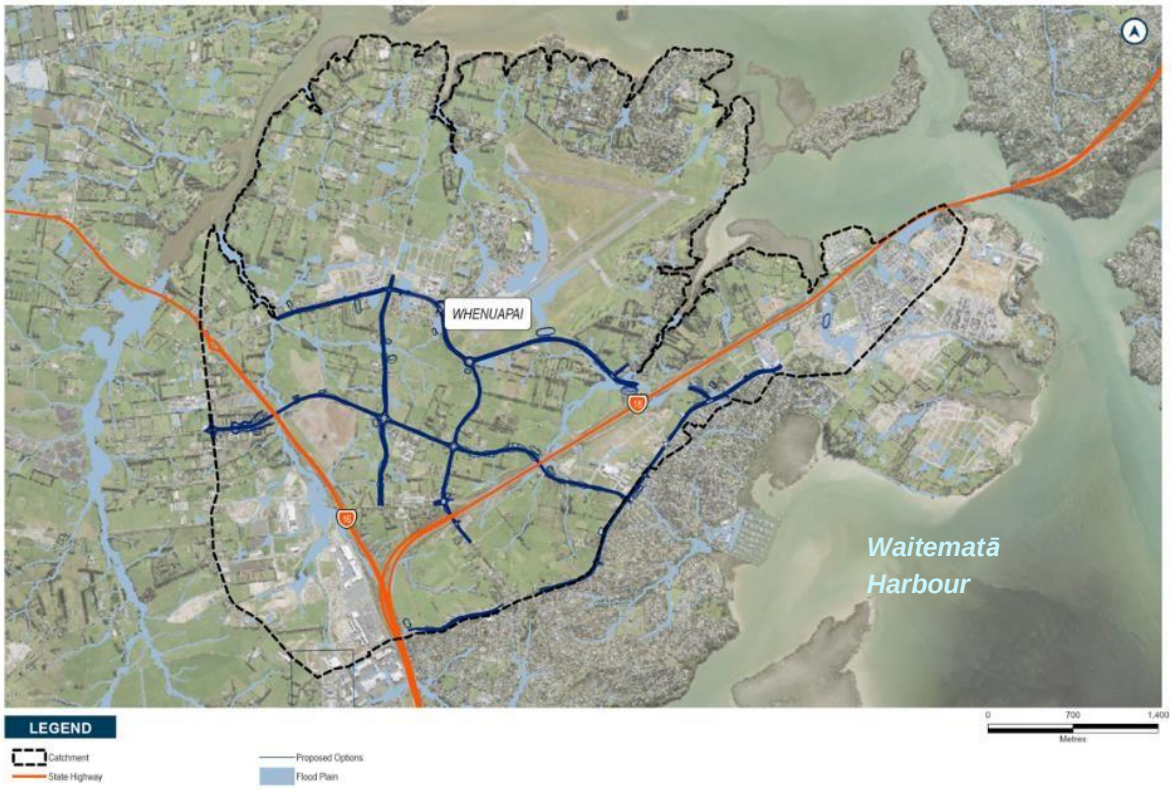


Figure 10-4: Whenuapai flooding environment

10.1.5 Māori Cultural Values

This section presents our summary of the cultural areas of significance in the project areas of Whenuapai. These have been drawn from the AUP:OP, discussion with manawhenua and the Cultural Impact Assessment (CIA), prepared by Te Kawerau a Maki.

10.1.5.1 Mapped Features

There are no identified Sites and Places of Significance to manawhenua identified under the AUP:OP within or in close proximity to the Whenuapai corridors. The closest site or place is approximately 1km away from Hobsonville Road upgrade being site #093 Tahingamanu near Hobsonville Point for 'Kāinga and mahinga kai'.

A CIA prepared by Te Kawerau a Maki for the project area has provided context on the history of the area and particular sites of significance near the transport corridors. Te Kawerau a Maki have retained close associations with the wahi tupuna and wahi tapu around the study area and have a number of statutory acknowledgements across the broader area, outside of proposed designation

footprints. A Te Kawerau a Maki cultural redress area is also at Te Onekiritea (Hobsonville bomb point) 1km from NOR W5 Hobsonville Road.

10.1.5.2 Discussed Features

Through engagement with manawhenua, the team is aware that the Upper Harbour-Waimauku area as a cultural landscape holds deep meaning and history, due to the place within the landscape, and contemporary aspects of cultural redress within the study area.

"*The character and integrity of the whole is made up of its constituent parts, such as the northern end of Ngā Rou Pou ā Maki to the south, the hillcountry of Riverhead to the north, Te Wai Roa ō Kahu in the east and Te Tōangaroa (Kaipara Portage) that connects it to Te Awa Kumeū, the expansive and fertile alluvial plains of the Kumeū and Kaipara rivers and their tributaries, the many pā and kāinga that fringe the Site corridor, and the wāhi tapu and pūrakau, such as the kaitiaki Tangihua and the peace-making meetings between Te Kawerau ā Maki and Te Tāou, associated with the area spanning the last 1000 years and earlier" (Te Kawerau a Maki CIA, June 2022)*

Specific features identified are near waterways (awa) in particular the Rawiri and Trig Stream, adjacent to SH18 at NOR W4 Spedding Road, Sinton Stream at NOR W2 Māmari Road and Waiarohia Stream at NOR W3 Brigham Creek Road.

10.2 NOR W1 - Trig Road (North)

10.2.1 Project Description

Trig Road (North) is an important north-south arterial in the Whenuapai Structure Plan, it connects Whenuapai and West Harbour, connects to SH18 east facing ramps as well as Hobsonville Road. The planned growth and transition from a rural to an urban environment, will put significant strain on existing transport infrastructure.

The principles of corridor design for Trig Road (North) are covered in Section 9.1, corridor specific design and receiving environment features are discussed in this section. Further details of the existing and likely future environment are in the supporting technical documents (Volume 4).

10.2.2 Overview

Trig Road (North) is an existing rural arterial extending from Brigham Creek Road in the north and Hobsonville Road in the south. Trig Road (North) provides an important connection between Whenuapai and West Harbour as well as the connection to SH18 and Hobsonville Road though east facing ramps. NOR W1 Trig Road (North) upgrade extends from the intersection at Brigham Creek Road to south of the SH18 off-ramp where it will tie into the southern section of Trig Road. Trig Road between SH18 and Hobsonville Road is part of a separate Te Tupu Ngātahi project (Redhills and Trig Road HIF).

A new designation is proposed to allow sufficient land to upgrade Trig Road (North) from its current width of 20m to a 24m cross section with separated active mode facilities. The designation footprint includes sufficient space for the intersections with Brigham Creek Road, Spedding Road and tie-ins with Northside Drive and the SH18 on ramps. The proposed designation footprint shows the envelope proposed to construct, operate and maintain Trig Road (North) and all its ancillary components, including construction area, stormwater infrastructure, batter slopes and retaining walls, see Figure 10-5.

Figure 10-5: NOR W1 Trig Road (North) upgrade overview

10.2.3 Trig Road (North) upgrade

The key features of the Trig Road (North) upgrade include:

- Widening of Trig Road (North) from its current general width of 20m to a 24m wide two-lane cross section including separated cycle lanes and footpaths on both sides of the corridor
- Localised widening around the existing intersections with Brigham Creek Road and Spedding Road to accommodate proposed roundabouts, and localised widening around the intersection of Trig Road (North) with Northside Drive to accommodate a signalised intersection
- Tie-ins with existing roads, stormwater ponds and culverts
- The addition of an active mode bridge to the existing bridge across SH18
- Batter slopes to enable widening of the corridor, and associated cut and fill earthworks
- Vegetation removal along the existing road corridor
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 10-6 and Figure 10-7 shows the indicative cross section, for further detail see Volume 3 Drawings.

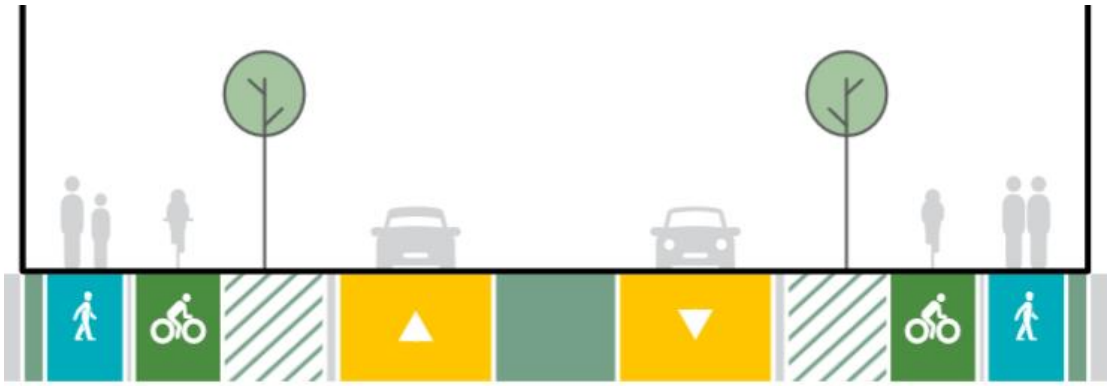


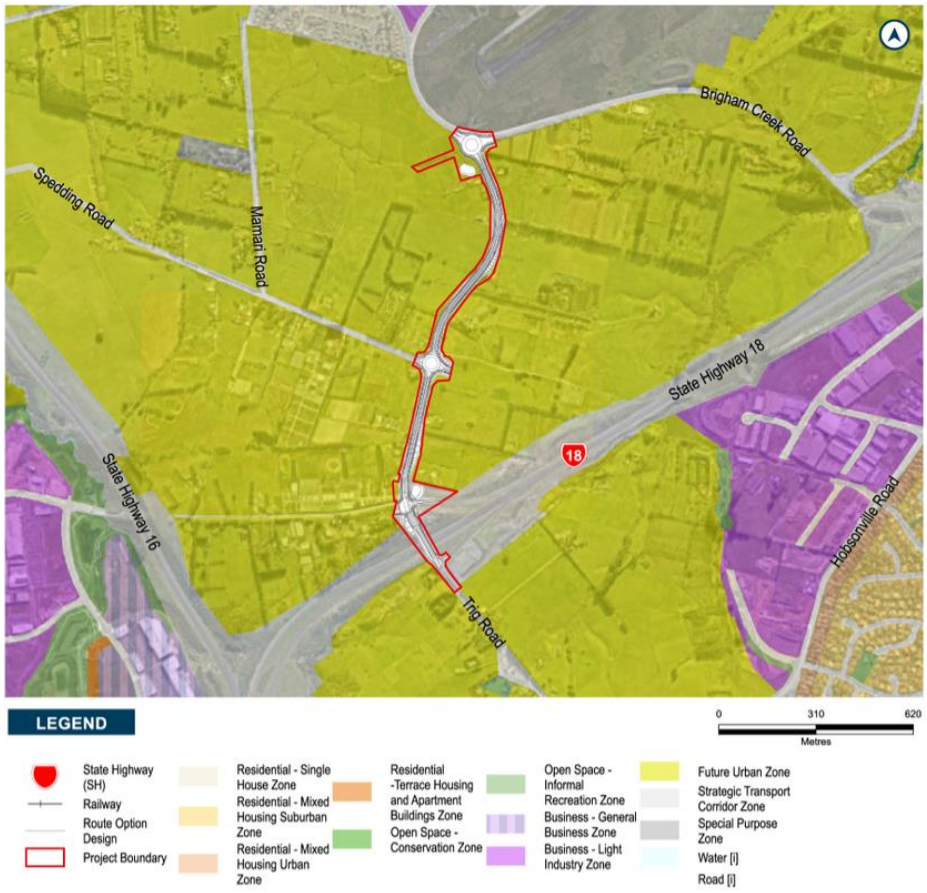
Figure 10-6: NOR W1 Trig Road (North) typical cross section – corridor

Figure 10-7: NOR W1: Trig Road (North) typical cross section – existing bridge and new active mode bridge

10.2.4 Trig Road (North) Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing and the likely future environment within which the upgraded corridor will be constructed, operated, and maintained. Table 10-2 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on land adjacent to the corridor.

Table 10-2: NOR W1 Trig Road (North) planning context

Planning Context	Provision
Land use – Existing AUP:OP zoning	 • FUZ – high likelihood of change • Strategic Transport Corridor Zone (SH16/SH18) – low likelihood of change
Land Use – Whenuapai Structure Plan	Identifies: • Business land use along corridor north of SH18 • Medium density residential south of SH18 over bridge, RNZAF land at Brigham Creek Road and Trig Road (North) intersection • Proposed sports park at corner of Spedding Road and Trig Road (North), AC has purchased this land however it is not yet designated as park
Overlays	• High-Use Aquifer Management Areas Overlay covers the entirety of the corridor • RNZAF noise overlays are present at the northern extent
Controls	• Macroinvertebrate index - entirety of the corridor • Motorway access controls apply where Trig Road (North) adjoins SH18 and Northside Drive • Flow 1 is present within the RNZAF base at the northern extent
Designation – transport related	#1473 Northside Drive, AT • AT is the Requiring Authority for this designation, no additional approvals required. Trig Road (North) has an intersection designed to integrate with this corridor #6741, SH 16 and 18 - Westgate to Whenuapai and Hobsonville, WK

Planning Context	Provision
	• Designated by Waka Kotahi for transport purposes. AT will be required to obtain written consent from Waka Kotahi under section 177 of the RMA. Trig Road (North) proposes an upgrade to the intersection with these ramps
Designation – non- transport related	#4311, Defence - protection of approach and departure paths (Whenuapai Air Base), Ministry of Defence • Works do not affect this designation's purpose #4310, Defence (Whenuapai Air Base), Ministry of Defence (MOD) • AT will require to obtain written consent from MOD under section 177 of the RMA for works within their designation

10.2.5 Human Environment

Section 10.2.5 sets out the existing and likely future human environment elements for Trig Road (North), including a discussion of:

- Land use and form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration)

Further detail on each can be found in the supporting specialist reports, see Volume 4.

10.2.5.1 Land Use and Urban Form

Existing Environment

Trig Road (North) corridor's existing land use environment is predominantly rural, with open pastoral fields, buildings are on large lots set back from the road corridor. Buildings are typically residential of low density and one to two storeys with private gardens. Scattered agricultural buildings for farm use are also present. At the southern end of the corridor is the SH16/18 motorway interchange forming a significant infrastructure element in the area, alongside horticultural nurseries with several greenhouses, distinct from the more open landscape in the northern section.

Likely Future Environment

The likely future land use is significantly changed, with the area identified under the Whenuapai Structure Plan (adopted by Auckland Council in 2016) as future business light industry zone. This land use will likely be characterised by commercial activities and offices of up to 20m in height, see Table 9-5. Dwellings are non-complying in the zone. The airbase north of the corridor is expected to remain as well as the motorway interchange in the south.

10.2.5.2 Transport

Existing Environment

The existing Trig Road (North) is a rural road with two vehicle lanes (one in each direction), 80kph speed limit north of Ryans Road. The corridor form is relatively consistent, with no kerb and channel on either side of the corridor and a footpath on the western side. A flush median is also provided where the corridor bridges SH18 and the motorway ramps connect. Current Annual Daily Traffic (ADT) from March 2018 shows approx. 7,300 vehicles per day.

There is a narrow footpath, which is approximately 1.5 metres wide, on the western side of the corridor. The 114 bus service currently operates on Trig Road (North) and connects Hobsonville Point, Whenuapai and Westgate. This service operates at least every 60 minutes 7 days a week during core travel times (excluding mornings and evenings).

Likely Future Environment

The forecasted average daily traffic on the upgraded transport corridor increases in 2048 to 13,000 vehicles and an increased public transport frequency from hourly to every 15 minutes under the 2048 AT bus network. With the planned land use intensifying to light industrial use and proximity to the motorway, increased demand is expected on the corridor.

Other transport projects that are expected to form part of the future environment include:

- Upgrade of Brigham Creek Road (as part of this Package), from two lanes to four lanes with walking and cycling. Brigham Creek Road will connect onto Trig Road (North) via a roundabout at its northern end, enabling a safe smooth transition between the two corridors
- Trig Road HIF, the southern extent of Trig Road forms part of a separate Te Tupu Ngātahi Package. This will continue after the SH18 overbridge with a similar cross section of two lanes and active mode provision on a 50km road
- The extended Spedding Road (as part of this Package) will cross Trig Road (North), through to Hobsonville. The corridor is planned to intersect via a roundabout at the existing T intersection. Spedding Road will have similar provision of two lanes with active mode facilities
- Northside Drive (under AT Designation 1473) is currently a rural terminating road. The intersection is planned to have two traffic lanes from Fred Taylor Drive to Trig Road (North) and provide active mode facilities. The intersection with Trig Road (North) is to be signalised and a new bridge (Northside Drive bridge) be constructed across SH16, providing a direct link to Redhills and Westgate
- SH16/18 connections, a Waka Kotahi Project, will change the layout and ramps between SH16 and 18, and may use the Northside Drive alignment, crossing Trig Road (North). It would (like Northside Drive Designation 1473) connect Northside Drive to Fred Taylor Drive via an overbridge. Both projects will increase the importance of the Trig Road intersection for access to SH18.

See Table 9-6: North West Transport Projects for further detail.

10.2.5.3 Historic Heritage and Archaeology

Existing Environment

There are no recorded historic heritage or archaeological sites on the existing Trig Road (North) corridor. Any unrecorded archaeological sites are protected under provisions of the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) but will not be uncovered until works commence (if present).

Likely Future Environment

The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

10.2.5.4 Community and Recreational Facilities

Existing Environment

There are no community or recreational facilities along the Trig Road (North) corridor. The nearest school is the Timatanga Community School, approximately 800m to the west, this will not be directly impacted by the works.

Likely Future Environment

Schools in the area are expected to remain and could grow as the population in the area increases. It is likely additional community facilities will be provided. Under the Whenuapai Structure Plan there is a 'Proposed Sports Park' shown at the intersection of Trig Road (North) and Spedding Road. The land at 92 Trig Road (North) and 4 Spedding Road is owned by Auckland Council and is the likely location of this park. However, the land is not currently reserve or zoned and still in residential use. There is an additional Proposed Suburb Park and a Designation (4667) for a primary school and early childhood centre by Ministry of Education at 15 Trig Road.

As development occurs and the surrounding population grows more community and recreational facilities may be added to the wider Whenuapai area, however as Trig Road (North) is proposed to be zoned light industrial, additional community and recreational facilities are anticipated to be limited.

10.2.5.5 Noise and Vibration

Existing Environment

Trig Road (North) is currently located within a predominantly rural area with few dwellings in close proximity to the road corridor. The ambient noise environment is dominated by road traffic noise from vehicles on Trig Road (North), SH18 and the surrounding network as well as aircraft noise associated from the RNZAF base. Noise levels in the rural environment of Whenuapai, currently zoned as FUZ, are anticipated to typically have low noise levels of 45 dB $L_{Aeq(24h)}$ to 55 dB $L_{Aeq(24h)}$. In areas near the busier sections of Trig Road (North) existing noise levels are anticipated to be between 55 dB $L_{Aeq(24h)}$ and 65 dB $L_{Aeq(24h)}$.

The RNZAF base also influences the noise levels in the Whenuapai area, particularly in the northern section of Trig Road (North). Receivers along this section of the corridor fall within the 65Ldn and 55Ldn noise contours (see Figure 10-3 above).

Likely Future Environment

As discussed in Section 10.2.4 above, the Whenuapai Structure Plan indicates that the following land use zonings adjacent to Trig Road (North):

- Land to the north of SH18 is proposed as Industrial or Business zones. This zoning would likely result in an increase in ambient noise levels
- Land to the south of SH18 is proposed as residential zoning. This zoning would likely result in an increase in ambient noise levels as the area urbanises.

Overall ambient noise levels are anticipated to increase as urbanisation occurs, changing the noise environment from the existing levels.

10.2.6 Natural and Physical Environment

Section 10.2.6 sets out the existing and likely future natural and physical environment elements for Trig Road (North), including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context

Further detail can be found in the relevant specialist reports, at Volume 4.

10.2.6.1 Geology

The Puketoka Formation has been mapped along the majority of the alignment. It has been assumed that this is the soft alluvial soils type which are organic in nature and have the potential to liquify. The geological conditions are not anticipated to vary in the future.

10.2.6.2 Hydrology and Natural Hazards

Existing Environment

Trig Road (North) is situated within the Whenuapai stormwater catchment. The project corridor lies on a ridge with several overland flow paths draining west of the corridor towards Sinton Stream and east of the corridor towards Waiarohia Stream. Existing minor culvert crossings drain the low-lying areas located next to the road. Existing flood prone areas have been identified from Auckland Council GeoMaps on the western and eastern side of Trig Road (North).

Likely Future Environment

Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects.

10.2.6.3 Terrestrial Ecology

Existing Environment

Habitats

The Trig Road (North) upgrade area is dominated by exotic grassland with woody vegetation mostly in the form of shelterbelt and roadside planting. Native restoration planting is located on both sides of the SH18 and Trig Road (North) interchange within the Waka Kotahi Designation 6741. The primary habits observed within the corridor were exotic grassland, exotic scrub both assessed as low value, exotic planting and native planting and some exotic treelands assessed as moderate value.

One intermittent stream (W1-S3) was identified within the proposed designation footprint, located between Spedding Road and the intersection with Brigham Creek Road. One shallow perched depression wetland (W1-W1) approximately 100m^2 is located west of Trig Road (North) near Brigham Creek intersection and is not connected to downslope area through a channelled flow. The wetland is dominated by exotic and facultative vegetation and meets the definition under the National Environmental Standards for Freshwater (NES-FW) as a natural wetland and was assessed in the Assessment of Ecological Effects as being moderate value.

Species

Records confirm the presence of long tailed bats within 10km radius of the Whenuapai area, however Automatic Bat Monitors did not detect any bats within the Whenuapai Zone of Influence (ZOI). Bats have previously been recorded along the Totara Creek (outside designation footprint), and mature shelterbelts may provide suitable habitat. Bat presence within or adjacent to the designation footprint cannot be excluded.

Copper skink (at risk-declining) is widespread and frequently recorded within highly modified habitats such as exotic scrub and rank grassland, like that in the corridor. This species is highly likely to occur within and adjacent to the Trig Road (North) corridor.

Incidental observations of bird species were noted, no Threatened or At Risk (TAR) species were observed during site observations and the most commonly noted were introduced species, including blackbirds, thrushes, sparrows, and mallard ducks. There is likelihood of lizards, bats and birds being present along the existing corridor and surrounding area.

Likely Future Environment

The protection and enhancement of existing watercourses and areas of significant natural value is provided in the AUP:OP. Therefore, it is assumed the future urbanised scenario will largely retain permanent streams and areas of significant vegetation, meaning in the future these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through consent applications. Vegetation clearance, excluding within riparian zones, notable trees and certain street or open space trees, is permitted under the AUP:OP therefore other mature trees are expected to be removed in an urbanised scenario.

10.2.6.4 Topography and Landscape Context

Existing Environment

The existing Trig Road (North) corridor and adjacent land is characterised by flat to gently rolling pastoral fields and agricultural production. Trig Road (North) is slightly elevated in the south, with the high point located on the approach to SH18. No notable trees are within proximity of Trig Road (North), the landscape is characterised by modification associated with rural agricultural use with open pasture directly adjacent to the corridor along both sides.

Vegetation cover comprising stand-alone elements of indigenous vegetation, hedgerows, shelterbelts, and shrubs along field boundaries. Exotic specimen trees are the predominant landcover on both sides of the road corridor and within the surrounding properties. Stands of mature native trees within the road reserve and along the boundaries of private properties contribute to the landscape. These include a mature Pohutukawa along the boundary of 92 Trig Road (North) and macrocarpa outside 53-55 Trig Road (North).

The land at Lyndale Nurseries (82 Trig Road (North)) and Touch of the Tropics Nursery (62 Trig Road (North)) feature dense mature shelter belt planting and a range of mature exotic trees within the properties and towards the road frontage. The Landscape Assessment Volume 4 categorises the character value within context of the existing road reserve as low.

Likely Future Environment

The land surrounding the transport corridor will witness a significant change from rural to urban land use character as urbanisation occurs. It is anticipated that the abiotic (environmental / non-living) features and biotic (biological / living) features of the landscape will be altered as the area is urbanised, including the removal of unprotected mature vegetation. However, urbanisation will also

likely involve the implementation of street and public open space planting and landscaping within future development.

10.3 NOR W2 - Māmari Road

10.3.1 Project Description

Māmari Road is an existing semi-rural road (a section is a paper road[9]) that extends from the intersection of Brigham Creek Road and Totara Road in the north to the intersection with Spedding Road in the south. The Māmari Road upgrade will extend the corridor south to connect with Northside Drive. The principles of corridor design for Māmari Road are covered in Section 9, corridor specific design and receiving environment features are discussed in this section. Further details of the existing and likely future environment are in the relevant technical assessments (Volume 4).

10.3.2 Overview

Māmari Road will provide an important FTN bus link with public transport priority lanes to connect commuters from Whenuapai to the future rapid transit station at Westgate (via Northside Drive), see Table 9-6. Māmari Road also provides a north-south connection between Whenuapai town centre and the proposed employment/industrial land. The intersection of Māmari Road and Brigham Creek Road will remain as a signalised intersection and the intersection with Spedding Road is to be a roundabout.

A new designation is proposed to allow sufficient land to upgrade and extend Māmari Road from a 20-metre-wide rural corridor to a 30-metre wide four-lane urban arterial to Northside Drive with separated active mode facilities. The proposed designation footprint in Figure 10-8Figure 10-8 shows the envelope proposed to construct, operate and maintain Māmari Road and all its ancillary components, including construction areas, stormwater infrastructure, batter slopes and retaining walls.

[9] An unformed legal road (or 'paper road') is a legally recognised road that is undeveloped or partly formed but provides public access to a particular area or feature. Auckland Transport, 2021.

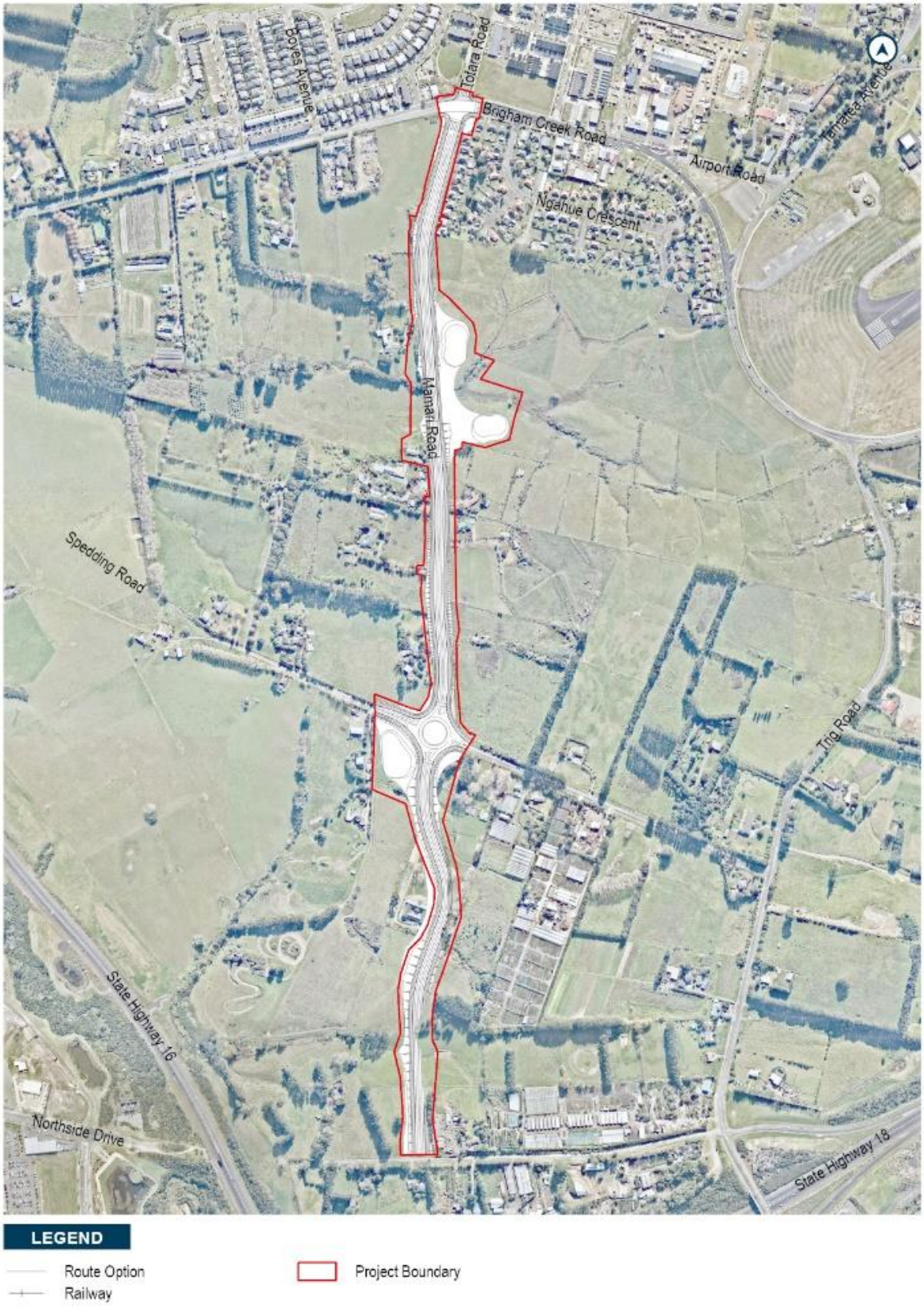


Figure 10-8: NOR W2 Māmari Road Upgrade Project Overview

10.3.3 Māmari Road upgrade

The key features of the Māmari Road upgrade include:

- The widening of the existing Māmari Road corridor (north of Spedding Road) from two lanes and a new section south of Spedding Road to Northside Drive to create a 30-metre wide four-lane urban arterial with separated active mode facilities on both sides of the corridor
- Three stream crossings over the Sinton Stream, Pikau Stream and another upper branch of the Pikau Stream
- Tie-ins with existing roads, stormwater ponds, and culverts. Refer to the drawings at Volume 3 for specific locations along the alignment
- Likely posted speed of 50kph, design speed (of which effects will be assessed on) is 60 kph
- Batter slopes to enable widening of the corridor, and associated cut and fill activities
- Vegetation removal along the existing road corridor
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 10-9 and Figure 10-10 show the indicative cross section, for further detail see Volume 3 Drawings.

Figure 10-9: NOR W2 Māmari Road upgrade typical cross-section – corridor

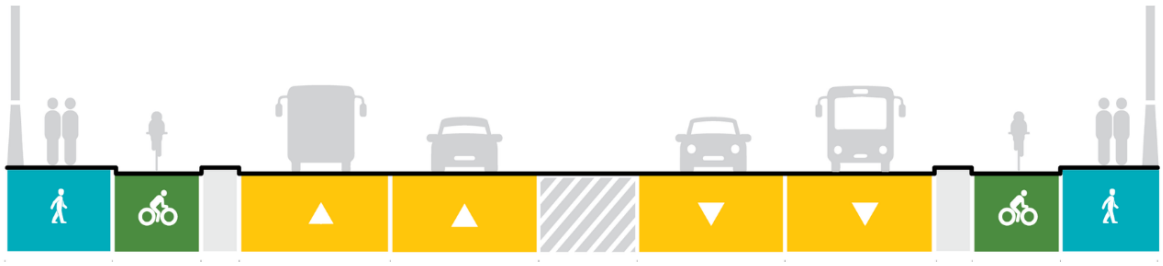
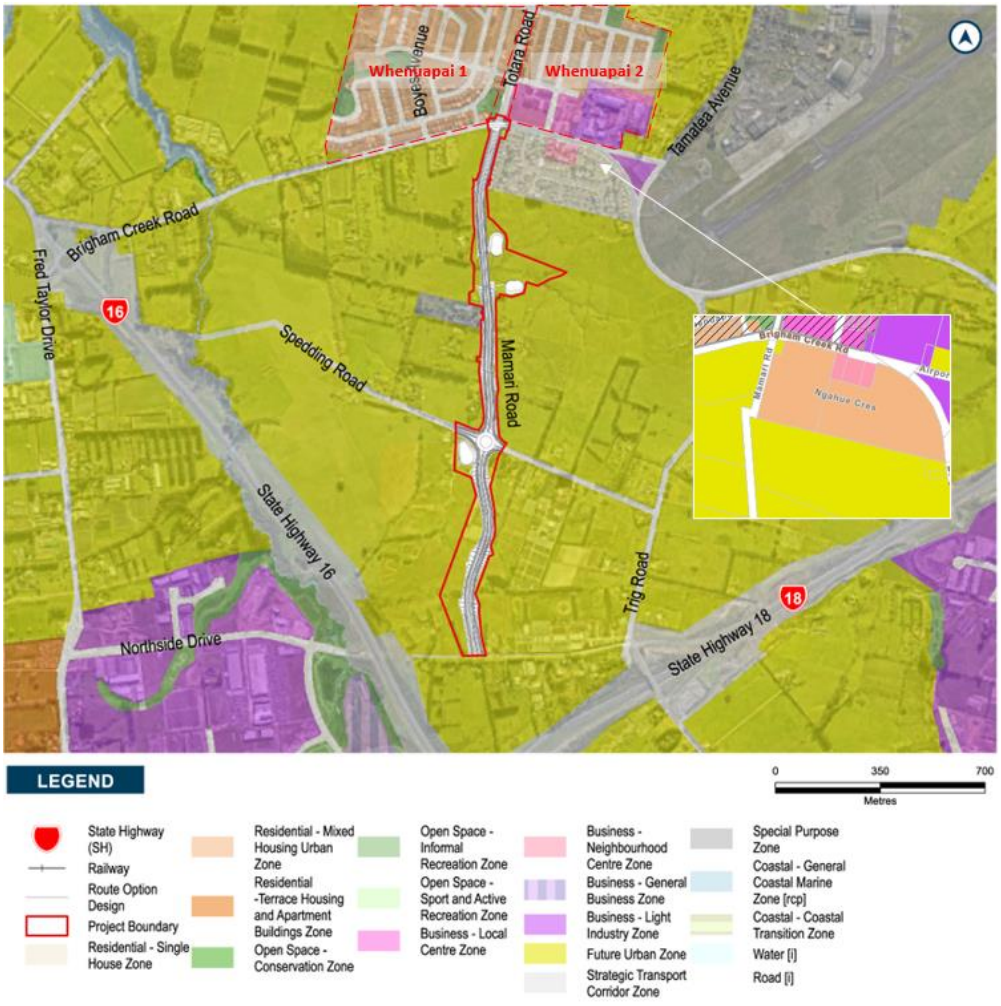


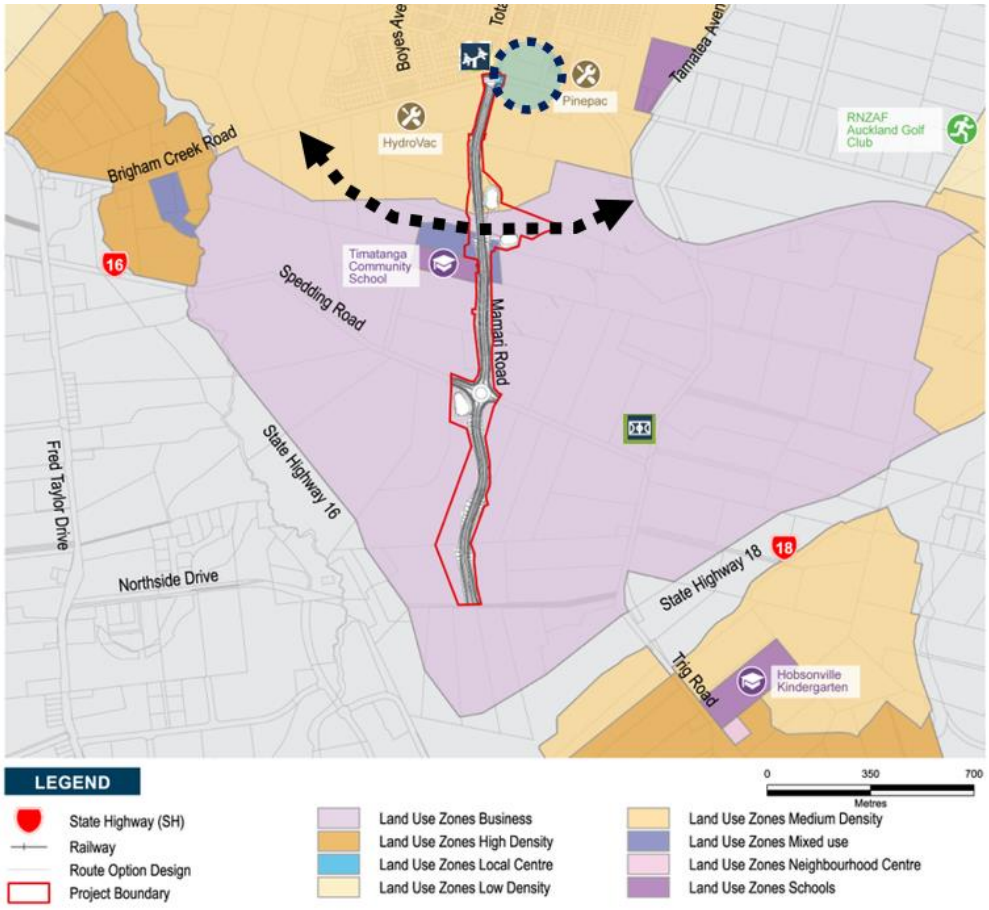
Figure 10-10: NOR W2 Māmari Road upgrade typical cross section - bridge

10.3.4 Māmari Road Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing and the likely future environment within which the extended and upgraded Māmari Road will be constructed, operated, and maintained. Table 10-3 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on adjacent land to the corridor.

Table 10-3: NOR W2 Māmari Road planning context

Planning Context	Provision
Land use – Existing AUP:OP zoning	 • FUZ – high likelihood of change • Residential – Single House Zone, Mixed Housing Urban Zone – low likelihood of change • Business – Local Centre Zone – low likelihood of change **Precincts** North of Māmari Road along Brigham Creek Road are Whenuapai 1 and Whenuapai 2. Call out shows area being investigated as part of Plan Change 78.

Planning Context	Provision
Land use – Whenuapai Structure Plan	 • Identifies industrial land use along the majority of the Māmari Road corridor. • The northern portion of the corridor is identified as having residential use on the west and airfield use in east (RNZAF base). • A town centre is identified at the intersection of Māmari Road and Brigham Creek Road, where the existing commercial use is (blue circle). • The black dash identifies an indicative Brigham Creek centre bypass. This bypass was investigated by Te Tupu Ngātahi, and the option discounted, refer to the Assessment of Alternatives at Appendix A.
Overlays	• Aircraft Noise Overlay • High Use Aquifer Management Areas Overlay.
Controls	• Macroinvertebrate index; and • Northern extent is within the Flow 1 control.
Plan changes	**Proposed Plan Change 86, 41-43 Brigham Creek Road Whenuapai:** Proposes to rezone to Residential Mixed Housing Urban Zone. **Proposed Plan Change 78, Intensification:** For Māmari Road, the changes affect the Northern tip of Residential - Single House Zone, increasing to Mixed Housing Urban. This increases the density of what's permitted to be built in the area.

Planning Context	Provision
Designation – transport related	#1473, Northside Drive – Roading purposes, AT • Māmari Road connects onto Northside Drive in the south. The existing Northside Drive is a rural standard road, providing local property access. Māmari Road has been designed to connect to a signalised intersection with the proposed Northside Drive. • SH16/18 Connections (a separate Waka Kotahi project) proposes to further upgrade Northside Drive to link to Westgate (see Table 9-6 for details). The Māmari Road NOR can connect to either.
Designation – non transport related	#4311, Defence purposes - protection of approach and departure paths (Whenuapai Air Base), MOD • The works will not affect this designations purpose #4310, Defence purposes (RNZAF base), MOD • AT will be required to obtain written consent under section 177 of the RMA for works within the existing Designation, from MOD

10.3.5 Human Environment

Section 10.3.5 sets out the existing and likely future human environment elements for Māmari Road, including a discussion of:

- Land use and form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration)

Further detail on each can be found in the relevant specialist reports, at Volume 4.

10.3.5.1 Land Use and Urban Form

Existing Environment

The existing land use surrounding the Māmari Road is rural in nature with single farm dwellings set back from the gravel road. Sections of the existing corridor is a paper road. The northern end of Māmari Road that connects into Brigham Creek Road is rural on the western side and has single dwellings as part of the RNZAF base on the eastern side. A Special Purpose – School Zone for Timatanga Community School is located in the centre of Māmari Road. The RNZAF base lies to the east of Māmari Road with landing lights in proximity to the corridor.

Likely Future Environment

The land surrounding the proposed Māmari Road upgrade is largely FUZ and forms part of the Whenuapai Structure Plan. This area is planned to undergo significant urban growth and change in the future. The likely future environment in which NOR W2 will operate is therefore assumed to be an urban or developing urban environment. The Whenuapai Structure Plan identified medium density residential in the northern section on the east side of Māmari Road, with light industrial land use proposed surrounding the remainder of the Māmari Road corridor.

The corresponding AUP:OP zoning for light industrial (as identified in the Whenuapai Structure Plan) is Business – Light Industry. This provides for industrial activities that do not generate objectionable

odour, dust or noise are anticipated. This includes manufacturing, production, logistics, storage, transport and distribution activities, however the final form of this FUZ is to be confirmed through plan changes.

10.3.5.2Transport

Existing Environment

Northern segment: between Brigham Creek Road and Spedding Road

The existing corridor for the first 200 metres is comprised of one vehicle lane in each direction on a rural standard corridor, without kerb and channel and a footpath on the eastern side only. It has a 50 km/h speed limit and 20-metre-wide cross section. The northernmost section turns into an unmarked turning head where the existing road has a rural character with two unmarked gravel vehicle lanes, an inconsistent form with no kerb and channel or footpaths. The road has an 80km/h speed limit and functions largely as a two lane no exit, property accessway. In 2020 between Spedding Road and Māmari Road, a 5 Day ADT of 130 vehicles per day during peak was recorded. There is no bridge connecting the two ends of Māmari Road over Sinton Stream.

Southern segment: Spedding Road to Northside Drive

There is no existing road corridor between Spedding Road and Northside Drive, the existing environment is rural with Northside Drive running east to west in the south.

Likely Future Environment

Māmari Road is identified as a key north south arterial road. If the project is not implemented, while Māmari Road could be upgraded to an urban standard, it would fail to achieve the strategic FTN role without a connection between Brigham Creek Road and Northside Drive and may continue to function as a two-lane no exit road from the future urban area and Brigham Creek Road or Spedding Road. The daily forecast traffic in 2048 is 15,800 to 16,900 vehicles (ADT) and ATs bus network forecasts 16 buses per hour on Māmari Road (approx. 1 bus every 5 minutes). The road would not be able to achieve this strategic function or accommodate the demand in its current form, even if sealed.

Other transport projects that are expected to form part of the future environment are:

1. Other NW Local Arterials Projects:

- Brigham Creek Road at the northern end of Māmari Road, the road will connect via a signalised intersection with Brigham Creek Road upgraded to four lanes (two either direction). Brigham Creek Road will provide active mode facilities also, enabling smooth transition for users.
- Existing Spedding Road bisects Māmari Road and will be upgraded from its current state to a two-lane urban road, connecting via a roundabout.

2. Non-Te Tupu Ngātahi Projects

- Northside Drive (under AT Designation 1473) is currently a rural terminating road. The corridor provides two traffic lanes from Fred Taylor Drive to Trig Road (North), with footpaths on both side and on road cycle facilities. Northside Drive will connect with a new bridge (Northside Drive bridge) across SH16, providing a direct link to Redhills and Westgate.
- SH16/18 connections, a Waka Kotahi Project, will change the layout and ramps between SH16 and 18, and plans to use the Northside Drive alignment, crossing Trig Road (North). It would (like Northside Drive Designation 1473) connect Northside Drive to Fred Taylor Drive via an overbridge. The Māmari Road corridor abuts the existing Northside Drive Designation 1473, with sufficient

space for a signalised intersection. It is expected that the SH16/18 Connections Project will construct this link, intersection form will be confirmed through this earlier project.

- The Northside Drive overbridge (via SH16/18 Connections or Designation 1473) will link Māmari Road to Westgate and the metropolitan centre, and the RTN station, providing a key link to the rapid public transport network. See Table 9-6: North West Transport Projects for further detail.

10.3.5.3 Historic Heritage and Archaeological Values

Existing Environment

There are no recorded historic heritage or archaeological sites within the designation footprint. However, the crossing of Sinton Stream which leads into the Totara Creek has the potential to uncover unrecorded archaeological features. For the sections of the corridor that are further away from waterways and on modified land the likelihood of historic heritage deposits is lower.

Likely Future Environment

The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

10.3.5.4 Community and Recreational Facilities

Existing Environment

Timatanga Community School at 9 Māmari Road is the only community or recreational facility adjacent to Māmari Road. There are existing community facilities north of Māmari Road, within the existing commercial area, however these are not within the designation footprint. They include a public park at 36 Whenuapai Drive and primary school at 18 Kupe Avenue, by Ministry of Education.

Likely Future Environment

Schools in the area are expected to remain and could grow in the wider area as the population increases.

As development occurs and the surrounding population grows more community and recreational facilities may be added to the wider Whenuapai area. On Māmari Road these are most likely to be located in the northern section, which the Structure Plan shows as residential and the existing Whenuapai Local Centre. The Structure Plan shows a general location for a 'Potential Multi-purpose Community Facility' centred on Brigham Creek Road, but adjacent to Māmari Road.

On the rest of the corridor additional community and recreational facilities are anticipated to be limited. This is because the land is proposed to be light industrial.

10.3.5.5 Noise and Vibration

Existing Environment

Māmari Road is currently located within a predominantly rural area with few dwellings in close proximity to the road corridor. The ambient noise environment is dominated by road traffic noise from vehicles on Māmari Road as well as aircraft noise associated with the RNZAF base. Noise levels in the rural environment of Whenuapai, currently zoned as FUZ, are anticipated to typically have low noise levels of 45 dB $L_{Aeq(24h)}$ to 55 dB $L_{Aeq(24h)}$. In areas near the busier sections of Brigham Creek Road (which intersects Māmari Road at its northern extent) existing noise levels are anticipated to be between 55 dB $L_{Aeq(24h)}$ and 65 dB $L_{Aeq(24h)}$. The area is impacted by the RNZAF base noise contours,

particularly the northern section. Receivers along this section of the corridor fall within the 65Ldn and 55Ldn noise contours.

Likely Future Environment

As discussed in Table 10-3, the Whenuapai Structure Plan indicates that the land surrounding Māmari Road is likely to be zoned for business land uses, except the northern section which is proposed for medium density residential alongside an existing Residential – Single House Zone. Urbanisation of FUZ will increase ambient noise levels compared to the current rural land use.

10.3.6 Natural and Physical Environment

Section 10.3.6 sets out the existing and likely future natural and physical environment elements for Māmari Road, including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context

Further detail can be found in the relevant specialist reports, at Volume 4.

10.3.6.1 Geology

Puketoka Formation has been mapped along the majority of the alignment. It has been assumed that this is the soft alluvial soils type which are organic in nature and have the potential to liquify. The geological conditions are not anticipated to vary in the future.

10.3.6.2 Hydrology and Natural Hazards

Existing Environment

Māmari Road is situated within the Whenuapai stormwater catchment. The catchment size is 1,931 ha and is drained by numerous creeks and streams, including Brigham Creek that forms the area's north-western boundary and Waiarohia Inlet which forms the area's north-eastern boundary. The catchment has two primary stream catchments - Totara Creek flowing to Brigham Creek and Waiarohia Stream flowing to the Waiarohia Inlet.

The transport corridor crosses two streams, Sinton Stream and Pikau Stream, and an existing pond west of Māmari Road that discharges into Pikau Stream.

Likely Future Environment

Although urban development is anticipated the hydrological environment and natural hazard conditions are not expected to significantly vary in the future, accounting for anticipated urban development managing its flooding effects. The 100-year ARI flood maps with Maximum Probable Development (MPD) and existing terrain show existing flooding issues at the proposed culvert crossings, Sinton Stream bridge crossing and flooding of properties upstream of Ngahue Crescent, Whenuapai.

10.3.6.3 Terrestrial Ecology

Existing Environment

Habitats

The Māmari Road area is dominated by exotic grassland with woody vegetation mostly in the form of shelterbelt and roadside planting. Mature shelterbelt and roadside planting have been classified as exotic treeland, the corridor is predominantly exotic grassland assessed as having low value, with exotic plantings and treeland having moderate value. Exotic shrub mostly consists of gorse and privet and is constrained to isolated areas next to the existing road corridor and the stream/wetland corridors.

Four streams are within the designation footprint, three are classed as permanent and one as intermittent. All streams have existing partial barriers to fish passage. Three natural wetlands as defined under NES-FW are associated with Māmari Road, they are:

- Wetland (W2-W1) at 28A Māmari Road is a large channelised system that drains upper Sinton Stream catchment. The wetland retains a relatively high degree of hydrological integrity despite historical attempts to drain the catchment. The wetland is categorised as having high value
- Wetland (W2-W2) at 5 Spedding Road is a valley bottom system. The wetland has been affected by historical drainage attempts and straightening of the Pikau Stream. The wetland is categorised as having moderate value
- Wetland (W2-W3) at 3 Spedding Road has been modified by agriculture and potential past realignment of upper parts. The steep topography indicates the hydrology may be more consistent with stream flows, however, is unable to be excluded at a desktop level. The wetland is categorised as having moderate value.

Species

Exotic treeland habitat around Sinton Stream and north of the proposed Māmari and Spedding Road intersection could provide suitable habit for bats. Low levels of bat activity were detected in previous assessments for the area along Totara Creek, therefore bat use of the area cannot be excluded from consideration.

Incidental observations of bird species were noted. The most commonly noted birds were introduced species, including Blackbird, House sparrow, Magpie, Myna and Song Thrush, as well as not threatened native species including Pukeko, Welcome Swallow and Spur Winged Plover.

Indigenous lizards were not identified during opportunistic searches however Copper skink (At Risk – Declining) is widespread and frequently recorded within highly modified habitats such as exotic scrub and rank grassland, such as that within the designation footprint. This species is highly likely to occur within and adjacent to the corridor.

Likely Future Environment

The AUP:OP places emphasis on the protection and enhancement of existing watercourses such as Sinton Stream, wetlands and areas of significant natural value, such riparian vegetation. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Mature trees associated with roadside and shelterbelt are expected to be removed in the Future Environment, as vegetation clearance, excluding within riparian zones, notable trees and certain street trees, is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.

10.3.6.4Topography and Landscape Context

Existing Environment

The landform is gently sloping with depressions around the stream corridors and wetland features. The northern end at the intersection with Brigham Creek Road has existing residential properties east of the corridor, key landscape identifiers include:

- Standalone elements of indigenous vegetation, hedgerows, shelterbelts, trees and shrubs along field boundaries; native riparian vegetation along rivers and wetland areas, exotic pastoral grassland contribute to the landscape character of the surrounding landscape
- Rural residential properties along the road tend to have a belt of native and non-native planting along the road frontage. No notable trees are in proximity to the corridor. Two streams, Sinton and Pikau streams cross through the middle of the corridor. The landscape character value is low within the context of the existing road reserve portion.

Likely Future Environment

The land surrounding the transport corridor will witness a significant change from rural to urban land use character as urbanisation occurs. It is anticipated that the quality and natural character values of riparian and wetland environments, such as Sinton and Pikau streams and the existing landform will be retained and, in some instances, enhanced as urban development progresses. This is in accordance with the policy direction of the AUP:OP and Whenuapai Structure Plan which generally seek to protect these features. Urbanisation will also likely involve the implementation of street and public open space planting and landscaping within future development.

10.4 NOR W3 - Brigham Creek Road

10.4.1 Project Description

Brigham Creek Road is an existing arterial road that extends from the intersection with SH16 in the west to the intersection with Hobsonville Road to the east. The upgrade extends from Totara Creek bridge in the west, to Kauri Road near the existing SH18 Brigham Creek Interchange in the east.

The principles of corridor design for Brigham Creek Road are covered in Section 9, corridor specific design and receiving environment features are discussed in this section. Further details of the existing and likely future environment are in the relevant technical assessments (Volume 4).

10.4.2 Overview

Brigham Creek Road upgrade will provide an east-west connection for all modes within Whenuapai and access to SH16, SH18 and local destinations such as Hobsonville and Kumeū-Huapai. This includes upgrades to the intersections with Totara Road/Māmari Road, Trig Road (North) and Kauri Road, all intersections along Brigham Creek Road are proposed to be signalised, with the exception of Trig Road (North), which is proposed as a roundabout.

A new designation is proposed to allow sufficient land to upgrade Brigham Creek Road from its current width of 20 metres to a 30-metre wide four-lane arterial cross-section with active modes on both sides. The proposed designation footprint includes sufficient space for the intersections with Māmari Road, Trig Road (North) and Kauri Road as well as tie-ins. The footprint shows the envelope proposed to construct, operate and maintain Brigham Creek Road and all its ancillary components, including construction area, stormwater infrastructure, bridges, batter slopes and retaining walls, see Figure 10-11.

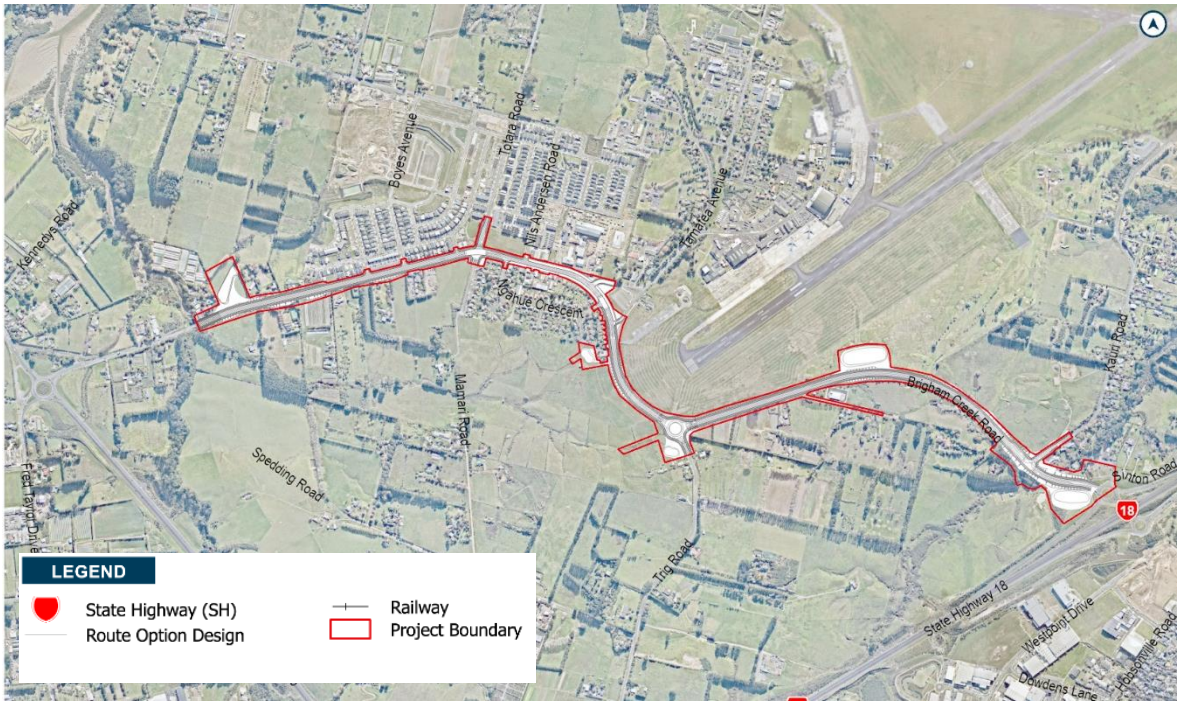


Figure 10-11: NOR W3 Brigham Creek Road upgrade overview

10.4.3 Brigham Creek Road upgrade

The key features of the Brigham Creek Road upgrade include:

- Widening of Brigham Creek Road from its existing two-lane arterial to a 30m wide four-lane arterial cross-section with active mode facilities on both sides.
- Upgrades to intersections and tie-ins with Totara Road/Māmari Road, Trig Road (North) and Kauri Road. All intersections along Brigham Creek Road are proposed to be signalised, with the exception of the intersection of Brigham Creek Road and Trig Road (North) which is proposed as a roundabout intersection.
- Tie-ins with existing roads, stormwater dry ponds, wetlands and culverts.
- Likely posted speed of 50km/h, design speed (of which effects will be assessed on) is 60 km/h
- Batter slopes to enable widening of the corridor, and associated cut and fill activities.
- Vegetation removal along the existing road corridor.
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 10-12 and Figure 10-13 shows the indicative cross section, for further detail see Volume 3 Drawings

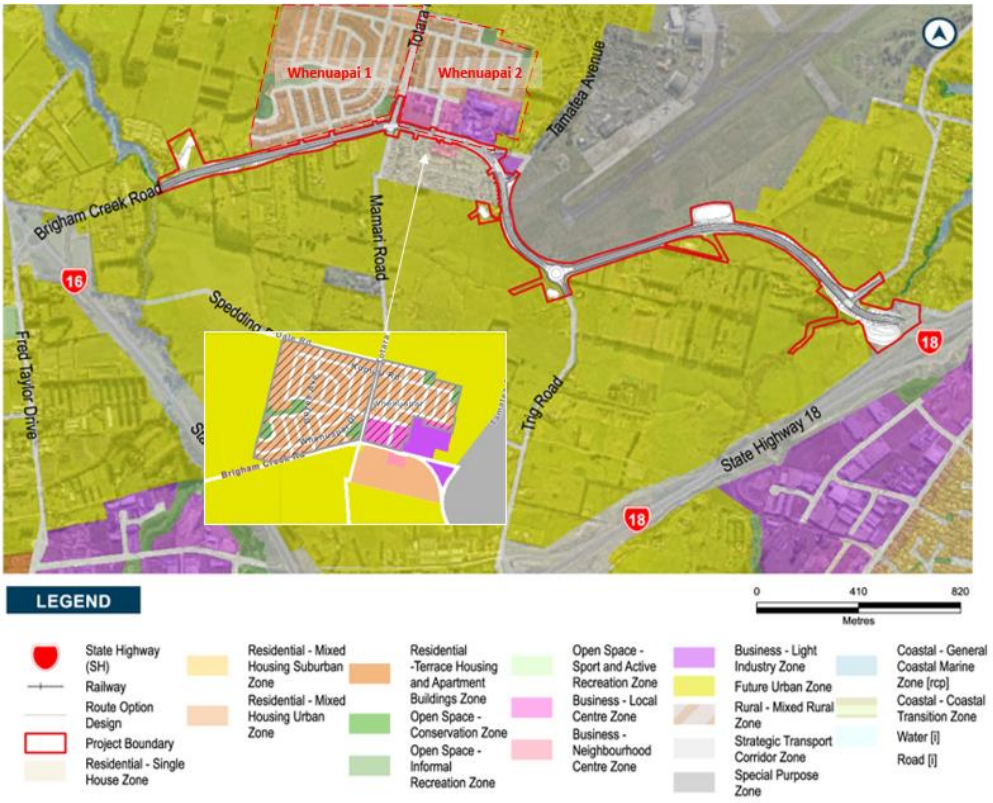
Figure 10-12: NOR W3 Brigham Creek Road upgrade typical cross-section – urban

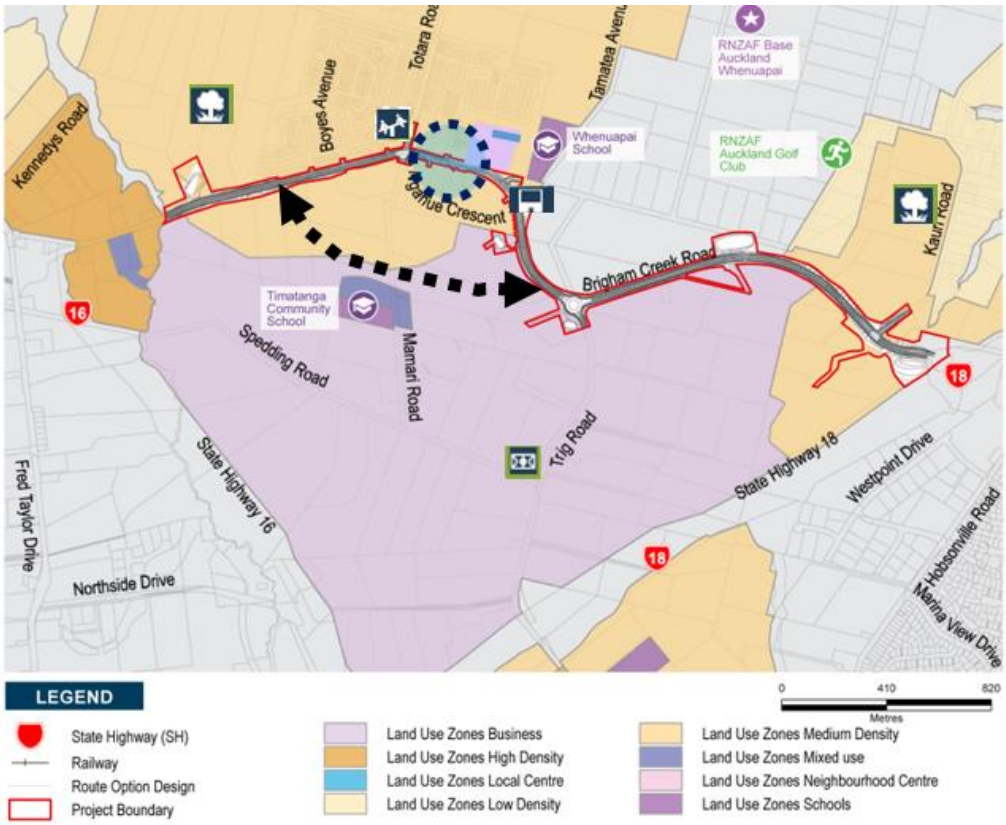
Figure 10-13: NOR W3 Brigham Creek Road upgrade typical cross section – town centre

10.4.4 Brigham Creek Road Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the upgraded Brigham Creek Road will be constructed, operated and maintained. Table 10-4 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on adjacent land to the corridor.

Table 10-4: NOR W3 Brigham Creek Road planning context

Planning Context	Provision
Land use – Existing AUP:OP zoning	 • FUZ – high likelihood of change • Special Purpose Zone – low likelihood of change • Residential – Single House Zone - low likelihood of change • Business – Local Centre Zone - low likelihood of change **Precincts** • Whenuapai 1 • Whenuapai 2 Call out shows area being investigated as part of Plan Change 78.

Planning Context	Provision
Land use – Whenuapai Structure Plan	 Identifies: • Medium density residential in east and west. Business on south side • Black dash identifies a potential Brigham Creek bypass, this was investigated by Te Tupu Ngātahi and dismissed as an option - see Assessment of Alternatives (Appendix A)
Overlays	• Closest Significant Ecological Areas (SEAs) are at either end of Brigham Creek Road, but outside the project boundaries. (eastern SEA_T_2034 Terrestrial, SEA-M2-57b Marine 2) (Western SEA_T_4733 terrestrial) • High Use Aquifer Management Areas Overlay • National Grid Yard Uncompromised • National Grid Subdivision Corridor • Aircraft Noise Overlay (RNZAF Airbase)
Controls	• Arterial road (along length of Brigham Creek Road) • Stormwater Management Area Control – Flow 1 • Macroinvertebrate Community index
Plan Changes	**Plan Change 69, Approved:** Identified industrial land, aligned with Auckland Council Whenuapai Structure Plan zoning (western end of Brigham Creek Road). Decision amended to retain FUZ adjacent Brigham Creek Road. **Plan Change 86, Notified:** Identified at 41-43 Brigham Creek Road Whenuapai. Proposes to rezone to Residential Mixed Housing Urban Zone. **Plan Change 78, Notified:** identified at the residential area of Ngahue Crescent. Changing the zoning from Single House Zone to Mixed Housing Urban. Whenuapai Precincts are excluded from PC78.

Planning Context	Provision
Designation – non transport related.	#4311, Defence purposes - protection of approach and departure paths (RNZAF base), MOD • The works will not affect this designation purpose #4310, Defence purposes (RNZAF base), MOD • AT will be required to obtain written consent under section 177 of the RMA for works within the existing Designation, from MOD #7504, Telecommunication and radiocommunication and ancillary purposes, Spark New Zealand Trading Limited • AT will be required to obtain written consent under section 177 of the RMA for works within the existing Designation, from Spark

10.4.5 Human Environment

Section 10.4.5 sets out the existing and likely future human environment elements for Brigham Creek Road, including a discussion of:

- Land use and form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration)

Further detail on each can be found in the relevant specialist reports, at Volume 4.

10.4.5.1 Land Use and Urban Form

Existing Environment

The existing land use surrounding Brigham Creek Road is largely rural, consisting of low density rural residential dwellings and rural businesses, except within the Whenuapai urban area and the RNZAF base. Along Kauri Road in the west, there is an area of residential housing (in FUZ) that resembles of low density residential rather than rural character. The SH18 corridor forms a significant structure in the western edge, separating Whenuapai from Hobsonville.

The Whenuapai urban area consists of a range of residential and business uses. The residential area to the south of Brigham Creek Road is low-density residential dwellings, with the residential area to the south predominantly medium-density residential dwellings (with parts of this area currently under development). The Whenuapai urban area contains a neighbourhood centre to the south of Brigham Creek Road containing a range of local businesses such as food outlets, retail, medical clinics and automotive services. The north side of Brigham Creek Road contains businesses such as a service station, school, timber supply yard and other industrial yard activities.

Brigham Creek Road also runs adjacent to the RNZAF base, which occupies a large portion of the land to the north of Brigham Creek Road to the east of the Whenuapai urban area. The MOD Designation extends wider than the Special Purpose Zone and includes the NZDF housing (Residential – Single House Zone) on the south side of Whenuapai.

Likely Future Environment

The land surrounding the proposed Brigham Creek Road upgrade is largely zoned FUZ and forms part of the Whenuapai Structure Plan. This area is planned to undergo significant growth and change in the future. The likely future land use environment in which NOR W3 will operate is therefore assumed to be an urban or developing urban environment. The Whenuapai Structure Plan identified a mix of high and medium density residential and business land use on the south side of the road corridor, with medium density residential identified on the north side of the road corridor (see Table 10-4).

10.4.5.2Transport

Existing Environment

The existing Brigham Creek Road connects from the roundabout at SH16 with Fred Taylor Drive in a curving alignment across Totara Creek, to the existing commercial zone, wrapping around the southern edge of the RNZAF base to connect to SH18 and via a series of roundabouts to Hobsonville Road. The Brigham Creek Road upgrade starts east of Totara Creek and ends at SH18, the conceptual design excludes the two SH interchanges. There is an existing 114 bus service on Brigham Creek Road connecting Hobsonville Point, Whenuapai and Westgate which operates every 60 minutes 7 days a week during peak travel times.

Totara Creek to Totara Road

Corridor form is inconsistent with formal kerb and channel, 1.8m footpath, bicycle lane, and indented parking adjacent to the recent development. Has a semi-rural character with two vehicle lanes (one in each direction) and an 80km/h speed limit. Between SH16 and Joseph McDonald Drive, the road carried a 5 Day ADT of approximately 14,400 vehicles per day, and 1,200-1,300 vehicles per hour during the morning and afternoon peak hours.

Totara Road to Tamatea Road

Corridor form is consistent with formal kerb and channel and narrow 1.5 metre footpaths on both sides and a continuous 1.8 metre bicycle path on the northern side. Has a semi-urban character with two vehicle lanes (one in each direction) and a 50km/h speed limit. Between Airport Road and the Speed Derestriction the road carried a 5 Day ADT of approximately 15,000 vehicles per day, and 1,300-1,400 vehicles per hour during the morning and afternoon peak hours.

Tamatea Avenue to SH18

Corridor form is inconsistent with formal kerb and channel in some locations, a continuous 3 metre shared path/footpath on the northern side, and discontinuous narrow 1.5 metre footpath on the southern side. The road has a semi-rural character with two vehicle lanes (one in each direction) and an 80km/h speed limit. Between SH16 and Joseph McDonald Drive the road carried a 5 Day ADT of approximately 14,400 vehicles per day, and 1,300-1,600 vehicles per hour during the morning and afternoon peak hours.

Likely Future Environment

The forecast ADT on Brigham Creek Road in 2048 varies from 22,900 vehicles between SH16 and Totara Road, dropping at Totara Road to 12,500 and increasing after Tamatea Avenue up to SH18 to 26,600 vehicles. The indicative 2048 AT bus network forecasts is for a bus every 7 minutes in the peak and every 20 minutes outside of peak periods along Brigham Creek Road. With the area of Whenuapai that is urbanised, greater demand pressure will be placed on Brigham Creek Road.

Other transport projects that are expected to form part of the future environment include:

- Other NW Local Arterials:
    - Māmari Road and Trig Road (North). Both of these corridors provide two lanes of traffic, with active mode facilities. Māmari Road connects via a signalised intersection at the centre of Whenuapai and is expected to play a key function connecting to the rapid transit network at Westgate. Trig Road (North) connects via a roundabout and will link the area to SH18 on ramps and in the south, Hobsonville Road. These roads have been planned together and form part of the key Whenuapai roading network
- NW Strategic Package
    - The Brigham Creek Interchange will connect at Sinton Stream Bridge to the Brigham Creek upgrade and provide a direct connection between Fred Taylor Drive in Redhills North and Whenuapai. The connections will enable local trips to be separated from strategic motorway journeys and continues provision for active modes to enable a seamless transition between the two areas
- Non-Te Tupu Ngātahi Projects
    - SH16/18 Connections is a planned upgrade to the tie ins between SH16 and SH18 and will impact the interchanges at Brigham Creek Road and SH16 and SH18. This project is not yet at NOR stage and details to be confirmed, however access will be retained to Hobsonville Road and the motorway network
- A future RTN station is proposed to be located near Brigham Creek (connecting to RTN) however exact location is not yet confirmed.

See Table 9-6: North West Transport Projects for further detail.

10.4.5.3Historic Heritage and Archaeological Values

Existing Environment

There are no recorded historic heritage sites within the proposed designation footprint that will be impacted by the upgraded transport corridor, however within a 200 m buffer of the corridor the following features are present:

- One archaeological site is recorded in the Auckland Council Cultural Heritage Inventory (CHI) (13579, R11/2084) at the edge of Totara Creek
- A group of notable trees is recorded in the CHI (2318) and scheduled in the AUP:OP (1813) at 10-12 Airport Road, Whenuapai.

Two high risk areas are at the Waiarohia Stream crossing and Totara Creek crossing. Both stream crossings have had little earthworks undertaken since 1940 and if there are any subsurface archaeological features in the vicinity there is a high risk that they are still in situ. Both are major streams with a deep channel and would have been most likely used in pre-Contact times for waka travel. The likelihood of historic heritage deposits further away from waterways and on modified land is lower.

Likely Future Environment

The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

10.4.5.4 Community and Recreational Facilities

Existing Environment

Within the Whenuapai urban area is the Whenuapai Settlement Playground, a small recreation and open space area west of the town centre. The closest school currently is Whenuapai (Primary) School and Whenuapai Kindergarten, which is located between Whenuapai and the RNZAF base to the north of the corridor.

Likely Future Environment

Existing open space areas and recreational activities are expected to remain unchanged. Schools in the area are expected to remain and could grow as the population in the area increases. It is likely additional community facilities will be provided as development occurs in the FUZ and the population in the surrounding area grows.

10.4.5.5 Noise and Vibration

Existing Environment

Brigham Creek Road runs through an existing rural environment at each end, with the middle section being a mix of town centre, industrial and suburban environments. The noise environment is dominated by road traffic noise from vehicles on Brigham Creek Road as well as aircraft noise associated with the RNZAF base. Noise levels in the rural environment of Whenuapai, currently zoned as FUZ, are anticipated to typically have low noise levels of 45 dB $L_{Aeq(24h)}$ to 55 dB $L_{Aeq(24h)}$. In areas near the busier sections of Brigham Creek Road existing noise levels are anticipated to be between 55 dB $L_{Aeq(24h)}$ and 65 dB $L_{Aeq(24h)}$.

The RNZAF base also influences the noise levels in the Whenuapai area, particularly in the central section of Brigham Creek Road. Receivers along this section of the corridor fall within the 65Ldn and 55Ldn noise contours (see Figure 10-3).

Likely Future Environment

As discussed in Table 10-4, the Whenuapai Structure Plan indicates that the land surrounding Brigham Creek Road is likely to be zoned for a range of business, light industrial and residential land uses. This will result in an increase in ambient noise levels as the area urbanises.

10.4.6 Natural and Physical Environment

Section 10.4.6 sets out the existing and likely future natural and physical environment elements for Brigham Creek Road, including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context.

Further detail can be found in the relevant specialist reports, at Volume 4.

10.4.6.1 Geology

Puketoka Formation has been mapped along a majority of the alignment. The geological conditions are not anticipated to vary in the future.

10.4.6.2 Hydrology and Natural Hazards

Existing Environment

Brigham Creek Road is situated within the Whenuapai stormwater catchment. The transport corridor crosses several overland flow paths and the Waiarohia Stream. Existing flood prone areas from Auckland GeoMaps are evident where overland flow paths and streams traverse the road corridor. The 100-year ARI flood maps from the Auckland Council catchment model show existing flooding issues at the location of the proposed culvert crossings across Waiarohia Stream and properties on Brigham Creek Road at: 36, 41-43, 44-48, 45, 115, 117, 119, 121 and 141 Brigham Creek Road. The existing culvert crossing over Waiarohia Stream shows overtopping of the road.

Likely Future Environment

Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects.

10.4.6.3 Terrestrial Ecology

Existing Environment

There are two SEAs in proximity to the NOR, both associated with the two main streams at Totara Creek and Waiarohia Stream. The Totara Creek SEA_T_2034 covers associated riparian vegetation and is considered an important migration pathway for threatened fish species including īnanga. North of the proposed designation footprint, on the coastal side, is SEA-M2-57b within the Coastal Marine Area (CMA), see Figure 10-14.

Figure 10-14: SEAs associated with Totara Creek Riparian vegetation

The Waiarohia Stream SEA_M2_57b covers the inner Waitematā Harbour, which contains various mudflats and mangrove-lined inlets and creeks, with a natural transition between terrestrial, freshwater and marine habitats. The habitat is an important migration corridor for indigenous freshwater fish and for coastal fringe bird species.

Habitats

The Brigham Creek Road habitat mainly consists of exotic grassland and brownfield. There are some locations of higher value habit in form of treeland present as shelter belts and riparian vegetation near Waiarohia Stream.

Eight stream branches were identified within a 100 metre buffer, however only six are within the designation footprint. Of these, four are classed as permanent and two as intermittent, two streams were classified via desktop assessment and the remainder through site investigation. Four streams were identified as having partial barriers to fish migration and two had total barriers. Five wetlands have been identified as associated with the transport corridor. Four of these met the definition under the NES-FW as natural wetlands, one was classed as artificial. The natural wetlands identified are:

- W3-W2 at 20-22 Brigham Creek Road, located north of Brigham Creek drains a small sub catchment of Slaughter House Stream. The wetland is affected by historical drainage and vegetation clearance
- W3-W4 – 96 Trig Road (North), is associated with a headwater stream that has been historically drained and is affected by the straightening of the stream and historical agricultural drainage attempts. A site visit at regional consent stage may determine that this wetland is artificial, as historical presence could not be confirmed
- W3-W5 at 153 Brigham Creek Road near the Spark Designation 7504, represents a channelled valley bottom system with areas of permanent and seasonal saturation. Native sedges represent a relatively large portion of the vegetation cover and represents a Critically Endangered vegetation type, see Figure 10-15
- W3-W7 at 150-152 Brigham Creek Road, is historically represented by an unchanneled valley bottom system but has been modified by a large upslope pond and a present-day channel.

The stormwater wetland near SH18 is categorised as high value ecologically but is an artificial wetland for infrastructure purposes under the NES-FW.

Figure 10-15: Wetland W3-W5, high value critically endangered wetland type

Species

The Waiarohia Stream and associated habitat may enable bat movement through the wider area and provide potential roost and foraging habit supported by mature shelterbelts and exotic treeland. Records confirm bat activity within 10 km of the Whenuapai area, therefore bat use of the area cannot be excluded from consideration.

Incidental observations of bird species were noted, areas of water such as the existing stormwater pond at SH18 near Brigham Creek Road may provide habitat for At Risk – Declining spotless crake. Other birds observed were generally not threatened natives, including Myna, Pukeko, Spur Winged Plover, Swamp Harrier and Welcome Swallow, as well as introduced Myna.

Copper skink (At Risk – Declining) has been recorded within 2 km of Brigham Creek Road. The species is versatile and utilises highly modified habitats such as exotic scrub and rank grassland, like that adjacent to the proposed designation footprint. This species is highly likely to occur within and adjacent to the proposed designation footprint.

Likely Future Environment

The AUP:OP places emphasis on the protection and enhancement of existing watercourses and areas of natural value, such as the Totara Creek, and Waiarohia Stream. This is assumed to result in permanent streams, areas of indigenous vegetation and features of ecological value such as natural wetlands generally being avoided and retained in the likely future environment. Sediment and pollutants are assumed to be treated and controlled. Mature trees associated with roadside and shelterbelt are expected to be removed in the Future Environment, as vegetation clearance, excluding within riparian zones, notable trees and certain street trees, is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.

10.4.6.4Topography and Landscape Context

Existing Environment

The corridor has a central high point, and the landform descends gently towards the Waiarohia Stream to the east and the Totara Creek to the west. Rolling pastoral fields surround the western and eastern extents of the site. The RNZAF base is a substantial feature within the landscape with development restrictions which alter the landscape. Key landscape features include:

- Standalone elements of indigenous vegetation, hedgerows, shelterbelts, trees and shrubs along field boundaries; native riparian vegetation along rivers and wetland areas, exotic pastoral grassland and non-native stand-alone trees within the streetscape of the existing urban areas
- The RNZAF base and its approaches are devoid of tall vegetation and trees due to air safety standards
- Trees within the streetscape are limited, however landmark trees are located within the southern boundary of the Whenuapai Settlement Park. There are no notable trees within the corridor
- Two streams, Totara Creek at the eastern end of the NOR and Waiarohia Stream at the western end of the NOR, cross the corridor.

The landscape character value is categorised in the Landscape Assessment (Volume 4) as low within the context of the existing road reserve and is moderate within areas in proximity to SEA.

Likely Future Environment

The land surrounding the Project will witness a significant change from rural to urban character. The quality and natural character values of riparian and wetland environments, such as the Totara Creek

and Waiarohia streams and the existing landform, are generally expected to be retained and, in some instances, will be enhanced as urban development progresses. This is in accordance with the policy direction of the AUP:OP and intentions of the Whenuapai Structure Plan.

10.5 NOR W4 - Spedding Road

10.5.1 Project Description

Spedding Road is an existing road from Trig Road (North) in the east, intersecting with the southern portion of the existing Māmari Road. Spedding Road is currently no exit and services rural lots, with the western section dropping to an unformed paper road to SH16. It is proposed to extend Spedding Road east and west through Whenuapai, with a new intersection over SH16 to Fred Taylor Drive and Hailes Road in Redhills, and east from Trig Road (North) via a new greenfields section connecting to Hobsonville Road over SH18.

The principles of corridor design for Spedding Road are covered in Section 9, corridor specific design and environment features are discussed in this section. Further details of the existing and likely future environment are in the relevant technical assessments (Volume 4).

10.5.2 Overview

Spedding Road upgrade and extension will provide a connection between residential land in Redhills North, employment land in Whenuapai and the proposed RTN station (a non-Te Tupu Ngātahi project). This connection will reduce the severance created by the State Highway and provide a crossing that supports local movement, via cars, public transport and active modes.

The existing corridor will be upgraded from a 14 m cross section to a 24 m wide two-lane arterial with separated active mode facilities on both sides. The intersections of Spedding Road with Fred Taylor Drive, Trig Road (North) and Māmari Road are proposed to be roundabouts. The proposed designation footprint shows the envelope proposed to operate and maintain Spedding Road and all its ancillary components, including construction area, stormwater infrastructure, batter slopes and retaining walls, see Figure 10-16.

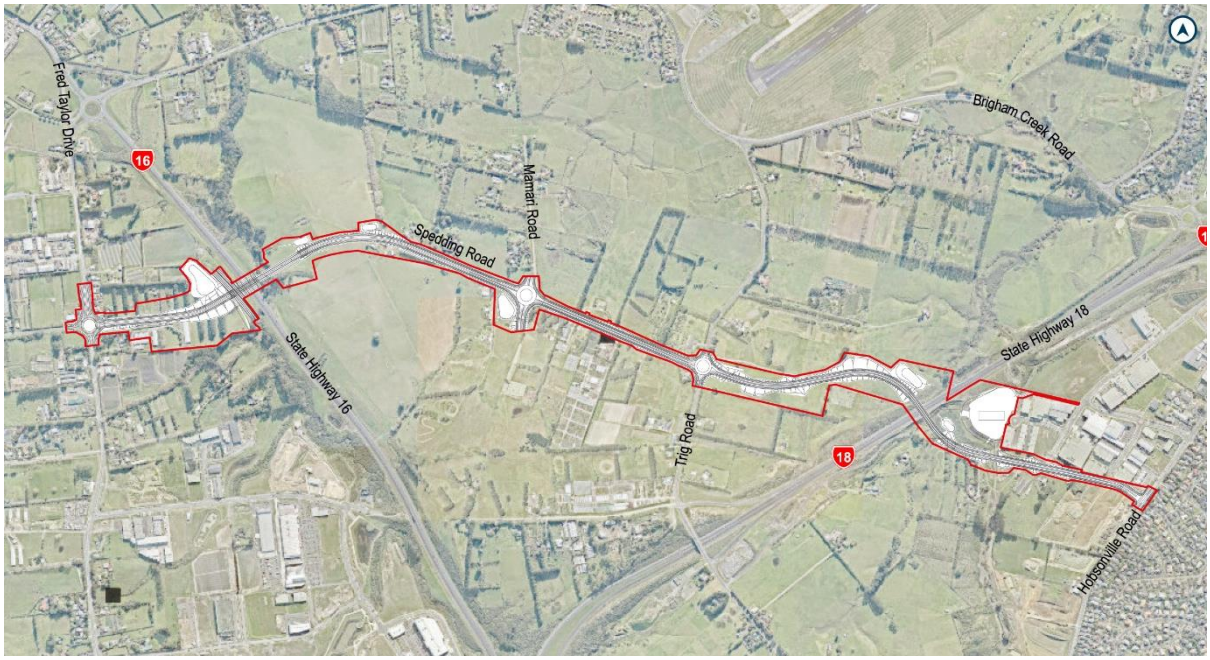


Figure 10-16: NOR W4 Spedding Road upgrade and extension overview

10.5.3 Spedding Road upgrade

The key features of the Spedding Road upgrade and extension include:

- Upgrade of the existing 14 m wide corridor and formation of new corridor to a 24 m wide two-lane arterial cross section with separated cycle lanes and footpaths on both sides
- New roundabouts at the intersection of Fred Taylor Drive in the west, Māmari Road, and Trig Road (North) and signals at Hobsonville Road in the east
- A bridge crossing the SH16 motorway near Totara Creek and SH18 motorway near Rawiri Stream
- Stormwater ponds and culverts
- Likely posted speed of 50 kph, design speed (of which effects will be assessed on) of 60 kph
- Batter slopes to enable widening of the corridor, and associated cut and fill activities
- Vegetation removal along the existing road corridor

Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas. Figure 10-17 and Figure 10-18 shows the indicative cross sections, for further detail see Volume 3 Drawings.

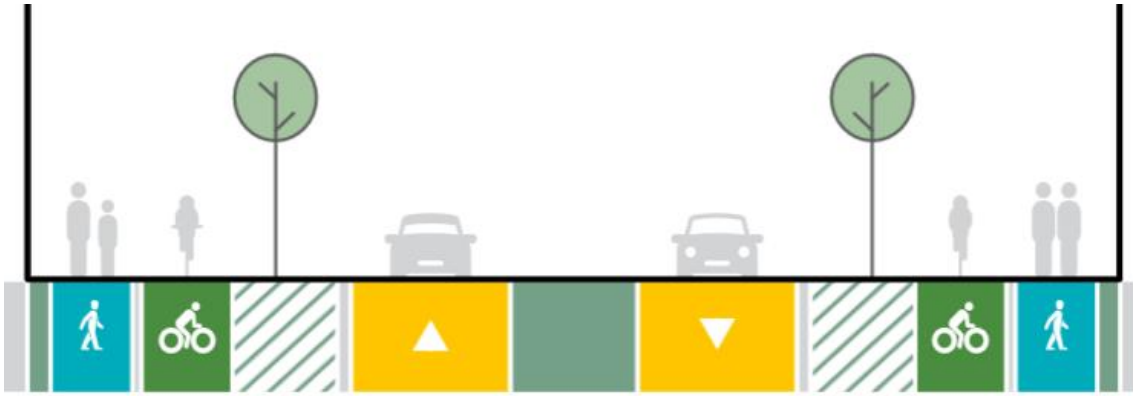


Figure 10-17: NOR W4 Spedding Road typical cross section – corridor and bridge

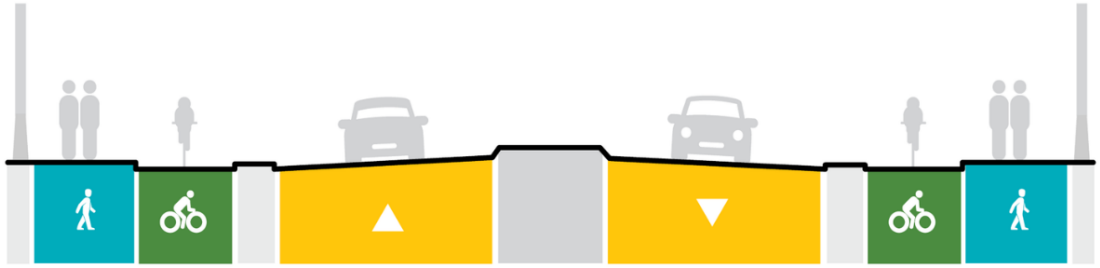


Figure 10-18: NOR W4 Spedding Road typical Cross section – two lane bridge

10.5.4 Spedding Road Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which Spedding Road will be constructed (upgraded and extended), operated and maintained. Table 10-5 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on adjacent land to the corridor.

Table 10-5: NOR W4 Spedding Road planning context

Planning Context	Provision
Land use – Existing AUP:OP zones	• FUZ - high likelihood of change • Strategic Transport Corridor - low likelihood of change • Business – Light Industry Zone – low likelihood of change • Open Space – Informal Recreation Zone, Conservation Zone - low likelihood of change **Precincts** • Hobsonville Corridor sub-precinct C
Land use – Whenuapai Structure Plan	 Identifies: • Business – generally south of Brigham Creek Road alignment • Medium density housing • Proposed Sports Park - near Spedding Road and Trig Road (North) intersection • RTN station - near Spedding Road and SH18
Overlays	• Significant Ecological Areas - SEA_T_2034 • High-Use Aquifer Management Areas [rp] • Aircraft Noise – RNZAF base • National Grid Corridor
Controls	• Arterial Road • Macroinvertebrate Community Index • Stormwater Management Area Control - Flow 1 and Flow 2
Plan Changes	**Plan Change 69, Approved:** Business Light Industry Zone - at western end of proposed Spedding Road alignment
Designation – transport related	#6741, State Highway 16 and 18 - Westgate to Whenuapai and Hobsonville, Waka Kotahi • AT will be required to obtain written consent from Waka Kotahi under section 177 of the RMA for works within their designation #1468, Road Widening - State Highway 16 (Westgate to Whenuapai), AT #1433, Road - Fred Taylor Drive Transport Corridor, AT #1437, NOR Hobsonville Road Transport Corridor, AT #1467, Road Widening - Hobsonville Road, AT • These are existing designations where AT is the Requiring Authority (and so written consent is not required). Fred Taylor Drive and Hobsonville Road are included in the NW Local Arterials Package and the Spedding Road design has accounted for and will integrate with, the future form of these roads

Planning Context	Provision
Designation – non- transport related	#4311, Defence purposes - protection of approach and departure paths (RNZAF base), MOD • The works will not affect this designation's purpose #9377, Northern Interceptor Shared Corridor, Watercare Services Ltd • AT will be required to obtain written consent from Watercare under section 177 of the RMA for works within their designation

10.5.5 Human Environment

Section 10.5.5 sets out the existing and likely future human environment elements for Spedding Road, including a discussion of:

- Land use and urban form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration)

Further detail on each can be found in the relevant specialist reports, at Volume 4.

10.5.5.1Land Use and Urban Form

Existing Environment

The land use surrounding the proposed Spedding Road corridor is predominantly rural, comprised of single dwellings set back from the road and containing general rural activities and other businesses including transportation. The eastern extent crosses over SH18 and contains light industrial uses (within the Hobsonville Corridor Precinct) to the north with various businesses, warehouses and storage facilities. The western extent crosses over SH16 and contains a range of horticultural and agricultural land uses.

Likely Future Environment

The FUZ sections of the corridor are planned to undergo significant growth and change in the future. The likely future land use environment in which the upgraded and extended Spedding Road will operate is assumed to be urban or developing urban.

The Whenuapai Structure Plan identified business and industrial land uses surrounding the majority of the corridor with a mix of high and medium density residential land use to the south of SH18. There are no adopted or proposed Plan Changes for the western side of the corridor which is FUZ, as Plan Change 5 has now been withdrawn. The section of the corridor closest to Hobsonville Road forms part of Hobsonville Corridor Precinct which is zoned Business – Light Industry. This area is currently undergoing urbanisation.

10.5.5.2Transport

Existing Environment

The portion of Spedding Road corridor which currently exists has a rural character, with a consistent corridor form that has no kerb and channel on either side and no footpaths. The carriageway has two unmarked unsealed vehicle lanes (one in each direction) and has an 80km/h speed limit. Between Trig Road (North) and Māmari Road, Spedding Road carried a 5 Day ADT of approximately 290

vehicles per day, and 30-50 vehicles per hour during the morning and afternoon peak hours. There are no existing bus services on Spedding Road.

The Spedding Road corridor to the west is an unformed paper road, curving over rural land to connect to SH16. This unformed road is not used for transport purposes. East of Trig Road (North) there is no existing corridor or paper road.

Likely Future Environment

The forecast ADT in 2048 on Spedding Road (west of Trig Road (North)) is 18,400 vehicles, and east of Trig Road (North) is 15,100 vehicles, representing a significant increase in traffic demand. The indicative 2048 AT bus network forecasts 9 buses per hour on Speeding Road, or approximately 1 bus every 5-10 minutes. The future transport environment assumes that wider transport proposals are in place, including:

- Other NW Local Arterial projects:
  - Local roading upgrades as part of the NW Local Arterials Package being Fred Taylor Drive, Māmari Road, Trig Road (North) and Hobsonville Road. These roads have been planned to include provision for general traffic, as well as protected active mode facilities, that will enable seamless connection between the corridors for users. With the exception of Hobsonville Road which will be signalised, all are proposed to intersect via a roundabout
- NW Strategic Package (separate package)
  - As part of the Brigham Creek Interchange upgrade for the Alternative State Highway (NW Strategic Package, which is a separate Te Tupu Ngātahi application), Spedding Road will form an overbridge over the existing SH16 and future RTC
- Non-Te Tupu Ngātahi Project
  - A future RTN station is proposed to be located near Brigham Creek (connecting to NW Strategic Package RTC) however exact location is not yet confirmed, Spedding Road will form an east west link from Whenuapai to the RTN.

See Table 9-6: North West Transport Projects for further detail.

10.5.5.3 Historic Heritage and Archaeological Values

Existing Environment

There are no recorded historic heritage or archaeological sites within the proposed designation area however a World War Two, gun emplacement has been identified adjacent to the proposed transport corridor at 4 Spedding Road / 92 Trig Road (North) (CHI 20469) the site is not an archaeological site under the definition of the HNZPTA and it is not currently scheduled in the AUP:OP[10]. There is a risk that ancillary components of this structure extend into the proposed Spedding Road corridor. The likelihood of historic heritage deposits further away from the site, waterways and on modified land is lower.

Likely Future Environment

The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

[10] Note proposed Plan Change 5 proposed a heritage overlay at 4 Spedding Road and 92 Trig Road (North). The plan change has now been withdrawn, including the heritage overlay provision.

10.5.5.4 Community and Recreational Facilities

Existing Environment

There are no community or recreational facilities adjacent to the proposed Spedding Road.

Likely Future Environment

It is likely additional community facilities will be provided within the FUZ at Redhills and Whenuapai as development occurs and the population in the surrounding area grows, such as the proposed Sports Field identified in the Whenuapai Structure Plan, which is likely to be located at 4 Spedding and 92 Trig Road (North).

10.5.5.5 Noise and Vibration

Existing Environment

Spedding Road is currently located within a predominantly rural area with few dwellings in close proximity to the road. Where land is in proximity to SH16 and SH18 this elevates the ambient noise environment. Noise levels in the rural environment of Whenuapai, currently zoned as FUZ, are anticipated to typically have low noise levels of 45 dB $L_{Aeq(24h)}$ to 55 dB $L_{Aeq(24h)}$. In areas near the busier sections of Hobsonville Road existing noise levels are anticipated to be between 55 dB $L_{Aeq(24h)}$ and 65 dB $L_{Aeq(24h)}$. In the western section of Spedding Road, receivers along this section of the corridor fall within the 65 Ldn and 55 Ldn noise contours of RNZAF base.

Likely Future Environment

As discussed in Table 10-5, the land surrounding the Spedding Road corridor is likely to be zoned for a range of business and industrial land uses, as identified in the Whenuapai Structure Plan. Areas of higher density Residential-Terrace Housing and Apartment Zone at the western end and Mixed Housing Urban Zone at the eastern end near Hobsonville Road. This will result in an increase in ambient noise levels as the area urbanises.

10.5.6 Natural and Physical Environment

Section 10.5.6 sets out the existing and likely future natural and physical environment elements for Spedding Road, including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context

Further detail can be found in the relevant specialist reports, at Volume 4.

10.5.6.1 Geology

Spedding Road along majority of the alignment is built on Puketoka Formation, which is mainly alluvial sediments. The eastern section of Spedding Road is adjacent to the East Coast Bays Formation, part of the Waitemata Group which is mainly marine sedimentary and volcanic rocks. This is not anticipated to change in future.

10.5.6.2 Hydrology and Natural Hazards

Existing Environment

The Spedding Road corridor is situated within the Whenuapai stormwater catchment (see Section 10.1.4). The corridor crosses numerous overland flow paths and three streams, namely Totara Creek, Trig Stream, Waiarohia Stream and Rawiri Stream. Existing flood prone areas from Auckland GeoMaps are evident where overland flow paths and streams traverse the road. The 100-year ARI flood maps from Auckland Council show existing flooding at the location of the proposed Trig Stream bridge crossing (east of SH18), the proposed culvert crossing at 43 Westpoint Drive and potential flooding of property at 121 Fred Taylor Drive.

Likely Future Environment

The Whenuapai Structure Plan identifies the Totara Creek and Trig / Rawiri / Waiarohia Stream fork as esplanade reserve, and these features are therefore likely to be retained and enhanced. Anticipated urban development is expected to increase surface water runoff by increasing impervious surfaces, however provided development addresses its flooding effects, it is not expected to increase the natural hazard conditions significantly in the future.

10.5.6.3 Terrestrial Ecology

Existing Environment

Habitats

The western section is dominated by exotic grassland and mature shelter belt planting, transecting several mature exotic shelterbelts. The Auckland Council vegetation layer classified this habitat as native shrub forest, however, project field observations confirmed exotic species dominance. SEA_T_2034 (terrestrial) riparian vegetation is located alongside SH16 at the edge of the proposed Spedding Road overbridge. The stream in the SEA is an important migration pathway for threatened fish species including īnanga, see Figure 10-19.

Figure 10-19: SEA_T_2034, near proposed SH16 overbridge for Spedding Road

In the eastern section of the proposed corridor, exotic scrub is present between Trig Road (North) and Rawiri Streams with native vegetation generally present in roadside planting where the corridor crosses SH18 and around parts of the Rawiri and Totara Creek. Some mature trees are also present as shelter belts, along the roadside and near the streams. Native planting and exotic treeland in the area were generally considered to be of high value.

Within the proposed designation footprint, ten streams or stream tributaries were identified. Four were identified as intermittent and six stream branches as permanent. The permanent streams are Totara Creek, Sinton Stream Tributary, Waiarohia Stream and tributary, Trig Stream and Rawiri Stream. The Rawiri Stream is an identified restoration area for manawhenua and the local board, see Figure 10-20.

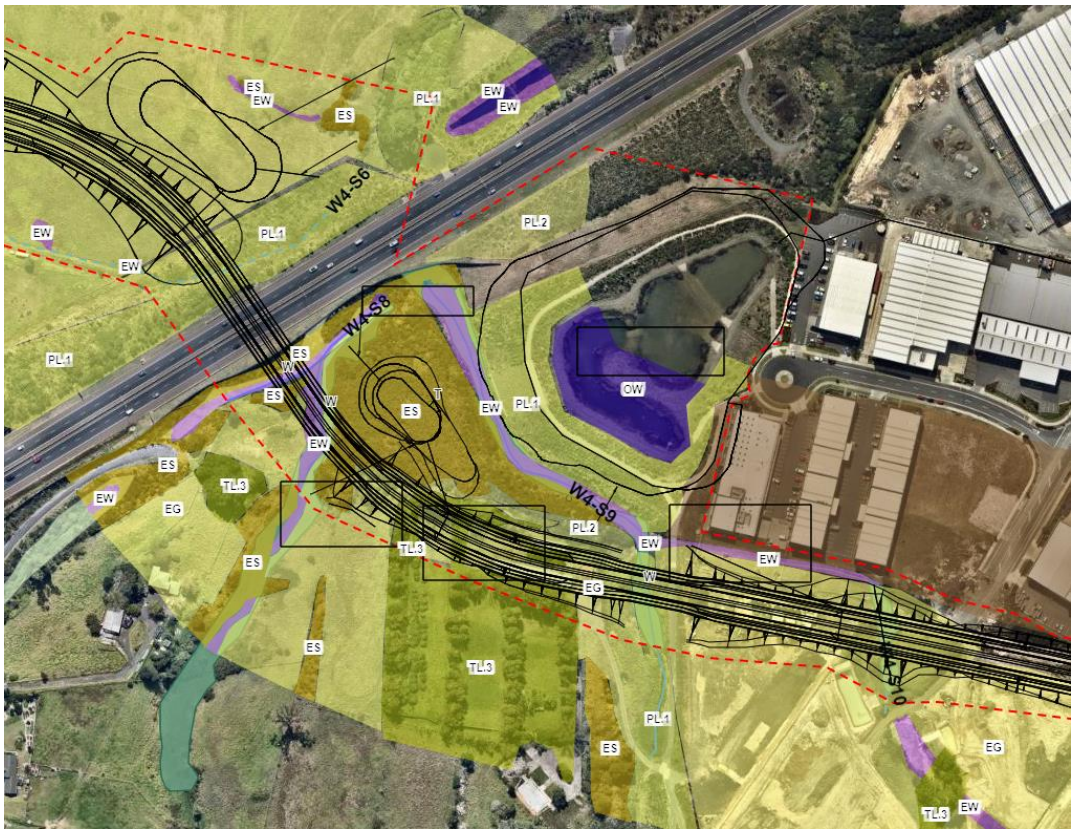


Figure 10-20: Rawiri, Trig and Waiarohia Stream in proximity to Spedding Road proposed SH18 crossing

Seven wetlands will be affected by the Spedding Road corridor most notably in the eastern portion. All of these currently meet the definition of natural wetland under the NES-FW:

- W4-W1 and W4-W2 at 15-19 Spedding Road, both drain relatively small sub-catchments of the receiving Totara Creek and may be seasonal. Both classified as low value
- W4-W3 at 15-19 Spedding Road, is a depression wetland that is likely spring fed and affected by previous attempts at drainage. Classified as having moderate value
- W4-W3A at 49 Trig Road (North), is a valley bottom wetland dominated by exotic species and impacted by agricultural activities, the road crossing and recent catchment infill (in the south). Classified as having moderate value
- W4-W4, is a hillside seep associated with Trig Stream and Waiarohia tributary, near SH18. The wetland was previously realigned for SH18 and was historically larger in size. Classified as having moderate value
- W4-W5 at 100 Hobsonville Road, is likely induced and influenced by upslope ponding at the existing SH18 crossing. Classified as having moderate value

- W4-W6 at 4-6 Rawiri Road, is likely an induced wetland due to Rawiri Stream being realigned for development at Rawiri Place. Potential for the wetland to be classified as artificial if part of the stormwater management for Rawiri Place. Conservatively classed as natural wetland and classified as having negligible value.

Species

Area wide bat surveys identified that the area has suitable habitat for bats, particularly along the Totara Creek and Waiarohia catchment. Exotic treeland and riparian vegetation are also likely to support bat foraging and movement between known bat populations in the Waitakere ranges and Riverhead Forest.

The wider study area also provides suitable habitat for native birds, although no TAR species were observed during site visits, nor are any TAR species associated with the habitat within the proposed corridor. Several native and not threatened species of birds were identified, as well as birds introduced and naturalised (see Assessment of Ecology Effects, Volume 4).

Copper skink is also likely to be associated with the corridor's habitat features, and frequently recorded within highly modified habitats such as exotic scrub and rank grassland. The species has been recorded within 3 kilometres of Spedding Road and are likely to favour the exotic scrub near the Trig and Rawiri Stream corridor.

Likely Future Environment

The AUP:OP emphasises the protection and enhancement of existing watercourses and areas of significant natural value, such as that surrounding the Totara Creek and Waiarohia catchment. It is therefore assumed that in the likely future environment, permanent streams and areas of indigenous vegetation value will generally be retained and may enhance over time.

Mature trees associated with roadside and shelterbelt are expected to be removed in the Future Environment, as vegetation clearance, excluding within riparian zones, notable trees and certain street trees, is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.

10.5.6.4Topography and Landscape Context

Existing Environment

Spedding Road traverses a gently sloping topography with a high point towards the centre of the route near the intersection with Māmari Road. The low points are on the approaches and crossings at SH16 and SH18. There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation footprint. The character of Spedding Road area is summarised below:

- Landscape has been modified to predominantly agricultural land use, the majority of Spedding Road is characterised by open pasture fields
- Vegetation comprises standalone indigenous vegetation clusters, hedgerows, rural shelterbelts, trees and shrubs along field boundaries, riparian vegetation along rivers and wetland areas and areas of exotic grassland and non-native stand-alone trees. There are no notable trees present
- Stands of mature native trees are located within the road reserve and along the roadside boundaries of private properties contribute to the landscape character. Residential properties tend to have native and non-native planting along their frontage.

The corridor has several stream/wetland crossings. In the western section, Totara Creek adjacent to the proposed SH16 bridge, Sinton Stream and the Pikau Stream are adjacent to the Māmari Road

interchange. Waiarohia Stream is in the east near Trig Road (North) intersection, and Trig Stream crosses the proposed corridor close to SH18.

The corridor is assessed as having a low sensitivity to landscape change, although there are pockets of indigenous vegetation, stream and wetland environments with a higher level of sensitivity.

Likely Future Environment

The land surrounding the transport corridor will witness a significant change from a rural to urban land use character as urbanisation occurs with removal of open pasture and unprotected mature vegetation. The quality and natural character values of riparian and wetland environments are generally anticipated in the AUP:OP to be retained and, in some instances, enhanced as urban development progresses. These include the riparian and wetland environments associated with Totara Creek and Waiarohia, Trig and Rawiri streams which are identified as esplanade reserve in the Whenuapai Structure Plan. The future environment will likely involve implementation of street tree planting, public open spaces and private landscaping in future developments.

10.6 NOR W5 - Hobsonville Road

10.6.1 Project Description

Hobsonville Road is an existing arterial corridor over 4 km in length. The existing corridor extends from SH16 in the west to Hobsonville Point Road and Buckley Avenue / Squadron Drive in the east. It is proposed to upgrade Hobsonville Road from the intersection with Oriel Avenue in the west to the intersection with Memorial Park Drive in the east.

The NOR proposes an alteration to AT's existing Designation 1437 and therefore the assessment is limited to works beyond the scope of the existing Designation. It does not include works that can be currently undertaken within (or effects that are or could reasonably be generated by) the existing designation. The principles of corridor design for Hobsonville Road are covered in Section 9, corridor specific design and receiving environment features are discussed in this section. Further details of the existing and likely future environment are in the relevant technical assessments (Volume 4).

10.6.2 Overview

Hobsonville Road provides an important east-west connection from Westgate to Hobsonville and will tie into key connections at Trig Road (North), Brigham Creek Road and the extended Spedding Road (subject to separate NORs at Sections 10.2, 10.4 and 10.5).

An alteration to the existing Hobsonville Road designation is proposed to upgrade Hobsonville Road, between Oriel Avenue and Luckens Road and from between Brigham Creek Road and Hobsonville Point Road to a 30 m wide four-lane arterial, between Luckens Road to Memorial Park Drive to a 24 m wide two-lane arterial. Active mode facilities will be provided on both sides, along the entire corridor. The indicative alteration footprint shows the envelope proposed to operate and maintain Hobsonville Road and all its ancillary components, including stormwater infrastructure, bridges, batter slopes and retaining walls, see Figure 10-21.

Figure 10-21: NOR W5 Hobsonville Road upgrade overview

10.6.3 Hobsonville Road upgrade

Key features of the Hobsonville Road upgrade include:

- The upgrade of the section between SH16 and Luckens Road to a 30 m wide four-lane arterial, and a 24 m wide two-lane arterial from Luckens Road to Brigham Creek Road, and widening to 30 m between Brigham Creek Road and Memorial Park Lane. Active mode facilities will be provided on both sides along the entire length of the corridor
- The upgrade of several intersections, including the intersection with proposed Spedding Road and Brigham Creek Road (at SH18)
- Stormwater ponds and culverts
- Likely posted speed of 50 km/h, design speed (of which effects will be assessed on) is 60 km/h
- Batter slopes to enable widening of the corridor, and associated cut and fill activities
- Vegetation removal along the existing road corridor
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 10-22 and Figure 10-23 shows the indicative cross section, for further detail see Volume 3 Drawings.

Figure 10-22: NOR W5 Hobsonville Road upgrade typical 30m cross-section

Figure 10-23: NOR W5 Hobsonville Road upgrade typical 24 m cross section

10.6.4 Hobsonville Road Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the transport corridor will be constructed, operated and maintained. Table 10-6 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on adjacent land to the corridor.

Table 10-6: NOR W5 Hobsonville Road planning context

Planning Context	Provision
Land use – Existing AUP:OP zoning	• FUZ - high likelihood of change • Strategic Transport Corridor Zone - low likelihood of change • Residential - Mixed Housing suburban Zone low likelihood of change • Open space - Informal Recreation Zone, Conservation Zone - low likelihood of change • Business - Mixed Use Zone, Local Centre Zone, Light Industry Zone - low likelihood of change **Precincts** • Hobsonville Corridor Sub-Precinct A, Sub-precinct B and Sub-precinct C
Land use – Whenuapai Structure Plan	The western end of the corridor is FUZ (north side only), the Whenuapai Structure Plan shows 'High Density Residential' bordering the corridor.
Overlays	• Arterial Roads • High-Use Aquifer Management Areas • Notable Trees Overlay - 1812, Pohutukawa at 19 Williams Road, Hobsonville
Controls	• Macroinvertebrate Community Index • Vehicle Access Restriction Control • Stormwater Management Area Control – Flow 1 and Flow 2
Plan Changes	**Plan Change 78, Notified:** Proposes up zoning Residential Mixed Housing Suburban to Mixed Housing Urban and Mixed Housing Urban to Terrace Housing and Apartment Buildings Zone (THAB) on land adjacent to SH16 (south side only).
Designation – transport related	#6741, State Highway 16 and 18 - Westgate to Whenuapai and Hobsonville, Waka Kotahi • AT will be required to obtain written consent under section 177 of the RMA for works within the existing Designation, from Waka Kotahi #1437, Road - Hobsonville Road Transport Corridor, AT • Subject of this alteration #NOR Road Widening - Hobsonville Road. AT lodged a NOR in 2012 for road widening. This has interim effect only under section 178 of the RMA • As AT is the Requiring Authority for the NOR, it does not require written consent. The NOR overlaps in part with the existing designation and provides for widening in some locations that are also required in the proposed alteration to Designation 1437
Designation – non transport related	#9375, Northern Interceptor Phase 3 and 6, Designations, Watercare Services Ltd #9377, Northern Interceptor Shared Corridor, Designations, Watercare Services Ltd

Planning Context	Provision
	• AT will be required to obtain written consent under section 177 of the RMA for works within the existing Designations, from Watercare Services Ltd #4311, Defence purposes - protection of approach and departure paths (Whenuapai Air Base), MOD • The works will not affect this designation purpose

10.6.5 Human Environment

Section 10.6.5 sets out the existing and likely future human environment elements for Hobsonville Road, including a discussion of:

- Land use and form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration)

Further detail on each can be found in the relevant specialist reports, at Volume 4.

10.6.5.1 Land Use and Urban Form

Existing Environment

The existing land use surrounding Hobsonville Road is urban, with the corridor constrained by residential dwellings on the southern side, and commercial and industrial properties on the northern side. The southern side of Hobsonville Road is largely zoned Residential, with a Local Centre Zone adjacent to the intersection of Hobsonville Road, Wiseley Road and Clark Road at the eastern end of the corridor. This centre contains a range of businesses, medical facilities (the Hobsonville Veterinary Clinic and Upper Harbour Medical Centre) and Hobsonville Public Hall.

The northern side between SH16 and Trig Road is zoned residential and generally consists of one and two storey residential dwellings, set behind residential zone is rural land use.

Land to the east of Trig Road to Westpark Drive is predominantly rural, containing low density dwellings and the occasional business. Land to the east of Westpark Drive to Brigham Creek Road is zoned Business – Light Industrial Zone. This contains a range of land uses, varying from light industrial warehouses and businesses, storage facilities, cafes and local shops, Hobsonville Returned Services Association, Hobsonville School and early child centres and land that is yet to be developed. The eastern extent from Brigham Creek to Hobsonville Point Road is zoned Business – Mixed Use Zone and Business – Local Centre Zone and contains a range of retail, business and supermarket land uses forming a key retail centre for the Hobsonville area. On the north side of this section areas are undeveloped or currently under development. Recreational land is located at the eastern end of the corridor with the Hobsonville War Memorial Park.

Likely Future Environment

The majority of the corridor is zoned urban (residential, business and industrial). These areas and open space zones are not expected to materially change in the future. In these areas, it is assumed that the upgrade of Hobsonville Road will be constructed and operate in the existing urban environment or planned environment (i.e., what can be built under the existing AUP:OP zones).

Higher landuse change is expected in the adjacent land at the western end, where FUZ is located (note that the intersection with Trig Road is part of a separate NOR). The Whenuapai Structure Plan identified a mix of medium and high-density residential land use on the north side of Hobsonville Road. The Auckland Council preliminary response to the NPS-UD has also proposed up zoning Residential Mixed Housing Suburban to Mixed Housing Urban, and the existing Mixed Housing Urban to THAB, see Table 9-5 for zoning urban form description.

Overall, the likely future land use environment in which NOR W5 will operate is assumed to be an urban environment.

10.6.5.2Transport

Existing Environment

The existing Hobsonville Road corridor goes from east to west starting at the northwestern motorway overbridge and concluding at the Memorial Park Lane / Clark Road / Hobsonville Point Road intersection. The existing corridor is semi-urban with two vehicle lanes (one in each direction) and a speed limit of 50 km/h. The traffic load varies, between Westpark Drive and Marina View Drive carrying a 5 Day ADT of approximately 12,100 vehicles per day, and 1,100 vehicles per hour during the morning and afternoon peak. Between Sinton Road and Wiseley Road, it carried a 5 Day ADT of approximately 18,200 vehicles per day, and 1,400-1,500 vehicles per hour during the morning and afternoon peak.

For walking and cycling, Hobsonville Road has a continuous 1.5 m footpath provided on the southern side; on the northern side a 1.5 m footpath is provided, however this is missing in sections. Cycling facilities are limited and inconsistent along the corridor.

Public transport on Hobsonville Road is provided by the 120-bus service which connects Constellation Station, Greenhithe, Hobsonville Road, Westgate, Don Buck Road and Henderson. This service operates at least every 30 minutes, between 7am – 7pm, 7 days a week.

Likely Future Environment

The forecast ADT on Hobsonville Road in 2048 is increased, with 20,200 vehicles between SH16 and Luckens Road, 14,900 vehicles between Luckens Road and Brigham Creek Road and 23,000 vehicles between Brigham Creek Road and Hobsonville Point Road. The indicative 2048 AT bus network forecasts a bus every 10 to 12 minutes in the peak and every 20 minutes outside of peak periods.

Other transport projects that are expected to form part of the future environment are:

- Other NW Local Arterials projects:
  - Trig Road (south) upgrade as part of a separate Te Tupu Ngātahi package, proposes an upgrade to Trig Road, retaining two general traffic lanes but upgrading the corridor to an urban standard, with provision for active mode facilities. This includes the intersection with Hobsonville Road, which will be retained as a T intersection with signals. This corridor will connect the two ends of NOR W5 as an integrated urban corridor
  - The upgraded Spedding Road is proposed to create a new intersection at Marina View Drive, providing another local link from Hobsonville to Whenuapai over SH18. This will be two lanes with protected active mode facilities.
- Non-Te Tupu Ngātahi Projects:
  - SH16/18 is an early-stage project, proposed by Waka Kotahi that will affect the eastern end of Hobsonville Road, where it connects to Brigham Creek Road. The existing arrangement of

roundabouts is expected to be replaced however this is to be confirmed. Access to SH18 and Brigham Creek Road is expected to be retained.

See Table 9-6: North West Transport Projects for detail.

10.6.5.3 Historic Heritage and Archaeological Values

Existing Environment

There are no recorded historic heritage sites within the proposed designation footprint, although several historic heritage structures and notable trees are recorded with 200 m of the corridor. Those adjacent to the corridor are:

- **008:** House at 80 Hobsonville Road (CHI 3699). The building is outside the designation footprint and was moved to the site after 1940, therefore it is unlikely that there will be archaeological remains
- **014**: Notable Pohutukawa tree at 19 Williams Road (CHI 2281) AUP:OP scheduled #1812 is outside the designation footprint
- **005**: Hobsonville Hall at 397 Hobsonville Road (CHI 3496) is not scheduled in the AUP:OP and is not an archaeological site (built after 1900)
- **003**: Midden and possible gum digger camp at 18 Westpoint Drive (CHI 12363). There are earthworks on site (carried out under an archaeological authority). However no archaeological features have been discovered to date. This site may extend to the adjacent Hobsonville Returned Services Association property.

Likely Future Environment

Development and associated changes are being undertaken at CHI 12363, however the environment as it relates to historic heritage and archaeological values is otherwise likely to remain the same in the future.

10.6.5.4 Community and Recreational Facilities

Existing Environment

As an urban corridor, there are a range of existing community and recreational facilities located along Hobsonville Road, including:

- Westgate Baptist Church (67 Hobsonville Road): providing religious facilities and early childcare facilities
- Hilda Griffin Reserve (opposite the intersection of Trig Road and Hobsonville Road) providing a largely vegetated open space with pedestrian thoroughfare to surrounding residential streets and to Louise Place Reserve
- Hobsonville War Memorial Park
- Headstart Child Care (193 Hobsonville Road) providing early childcare facilities
- Hobsonville School (104A Hobsonville Road), under Designation 4618 by Ministry of Education for educational purposes
- Hobsonville Road Retired Services Association (114 Hobsonville Road)
- Upper Harbour Medical Centre (393 Hobsonville Road)
- Hobsonville Public Hall (397 Hobsonville Road).

A number of facilities are also in close proximity to the Hobsonville Road corridor, including:

- Te Piri Ngātahi o te Maungaarongo Marae (Luckens Road), affiliated with Ngapuhi and situated approximately 100 m south of Hobsonville Road
- Hobsonville Bowling Club (1 Memorial Park Lane) situated to the north of Hobsonville War Memorial Park
- Various childcare centres and kindergartens in close proximity to Hobsonville Road along the length of the corridor.

Likely Future Environment

Existing open space and recreational areas are expected to remain unchanged. Schools in the area are expected to also remain and could grow as the population in the area increases. It is likely additional community facilities will be provided as development occurs and the population in the surrounding area grows. Within the FUZ and the area adjacent Trig Road, additional schools and park facilities may be provided.

10.6.5.5 Noise and Vibration

Existing Environment

Hobsonville Road is an existing urban corridor with commercial and residential development still occurring in the surrounding area. The noise environment is dominated by road traffic noise from vehicles on Hobsonville Road. Existing noise levels in the area range between 33 dB $L_{Aeq(24h)}$ to 66 dB $L_{Aeq(24h)}$.

Likely Future Environment

Although development is still occurring in the area, the corridor is predominantly urbanised, and future ambient noise levels are not expected to increase significantly above their current level.

10.6.6 Natural and Physical Environment

Section 10.6.6 sets out the existing and likely future natural and physical environment elements for Hobsonville Road, including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context.

Further detail can be found in the relevant specialist reports, at Volume 4.

10.6.6.1 Geology

Puketoka Formation has been mapped in the middle of the corridor with East Coast Bays Formation on either end. The geological conditions are not anticipated to vary in the future.

10.6.6.2 Hydrology and Natural Hazards

Existing Environment

Hobsonville Road is situated within the Whenuapai stormwater catchment and lies mostly on a ridgeline, with few overland flow paths and an existing pond outlet upstream that discharges towards Waiarohia Stream.

Existing flood prone areas are evident where overland flow paths traverse the road. The 100 year ARI flood maps accounting for future impervious area and existing terrain shows flooding at the existing pond near 16/18 Williams Road and properties at, 281, 283 and 285 Hobsonville Road and 11 and 15 Starlight Cove.

Likely Future Environment

The area is already urbanised along majority of the corridor and highly impervious. In future environment, provided development addresses its flooding effects, there is not expected to be significantly increased natural hazards conditions in the future.

10.6.6.3Terrestrial Ecology

Existing Environment

Habitats

The entire southern section of Hobsonville Road is urbanised, the northern section is varied with segments that are adjacent to or within rural land, typically dominated by exotic grassland, and sections that are brownfield. Exotic planting is common within the existing roadsides and within gardens. On the northern side near the intersection with Brigham Creek Road key ecological features include a section of exotic treeland and stream habitat associated with a Waiarohia stream tributary.

One natural wetland (W5-W1) has been identified as affected by the project at 102B Hobsonville Road. The site is dominated by exotic species and its immediate catchment is predominantly pasture with the wetland potentially being seasonal. Two streams were identified, one branch as intermittent, one identified as permanent. Both had partial barriers to fish passage.

Species

The terrestrial habitat associated with Hobsonville Road corridor is considered to be of negligible value to bats. Incidental observations of bird species were noted, however no TAR species were noted, only introduced naturalised and not threatened species. Given the versatility of Copper skink habitat and that they have been recorded within 1 km of the corridor, there is the potential for them to be present. Exotic treeland and scrub along the corridor has higher habitat value.

Likely Future Environment

The existing undeveloped greenfields for portions of Hobsonville Road (mostly to the north of the existing alignment) are zoned FUZ in the AUP:OP and are planned for urbanisation. The AUP:OP emphasises the protection and enhancement of existing watercourses such as the Waiarohia stream tributary. The treeland noted is not identified as SEA or subject to any protection under the AUP:OP and as such likely to be removed. It is assumed that in the likely future environment. The exotic grassland and treeland will be lost, and replaced with private gardens, landscaping, and street planting along the corridor.

10.6.6.4Topography and Landscape Context

Existing Environment

Hobsonville Road is positioned along a central ridgeline with a moderate slope, ascending towards a high point at the Trig Road intersection then gradually descends east towards Hobsonville Point. The lowest point of the corridor is the intersection with Memorial Park Lane. Key landscape features are:

- The northern side of Hobsonville Road is characterised by fields bordered by isolated native vegetation, hedgerows and exotic grass. This rural character transitions to residential properties to

the west and large lot light industrial and commercial properties under development to the east near Westpark Drive

- The southern side of Hobsonville Road is defined by one and two storeys Residential Mixed Housing, Urban and Suburban Zone (see Table 9-5: AUP:OP Zoning Potential Urban Form). Mature trees within the road reserve and private front yards contribute to the urban streetscape
- Four notable trees are within or proximate to the proposed designation footprint, three at 277 Hobsonville Road at Hobsonville School including two Pohutukawa and one Kauri (#1980), and one Pohutukawa (#1812) at the intersection of 19 Williams Road.

The Landscape Assessment classifies the character value as low within the context of the existing arterial road.

Likely Future Environment

The FUZ land within the Hobsonville Road Corridor Precinct which is currently undeveloped will change from rural to urban land use as urbanisation occurs. Urbanisation will likely involve the implementation of street tree plantings, public open space areas and general landscaping within the private yards of future housing development for public amenity. The southern side of the corridor is residential use and will generally retain its character.

10.7 Whenuapai NOR Package Overview

Table 10-7: Whenuapai NORs Overview

Notice	Purpose	Objectives *Enable the provision of a transport corridor that*	Indicative Extent[11] Length (l) and Width of transport corridor (w)[12]	Lapse Period	Properties Directly Affected
NOR W1 Trig Road (North)	Construction, operation and maintenance of a transport corridor	a) Improves connectivity through Whenuapai and by connecting Whenuapai to the State Highway. b) Integrates with and supports planned urban growth and the future transport network in Whenuapai. c) Contributes to mode shift by providing dedicated facilities for active modes. d) Is safe for all users. e) Improves network resilience for all users.	Linear designation from Brigham Creek Road to SH18 over bridge. • 1.6 km (l) • 24 m (w)	15 years	Total: 43
NOR W2 Māmari Road	Construction, operation and maintenance of a transport corridor	a) Improves connectivity within Whenuapai and by connecting Whenuapai to Westgate, via the future Northside Drive extension. b) Integrates with and supports planned urban growth and the future transport network in Whenuapai. c) Contributes to mode shift by providing dedicated facilities for public transport and active modes. d) Is safe for all users. e) Improves network resilience for all users.	Linear designation from Brigham Creek Road to Northside Drive. • 1.8 km (l) • 30 m (w)	15 years	Total: 22

[11] Figure are approximate, refer to plans for extent of designation.

[12] Note dimensions are for the permanent road corridor works only, and do not include the areas for construction works, stormwater ponds etc

Notice	Purpose	Objectives *Enable the provision of a transport corridor that*	Indicative Extent[11] Length (l) and Width of transport corridor (w)[12]	Lapse Period	Properties Directly Affected
NOR W3 Brigham Creek Road	Construction, operation and maintenance of a transport corridor	a) Improves connectivity through Whenuapai and to the strategic transport network. b) Integrates with and supports planned urban growth and the future transport network in Whenuapai. c) Contributes to mode shift by providing dedicated facilities for active modes. d) Is safe for all users. e) Improves network resilience for all users.	Linear designation from Totara Creek to SH18 interchange. • 3.5 km (l) • 30 m (w)	15 years	Total: 55
NOR W4 Spedding Road	Construction, operation and maintenance of a transport corridor	a) Improves connectivity through Whenuapai and between Redhills North and Hobsonville. b) Integrates with and supports planned urban growth and the future transport network in Whenuapai. c) Contributes to mode shift by providing dedicated facilities for active modes. d) Is safe for all users. e) Improves network resilience for all users.	Linear designation from Hailes Road to Hobsonville Road • 3.7 km (l) • 24 m (w)	15 years	Total: 64
NORW5 Hobsonville Road (alteration to designation 1437)	Transport Corridor	a) Improves connectivity along the corridor to Whenuapai and to Westgate. b) Integrates with and supports planned urban growth and the future transport network in Whenuapai. c) Contributes to mode shift by providing dedicated facilities for active modes. d) Is safe for all users. e) Improves network resilience for all users.	Linear designation from Oriel Avenue to Memorial Park Lane[13]. • 3.7 km (l) • 24-30 m (w)	Not applicable.	Total: 195

[13] Hobsonville Road proposal excludes works intersection at Trig Road (North) intersection, which is covered under another SGA application.

Redhills and Riverhead

Project descriptions and receiving environment

Te Tupu Ngātahi Supporting Growth

11 Redhills and Riverhead Projects and Receiving Environment

Section 11 sets out the overall receiving environment elements common across the NW Local Arterial Package in the Redhills and Riverhead areas. Each transport corridor is then discussed specifically in Sections 11.2 to 11.4. For detailed assessment from each discipline, refer to supporting technical documents in Volume 4.

11.1 Planning context

The Redhills area includes one new NOR for Don Buck Road and one alteration to an existing designation (Designation 1433) at Fred Taylor Drive. West of Don Buck Road and Fred Taylor Drive (southern end) is urban zoning largely in rural use with residential and commercial activities scattered and on the east. Either side of Fred Taylor Drive northern end is FUZ.

Riverhead has one new NOR at Coatesville-Riverhead Highway, from Riverhead settlement to SH16. Figure 11-1 shows the Redhills and Riverhead areas against the AUP:OP zones.

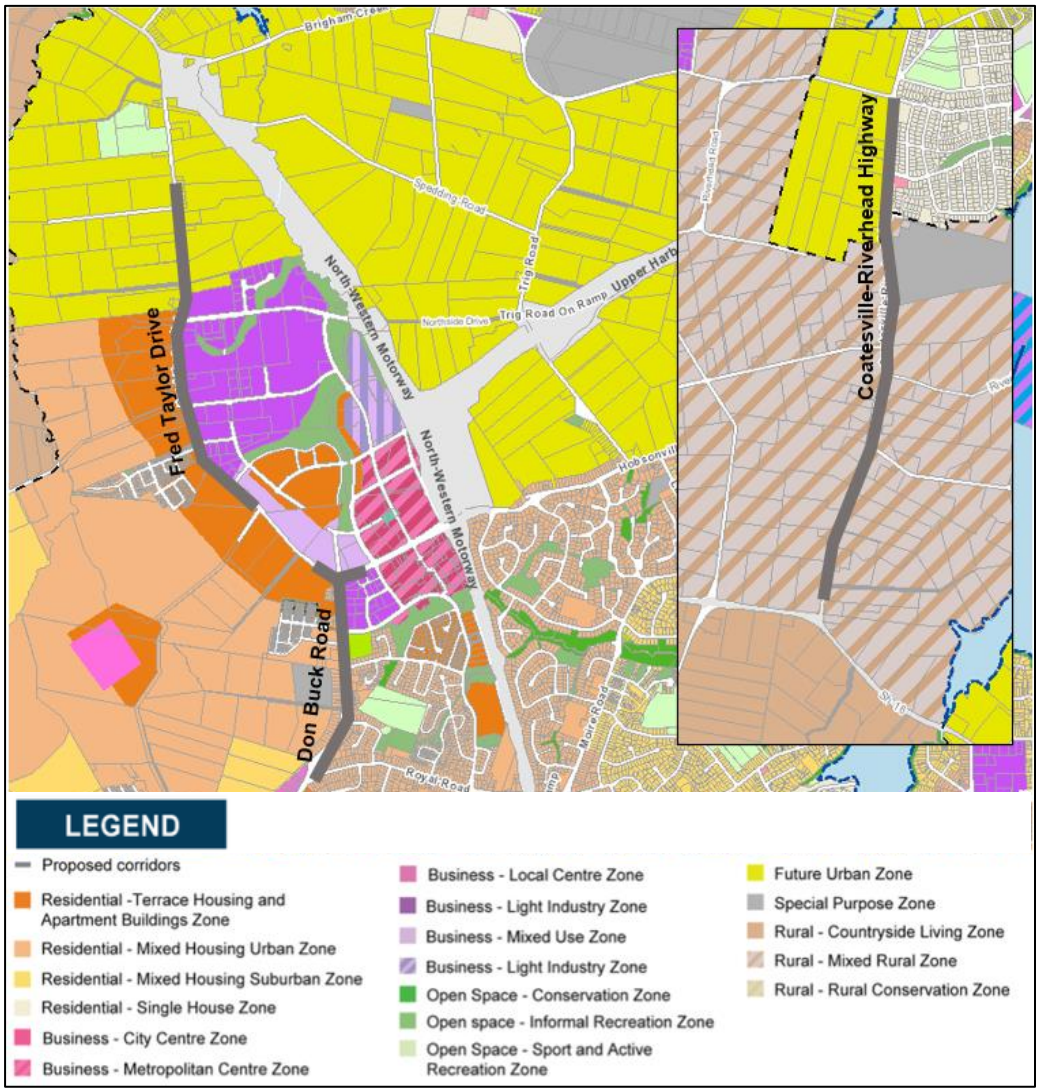


Figure 11-1: Redhills and Riverhead proposed corridors (AUP:OP zones) (Riverhead area in call out box.

Table 11-1 sets out the anticipated dwelling capacity identified in the FULSS. Redhills and Riverhead also provide land for business and an expanded local centre. The anticipated development readiness of the areas is identified through proposed staging, from the existing live zones through to Decade Two (2028-2032). Noting that modelling has indicated later build outs than anticipated under the FULSS (see Section 4.1).

Table 11-1: Redhills urban capacity under the FULSS

Area timing	Capacity (approx.)	Area (in ha)	
Redhills (live zoned) (2012-2017)	10,650 dwellings	594 ha	
Redhills North (2028-2032)	1,400 dwellings	191 ha	
Kumeū Huapai Riverhead (ready by 2028-2032)	6,600 dwellings	36,900	

11.1.1 Spatial Planning

Auckland Council has prepared the Spatial Land Use Strategy for North West Auckland[14] (Spatial Strategy) which identifies the location and type of key land uses, see Figure 11-2.

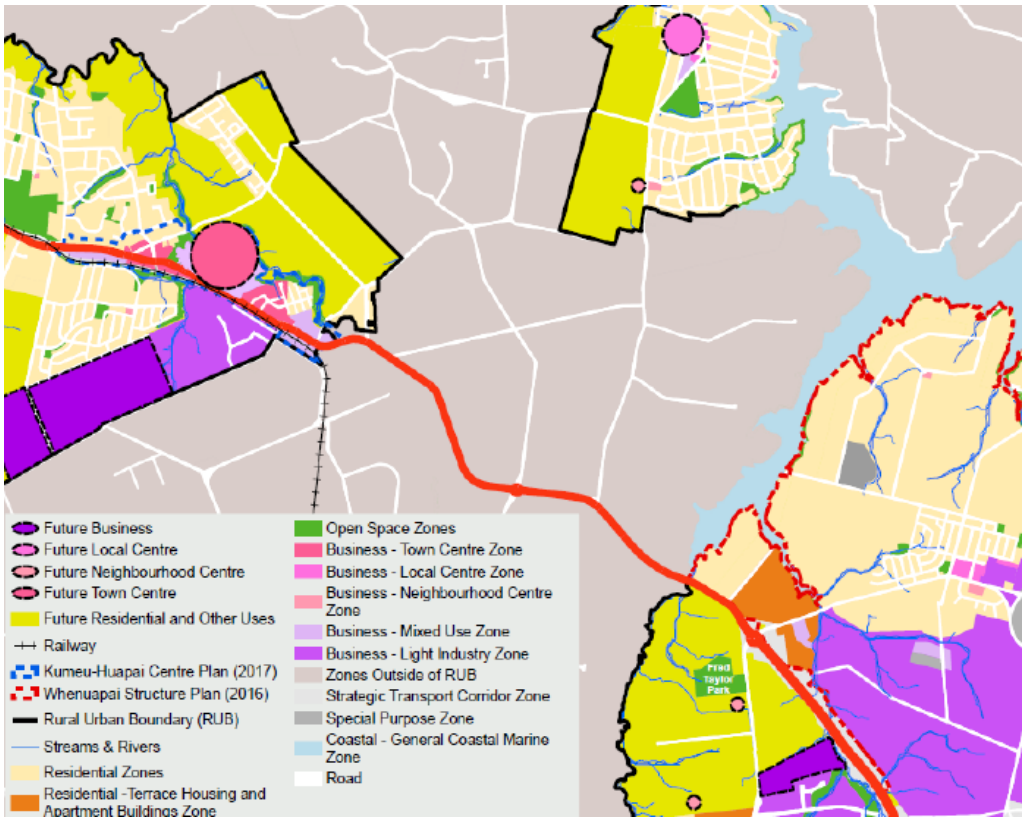


Figure 11-2: Spatial Land Use Strategy for North West (Auckland Council)

[14] Spatial Land Use Strategy - North West Kumeū-Huapai, Riverhead, Redhills North, Auckland Council (adopted May 2021)

The Spatial Strategy is not a structure plan, Auckland Council plans to align commencement of the structure planning process and subsequent plan changes, to meet the FULSS land staging programme, which is between 2028 and 2032. The Spatial Strategy instead identifies key landuse activities such as centres and industry. In Redhills North a new neighbourhood centre is indicated adjacent to Fred Taylor Drive and an expansion of industrial land also shown. The remainder is categorised as a 'Residential and Other Uses'. At Riverhead, a Future Local Centre is shown at the existing commercial area and a smaller Neighbourhood Centre Zone opposite existing commercial.

11.1.2 Plan Changes

Plan Change 60 (Open space and rezoning matters) notified on 28 January 2021, Plan Change 60 is an Auckland wide plan change, it applies at 21 Fred Taylor Drive to change the zoning from *Business-Mixed Use Zone* and *Residential – Terrace Housing and Apartment Building* to *Business-Mixed Use Zone*.

Proposed Plan Change 78 (Intensification) was notified in response to the NPS-UD and requirements of the RMA to enable more intensive development in and around neighbourhood, local, town and city centres and rapid transit stops and incorporate Medium Density Residential Standards into the AUP:OP. Areas of residentially zoned land adjacent to Don Buck Road are proposed to be up-zoned from Mixed Housing Urban Zone to Terrace Housing and Apartment Building Zone.

11.1.3 Māori Cultural Values

This section presents our summary of the cultural areas of significance in the project areas of Redhills and Riverhead. These have been drawn from the AUP:OP, discussion with manawhenua and the Cultural Impact Assessment prepared by Te Kawerau a Maki. There are no identified Sites and Places of Significance to manawhenua identified under the AUP:OP within or in close proximity to Don Buck Road, Fred Taylor Drive or Coatesville-Riverhead Highway corridors.

A CIA prepared by Te Kawerau a Maki for the North West Transport Network area has provided context on the history of the area and particular sites of significance near the proposed designation footprints. Te Kawerau a Maki have retained close associations with the wahi tupuna and wahi tapu around the study area and have a number of statutory acknowledgements across the broader area. These include:

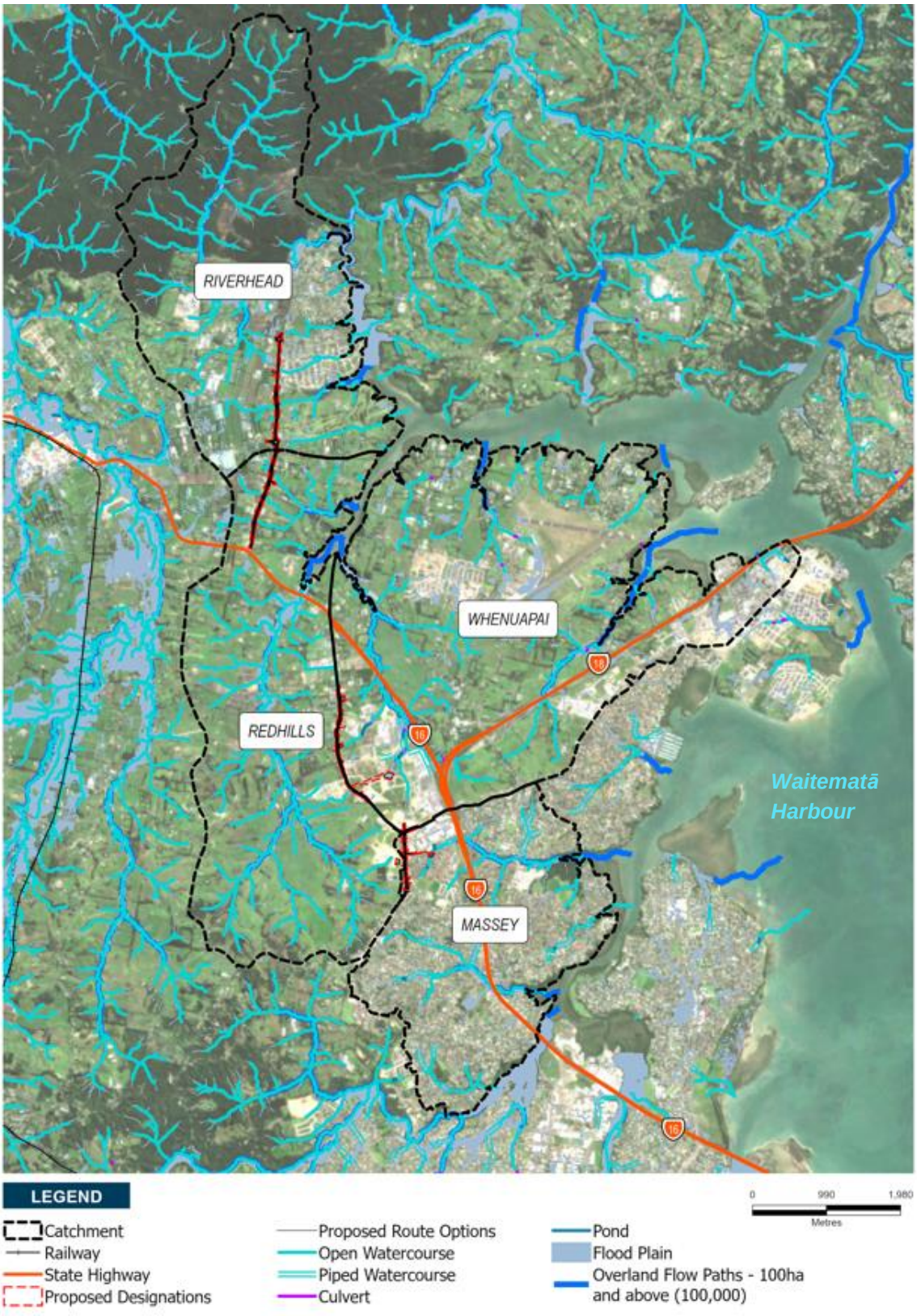
- Site at Te Wai o Pareira (Henderson Creek and tributaries) which includes the area of Don Buck Road, the Manutewhau Creek at Don Buck Road is identified as an area of value by the iwi as well as where Don Buck Road intersects with Fred Taylor Drive, called Pukewhakataratara, the site of a strategic pā
- Coatesville-Riverhead Highway is adjacent to the Rangitopuni Stream and Tributaries acknowledgement area, a cultural redress area for Te Kawerau Maki within the Riverhead Forest is approximately 1 kilometre away from the corridor. Several unnamed tributaries at Coatesville-Riverhead Highway corridor are identified by the iwi as being of cultural value.

11.1.4 Hydrological and Flooding Environment

Don Buck Road and Fred Taylor Drive are located on ridgelines, Don Buck Road straddles the Redhills and Massey catchment, and Fred Taylor Drive Redhills and Whenuapai catchment. Coatesville-Riverhead Highway straddles the Riverhead and Redhills catchments. The Redhills catchment is approximately 1,366 ha and drains by the Waiteputa and Ngongetepara Streams, Massey is approximately 914 ha and drained by Momutu Stream, Manutewhau and Rarawaru

Streams and Riverhead 1,299 ha and drains primarily by Rangitopuni Stream. The catchments receiving environment is the Waitematā Harbour see Figure 11-3.

Figure 11-3: Redhills and Riverhead area flooding environment



11.2 NOR RE1 - Don Buck Road

11.2.1 Project Description

Don Buck Road is an existing two-lane arterial extending from Fred Taylor Drive in the north to Swanson Road and Universal Drive in the south. The NOR proposes to upgrade a key section of this corridor from Royal Road in the south to the intersection with Fred Taylor Drive in the north. The arterial travels through an existing urban area and is the primary north south route parallel to SH16 for non-motorway journeys.

The principles of corridor design for Don Buck Road are covered in Section 9. Corridor specific design and receiving environment features are discussed in this section. Further details of the existing and likely future environment are in the relevant technical assessments (Volume 4).

11.2.2 Overview

Don Buck Road upgrade will provide a key connection to the Westgate metropolitan centre and a multi-modal alternative to the state highway for north-south trips and enable the corridor to support the FTN. Don Buck Road upgrade ties in with the proposed upgrades to the Royal Road intersection and Fred Taylor Drive as part of Redhills HIF, a separate Te Tupu Ngātahi package.

A new designation is proposed to upgrade Don Buck Road to a 30 m four lane arterial with separated active mode facilities on both sides and bus lanes. The intersection at Fred Taylor Drive is proposed to be altered from a roundabout to signals. The proposed designation footprint shows the envelope proposed to upgrade, operate and maintain Don Buck Road and all its ancillary components, including construction stormwater infrastructure, batter slopes and retaining walls, see Figure 11-4.

Figure 11-4: NOR RE1 Don Buck Road upgrade overview

11.2.3 Don Buck Road upgrade

The key features of the Don Buck Road upgrade include:

- Widening of Don Buck Road to a 30 m wide four-lane arterial with bus priority lanes and separated active mode facilities on both sides of the corridor
- The upgrade to the intersections with Fred Taylor Drive, Westgate Drive, Kapia Road, Rush Creek Drive and Beauchamp Road
- Tie-ins with existing roads, stormwater pond and culverts
- Likely posted speed of 50 km/h, design speed (of which effects will be assessed on) is 60 km/h.
- Batter slopes to enable widening of the corridor, and associated cut and fill activities (earthworks)
- Vegetation removal along the existing road corridor
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 11-5 shows the indicative cross section, for further detail see Volume 3 Drawings.

Figure 11-5: NOR RE1 Don Buck Road typical 30m cross section

11.2.4 Don Buck Road Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the Don Buck Road upgrade will be constructed, operated and maintained. Table 11-2 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on adjacent land to the corridor.

Table 11-2: NOR RE1 Don Buck Road planning context

Planning Context	Provision
Land use – Existing AUP:OP zoning	• Residential – Terrace Housing and Apartment Building, Mixed Housing Urban Zone, Mixed Housing Suburban Zone • Business – Light Industry, Business Park, Metropolitan Centre • Open Space – Community Zone, informal recreation, Sport and active recreation, Conservation Zone **Precincts** • Redhills Precinct

Planning Context	Provision
	• Westgate Precinct • Sub precincts A, C, E These is low chance of the existing environment in the residential and business zones changing, i.e., they will remain urban. There is however potential for intensification of urban areas and for vacant land along the corridor and to the west to be developed (see Section 9.4).
Overlays	• High-Use Aquifer Management Areas Overlay [rp] - Kumeū Waitemata Aquifer
Controls	• Arterials Roads • Macroinvertebrate Community Index – Urban • Stormwater Management Area Control - MASSEY, Flow 2
Plan Changes	**Plan Change 60 Notified:** Council initiated plan change, plan errors or anomalies (inc. cadastral boundary changes) • 21 Fred Taylor Drive, change from Business-Mixed Use Zone and Residential – terrace Housing and Apartment Building Zone to Business-Mixed Use Zone • 5 Tawhia Drive, change from THAB to Open Space - Informal recreation zone **Plan Change 78 (Intensification):** at Don Buck Road, the changes affect the residential area, changing the zoning from Residential - Mixed Housing Urban to Terraced Housing and Apartment Building Zone.
Designation – transport related	#1468, Road Widening - State Highway 16 (Westgate to Whenuapai), Designations, AT • AT is the requriing authority for the designation, and is not required to obtain any written consent for works within the designation
Designation – non-transport related	#9376, North Harbour No.2 Watermain, Designations, Watercare Services Ltd • AT will be required to seek Watercare Services Ltd written consent under section 177 of the RMA for works within the earlier designation #4311 Airspace Restriction Designations -, Defence purposes protection of approach and departure paths (Whenuapai Air Base), MOD • The works will not impact upon this designation purpose #4646, Educational purposes – special school years 0-143 (Westbridge Residential School), Designations, Minister of Education • The works are unlikly to impact on this designation, but if they do section 177 written consent will be sought from the Ministry of Education

11.2.5 Human Environment

Section 11.2.5 sets out the existing and likely future human environment elements for Don Buck Road, including a discussion of:

- Land use and form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration)

Further detail on each can be found in the relevant specialist reports, at Volume 4.

11.2.5.1 Land Use and Urban Form

Existing Environment

The upgraded corridor is situated within the existing Don Buck Road corridor and extends into adjacent land that is characterised by one to two storey dwellings and bigger box commercial development in the northern extent. Buildings are generally set back from the corridor making the corridor appear wider and less enclosed.

Likely Future Environment

As the area is already zoned and developed it has a lower likelihood of significant change in the future, i.e., it will remain urban. There is however potential for intensification of urban areas to reflect changes prompted by the NPS-UD and medium density housing standard. Vacant greenfield land along the corridor and further to the west is likely to be developed and will reflect the provisions within the Redhills Precinct. The existing community facilities, schools and public open spaces are likely to remain in the future.

11.2.5.2 Transport

Existing Environment

The existing Don Buck Road has a semi-urban character with two vehicle lanes (one in each direction) and a 50 km/h speed limit. The corridor has a fairly consistent form, with kerb and channel on both sides of the corridor, a flush median, and 1.5 metre footpaths and on-road cycle path (unprotected) on both sides. In some locations, the on-road cycle paths convert to a 3 m shared path.

Between Triangle Road and Royal Road, the corridor carried a 5-day ADT of approximately 25,300 vehicles per day and 2,100 vehicles per hour during the morning and afternoon peak. Three bus services currently operate on Don Buck Road being 14W between Westgate and New Lynn, (at least every 15 minutes, 7am – 7pm, 7 days a week). 120 between Constellation Station and Henderson, a Connector Service (at least every 30 minutes, 7am – 7pm, 7 days a week) and 129 between Westgate and the City which operates as a peak hour service.

Likely Future Environment

Don Buck Road in 2048 is expected to carry an ADT of 25,500 - 27,000 vehicles and 12-18 buses per hour under the indicative 2048 AT bus network, which is approximately one bus every five minutes. Other transport projects that are expected to form part of the future environment are

- Other Te Tupu Ngātahi Projects:
  - Redhills HIF will form an intersection at Royal Road and Don Buck Road, creating a new signalised intersection and access into the current greenfield (but zoned and under construction basin. In the northern end, Redhills HIF proposes new intersections between Dunlop Road and Fred Taylor Drive, with Fred Taylor Drive being upgraded to the intersection. The project will provide for widening to four lanes and protected active mode facilities.
- Non-Te Tupu Ngātahi Projects:
  - A Westgate RTN station is planned in the Metropolitan area. This will link to the strategic public transport network and the CBD. Don Buck Road will form an important link through to this station.

See Table 9-6: North West Transport Projects.

11.2.5.3 Historic Heritage and Archaeological Values

Existing Environment

There are no recorded archaeological sites or heritage areas, structures or buildings within the extent of the proposed route. A small stream in Rush Creek Reserve (site of the proposed stormwater pond), has been modified recently and the risk of encountering undisturbed archaeological features is small. The Redhills area has been utilised in the pre-Contact and early Contact period and therefore there is a small risk of unrecorded archaeological features being encountered. The CIA prepared by Te Kawerau a Maki has raised the historic use and significance of the Rush Creek tributary for their iwi.

Likely Future Environment

The environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

11.2.5.4 Community and Recreational Facilities

Existing Environment

As an urban corridor, a range of existing community and recreational facilities are located along Don Buck Road, including:

- St Pauls Primary School (Special Purpose – School Zone) and Westbridge Residential School (Ministry of Education Designation 4646) on the east side of Don Buck Road
- Massey Leisure Centre and Library is a major feature in the corridor on the corner of Westgate Drive and Don Buck Road, including sporting facilities and bookable spaces
- Open Space - Informal Reserve at Rush Creek Reserve and outdoor fields facilities at Royal Reserve, set back off Beauchamp Drive
- Private community facilities, including Massey Presbyterian Church at 510 Don Buck Road, the Salvation Army store at 532 Don Buck Road (site now owned by Universal Homes). Kingdom Hall of Jehovah's Witness at 505 Don Buck Road
- There are also supporting commercial facilities in the form of shops and services close to the intersection with Fred Taylor Drive.

Likely Future Environment

Existing open space areas and public recreational activities are expected to remain unchanged. Schools in the area are expected to remain and could grow as the population in the area increases. It is likely additional community facilities will be provided as development occurs and the population in the surrounding area grows. The area within the Redhills basin (existing greenfield live zoned) will introduce new residents and expanded community. The I610 Redhills Precinct plan identifies a new Business – Local Centre and indicative new recreation spaces.

11.2.5.5 Noise and Vibration

Existing Environment

Don Buck Road is an existing arterial road with commercial buildings and residential dwellings along the road corridor. The noise environment is dominated by road traffic noise from vehicles on Don Buck Road and industrial noise from businesses located in the Light Industrial Zone. Existing noise levels in the area range between 35 – 67 dB $L_{Aeq(24h)}$.

Likely Future Environment

Although development is still occurring in the area, future ambient noise levels are not expected to increase significantly above their current level.

11.2.6 Natural and Physical environment

Section 11.2.6 sets out the existing and likely future natural and physical environment elements for Don Buck Road, including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context

Further detail can be found in the relevant specialist reports, at Volume 4.

11.2.6.1 Geology

Don Buck Road is identified as being wholly within the East Coast Bays Formation, which is part of the Waitemata Group. The Waitemata Group is mainly marine sedimentary and volcanic rocks. The geological conditions are not anticipated to vary in the future.

11.2.6.2 Hydrology and Natural Hazards

Existing Environment

Don Buck Road corridor is located on a ridgeline between the Redhills and Massey stormwater catchments, there are no major flood plains or flood prone areas along the corridor and no stream crossings (however the proposed pond is located at the Mānutewhau Creek (within Rush Creek Reserve)).

Likely Future Environment

The immediate corridor catchment is currently urban and located on a ridgeline. Nearby greenfield areas such as that in the Redhills basin are expected to address their own effects and not increase flood hazard risk. The hydrological environment and natural hazard conditions are therefore not expected to significantly vary in the future.

11.2.6.3 Terrestrial Ecology

Existing Environment

Habitats

The existing environment surrounding Don Buck Road is primarily brownfield urban consisting of hard standing concrete unmanaged bare ground as well as construction sites. There is also exotic grassland and amenity planting (e.g., gardens, roadside planting). Higher value habitat generally consists of native planting in and around Rush Creek Reserve.

Due to the corridors position on a ridgeline, there are no stream crossings however there Mānutewhau Creek (Rush Creek) is within Rush Creek Reserve. Mānutewhau was classified as permanent as there was evidence of continuous flow, there is also a tributary of the stream, both were assessed as having moderate value. There are no natural wetlands within the corridor, a wetland was present at Kapia Road, however, consent was granted in 2020 for its reclamation by the Westhills

development. A wetland at Rush Creek Reserve (R1-W1) is a stormwater feature and classified as artificial under the NES-FW.

Species

Area wide bat surveys were undertaken for the Redhills area and identified presence of long-tailed bats within 2 km southwest and 1.5 kilometres northwest of the corridor. No dedicated bird surveys were undertaken, incidental observation did not note any TAR species during site visits, only common species including blackbird, mynas, mallard ducks and sparrows were seen.

Lizards were not identified during opportunistic searches; however Copper skinks have been recorded within three kilometres of the corridor and have been associated with all of the vegetation types along Don Buck Road.

No fish surveys were carried out however īnanga and longfin eel (both at risk -declining) species have been recorded within two kilometres of Don Buck Road.

Likely Future Environment

The corridor itself is largely urbanised and is unlikely to undergo significant ecological change. The areas of identified higher ecological value within public reserves are anticipated to remain in the future environment. Similarly, streams are likely to be retained and enhanced in the natural environment as per directive provisions of the AUP:OP.

Where development is planned or occurring such as west of the corridor within greenfield areas of the Redhills basin, significant change will occur. Unprotected areas of vegetation that are not identified as SEA, riparian or otherwise protected will likely be removed as urban development is undertaken. Future habitats will include private garden plantings and roadside landscaping (e.g., street trees).

11.2.6.4 Topography and Landscape Context

Existing Environment

Don Buck Road is situated along a north-south ridgeline that gently rises in the south with a highpoint close to the Royal Road intersection. The existing road reserve is characterised by exotic grass with standalone trees and stands of native and non-native trees intermittently along the road reserve. The largest band of vegetation is at the south eastern end of the corridor, no notable trees are in proximity of the corridor. The northern end of the corridor is adjacent to large, sealed areas used for light industry uses. The Landscape Assessment classifies the character value within the context of the existing road reserve as very low.

Likely Future Environment

It is anticipated that the limited biotic features within the landscape will be removed to facilitate development of vacant lots in the immediate vicinity. Beyond the first line of existing residential lots (within the Redhills basin) land is zoned for residential and business purposes, earthworks are underway, and the area will be urbanised over the next 10 years, experiencing a significant change in use. Land immediately abutting the transport corridor will continue to be predominantly urban and residential although may intensify in density, given Plan Change 78 (Intensification) and population increase.

11.3 NOR RE2 - Fred Taylor Drive

11.3.1 Project Description

Fred Taylor Drive is an existing arterial through the Redhills North area, linking from Brigham Creek roundabout in the north down to Westgate and Don Buck Road in the south. A portion of the corridor between Don Buck Road intersection and Dunlop Road is included within another Te Tupu Ngātahi package being Redhills HIF.

The NOR proposes an alteration to AT's existing Designation 1433 and therefore the assessment is limited to works beyond the scope of the existing Designation. It does not include works that can be currently undertaken within (or effects that are or could reasonably be generated by) the existing designation. The principles of corridor design for Fred Taylor Drive are covered in Section 9. Corridor specific design and receiving environment features are discussed in this section. Further details of the existing and likely future environment are in the relevant technical assessments (Volume 4).

11.3.2 Overview

Fred Taylor Drive serves as the spine of the Redhills North area and will provide access to a future rapid transit station and the strategic highway network. Fred Taylor Drive FTN facilities upgrade will provide a multimodal link to Westgate centre and support active modes and public transport priority.

An alteration to the existing designation is proposed to upgrade Fred Taylor Drive from the current two-lane arterial to a 30 m wide four lane arterial, with separated active mode facilities. The proposed designation footprint shows the envelope proposed to construct, operate and maintain Fred Taylor Drive and all its ancillary components, including construction area, stormwater infrastructure, batter slopes and retaining walls, see Figure 11-6.

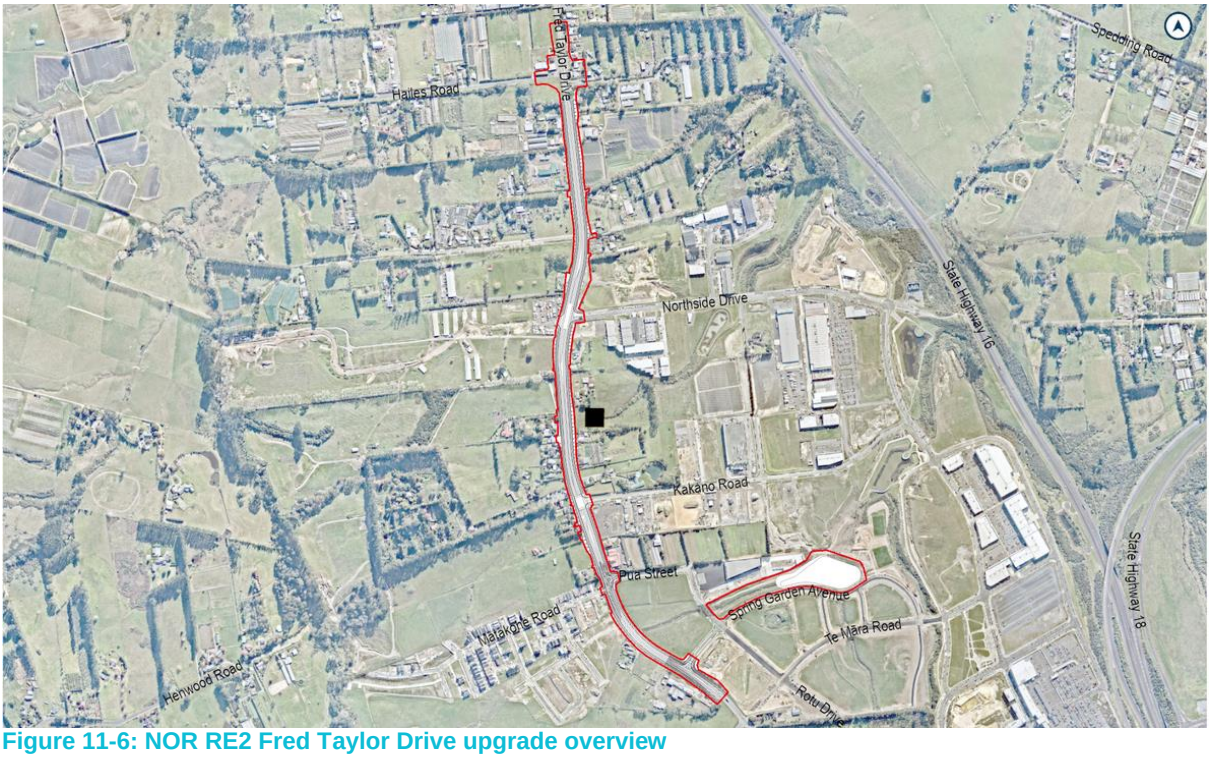


Figure 11-6: NOR RE2 Fred Taylor Drive upgrade overview

11.3.3 Fred Taylor Drive upgrade

Key features of the Fred Taylor Drive upgrade include:

- The upgrade of the existing corridor to a 30 m wide four-lane FTN arterial with separated active mode facilities
- The upgrade of the intersections with Northside Drive, Kakano Road and to signalised intersections and with Hailes Road (and future Spedding Road) to a roundabout
- Additional land for tie-ins with side streets and stormwater pond
- Likely posted speed of 50 km/h, design speed (of which effects will be assessed on) is 60 km/h
- Batter slopes to enable widening of the corridor, and associated cut and fill activities
- Vegetation removal along the existing road corridor
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

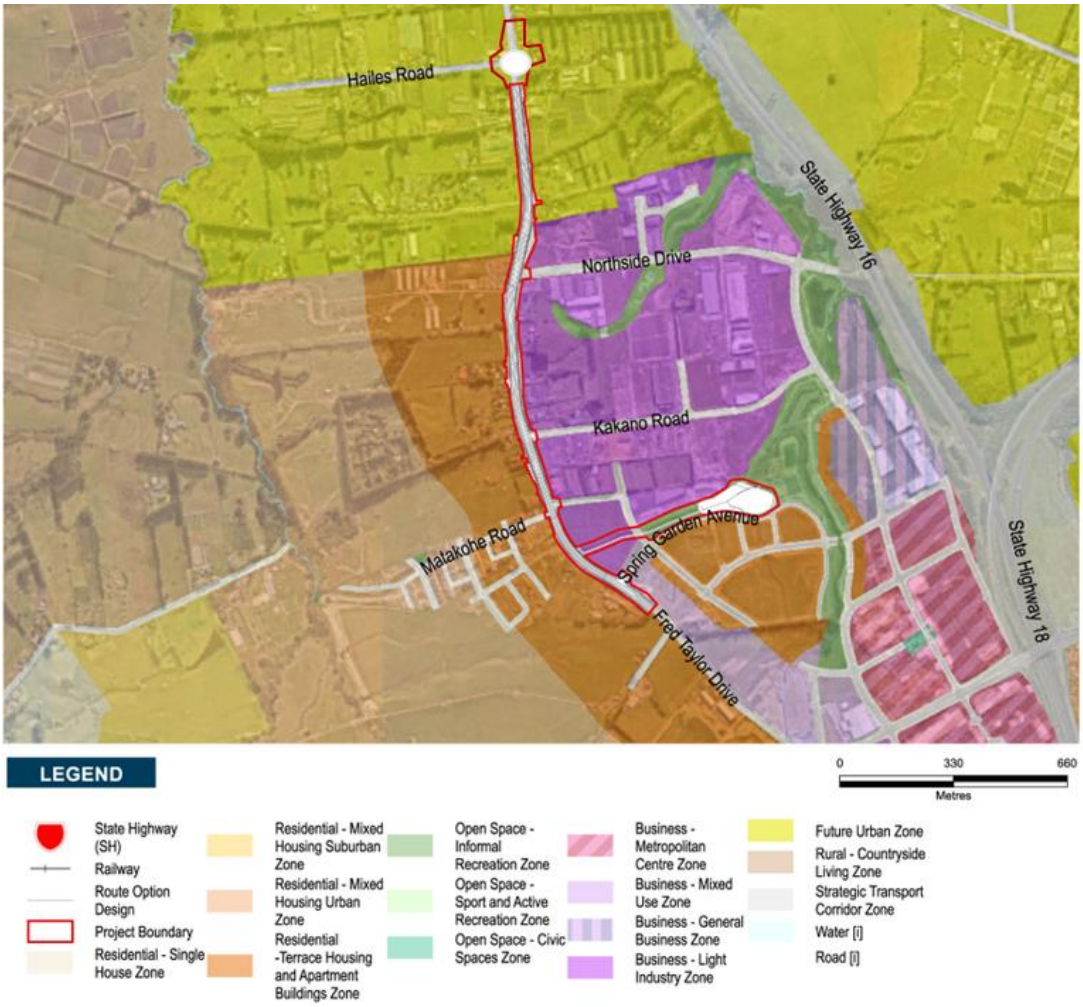
Figure 11-7 shows the indicative cross section, for further detail see Volume 3 Drawings.

Figure 11-7: NOR RE1 Fred Taylor Drive typical 30 m cross section

11.3.4 Fred Taylor Drive Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the upgrade of Fred Taylor Drive will be constructed, operated, and maintained. Table 11-3 summarises the range of land use scenarios and pertinent planning provisions to the transport corridor.

Table 11-3: NOR RE2 Fred Taylor Drive planning context

Planning Context	Provision
Land use – Existing AUP:OP zoning	 • FUZ - This zone has a high likelihood of change • Business - Light Industry, General Business Zone, Business Park • Residential – Terrace Housing and Apartment Building, Mixed Housing Urban • Open Space – Informal recreation **Precincts** • Westgate Sub precinct C, D, F and G • Redhills Precinct These is low chance of the existing environment in the residential and business zones changing, i.e., they will remain urban (see Section 9.4).
Spatial Strategy (Auckland Council)	• The NW Spatial Strategy identifies a small centre close to Fred Taylor Park, and an expansion to the existing industrial area in the south. The remainder of the area is unspecified and identified as 'residential and other uses' • A future structure planning process will be undertaken closer to the release of this land area
Overlays	• High-Use Aquifer Management Areas Overlay [rp] - Kumeū Waitemata Aquifer • Aircraft Noise Overlay - NZRAF base - noise control area (55dBA)

Planning Context	Provision
Controls	• Macroinvertebrate Community Index – Urban • Macroinvertebrate Community Index - Rural • Arterial Roads
Designation – transport related	#1433, Road - Fred Taylor Drive Transport Corridor, Designations, AT (subject of this alteration) #1468, Road Widening - State Highway 16 (Westgate to Whenuapai), Designations, AT • AT is also the requiring authority for #1468 and as such does not need to obtain written consent for works in this designation
Designation – non transport related	#4311, Defence purposes - protection of approach and departure paths (RNZAF base), MOD • Proposal will not impact this airspace designation

11.3.5 Human Environment

Section 11.3.5 sets out the existing and likely future human environment elements for Fred Taylor Drive, including a discussion of:

- Land use and form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration)

Further detail on each can be found in the relevant specialist reports, at Volume 4.

11.3.5.1 Land Use and Urban Form

Existing Environment

The land use along the Fred Taylor Drive corridor is in transition, with the southern end of the corridor being zoned and in various stages of development from greenfield to urbanisation. Towards Westgate and Don Buck Road is large format commercial and industrial uses with the area to the west predominantly being developed for residential. The Redhills North FUZ area is still used for predominantly rural activities.

Likely Future Environment

The environment surrounding Fred Taylor Drive has a high likelihood of change as it is partially greenfield, and a substantial portion is in FUZ. South and immediately adjacent of Northside Drive the earthworks are being undertaken within the Business - Light Industry Zone on the eastern side and Residential - THAB on the western side (see Table 9-5).

Redhills North FUZ is not structure planned, the NW Spatial Strategy identifies a Business – Light Industry Zone on the east and a Future Neighbourhood Centre near Fred Taylor Park and existing THAB. The remaining area is classified as 'Future Residential and Other Uses'. Those future uses will be confirmed through structure planning, given the proximity of a planned RTN station, metropolitan centre at Westgate and NPS-UD direction it may be of similar density and form to existing apartment and terrace housing and light industry activities.

11.3.5.2Transport

Existing Environment

Current form is inconsistent, with formal kerb and channel and approx. 2.5 m footpaths only in sections adjacent to recent development or upgraded intersections. Cycling facilities are mixed, with some on road cycle facilities, some separated paths, some shared paths and sections of no facilities.

The corridor has a semi-urban character with two vehicle lanes (one in each direction) and an 80 km/h speed limit. Between Spring Garden Road and Matakohe Road, Fred Taylor Drive carried a 5 day ADT of approximately 1,300 vehicles per day and 930-1,140 vehicles per hour during the morning and afternoon peak. Four public transport services operate on the northern section of Fred Taylor Drive (north of Northside Drive), connecting at Westgate via Maki Street being:

- 122 between Huapai and Westgate (every 2 hours, 7 days a week)
- 125 between Helensville and Westgate, (every 2 hours 7 days a week)
- 125X weekday peak period service between Helensville and City
- 126 between Westgate and Albany Station (every 60 minutes 7 days a week).

Likely Future Environment

The forecast ADT in 2048 on Fred Taylor Drive ranges from 15,000 to 22,000 vehicles. The indicative 2048 AT bus network forecasts 16 buses per hour on Fred Taylor Drive, or approximately 1 bus every 5 minutes.

Other transport projects expected to form part of the future environment are:

- NW Local Arterial Package
- Don Buck Road upgrade and at the northern end, and Spedding Road is proposed to be extended across SH16 opposite Hailes Road and provide a direct local multi modal connection between Redhills and Whenuapai.
- Other Te Tupu Ngātahi Package
- Redhills HIF proposes changes to the intersection at Dunlop Road and Baker lane. This is expected to continue the Fred Taylor cross section and active mode provision to the intersection with Don Buck Road
- NW Strategic Package proposes an interchange at the current Brigham Creek roundabout with Fred Taylor Drive separated from regional movements to connect directly to Brigham Creek Road.
- Non-Te Tupu Ngātahi projects
- A proposed RTN station in the vicinity of Fred Taylor Drive and SH16.

Network connections will improve Redhills connection to the wider North West and create alternative travel options for walking cycling and public transport. Fred Taylor Drive will also become a key road link to the strategic RTN, see Table 9-6: North West Transport Projects for further detail.

11.3.5.3Historic Heritage and Archaeological Values

Existing Environment

There is one recorded archaeological site within the extent of the proposed route but no historic areas, structure or buildings. The archaeological site R11/3097 at 81 Fred Taylor Drive is the crash site of a B17E bomber from 1942, however the main impact area has recently been extensively earth worked. There is a small risk that the debris field of the crash extends across Fred Taylor Drive.

The Redhills area was also utilised in pre-Contact and early Contact period and therefore there is a very small risk of unrecorded archaeological features being encountered. Two trees are also recorded under the CHI at 121 Fred Taylor Drive. However these are outside the designation footprint and not identified as notable under the AUP:OP.

Likely Future Environment

The environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

11.3.5.4 Community and Recreational Facilities

Existing Environment

There are limited community facilities along Fred Taylor Drive, with the corridor largely transitioning from rural to urban. There are some commercial premises along the corridor, including fruit and vegetable shop at Hailes Road, and a 'Remarkable Kids Learning Centre' off Northside Drive set back from the corridor. At the northern end Fred Taylor Park provides sporting facilities and fields, although this is outside the proposed designation extent. Kopupaka Reserve includes a playground and park with walking paths.

Likely Future Environment

Existing open space areas and recreational activities are expected to remain unchanged, however Fred Taylor Park will be impacted by the proposed Brigham Creek Interchange works, proposed as part of the NW Strategic Package. Additional community facilities are likely to be provided as development continues and the population in the surrounding area grows.

11.3.5.5 Noise and Vibration

Existing Environment

Fred Taylor Drive is located within a predominantly rural area, the noise environment is dominated by road traffic noise from vehicles on Fred Taylor Drive and the surrounding road network. Existing noise levels in the area range between 36 – 65 dB $L_{Aeq(24h)}$.

Likely Future Environment

Development is occurring in the area, and ambient noise levels are likely to increase above their current level. Predictions show a higher traffic noise level range of between 39 – 66 dB $L_{Aeq(24h)}$.

11.3.6 Natural and Physical Environment

Section 11.3.6 sets out the existing and likely future natural and physical environment elements for Fred Taylor Drive, including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context.

Further detail can be found in the relevant specialist reports, at Volume 4.

11.3.6.1 Geology

The majority of the Fred Taylor Drive corridor is within the Puketoka Formation, part of the Tauranga Group, the soil is mainly alluvial sediments. The southern end of Fred Taylor Drive is located in East Coast Bays Formation, part of the Waitemata Group. The Waitemata Group is part of the Akarana Supergroup and mainly marine sedimentary and volcanic rocks. The geological conditions are not anticipated to vary in the future.

11.3.6.2 Hydrology and Natural Hazards

Existing Environment

Fred Taylor Drive runs predominantly on a ridgeline between the Redhills and Whenuapai stormwater catchment, with several overland flow paths and streams draining west of the corridor towards Ngongetepara Stream and east of the corridor towards Totara Creek. An existing minor culvert crossing drains the low-lying area alongside the road at 160 Fred Taylor Drive.

Existing flood prone areas have been identified from Auckland Council GIS at 160 Fred Taylor Drive, 132-136 Fred Taylor Drive and 1 Spring Road, Massey. Flood plains are evident on both sides of the corridor with additional flood prone areas further downstream of the catchment on the eastern side.

Likely Future Environment

The immediate catchment is either planned to be urban or already urbanising, existing streams within Auckland Council reserve land are likely to remain. In the future environment, provided development addresses its flooding effects, there is not expected to be significantly increased natural hazards conditions in the future.

11.3.6.3 Terrestrial Ecology

Existing environment

Habitats

Fred Taylor Drive corridor habitat is generally dominated by exotic grass, amenity planting and exotic treeland. There are also large areas of brownfield, which includes areas of hard stand (e.g., concrete, bare ground), cropland, market gardens and construction sites. There are no SEAs, wetlands or streams within the Fred Taylor Drive corridor.

Species

Bat surveys were undertaken and identified long tailed bats (pekapeka) within 1 km of the corridor. Treeland within the corridor may be suitable for bat roosting and foraging. No dedicated bird surveys were undertaken, but incidental sightings were noted for common species such as mynas and sparrows. No TAR species were observed during investigations. No indigenous lizards were identified during site walkovers; however, the plague skink was identified. Copper skinks have also been identified within 4 kilometres of the corridor and is likely associated with all the vegetation types in the study area.

Likely Future Environment

The environment is likely to undergo significant change in the future, the southern extent is zoned but largely still greenfield with areas of earthworks and development occurring. The section north of Northside Drive is zoned FUZ but is currently rural, therefore this area will undergo significant change. In a future urbanised environment, the exotic grassland will be removed, and replaced with urban land

use. Private gardens, street and public open space planting will be predominant. The southern extent is zoned residential and commercial but largely still greenfield with areas of earthworks and development occurring.

11.3.6.4Topography and Landscape Context

Existing Environment

Fred Taylor Drive is positioned along a shallow ridgeline with a north south aspect and a gentle slope ascending towards a high point at the southern end of the route. The lowest point of Fred Taylor Drive NOR is at the northern end of the corridor. There are no rivers or permanent streams which cross the corridor. There are no notable trees (as identified under the AUP:OP) within or proximate to the corridor, however mature Norfolk Pines are adjacent to the Pua Street interchange and prominent in the landscape. The Landscape Assessment classifies the character value as being low within the context of the existing arterial and urbanisation.

Likely Future Environment

It is anticipated that the existing physical landform will endure, some of the defining biotic (vegetation cover) features of the landscape will undergo significant change alongside future development, with the removal of vegetation to accommodate proposed commercial and residential development. Development projects will also likely involve the implementation of street tree plantings, new or enhanced public open space areas and landscaping within the yards of future housing, which will contribute to amenity.

11.4 NOR R1 - Coatesville-Riverhead Highway

11.4.1 Project Description

Coatesville-Riverhead Highway is an existing north-south corridor that starts at SH16 in the south, up through Riverhead and terminating at the intersection with Dairy Flat Highway in the north. The proposed designation extent is limited to between the existing Riverhead settlement (at Riverhead Road) and SH16.

The principles of the corridor design for Coatesville-Riverhead Highway are covered in Section 9. Corridor specific design and receiving environment features are discussed in this section. Further details of the existing and likely future environment are in the relevant technical assessments (Volume 4).

11.4.2 Overview

Coatesville-Riverhead Highway is an existing road with two lanes (one in either direction). There are no footpaths along the rural section of the corridor and only footpaths on the eastern section within urban Riverhead. The arterial forms a key connection for the Riverhead community for trips via SH16 to key employment centres such as Westgate and the CBD.

A new designation is proposed to upgrade Coatesville-Riverhead Highway from its current width of approximately 20 metre to a 24 metre urban cross section and a 33 metre rural cross section. The designation includes a shared path in the rural section and separated active mode facilities on both sides in the urban section, as well as intersection upgrades at Riverhead Road, Old Railway Road and tie ins. The proposed designation footprint shows the envelope required to upgrade, operate and maintain Coatesville-Riverhead Highway and all its ancillary components, including construction area, stormwater infrastructure, batter slopes and retaining walls, see Figure 11-8.

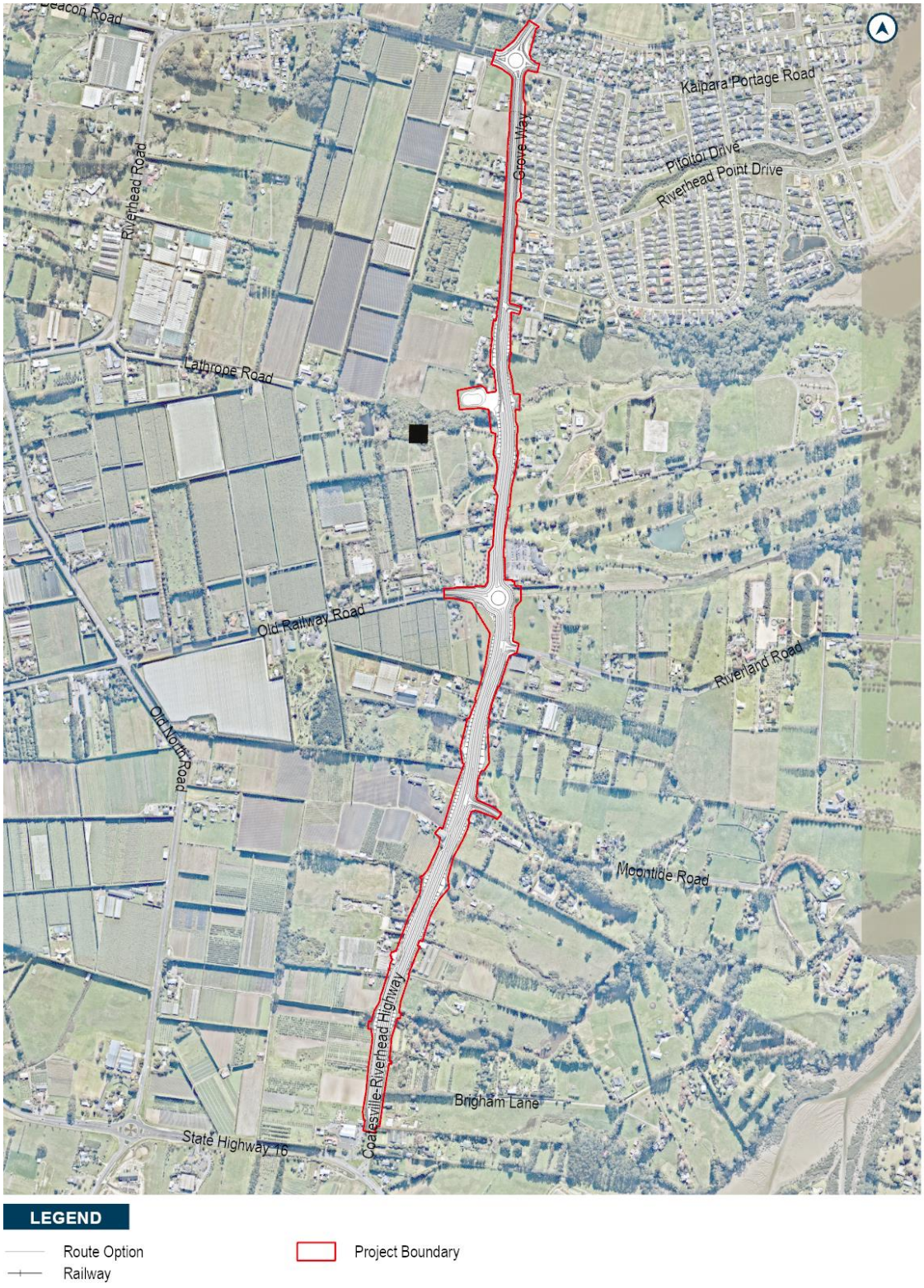


Figure 11-8: NOR R1 Coatesville-Riverhead Highway upgrade overview

11.4.3 Coatesville-Riverhead Highway upgrade

The key features of the Coatesville-Riverhead Highway upgrade include:

- Upgrading the southern section of the corridor to a 33 metre two-lane low speed rural arterial with active mode space on the western side and upgrading the northern section of the alignment to a 24 metre two-lane urban arterial with active mode facilities on both sides of the corridor
- Upgrade of the Coatesville-Riverhead Highway / Old Railway Road intersection from priority T intersection to a roundabout
- Upgrade of the existing Coatesville-Riverhead Highway / Riverhead Road roundabout.
- Likely posted speed of 50 km/h, design speed (of which effects will be assessed on) is 60 km/h
- Tie-ins with existing roads, stormwater treatment (swales and wetland) and culverts
- Batter slopes to enable widening of the corridor, and associated cut and fill activities
- Vegetation removal along the existing road corridor
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 11-9 and Figure 11-10 shows the indicative cross sections, for detail see Volume 3 Drawings.

Figure 11-9: Coatesville-Riverhead Highway 24 m urban arterial

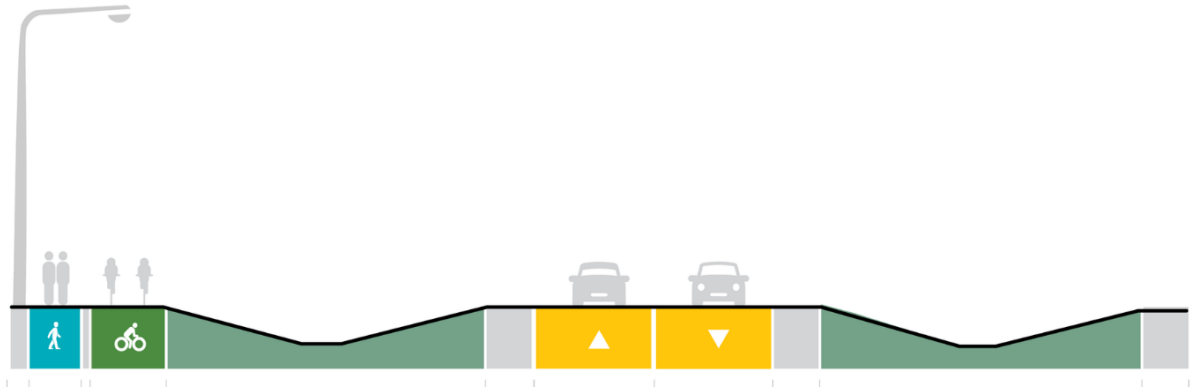


Figure 11-10: Coatesville-Riverhead Highway typical 33 m rural cross section

11.4.4 Coatesville-Riverhead Highway Existing and Likely Future Environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the corridor will be upgraded, operated, and maintained. Table 11-4 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on land adjacent to the corridor.

Table 11-4: NOR R1 Coatesville-Riverhead Highway Planning Context

Planning Context	Provision
Land use – Existing AUP:OP zoning	• FUZ - • Residential – Single House • Rural - Mixed Rural Zone • Special Purpose - School Zone • Business - Neighbourhood Centre Zone • Open Space - Sport and Active Recreation Zone The land east of the corridor is already zoned under the AUP:OP as Residential – Single House Zone. There is also a large area of Special Purpose Zone just south of the Rural Urban Boundary (RUB), the remainder is Rural – Mixed Rural Zone up to where the corridor joins SH16. Except FUZ which has a high likelihood of change, the zones have a lower likelihood of land use change. In particular the area outside of the RUB is not expected to undergo urban development.
Spatial Strategy (Auckland Council)	• Future Residential and Other Uses • Future Neighbourhood Centre • Future Local Centre The Spatial Strategy identifies a 'Future Neighbourhood Centre' opposite the Hallertau Brewery and the remainder unspecified, as 'Future Residential and Other Uses'. A Future Local Centre is identified north of where the route terminates, at the existing commercial centre.
Overlays	• High-Use Aquifer Management Areas Overlay [rp] - Kumeū Waitemata Aquifer
Controls	• Arterial Roads • Macroinvertebrate Community Index – Rural • Macroinvertebrate Community Index – Urban • Stormwater Management Area Control - RIVERHEAD, Flow 1
Plan Changes	**Plan Change 78, Notified:** Riverhead is not subject to any other plan changes.
Designation - transport related	#6766, State Highway 16 - Hobsonville to Wellsford, Designations, Waka Kotahi • There is a proposed alteration to this designation proposed that will change the intersection with Coatesville-Riverhead Highway. The R1 project boundary will end at the altered 6766 Designation boundary and tie into this network • AT works which occur within an earlier designation boundary will require written consent under section 177 of the RMA from Waka Kotahi
Designation – non transport related	#4311, Airspace Restriction Designations - Defence purposes - protection of approach and departure paths (Whenuapai Air Base), MOD • The NOR will not affect this designation

11.4.5 Human Environment

Section 11.4.5 sets out the existing and likely future human environment elements for Coatesville-Riverhead Highway, including a discussion of:

- Land use and form
- Transport
- Historic heritage and archaeology
- Community and recreational facilities
- Acoustic environment (noise and vibration).

Further detail on each can be found in the relevant specialist reports, at Volume 4.

11.4.5.1 Land Use and Urban Form

Existing Environment

Along the majority of the corridor the existing environment is rural with agricultural and viticulture uses and low scale large lot residential. The corridor is rolling in geometry with a wide grassed berm either side, and farm fencing and non-uniform planting or windbreaker planting. Towards the northern extent the eastern side has built features that become denser with smaller lots and low level (one-two storey) buildings properties close together. Suburban features like footpaths and private gardens become predominant.

Likely Future Environment

The rural area is unlikely to change significantly, as it is outside of the RUB. The Rural - Mixed Rural Zone provides for horticulture, viticulture, farming and equine activities with ancillary commercial activities such as cafes, restaurants and tourist or visitor facilities. The land is expected to have a high level of amenity and also provides for rural lifestyle.

Within the RUB, the western FUZ side of Coatesville-Riverhead Highway will urbanise, and a new neighbourhood centre and expanded existing town centre have been identified in the Spatial Strategy. The Riverhead area is not located in proximity to an RTN station or major centre, therefore the density of future use is likely to be close to that which is existing, although zoning won't be confirmed until after structure planning and plan changes come into effect.

11.4.5.2 Transport

Existing Environment

Coatesville-Riverhead Highway has a rural character with two vehicle lanes (one in each direction), and a speed limit of 60 km/h south of Short Road and a 50 km/h north of it. For active mode provision, there is a 1.8 metre footpath on the eastern side of the road between Short Road and Riverhead Road and no footpaths along the rest of the corridor.

In March 2021 near SH16, Coatesville Riverhead Highway carried a 5 Day ADT of approximately 9,900 vehicles per day and 890-1,040 vehicles per hour during the morning and afternoon peak. The current bus service is 126 which runs on Coatesville Riverhead Highway connecting to Westgate, Riverhead, Coatesville, and Albany Station The service operates at least every 60 minutes 7 days a week.

Likely Future Environment

The forecast ADT in 2048 is 9,000 vehicles between SH16 and Short Road, and 7,000 vehicles between Short Road and Riverhead Road. The indicative 2048 AT bus network forecasts 5 buses per hour on Coatesville Riverhead Highway, or approximately 1 bus every 10-15 minutes.

Non-Te Tupu Ngātahi projects expected to form part of the future environment include SH16 Safety Improvement Programme, Stage 2 by Waka Kotahi. This includes a new roundabout at the intersection of SH16 and Coatesville-Riverhead Highway, see Table 9-6 previously and Figure 11-11.

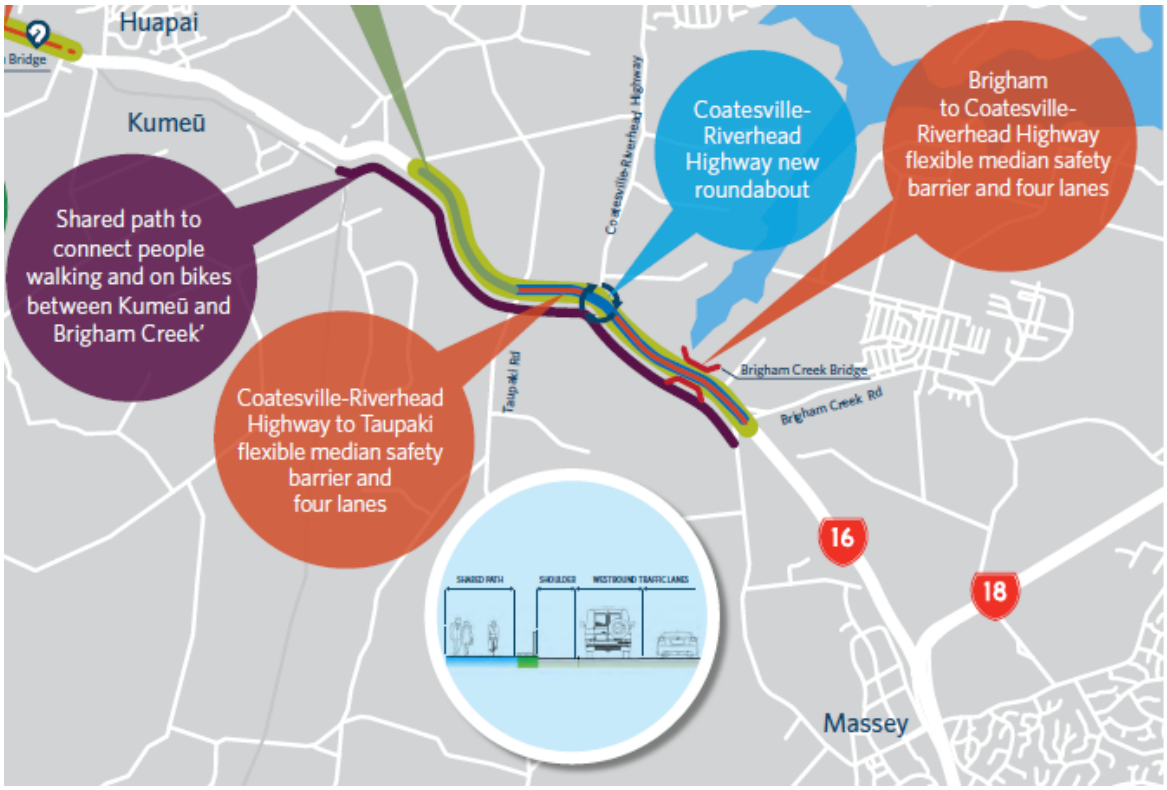


Figure 11-11: SH16 safety improvements at Coatesville-Riverhead Highway (Waka Kotahi, 2022)

11.4.5.3 Historic Heritage and Archaeological Values

Existing Environment

There are no recorded archaeological sites or historic areas, structures or buildings within the extent of the upgraded corridor. The area has been utilised in the pre-Contact and early Contact period and therefore there is a very small risk unrecorded archaeological features will be encountered. An early harbour survey for example shows a canoe landing area from the upper harbour to Kumeū River which potentially would cross the corridor, however the report notes such pathways are rarely recognised in archaeological record.

Likely Future Environment

The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

11.4.5.4 Community and Recreational Facilities

Existing Environment

A range of existing community and recreational facilities are located along Coatesville-Riverhead Highway, including:

- Hare Krishna Centre – 1229 Coatesville-Riverhead Highway
- Korean Monastery - 1244 Coatesville-Riverhead Highway
- Huapai Golf Club – 1262 Coatesville-Riverhead Highway
- Boric Food Market – 1404 Coatesville-Riverhead Highway
- New Sky Golf Range - 1352 Coatesville-Riverhead Highway
- Hallertau Brewery and beer garden – 1171 Coatesville-Riverhead Highway.

Those facilities in proximity to but not within the project include the Riverhead War Memorial Park, Riverhead Bowls Club, and Critter Creek Animal Resort.

Likely Future Environment

Existing open space areas and recreational activities are expected to remain unchanged, although there is potential for the amenities (identified above) to change in line with the AUP:OP zoning. Schools in the area are expected to remain and could grow as the population in the area increases. It is likely additional community facilities will be provided within the FUZ and existing urban areas as development occurs and the population in the surrounding area grows.

11.4.5.5 Noise and Vibration

Existing Environment

The Coatesville-Riverhead Highway currently runs through a rural area with few dwellings near the road. The noise environment is dominated by road traffic noise from vehicles on the Coatesville-Riverhead Highway and surrounding road network. Noise levels within the NOR footprint range between 33 – 66 dB $L_{Aeq(24h)}$.

Likely Future Environment

Development is highly likely to occur in the FUZ. An increase in ambient noise levels is expected as the area urbanises. In a future without the upgraded corridor, a slightly higher noise range between 34 – 67 dB $L_{Aeq(24h)}$ is predicted.

11.4.6 Natural and Physical Environment

Section 11.4.6 sets out the existing and likely future natural and physical environment elements for Coatesville-Riverhead Highway, including a discussion of:

- Geology
- Hydrology and natural hazards
- Terrestrial ecology (and key freshwater features)
- Topography and landscape context

Further detail can be found in the relevant specialist reports, at Volume 4.

11.4.6.1 Geology

The alignment runs through Puketoka formation which is part of the Tauranga group. The group is composed mainly of alluvial sediments. The geological conditions are not anticipated to vary in the future.

11.4.6.2Hydrology and Natural Hazards

Existing Environment

The corridor lies within the Riverhead and Redhills stormwater catchment and crosses five unnamed streams that drain east towards the estuaries. Flood plain and flood prone areas are evident from Auckland GIS next to the road corridor and the flood plain overtops the existing road. The existing drainage consist of earth channels on the western side of the road that drains into a pipe network and discharges to an open channel further east of the corridor.

Likely Future Environment

As the area will primarily remain rural, with urban development limited and concentrated in the north FUZ, the hydrological environment and natural hazard conditions are not expected to significantly vary. Developers will be expected to address their own effects and not increase flood hazard risk.

11.4.6.3Terrestrial Ecology

Existing Environment

Habitats

The rural and FUZ sections of the corridor are predominantly exotic grassland, with woody vegetation in the form of shelterbelts and roadside planting.

The area has nine identified streams from site investigations and desktop surveys, four have been classified as intermittent and five as permanent streams. Three of the permanent streams were identified as having moderate value, one as having high value and one as having low value. One wetland was identified at 1229 Coatesville-Riverhead Highway within the footprint and has been classified as a natural wetland under the NES-FW with exotic vegetation.

Species

Bat surveys picked up long-tailed bats (pekapeka) within 2 kilometres southwest of the corridor. It is likely that mature shelterbelt planting along the corridor could provide habitat for roosting and enable bat movements.

No dedicated bird surveys were undertaken for the corridor however incidental observations were made of common species such as blackbirds, sparrow and pūkeko. The habitat of the area such as shrubby vegetation, native planning and mature exotic treeland provides localised habitat value for birds. Copper skink has also been recorded within 2 kilometres of the corridor and is likely associated with majority of vegetation types along the corridor. The introduced plague skink was also observed within the corridor.

No dedicated fish surveys were undertaken, however incidental sightings of eels (unidentifiable species) were made at three streams. These will be assessed at regional consenting stage.

Likely Future Environment

Outside of the RUB the land within and adjacent to Coatesville-Riverhead Highway is unlikely to undergo significant change. In the future urbanised environment, exotic grassland will be removed, residential land use and street and public open space planting will be more present. Along with exotic grassland other unprotected vegetation that is not identified as SEA, riparian or otherwise (street trees over certain size, open space vegetation) may be removed as urban development is undertaken.

The AUP:OP emphasises the protection and enhancement of existing watercourses and wetlands are protected under the NES-FW. It is assumed that in a future scenario, permanent streams and areas of wetland will generally be avoided and retained. Within the rural areas, habitat change will be less significant.

11.4.6.4Topography and Landscape Context

Existing Environment

Coatesville-Riverhead Highway is situated along a gently undulating landform that is partially cut into the surrounding landscape to accommodate the existing road. The corridor traverses four unnamed tributaries of Brigham Creek.

The majority of the adjacent land comprises grass with stands of native and non-native trees intermittently along the road. Dense linear belts of hedgerows and shelterbelts intermittently form property boundaries and a 'Notable Group' of Redwood trees (AUP:OP #2598,) is located within 1135 Coatesville-Riverhead Highway, adjacent to but outside the project footprint. Mature trees contribute to the character of the local landscape.

Likely Future Environment

The land surrounding the majority of the designation footprint (within the Mixed Rural Zone) is expected to retain its existing aesthetic, land use and landscape character.

Land will experience change within the FUZ from rural to urban land use. This land is expected to be urbanised for residential purposes over the next 10-20 years. It is anticipated that the physical features of the landform will be altered over time as the landscape is urbanised.

11.5 Redhills and Riverhead NORs Package Overview

Table 11-5: NOR R1 Coatesville-Riverhead Highway Planning Context

Notice	Purpose	Objectives *Enable the provision of a transport corridor that:*	Indicative Extent[15] Length (l) and Width of transport corridor (w)[16]	Lapse Period	Properties Affected
NOR RE1 Don Buck Road	Construction, operation and maintenance of a transport corridor	a) Improves connectivity through Redhills to Westgate. b) Integrates with and supports planned urban growth and the future transport network in Redhills. c) Contributes to mode shift by providing dedicated facilities for public transport and active modes. d) Is safe for all users.	Linear designation from Royal Road to Fred Taylor Drive. • 1.12 km • 30 m (w)	15 years	Total: 104
NOR RE2 Fred Taylor Drive (alteration to Designation 1433)	Transport corridor	a) Improves connectivity between Redhills, Whenuapai and Kumeū-Huapai. b) Integrates with and supports planned urban growth and the future transport network in Redhills. c) Contributes to mode shift by providing dedicated facilities for public transport and active modes. d) Is safe for all users.	Linear designation from Dunlop Road to Hailes Road • 1.6 km • 30 m (w)	Not applicable	Total: 70
NOR R1 Coatesville-Riverhead Highway	Construction, operation and maintenance of a transport corridor	a) Improves connectivity between Riverhead, Westgate and Kumeū-Huapai. b) Integrates with the existing and future environments and with the future transport network in Riverhead. c) Contributes to mode shift by providing dedicated facilities for active modes. e) Is safe for all users.	Linear designation from Riverhead Road to SH16. • 2.96 km • 24-33 m (w)	20 years	Total: 55

[15] Figure are approximate, refer to plans for extent of designation.

[16] Note dimensions are for the permanent road corridor works only, and do not include the areas for construction works, stormwater ponds etc

12 NW Local Arterials Engagement

12.1 Introduction

This section provides an overview of engagement undertaken for the NW Local Arterials Package in Whenuapai, Redhills, and Riverhead. It summarises the approach during each phase, focusing on key themes and common issues raised across the NW Local Arterials Package and North West Transport Network generally. Where engagement has affected a specific corridor design outcome, such as alternatives consideration or identification and management of an environmental effect, that is considered in either the Assessment of Alternatives (Appendix A) or the AEE, Part B, as relevant.

Prior to detailed design and construction, further engagement will be undertaken by the requiring authority, as needed to manage impacts of the extended and / or upgraded corridors, this is set out in detail in the AEE Part B and the proposed conditions at Appendix B.

12.2 Groups Engaged

Te Tupu Ngātahi has worked with partners, stakeholders, potentially affected landowners and the wider community through all project stages. The following parties (see Table 12-1) were engaged using a variety of tools and methods (see Figure 12-1). Following the COVID19 pandemic, online engagement use increased, however this was supported by face-to-face engagement, in particular for public and landowners.

Table 12-1: Groups across NW Local Arterial Package

Group	In particular
Partners	Manawhenua, Auckland Council
Elected members	MP's and Ward Councillors, Auckland Council Planning Committee, Local Boards (Upper Harbour, Rodney, and Henderson and Massey)
Stakeholders	Government stakeholders including Ministry of Education, New Zealand Defence Force (NZDF), Department of Conservation, Ministry of Business, Innovation and Employment, Kāinga Ora and Heritage New Zealand Pouhere Taonga, Fire and Emergency New Zealand and KiwiRail
Network Utilities	Watercare, Transpower, Vector, First Gas, Spark
Interest Groups	Bike and Walk Auckland, Forest and Bird, Greater Auckland, Generation Zero, accessibility groups, business associations, road user groups
Developers	Oyster Capital, Cabra Development Limited, Liberty Property Trustees, Hugh Green Group, Woolworths New Zealand / Countdown, Roscrea No. 2 Trustee Limited, Neil Group
Landowners	Those who own property within the study corridor
Public	Members of the community and wider

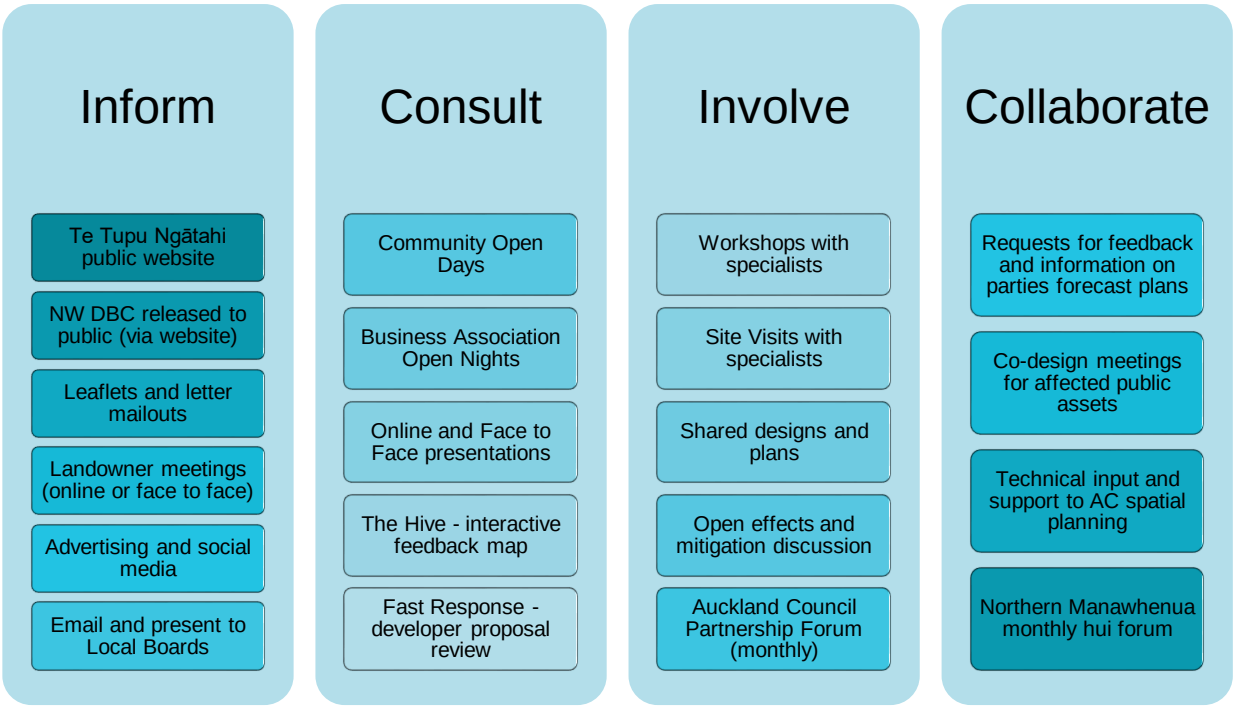


Figure 12-1: IAP2 Engagement Methods

12.3 Engagement Stages and Approach

Te Tupu Ngātahi has engaged through all project stages including IBC, DBC and preparation of the route protection package. Although there is no statutory obligation to engage it is widely accepted as best practice, and has generally had the following objectives:

- Provide information to landowners on how projects might impact their property, the route protection process and anticipated delivery timelines
- Identify and understand constraints including any characteristics or features of properties (environmental, historic, cultural) not previously known to the Project team, in order to inform and develop the project(s)
- Integrate and collaborate with other network providers to achieve strategic co-benefits where practicable and/or not preclude future network plans
- Keep the community informed of the projects progress
- To avoid, remedy and mitigate potential adverse effects of the project where practicable.

Following broad engagement at business case which indicated a high level of support, the NW Local Arterials Package moved into the NOR engagement phase, focusing on directly affected landowners and stakeholders (see Figure 12-2). These engagement phases are summarised in Table 12-2. It is noted that detailed design and delivery engagement will be undertaken in future by the requiring authority.

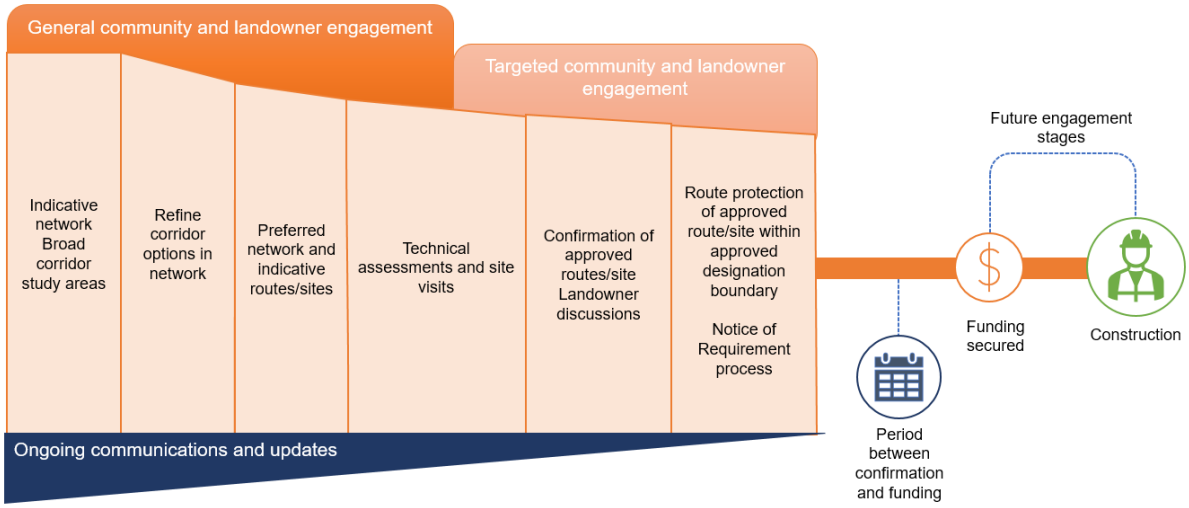


Figure 12-2: Te Tupu Ngātahi engagement process

Table 12-2: Project engagement stages summary

Project Stage	Timing	Engagement Summary
Indicative Business Case (IBC)	2018 -2019	• Receive feedback on the options considered for the business case. • Information drop ins, workshops to develop an IBC for the North West future transport network.
Detailed Business Case (DBC) / Options assessment	2020 - 2021	• Engagement to prepare the DBC and options assessment. • Collaborate with Auckland Council partners in combined drop-in sessions to inform communities of the transport projects proposed in the North West. • Elected members engaged to provide insights from the community and inform the DBC and the options assessment. • Key stakeholders (e.g., government, network utilities, interest groups and developers owning property) provided regular updates and opportunities to provide feedback. • Landowners and the community engagement between the 1st of November 2020 and 1st February 2021. People invited to provide feedback, including via drop-in sessions, face-to-face, email, phone call, feedback forms, Social Pinpoint and online surveys.
Notice of Requirement (NOR) phase	2022	• Briefing and presentations to local boards and elected representatives. • Publicly released the North West DBC documentation to the Te Tupu Ngātahi website. • Community Drop-in sessions held at Te Manawa in Westgate • Identified affected property owners sent letters in August 2022 • NOR boundary plans sent in September and October 2022 to affected landowners with offer of engagement. Over 174 emails and phone calls were received across NW Local Arterials Package and 123 meetings held to date with landowners.

12.4 Engagement Response

12.4.1 Project and Area Context

The NW Local Arterials Package includes eight extended and / or upgraded transport corridors, totalling approximately 20 kilometres of corridor. Over the next 30 years the North West is forecast to grow tenfold from approximately 9,000 to 100,000 people, increasing from 3,200 to 40,000 dwellings and providing 20,000 new jobs up from current 5,000 (source: FULSS). These figures represent an extensively changed community. Figure 12-3 is a snapshot of the North West Transport Network engagement and responses by package, including the NW Strategic Package:

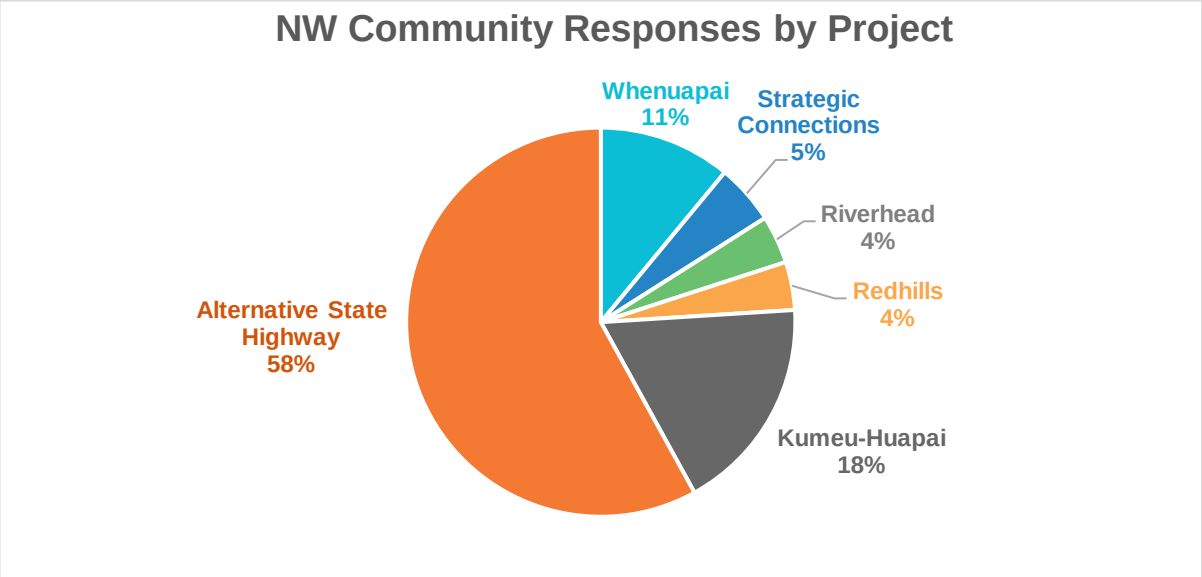


Figure 12-3: Engagement responses by North West project (including NW Strategic)

12.4.2 Feedback Synthesis and Projects Response

The following provides a synthesis of the key themes from engagement along with the source / how representative of the aggregate the feedback is. The intention of providing this data is to highlight key issues common to the NW Local Arterials Package and how the project has responded to them. As stated at Section 12.1, where feedback affected a specific project or option design, this is detailed in either the AEE Part B or the Assessment of Alternatives at Appendix A, as relevant. Note that Table 12-3 is intended to be representative, not exhaustive.

Table 12-3: NW Local Arterials key feedback themes

Feedback	Most raised by	Project Response
General		
Concern regarding property impacts including value, access, future acquisition process.	Landowners	Noted and acknowledged. The project has communicated with those directly affected landowners separately to discuss proposed upgrades and expectations. Access has been considered for each property and legal access will be maintained where practical, or the property acquired, if not. Refer to AEE,

Feedback	Most raised by	Project Response
		Section 25 for Property, Business and Amenity. Refer to Volume 3 for Drawings.
Support for public transport upgrades.	All	Noted, most corridors enable public transport improvements.
Support for safe cycle lanes and pedestrian facilities.	All	Noted. All corridors will provide separated safe active mode facilities.
Frustrations with lack of certainty over transport projects.	Public	Route protection of the corridors will provide certainty regarding the extent and location. For expected delivery timeframes see Section 4.2, for lapse dates discussion see Section 5.
Concerns regarding noise and vibration operational effects on properties.	Kāinga Ora	Noted. The Project provides an assessment of acoustic impacts, see Volume 4 and AEE Section 16 for Traffic Noise and Vibration and Section 17 for Construction Noise and Vibration. The NOR conditions propose a management framework to address noise effects.
Sequencing – sought investment in better transport connections prior to additional housing being built.	Public	Noted. The transport corridors are being protected ahead of development to enable better integrated delivery between landuse and transport. Refer to Section 4 for background and staging.
Trig Road (North)		
47% of respondents noted the project as very important or important, 24% as unimportant or very unimportant and 29% were neutral.	Public	Noted. Trig Road (North)s role is expected to increase in future, see Section 3.1 for Existing challenges and constraints and Section 6 Whether the work and designation are reasonably necessary.
Re. Traffic there was divergent views, some noted they did not experience any traffic issues on Trig Road (North). Those in support generally raised heavy traffic congestion.	Public / landowners	Refer to ITA at Volume 4 for expectation of daily and predicted traffic modelling.
Community noted that the road had too many traffic signals. Preference for roundabout over signals.	Public	An assessment of intersections forms has been undertaken and Trig Road (North) generally provides roundabouts. Refer to the ITA at Volume 4 and Assessment of Alternatives for intersection methodology.
Māmari Road		
Most respondents did not note any issues on Māmari Road and said it was not problematic or hardly used.	Public /Landowners	Māmari Road is currently not a connected route; however, it will have a strategic role in future. See Section 8.

Feedback	Most raised by	Project Response
Brigham Creek Road		
Corridor received high support, 94% of respondents rated as very important or important.	Public	Noted.
Noted heavy traffic congestion that was worsening.	Public	Brigham Creek Roads design provides additional capacity through provision for four lanes (two either direction) and active modes as an alternative choice.
Noted poor safety provisions for cyclists and motorists.	Public	Noted. The design proposed supports Vision Zero and Safe Roads standards.
Concern re. new residential development putting pressure on the local transport network	Public	Noted. Te Tupu Ngātahi is seeking to route project routes ahead of urban build out to secure transport corridors and enable solutions.
Spedding Road		
63% of Spedding Road East respondents said this section was very important or important. 43% of Spedding Road West respondents noted it as important or very important. 43% were also neutral on the Spedding Road West extension.	Public /Landowners	Respondents generally did not feel strongly about the upgrades. Once connected between Fred Taylor Drive and Hobsonville Road this routes significance will increase.
Fred Taylor Drive		
Traffic gets particularly congested approaching SH16 and also the Westgate area, support for upgrades.	Public	Noted. The changes to the SH16 end of Fred Taylor Drive are part of the NW Strategic Network (separate application). This will integrate with NOR RE2.
Don Buck Road		
60% of respondents noted the project as very important or important, 40% were neutral.	Public	Noted. Refer to Section 3.1 for *Existing Challenges and Constraints* on this corridor.
Hobsonville Road		
56% of respondents thought the project was very important or important. 25% thought it was very unimportant or unimportant.	Public	Noted. Refer to Section 3.1 for *Existing Challenges and Constraints* on this corridor.
Concerns regarding the fast pace of development along Hobsonville and uncertain timing of Project delivery.	Upper Harbour Local Board	Acknowledged. Te Tupu Ngātahi has worked with developers through Fast Response to integrate or reduce impacts where possible. Significant growth is expected, refer to Section 4.2 *Land use and transport staging.*

Feedback	Most raised by	Project Response
Impacts of potential widening on the West Harbour Fire (FENZ) Station at 21 Hobsonville Road.	Fire and Emergency NZ (FENZ)	Design has avoided the station building, works around the station access (temporary and permanent) will be confirmed and agreed at detailed design with FENZ.
Coatesville-Riverhead Highway		
Desire for increased speed limits on the corridor, assuming safety improvements could allow this.	Public	Corridor design has included safety as a priority, however higher speeds were not considered appropriate. Refer to Appendix A Assessment of Alternatives for options considered.

12.5 Summary of Engagement

Engagement has occurred for the NW Local Arterial Package through all project stages including at the IBC, the DBC including options assessment and NOR preparation. Engagement has been with partners, other network providers, stakeholders, directly affected land owners and the wider community. Engagement has been used by the team to inform and as appropriate update or change the transport corridors put forward to NOR. As noted, further detail on engagement outcomes is set out in relevant report sections of Assessment of Alternatives (Appendix A) or AEE Part B.

Prior to detailed design and construction, further engagement will be undertaken by the requiring authority, as needed to manage impacts of the extended and / or upgraded corridors, this is set out in detail in the AEE Part B and the proposed conditions at Appendix B.

PART B

Assessment of effects on the environment

13 Scope of Assessment of Effects under section 171 and section 181(2) of the RMA

In this AEE, the assessment of effects is limited to matters that would trigger a district plan consent requirement under the AUP:OP. However, relevant national and regional resource consent matters have been considered to inform the transport corridors design and development and the proposed designation footprint.

Under section 181(2), those same matters are to be considered 'with all necessary modifications', in relation to a NOR for an alteration as if it were a NOR for a new designation. NOR W5 alters the existing Hobsonville Road Designation 1437 and NOR RE2 alters Designation 1433. AT is the requiring authority for both the existing designations. The alteration is limited to the works proposed as part of the alteration. It does not include works that could be undertaken within (or effects that are or could reasonably be generated by) the existing designations.

The assessments that have been undertaken to support the NW Local Arterials Package include and are addressed in the following order:

- Positive effects of the Local Arterials Network
- Traffic and Transportation
- Traffic Noise and Vibration
- Construction Noise and Vibration
- Network Utilities
- Natural Hazards - Flooding
- Terrestrial Ecology
- Landscape and Visual
- Historic Heritage
- Māori culture, values and aspirations
- Community
- Property, Business and Amenity
- Urban Design Evaluation Framework

14 Positive effects of the Local Arterials Network

The NW Local Arterial Package will play a vital role in the success of future neighbourhoods by providing safe, accessible and sustainable travel choices that connect communities and encourage a transformational shift from private vehicles to public transport, walking and cycling. The early protection of the transport network will provide for the following outcomes:

Supporting and enabling growth: Protecting upgraded and extended transport corridors will support Auckland Council's growth aspirations for the growth areas of Auckland, including intensification or density of growth, resulting in more efficient urban land development.

Improved access to economic and social opportunities and resilience of the strategic transport network: Protecting upgraded and/or extended transport corridors will:

- Improve travel choices and access to the critical economic and social needs of the existing and future communities
- Reduce an over-reliance on existing strategic transport corridors
- Better align the form and function of existing transport corridors with the planned urban form
- Support freight service operations for businesses in the industrial and commercial areas of Whenuapai, Hobsonville and Redhills.

Transformational mode shift: The transport network supports a shift from private vehicles to public transport, walking and cycling, which will provide greater travel choice for all people as the city grows, and will support lower carbon travel choices.

Land use and transport integration: Integrating future transport outcomes with Auckland Council's aspirations for land use and urban form can provide for growth in a way that delivers high quality urban outcomes, placemaking and enhanced liveability - including the desire for a quality, connected urban environment.

Improved safety: Protecting improved and new transport corridors will help to address existing and increasing safety risks on transport corridors as growth areas urbanise, including:

- Provision of dedicated space for cyclists and pedestrians to safely accommodate these modes
- Specific safety improvement projects, such as improvements to existing transport corridors
- A reduction in private vehicle travel as a result of mode shift towards public transport and walking and cycling.

Sustainable outcomes: Protecting upgraded and extended transport corridors will support the Government's policy shift towards more sustainable outcomes. Effective land use transport integration and supporting mode shift towards more sustainable travel choices such as public transport and walking and cycling.

Infrastructure integration: Integrating the transport response with the needs and opportunities of network utility providers to provide a better whole of system outcome as Te Tupu Ngātahi provide space for utility provision within its conceptual design.

15 Traffic and Transportation

The potential effects of the NW Local Arterial Package on traffic and transportation have been assessed in the Assessment of Transport Effects reports for Whenuapai, and Redhills and Riverhead in Volume 4.

The effects assessment has been undertaken on the likely future environment, based on the full build out of future urban areas, and taking into account wider transport infrastructure upgrades (see AEE Part A, Section 9.5). The summary below should be read in conjunction with the specialist reports.

15.1 Methodology

Given the long-term nature of the transport corridors, the interim staging of individual transport corridors over the next three decades has not been assessed but instead a greater focus has been placed on the full build out of the future urban area to support future communities. Therefore, assessment focusses on the likely future environment and wider infrastructure upgrades to ascertain the long-term effects of transport corridors. There are several transportation projects being developed separately in the North West, including the NW Strategic Package, Redhills HIF and those outside of Te Tupu Ngātahi Application Packages identified in Section 9.5, which will integrate with or affect the NW Local Arterials Package. These projects form the complete transport response for the North West and have also been considered when assessing the long-term effects of the transport corridors.

The assessment has two elements: operational effects on the transport network and construction effects on the transport network. The methodology for the operational and construction related transport effects are applicable for each transport corridor.

The assessment is focussed on route protection, rather than imminent implementation. As such, it:

- Makes greater use of generic cross-sections and design standards
- Focuses more on desired outcomes and footprints
- Takes a longer-term view, with its inherent uncertainties
- Assumes more use of recommended management plans and planning processes rather than specific design details to manage potential effects.

A key element of the assessment is the definition of the existing / likely future environment, against which the effects are assessed (see AEE Part A). Transport corridors are planned to support urban development and will be unlikely to occur without such development. Additionally, the source of potential effects (such as people and vehicle movement), is generally from urban development and intensification, rather than from the planned infrastructure.

To isolate the effects of the planned works, the existing environment includes the likely future urban development but does not include the planned transport corridors for which designations are sought. The effects of the transport corridors are then assessed against the existing environment. Given the long-term perspective of the assessment, the analysis is based on the estimated full build out for the future urban area.

15.2 Positive Traffic and Transportation Effects

The purpose of the NW Local Arterial Package is to enable the provision of transport corridors that: improve connectivity, contribute to mode shift by providing active mode and public transport facilities,

are safe for users and improve network resilience. Therefore, all of the proposed transport corridors have been assessed to have positive operational effects on the transport network. Specific outcomes are identified in Section 15.3.

15.3 Assessment of Operational Traffic and Transportation Effects

Road Safety Effects

The design of each of the extended and / or upgraded transport corridors within the proposed transport network has been undertaken with consideration of the latest safety guidance. This includes AT's Vision Zero and Waka Kotahi's Road to Zero. The upgrade of the existing road network is expected to result in positive effects on safety when compared to the existing network, specifically:

- Significantly improved active mode facilities (including separation), resulting in improved protection for vulnerable road users
- Significantly improved active mode crossing facilities, resulting in a significantly safer environment for all road users
- An improved speed environment by reducing speed limits to more appropriate urban speeds (e.g. 50km/h) with enhanced place function and consequential reductions in the risk of Deaths and Serious Injuries (DSIs).

It is anticipated that the number of pedestrians and cyclists will increase significantly as the area surrounding the transport corridors is developed. The traffic volume will likely also increase over time and therefore the exposure between motorists and vulnerable road users will be higher than the existing road environment. However, the network has been designed to a reduced speed environment and provides segregated active mode facilities to reduce the likelihood and severity in the event of a crash.

Overall, each transport corridor is well aligned with the transport safety principles from AT and Waka Kotahi and, as such, no adverse road safety effects have been identified. It will provide a much safer transport system which will likely reduce the number of DSIs and result in positive effects for all road users. It is noted that the detailed design will be completed in the future to further detail measures to achieve the anticipated safety outcomes.

Walking and Cycling Effects

Each transport corridor proposes separated active mode facilities and includes sufficient space to provide dedicated pedestrian and cycle crossing facilities. The exact provision of active mode facilities will be confirmed at the detailed design stage and will be guided by AT's Vision Zero guidance and the TDM.

The proposed active mode facilities along each transport corridor have been designed in accordance with relevant AT standards and policies as summarised in Table 15-1.

Table 15-1: AT standards and policy assessment for active mode facilities

Policy/Standard	Network Component	Assessment
Auckland Transport Vision Zero[17]	Segregated active mode facilities	Segregated active mode facilities are proposed to provide a safe modal choice in the future environment. Vision Zero specifies that proposed designs should feature separated cycling facilities for arterial corridors in excess of 30 km/hr. The traffic speeds are proposed to be 50-60 km/hr, therefore the proposed design of the active mode facilities is considered to be appropriate for these standards.
AT Transport Design Manual[18]	Footpaths: 1.8 m minimum	At a minimum a 1.8 m footpath and a 2.0 m cycle path has been allowed for within the interim design. The total width of 6.8 m is proposed from carriageway to road boundary. This is to provide for all TDM requirements.

The interim design of each transport corridor is aligned with the transport safety principles from AT and, as such, no adverse walking and cycling effects have been identified.

The transport corridors will have a number of significant positive effects on walking and cycling as they will:

- Significantly reduce the likelihood and exposure to potential crashes as it will enable safe movement for vulnerable road users along and across the network
- Improve integration with the future active mode network, resulting in improved walking and cycling connectivity. This will improve walkable distances to employment opportunities in the wider North West area for future residents
- Lead to environmental and health benefits as a result of increased active mode trips and reduced reliance on vehicle trips
- Serve as a key enabler for greater use of active transport modes by providing safe connector route between:
- Riverhead and SH16 as part of the Coatesville-Riverhead Highway upgrade;
- Whenuapai and the future RTN at Westgate as part of the Whenuapai Package; and
- Alongside SH18 in the longer term.
- Support growth adjacent to the proposed corridors and significantly improve safety and access to employment and social amenities.

Public Transport Effects

Māmari Road, Hobsonville Road, Don Buck Road and Fred Taylor Drive will all provide dedicated facilities to support a frequent transit network and the cross-section for all other corridors will provide adequate spacing to facilitate public transport and associated bus stops. The exact corridor design and the location of bus stops will be identified as part of detailed design of the transport corridors. Once greater certainty is available on the location of key land use activities, more certainty on high demand locations for bus stops can be determined, e.g., around centres and schools.

The proposed public transport facilities have been designed in accordance with relevant AT standards and policies including AT's Transport Design Manual, Vision Zero and Roads and Streets Framework.

[17] Auckland Transport: Vision Zero: https://at.govt.nz/media/1980910/vision-zero-for-tamaki-makaurau-compressed.pdf

[18] Auckland Transport – Transport Design Manual: https://at.govt.nz/about-us/manuals-guidelines/roads-and-streetsframework-and-the-transport-design-manual/

The design of each corridor is intended to support public transport and, as such, no adverse public transport effects have been identified.

The following positive effects on public transport are identified:

- Reduced delays and improved reliability for future public transport services associated with Māmari Road upgrade, Brigham Creek Road upgrade, Hobsonville Road upgrade and Fred Taylor Drive upgrade, as well as the wider public transport network
- Improved integration with the future public transport network and improved east-west and north-south connectivity in Whenuapai and Redhills, as well as improved access to employment and social amenities
- The improvements will enable the expanded network on Brigham Creek Road, Spedding Road and Hobsonville Road corridors to be used by bus services as a diversion in the event of disruptions on other corridors, improving the resilience of the public transport network
- Increased attractiveness and uptake of public transport trips throughout Whenuapai, Redhills and Riverhead which will reduce reliance on private vehicle trips, resulting in positive environmental and health benefits
- Trig Road (North), Brigham Creek Road, Spedding Road, Hobsonville Road and Don Buck Road corridors will serve as an enabler for greater use of public transport by providing a reliable connector route between urban areas and to employment opportunities in Westgate Metropolitan Centre.

Effects on Access

As future arterial corridors, each transport corridor is expected to have limited access. As the future urban zone in Whenuapai, Redhills North and Riverhead develops, it is expected that future access to each corridor will be facilitated by collector road networks within the surrounding urbanised areas.

The collector network for the Whenuapai area has been indicatively identified by the Whenuapai Structure Plan; however it is expected that this will be subject to change as developers progress the collector roads through the plan change process. These, along with future developments, will be assessed by standard planning and approval processes through Auckland Council.

In terms of existing properties, the overarching design philosophy for the network has been to maintain driveway access where practicable. Where driveways are impacted, the designation footprint has been extended to accommodate driveway re-grading or re-alignment where this is practicable and safe access can be re-instated.

There are several existing properties where it has been identified that a replacement driveway will not be possible to implement with the projects in place, primarily due to changes to road levels and incursion of the corridor into the front of properties. These properties have been included within the proposed designation footprint.

Overall, adverse effects on access have been avoided by including impacted driveways within the designation where practicable and safe, or by designating the entire properties where access cannot be maintained.

In terms of wider access, it is considered that there are adverse access effects are minimal. This is due to the ability of future collector roads to integrate with the proposed transport corridors and as existing collector roads have been considered as part of the design of each corridor.

General Traffic Effects

Sufficient capacity has been designed within the proposed transport corridors to accommodate the predicted level of growth in Whenuapai, Redhills and Riverhead. All proposed intersections have been assessed using inputs from a local traffic model and are predicted to perform at a satisfactory level of service during peak periods.

15.4 Recommended measures to avoid, remedy or mitigate potential adverse operational effects

Based on the Assessment of Transport Effects, as summarised above, the NW Local Arterial Package will have significant positive effects on the operation of each corridor and the wider transport network. There are no anticipated adverse effects that require mitigation.

15.5 Assessment of Construction Traffic Effects

The majority of works required for the extended and / or upgraded transport corridors will be adjacent to or on live carriageways, which means that temporary traffic management will be required during the construction phase. The scale of temporary traffic management to delineate live traffic away from the construction zones is largely dependent on the various stages and requirements of the construction activities. It is expected that short term temporary road closure for nights or weekends may be required for some specific activities, such as road surfacing, traffic switches and gas line relocation. Other activities may require stop/go or contraflow traffic management, such as drainage, utility relocation, survey and investigation work.

The effect of temporary road closure or other traffic management methods to existing traffic on the specific corridor and adjacent road network should be confirmed in the future as part of the CTMP for each transport corridor on the basis of the traffic environment of the day. This will take into account the level of growth and activities that has occurred in Whenuapai, Redhills and Riverhead, the availability of the alternative routes, and any additional sensitive land use activities.

The construction of transport corridors will each require significant earthworks. Final cut and fill volumes will be confirmed following detailed design prior to construction and will also be subject to regional consents. The construction traffic movements to accommodate the earthworks will likely result in the increase of traffic volume on construction routes used during the construction period of each of the transport corridors.

Given the construction timing, the staging of the NW Local Arterials has yet to be determined, there is a degree of uncertainty associated with any predicted construction methodology and associated traffic routes. This means:

- The routes that will be used by construction vehicles will depend on the location of quarries and disposal sites which are not yet certain
- The exact location and extent of compound sites/lay down areas has yet to be determined
- The timing of construction of each transport corridor could impact on likely construction vehicle routes, for example, if Spedding Road is constructed prior to or after the upgrade of Brigham Creek Road, or Hobsonville Road.

Notwithstanding this, it is considered that given the connectivity to the strategic network and the available capacity in the network construction traffic will be able to be readily accommodated.

It is noted that access to compound sites, laydown areas and construction zones for construction vehicles, plant and materials will be via site access points identified as part of future CTMPs.

Details of the routes and timing restrictions will need to be updated and refined as part of the CTMP process. It is anticipated that the routes for construction traffic will likely be limited to arterial corridors and intersections with the provision of adequate vehicle tracking. Along with SH16 and SH18, with Fred Taylor Drive and Brigham Creek Road as a Level 1B freight route, it is recommended that these corridors are used where practicable.

Speed Limits

To maintain the safety of all road users, implementation of a safe and appropriate temporary speed limit will be required during the construction period on the network within the extent of works, and along the construction routes if needed. This should be in accordance with the latest traffic management standards at the time of construction. These recommended measures and other measures highlighted in the CTMP are expected to reduce the potential safety risks that may be associated with construction traffic.

Pedestrians and cyclists

The existing provision for pedestrian and cyclists is variable across the network. It is likely that the demand for these modes will increase if urbanisation occurs prior to construction, but future parallel collectors could also be used as an alternative route. Therefore, at the detailed design stage the management plan should consider the surrounding facilities and land use activities present prior to implementation. Residents and stakeholders should be kept informed of construction times and progress, and general observations of pedestrian and cyclist activity will be used to inform appropriate traffic management measures in the CTMP.

Property access for residents and businesses

During the time of construction, there will be temporary traffic management controls such as temporary concrete or steel barriers. Existing driveways that remain during construction will be required to have temporary access provision. It is anticipated that the contractor should undertake a property specific assessment of any affected driveways and provide temporary access arrangements if required. The temporary access should ensure the ability for residents to safely access and exit the property. These requirements should be captured in the CTMP.

Land use activities that will need further consideration in the CTMP

It is noted that significant land use change is expected along each of the transport corridors, with the exception of the rural section of Coatesville-Riverhead Highway. As such, traffic management controls will be confirmed prior to works to reflect the land use considerations at that time.

Table 15-2 provides a summary of the key existing land use or activities that have the potential to be sensitive to construction transport impacts, and that are currently located adjacent to the transport corridors and will need specific consideration during the development of the CTMP. This could include restricted truck movements during school pick up and drop off, or additional controls at key access locations.

Table 15-2: Sites for specific consideration within future CTMP

Corridor	NOR	Sites for Specific Consideration
Whenuapai		
Trig Road (North)	NOR W1	Proposed Ministry of Education site at 13 -15 Trig Road
Māmari Road	NOR W2	Timatanga Community School
Brigham Creek Road	NOR W3	Whenuapai School Whenuapai Kindergarten Whenuapai town centre
Spedding Road	NOR W4	No specific sites
Hobsonville Road	NOR W5	Hobsonville School Hobsonville town centre
Redhills and Riverhead		
Don Buck Road	NOR RE1	St Paul's Primary School Massey Leisure Centre
Fred Taylor Drive	NOR RE2	No specific sites
Coatesville-Riverhead Highway	NOR R1	No specific sites

15.6 Recommended measures to avoid, remedy or mitigate potential adverse construction effects

It is considered that the potential construction traffic effects can be accommodated and managed appropriately via a CTMP which is to be developed closer to the time of construction. Based on the assessment of transport construction effects, it is recommended that:

- A CTMP be prepared prior to the start of construction. Any potential construction traffic effects shall be reassessed prior to construction taking into account the specific construction methodology and traffic environment at the time of construction
- The objective of the CTMP is to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. To achieve this objective, the CTMP shall include:

a) Methods to manage the effects of temporary traffic management activities on traffic
b) Measures to ensure the safety of all transport users
c) The estimated numbers, frequencies, routes and timing of traffic movements, including any specific non-working or non-movement hours to manage vehicular and pedestrian traffic near schools or to manage traffic congestion
d) Size access routes and access points for all construction vehicles, the size and location of parking areas for plant, construction vehicles, and the vehicles of workers and visitors
e) Identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads

f) Methods to maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be
g) The management approach to loads on heavy construction vehicles, including covering loads of fine material, the use of wheel-wash facilities at site exit points and the timely removal of any material deposited or spilled on public roads
h) Method that will be undertaken to communicate traffic management measures to affected road users (e.g. residents/public/stakeholders/emergency services).

15.7 Summary of Traffic and Transportation Effects

Based on the assessment of effects, as summarised above, the NW Local Arterial Package provides considerable positive effects on the operation of the transport system, in particular improved safety, connectivity, resilience and contribution to mode shift. Access effects on property have been identified and the inclusion of these with the designation area has been provided. Therefore, there are no anticipated adverse effects that require mitigation.

In terms of construction traffic effects, it is considered that there is sufficient network capacity to enable construction traffic. To address the potential construction effects identified, a CTMP will be prepared prior to the start of construction.

16 Traffic Noise and Vibration

The Assessment of Traffic Noise and Vibration Effects reports for Whenuapai, and Redhills and Riverhead, in Volume 4, contain predictions of road traffic noise carried out using the method recommended in NZS 6806: Acoustics – Road traffic noise – New and altered roads (NZS 6806) in accordance with the AUP:OP.

The assessment of effects undertaken in the report is two-fold: in accordance with NZS 6806 and in relation to the predicted noise level changes comparing the future traffic noise levels with and without the extended and / or upgraded transport corridors. The summary below should be read in conjunction with this report.

16.1 Methodology

As required by NZS 6806, the assessment methodology included the prediction of existing and future traffic noise levels, both without (Existing and Do Nothing scenarios) and with the proposed transport corridors (Do Minimum scenario). The scenarios are explained below:

- The Existing scenario represents the current road network with current traffic volumes, i.e. the existing environment as it is experienced now
- The Do Nothing scenario represents the current road network with future traffic volumes, assuming a full build out of the area
- The Do Minimum scenario represents the proposed future road network, incorporating the proposed extended and / or upgraded transport corridors and other planned transport projects in the area. This scenario assumes a full build out of the area, and the transport infrastructure to enable the development. This is a realistic scenario at a point in time when all proposed designations are operational.

Noise effects of road traffic on existing noise sensitive locations, referred to as Protected Premises and Facilities (PPFs) within NZS 6806, have been assessed. PPFs within a 200m radius of the rural transport corridors and 100m radius of the urban transport corridors have been included.

Where transport corridors are considered ‘Altered Roads’, these have been assessed by comparing the predicted noise levels in the design year without the projects (Do Nothing) with the predicted noise levels in the design year with the projects (Do Minimum).

Transport corridors considered to be ‘New Roads’ have been assessed by comparing the predicted existing noise levels (the Existing Scenario) with the Do Minimum predictions.

16.2 Positive (or Neutral) Traffic Noise and Vibration Effects

Following the implementation of recommended mitigation set out in Section 16.4, the noise levels are predicted to decrease or remain unchanged at the vast majority of PPFs in the vicinity of Trig Road, Brigham Creek Road, Don Buck Road, Fred Taylor Drive and Coatesville-Riverhead Highway, resulting in positive noise effects. The reduction in noise levels is due to the redistribution of traffic across the network, resulting in a reduction in traffic volumes along the transport corridors.

The planned decrease in speed limit for Trig Road, Māmari Road, Brigham Creek Road, Spedding Road and Fred Taylor Drive will also provide a reduction in noise levels.

16.3 Assessment of Traffic Noise and Vibration Effects

16.3.1 Potential Traffic Noise and Vibration Effects

Adverse noise effects as a result of high levels of traffic noise may include sleep disturbance, loss of concentration, annoyance, a reduction in speech intelligibility and reduced productivity. The effects are not restricted to PPFs but also future residential and other noise-sensitive developments. The effects on future residential and other noise-sensitive developments are not included in the NZS 6806 definition of PPF. Where new noise sensitive developments are established in the vicinity of a road, their design should take account of the potential noise effects and care should be taken to avoid or minimise the effects.

The magnitude of effects will largely depend on noise levels received in noise-sensitive spaces within buildings, although there are also potential annoyance effects associated with a loss of amenity when high noise levels are received in outdoor living or recreation spaces.

Traffic from new (extended) or upgraded roading projects is not generally expected to create any vibration issues. The smooth and even surface typical of new urban roads would likely generate no more than negligible traffic vibration impacts. Therefore, traffic vibration has not been assessed for the transport corridors.

16.3.2 Assessment of Traffic Noise Effects

As set out above, following implementation of recommended mitigation measures outlined in Section 16.4, noise levels associated with the upgraded Trig Road (North), Brigham Creek Road, Don Buck Road, Fred Taylor Drive and Coatesville-Riverhead Highway transport corridors are predicted to decrease or remain unchanged at the vast majority of PPFs resulting in positive effects. This is due to the intended redistribution of traffic across the wider network and subsequent reduction in traffic volumes as well as the planned decrease in speed limit for Trig Road (North), Māmari Road, Brigham Creek Road, Spedding Road and Fred Taylor Drive.

Of the PPFs that are not predicted to receive a reduction or experience no change in noise levels, the predicted increase is assessed as negligible (between 0 dB and 2 dB) for most. Few PPFs are predicted to experience a 3 dB to 4 dB increase in noise level, resulting in slight adverse noise effects and fewer still are predicted to experience an increase greater than 5 dB in noise level, resulting in moderate noise effects.

As Māmari Road and Spedding Road will be extended as well as upgraded, noise levels are predicted to increase at a number of PPFs even with the implementation of the recommended mitigation measures. However, ambient noise levels will likely increase as the area urbanises and therefore any change in noise level due to the proposed projects may not be as noticeable at the time the proposed transport networks are operational.

All predictions in the Assessment of Traffic Noise and Vibration Effects are based on traffic flow along ‘New Roads’ and ‘Altered Roads’ at the design year (2048). These traffic volumes are predicated on the anticipated urbanisation of the area and implementation of surrounding infrastructure projects. Development of the surrounding areas will likely increase activity and associated noise levels. Therefore, any changes predicted for the traffic noise effects related to these projects are not likely to represent such a significant change at the time of construction due to the change in environment.

As such, the results are indicative of a possible future scenario, but effects cannot be definitively determined at this stage. Confirmation of the road traffic noise at current PPFs will be carried out

nearer the time of construction to confirm that the recommended mitigation still represents the Best Practicable Option (BPO). The review, confirmation and refinement of the BPO shall aim to achieve the same noise criteria categories as determined with the current BPO.

Nevertheless, the predictions show that most PPFs in the vicinity of each extended and / or upgraded transport corridor will receive levels within the lowest design noise levels. Therefore, resulting noise levels will be reasonable in a residential context at the majority of PPFs assessed and are able to be appropriately managed.

16.4 Recommended measures to avoid, remedy or mitigate potential adverse effects

There are broadly three mitigation options that can be applied to manage road traffic noise, and are discussed in NZS6806:

- The choice of road surface material, a mitigation option that reduces noise at the source (especially for roads with speeds above 40-50 km/h where the road-tyre interaction is the controlling noise source rather than engine noise)
- The installation of noise barriers either on the roadside or on the property boundary
- The inclusion (for new builds) or retrofitting (for existing buildings) of Building Modification Mitigation (e.g., alternative ventilation to enable windows and doors to remain closed, improved joinery and/or glazing, or, in rare cases, the installation of additional wall and ceiling lining).

NZS 6806 states:

> *The noise criteria are intended to address the adverse effects of road-traffic noise on people. Land-use planning is the preferred method of avoiding these effects. Where this is impracticable, the Standard sets out procedures and methods of the prediction, measurement and assessment, and guidelines for mitigation of road-traffic noise in accordance with the duty to adopt the best practicable option.*[19]

This indicates that NZS6806 deals with the residual noise effects after land-use planning has been implemented (or where it has been omitted in the planning stage).

Generally, mitigation is implemented from source to receiver. This means that the road surface is the first choice of mitigation measure as it protects the largest extent of receivers. Second are barriers placed either on the road edge or the property boundary. Barriers protect the area behind them, so are not suitable to shield upper floors of multi storey buildings, however, they are suitable to protect ground floors and outdoor living areas where these are facing a road. Barriers may also not be appropriate in suburban and urban environments for urban design reasons – this would be considered when the BPO is confirmed. Lastly, building modification can be implemented to existing PPFs where these are not sufficiently designed to reduce internal noise levels. Building modification is the last choice as it only protects individual living areas and has no benefit to the wider community.

Where future developments are not yet implemented, the road controlling authorities and developers have a shared responsibility to implement reasonable and appropriate mitigation. With mitigation in place, adverse effects associated with traffic noise and vibration are considered to be appropriately managed.

[19] NZS6806, Section 1.1.1

Application of AC-14 or equivalent low noise road surface has been recommended for each extended and / or upgraded transport corridor. The following additional mitigation will be considered during the detailed design of the relevant transport corridor:

- NOR W2 Māmari Road: Installation of a two-metre-high noise barrier at Timatanga Community School
- NOR W5 Hobsonville Road: Installation of two-metre-high localised noise barrier at 39 and 61 Hobsonville Road
- NOR RE1 Don Buck Road: Installation of two-metre-high localised noise barrier at 1 Rush Creek Drive and 508, 510, 538, 540, 546, and 560 Don Buck Road.

16.5 Summary of Traffic Noise and Vibration Effects

Predicted traffic noise levels during operation of the NW Local Arterial Package are generally expected to reduce or increase negligibly with recommended mitigation implemented when compared to the Do Nothing scenario.

17 Construction Noise and Vibration

The Assessment of Construction Noise and Vibration reports for Whenuapai, and Redhills and Riverhead, provided in Volume 4, contains predictions for construction noise carried out using the method recommended in NZS 6803 in accordance with the AUP:OP. The summary below should be read in conjunction with this report.

17.1 Methodology

The methodology for the assessment of construction noise and vibration included modelling inputs in regard to a reasonable worst case scenario. Vibration emission radii were calculated to provide a reasonable worst case estimate at receivers. It has been assumed that no concurrent project works will occur across the transport corridors where receivers may be subjected to impacts from work associated with more than one designation. Any receivers that may be impacted by more than one project would be reassessed closer to the time of construction. Any buildings within the proposed designation footprint will be removed and have not been assessed.

Construction noise setback distances and vibration emission radii have been determined (based on assumptions on the type of construction activities and equipment) for each of the proposed transport corridors and potentially affected receivers have been identified using these extents. The construction noise setback distances and vibration emission radii were used to determine where any potential construction noise and vibration exceedances of the relevant criteria could occur.

Potential effects of construction noise and vibration have then been assessed and construction management and mitigation measures identified where appropriate. To avoid and/or minimise exceedances of construction noise and vibration criteria, BPO mitigation and management measures will be utilised.

17.2 Assessment of Construction Noise Effects

Construction Noise

Construction noise levels have been assessed using the method recommended in NZS 6803 in accordance with the AUP:OP. As construction of each transport corridor is expected to last for more than 20 weeks, the “long-duration” noise limits are applicable.

Various construction activities and equipment will act as noise sources on site during construction works. A minimum set back distance from receivers to comply with day-time noise criterion of 70 dB without mitigation has been calculated for different type of equipment and construction activities. These are set out in Table 17-1 and Table 17-2 below.

Table 17-1: Construction equipment sound levels and indicative compliance distance

Equipment	Sound power level (dB L_{wA})	Free field noise level at varying distances (dB L_{Aeq})				Minimum Setback distance to comply with day-time criteria without mitigation, metres
		5 m	10 m	20 m	50 m	
30T excavator	105	86	80	73	66	30

Equipment	Sound power level (dB L_{wA})	Free field noise level at varying distances (dB L_{Aeq})				Minimum Setback distance to comply with day-time criteria without mitigation, metres
		5 m	10 m	20 m	50 m	
20T excavator	99	80	74	67	60	13
Roller compactor	101	82	76	69	62	20
Tipper Truck	107	88	82	75	68	36
Loader	105	86	80	73	66	30
Vibratory Plate Compactor	110	91	85	78	71	45
Smooth Drum Roller	103	84	78	71	64	25
Paver	103	84	78	71	64	25
Grader	99	80	74	67	60	13
Bridge Construction Only						
Concrete Truck	107	88	82	75	68	36
Cranes	99	80	74	67	60	13
Bore Pilling	115	96	90	83	76	73

Table 17-2: Activity sound power levels and compliance distance

Construction Type	Activity Sound Power Level (dB L_{wA})	Minimum set back distance from receivers to comply with day-time limit (70 dB L_{Aeq}) without mitigation, metres
Typical across all works	110	48 m
Earthworks	111	52 m
Drainage works	113	56 m
Pavement Construction	115	76 m
Bridge Construction	117	90 m

Construction Noise Effects

Receivers are located at varying distances from construction areas within each of the proposed transport corridors. Appendix A of the Whenuapai Construction Noise and Vibration Assessment and

Appendix A of the Redhills and Riverhead Construction Noise and Vibration Assessment identified affected receivers (without mitigation) for each corridor.

- **Existing properties** - If high noise generating activities occur within the designation boundary, existing properties within 90 metres could experience unmitigated noise levels that exceed the 70 dB L_{Aeq} noise criterion
- **Future Properties** - Future receivers constructed within 76 metres of construction works could experience unmitigated noise levels that exceed the 70 dB L_{Aeq} noise criterion during high noise generating activities such as pavement works.

Without effective barriers and mitigation in place noise levels of up to 90 dB L_{Aeq} could occur intermittently at the closest existing receivers on each of the transport corridors. At this level effects could include loss of concentration, annoyance, and a reduction in speech intelligibility.

With effective mitigation in place, noise levels are predicted to comply with the 70 dB L_{Aeq} noise criterion for most of the construction works. However, if exceedances occur, they are not expected to be frequent, due to:

- The majority of the equipment will likely produce lower noise levels than the highest noise equipment for large portions of the works
- The operation of construction equipment will be intermittent in nature
- Construction will be staged so as equipment moves away from the receiver noise levels will reduce
- The setback distances from sensitive receivers to the majority of the proposed works.

Where a noise exceedance is predicted at any receiver that exists at the time of construction, the effects will be mitigated and managed through the CNVMP and Schedules.

Night Time Works

It is expected that the majority of the works will be carried out between 7am and 6pm Monday to Saturday. There will be extended hours during the summer earthworks season (e.g. 6 am to 8 pm, Monday to Sunday), and there is also the potential for night works for critical activities such as culvert construction and road surfacing.

If night-time works are required in close proximity to residential receivers, consultation and mitigation measures will be essential. The use of noisy equipment should be avoided where possible to prevent sleep disturbance. If the use of noisy equipment cannot be avoided during the night-time it may be necessary to offer temporary relocation to the most affected residential receivers to manage and mitigate adverse effects.

17.3 Assessment of Construction Vibration Effects

Construction Vibration

Construction vibration levels have been assessed against the requirements of the AUP:OP, which refer to the criteria in DIN 4150-3:1999 for the avoidance of cosmetic building damage (DIN criteria). The AUP:OP also details amenity criteria, which act as a trigger for consultation if predicted to be exceeded.

The vibration criteria and emission radii for high vibration generating equipment are detailed in Table 17-3.

Table 17-3: Vibration sources and indicative emission radii

Equipment	Daytime Occupied Buildings (2 mm/s)	DIN 4150 emission radii		
		Historic and Sensitive (2.5 mm/s)	Residential (5 mm/s)	Commercial (10 mm/s)
Roller Compactor	21m	17m	8m	4m
Bore Pilling	4m	2m	1m	1m
Excavator	12m	10m	6m	2m
Tipper Truck	2m	2m	1m	0m
Vibratory Plate Compactor	3m	2m	1m	1m

Construction Vibration Effects

The vibration effects associated with construction of each of the extended and/or upgraded transport corridors are considered in terms of human response and building damage. With Te Tupu Ngātahi noise and vibration specialists considering, based on their experience, that the main concern for building occupants during construction is damage to the building itself.

People can generally perceive vibrations at a much lower level than when building damage is likely to occur. The adverse effects of construction vibration on building occupants may be significant in some buildings adjacent to the areas of works. Adverse effects may range from annoyance to loss of amenity or inability to carry out work. Vibration effects will reduce with distance from the source, and the level of vibration transmission into a building will depend on a number of factors, such as the foundation type and building construction.

Appendix B of the Whenuapai Construction Noise and Vibration Assessment and Appendix B of the Redhills and Riverhead Construction Noise and Vibration Assessment identifies affected receivers (without mitigation) for each corridor. However, effects on these properties can be mitigated and managed through a CNVMP.

Specific to the Spedding Road upgrade, the Whenuapai Aerodrome Heavy Anti-Aircraft Battery is located across the properties at 4 Spedding Road and 92 Trig Road (North). The Battery consists of four concrete gun emplacements and a command post that are buried underground. The Battery is scheduled as a Historic Heritage Place, therefore the DIN historic/sensitive criterion is applicable. The construction boundary abuts the heritage overlay. Predictions indicate that unmitigated vibration levels could exceed the DIN criteria for historical / sensitive properties.

It should also be noted that construction vibration effects generally have a short timeframe, typically a few days at a time reflecting the linear nature of construction and as alternative equipment to a roller compactor with lower vibratory effect should be used where practicable.

17.4 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

Construction Noise and Vibration Management Plan

The Assessment of Construction Noise and Vibration Effects outlines that the implementation of a CNVMP will be the most effective way to control construction noise and vibration on each of the transport corridors. The CNVMP will provide a framework for the development and implementation of best practicable options to avoid, remedy or mitigate the adverse effects on receivers of noise and vibration resulting from construction.

Schedules

In addition to a CNVMP, Site Specific or Activity Specific Construction Noise and Vibration Management Schedules is recommended where noise and/or vibration limits are predicted to be exceeded for a more sustained period or by a large margin.

Noise mitigation measures

A hierarchy of mitigation measures will be adopted through the CNVMP and Schedules, as follows:

- Managing times of activities to avoid night works and other sensitive times
- Liaising with neighbours so they can work around specific activities
- Selecting equipment and methodologies to restrict noise
- Using screening/enclosures/barriers
- Offering neighbours temporary relocation.

By following this hierarchy, the BPO for mitigation will be implemented, whilst avoiding undue disruption to the community. In particular, temporary relocation of neighbours can cause significant inconvenience and should only be offered where other options have been exhausted and noise levels still require mitigation.

Vibration mitigation measures

Similar to noise, a hierarchy of vibration mitigation measures will be adopted through the CNVMP and Schedules (where produced) as follows:

- Managing times of activities to avoid night works and other sensitive times (communicated through community liaison)
- Liaising with neighbours so they can work around specific activities
- Operating vibration generating equipment as far from sensitive sites as possible
- Selecting equipment and methodologies to minimise vibration
- Offering neighbours temporary relocation
- In specific situations, a cut-off trench may be used as a vibration barrier if located close to the source.

To control and minimise vibration levels at the Whenuapai Aerodrome Heavy Anti-Aircraft Battery the use of smaller or low vibration equipment will be required. The AUP:OP requires a vibration management plan to be prepared. In addition to detailing the proposed works and mitigation measures, the vibration management plan is required to set out a methodology for monitoring the proposed works to measure compliance with DIN criterion.

In general, there are less options available to mitigate vibration propagation and insulate receiver buildings, compared to noise. Mitigation will therefore focus on scheduling of activities, effective communication with neighbours, and selection of appropriate equipment and methods, where practicable. Appropriate vibration mitigation measures for each activity will be listed in the CNVMP and Schedules.

Night Works

Night works have the potential to cause the greatest disturbance to residents and should be avoided where possible. Where there are no practicable alternative options to night works, it may be necessary to implement enhanced noise and vibration management measures, but this will depend on the location of the worksite and the proposed activities.

When work must be carried out at night, it may be necessary to:

- Increase the frequency of communications with stakeholders
- Carry out regular noise and vibration monitoring to confirm noise and vibration levels; or
- Offer temporary relocation to neighbours if unreasonable noise and/or vibration levels cannot be avoided.

17.5 Summary of Construction Noise and Vibration Effects

The effects predicted by way of the Assessment of Construction Noise and Vibration Effects are based on indicative information to support the NW Local Arterials Package and any conclusions in the assessment will be confirmed during the detailed design stage, taking account of the receivers as they exist at the time of construction.

Construction noise and vibration can be mitigated and managed, utilising the measures set out above to generally comply with the applicable limits as defined in the AUP:OP. Where an exceedance is predicted at any receiver that exists at the time of construction, the effects will be mitigated and managed through a CNVMP.

A CNVMP is the most effective way to avoid, remedy or mitigate construction noise and vibration effects on receivers and will ensure that any potential adverse effects are appropriately managed.

18 Network Utilities

This section identifies existing utilities within or adjacent to the extended and / or upgraded corridors, the expected effects of the NW Local Arterial Package on those utilities and any measures proposed to manage potential impacts. Construction of the extended and / or upgraded corridors will cause disruption in the corridor and may require the protection or relocation of existing network utilities. The impacts of construction can generally be grouped into two categories:

- Impacts to general services and assets, and
- Impacts to non-typical assets, where works around them require additional control beyond business as usual, due to the potential risks or disruptions to the service being significant.

18.1 Methodology

The NW Local Arterial Package and proposed designation footprints have considered desktop information from publicly available Before-U-Dig website[20] and Auckland Council GeoMaps. However, thorough site investigations are required to confirm the full scope of works for service relocations. As part of the Te Tupu Ngātahi programme, regular engagement with network utility operators has also been undertaken to better understand each extended and / or upgraded transport corridors interface with utilities.

The typical utilities for each (existing) corridor include:

- Three waters - wastewater, potable water, stormwater
- Electricity overhead and underground lines
- Gas lines
- Ethernet and telecommunications

Additional non-typical utilities are identified in Table 18-1.

Table 18-1: Non-typical network utilities affected by each transport corridor

Corridor	Specific Utilities
Whenuapai	
Trig Road (North)	N/A
Māmari Road	N/A
Brigham Creek Road	Telecommunication infrastructure in Spark Designation 7504, located on the south side of the road corridor at 153 Brigham Creek Road Southern Cross International Cable
Spedding Road	Watercare Services Ltd - Northern Interceptor shared corridor (Designation 9377) 110kv Electricity Transmission Lines (under AUP:OP Grid overlay). Through engagement, it is understood this Albany to Henderson line will be dismantled between 2021/2022
Hobsonville Road	Watercare Services Ltd - Northern Interceptor Phase 3 and 6 (Designation 9375)

[20] https://www.beforeudig.co.nz/nz/home

Corridor	Specific Utilities
	74 Hobsonville Road contains a large pump station with cross connections to the trunk watermains which is designated (Designation 8856)
Redhills and Riverhead	
Don Buck Road	Watercare Services Ltd - North Harbour No.2 Watermain (Designation 9375)
Fred Taylor Drive	N/A
Coatesville-Riverhead Highway	Vector - High pressure gas pipeline (at intersection with Riverhead Road) Watercare Pump Station (non-designated) outside 1261 Coatesville-Riverhead Highway

18.2 Positive Effects on Network Utilities

The extension and/ or upgrade of each of the corridors will allow utilities to be generally located outside the carriageway in future, making ongoing access and maintenance easier.

Subject to discussions with utility providers there is the potential for positive effects resulting from the rationalisation of utilities service locations in the existing corridors and co-location within a common services trench for underground services. This will also make future access and maintenance of the different utilities simpler going forward.

The extension and / or upgrade of each of the corridors will therefore allow utilities to be generally located outside the carriageway in future, making ongoing future access and maintenance easier.

18.3 Existing Utility Approval Protocols

To understand the potential effects on utilities an understanding of the existing utility approval protocols is required.

There are established protocols for works within the existing road reserve controlled under the Utilities Access Act 2010 and associated National Code of Practice for Utility Operators Access to Transport Corridors.

Under the Code of Practice utility providers can access the road reserve (excluding motorways) as of right, subject to reasonable conditions imposed from the transport authority. Access is managed through the Corridor Access Request process, provided through AT as the regions road controlling authority.

All parties also have a duty to take all practicable steps to protect other parties' assets when working in transport corridors. Effects of construction on these utilities can be effectively managed under the Code of Practice or subsequent superseding document as part of standard roading authority and network utility practice.

In addition, where an existing designation is in place for a utility under the RMA, AT will be required to seek written consent for works within that designation. Written consent may be withheld where the later works would prevent or hinder the public work or project or work to which the earlier designation relates under section 177. There are established protocols for obtaining this written consent under the RMA.

18.4 Assessment of Temporary Construction Effects on Network Utilities

General services and assets

New road reserves will be formed as part of the extension of Māmari Roads and upgrade of the existing paper road section, and the extension of Spedding Road to the east and west. There are no known existing network utilities services within these greenfield sections.

With the exception of the sections of Māmari Road and Spedding Road that are being extended, all other corridors (including the existing sections of Māmari Road and Spedding Road) involve existing corridors. The works will impact the existing road reserve (generally the location of utilities) and are expected to have the following impacts:

- Limitations on access to utilities within the corridor whilst construction works are being undertaken
- Risk of uncovering unknown assets or potential damage to assets if depths are unknown, resulting in temporary disruption to users and requiring repair
- Location of devices shifting in relation to the road reserve corridor due to reallocation of corridor space.

As the road controlling authority, AT has existing established processes for engaging and coordinating works with utility providers in the corridor. Although there will be temporary disruption, the staging of construction along the alignment will limit prolonged disruption in any section.

As part of the road corridors being extended and / or upgraded, engagement with network utilities will occur to coordinate works where practicable (such as laying new cables or services under the ‘dig once’ principle). These works will be coordinated to align with the Code of Practice and or RMA requirements.

Non-Typical Utilities

Construction works in corridors with non-typical utilities (refer to Table 18-1) has the potential for significant effects on utility services, if carried out without sufficient planning and coordination.

As part of the upgrade of existing corridors with non-typical utilities, services will likely require temporary diversion or relocation prior to being integrated in the permanent corridor location. Temporary diversions of utilities are expected to be accommodated within the designation boundaries, which will reduce the geographical extent of impacts. Early engagement with the respective utility provider will be required to identify the critical service and confirm a relocation methodology. These steps alongside ensuring the Code of Practice is met and, if relevant, ensuring RMA requirements for existing utilities that are designated are met, will ensure effects are avoided and/or managed appropriately.

Given the established protocols which exist and ATs existing processes in place as road controlling authority, potential for significant impacts is expected to be suitably managed.

18.5 Assessment of Operational Effects on Network Utilities

Once the project is constructed and operational there will be no ongoing adverse effects to network utilities.

18.6 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

To provide clarity and recognise the existing access controls in place, the works listed below are not anticipated to prevent or hinder each of the transport corridors prior to their construction. Network utility operators with existing infrastructure located within the NW Local Arterials Package proposed designation footprints will not require RMA written consent under section 176(1)(b) of the RMA for the following activities prior to construction:

- Operation, maintenance and urgent repair works
- Minor renewal works to existing network utilities necessary for the on-going provision or security of supply of network utility operations
- Minor works such as new service connections
- The upgrade and replacement of existing network utilities in the same location with the same or similar effects as the existing utility.

This will be offered via a condition on each NOR, to provide certainty to utility partners and reduce delays. For works that will exceed the described activity threshold, AT has an established process for considering and providing section 176/178 written consent[21]. Note, the above does not change other approvals required, for example Corridor Access Request will still need to be sought.

Table 18-2: Summary of proposed management measures for each transport corridor

Project	General mitigation applies (Y/N)	NOR specific measures
Whenuapai Area		
W1 Trig Road (North)	Y	Network Utility Operators (Section 176 Approval)
W2 Māmari Road	Y	Network Utility Operators (Section 176 Approval)
W3 Brigham Creek Road	Y	Network Utility Operators (Section 176 Approval) **Note:** AT will require section 177 written consent for works in existing Spark Designation 7504
W4 Spedding Road	Y	Network Utility Operators (Section 176 Approval) **Note**: AT will require section 177 written consent for works in WSL existing Designation 9377
W5 Hobsonville Road	Y	Network Utility Operators (Section 176 Approval)

[21] https://at.govt.nz/about-us/working-on-the-road/road-processes-for-property-owners/consent-for-works-in-an-at-designation-or-notice-of-requirement/

Project	General mitigation applies (Y/N)	NOR specific measures
		Note: AT will require section 177 written consent for works in WSL existing Designation 9375 and 8856
Redhills and Riverhead		
RE1 Don Buck Road	Y	Network Utility Operators (Section 176 Approval) **Note**: AT will require section 177 written consent for works in WSL existing Designation 9375
RE2 Fred Taylor Drive	Y	Network Utility Operators (Section 176 Approval)
R1 Riverhead-Coatesville Highway	Y	Network Utility Operators (Section 176 Approval)

18.7 Summary of Effects on Network Utilities

Service relocation works are expected to be accommodated within the construction corridor within the designation footprint. Additional work area may be required for realignment of key services for example the overhead power lines. The exact scope of service relocation works will be confirmed through detailed design in consultation and engagement with the respective utility providers. If additional works are required outside the designation, approvals will be sought as necessary based on the detailed methodology at the time.

An assessment of the existing utilities within the corridor has been carried out and considered. Through the implementation of the Network Utility Operators (Section 176 Approval) for ongoing access and maintenance of works in advance of construction it is considered that potential adverse effects on network utilities can be avoided or appropriately managed.

19 Natural Hazards – Flooding

The Assessment of Flood Hazard Effects for Whenuapai, and Redhills and Riverhead, provided in Volume 4, assesses the potential effects of the proposed transport corridors during construction and operational phases on the flood extents and levels in the surrounding area. The summary below should be read in conjunction with this report.

Stormwater quantity, quality and effects on streams will be considered as part of a future regional consent process. This assessment focusses on flood hazard effects which is a district plan matter under the AUP:OP.

19.1 Methodology

The assessment of flooding effects involved the following steps:

- Desktop assessment to identify potential flooding locations from Auckland Council GeoMaps
- Modelling of the pre-development and post-development terrain with Maximum Probable Development (MPD) and 100 year (ARI) plus climate change rainfall
- Two climate scenarios were modelled, one allowing for 2.1°C of temperature increase and one for 3.8°C of temperature increase. The higher climate change scenario has been used to undertake a sensitivity analysis to understand the increased risk of greater climate change impacts
- Producing flood level maps for pre-development and post-development scenarios and flood difference maps to show the change in flood levels and extents (greater than 50mm) as a result of the extended and / or upgraded corridors
- Inspection and review of flood difference maps at key locations such as bridges and where there are noticeable changes in flood extents or flood levels.

While stormwater effects apart from flooding are not assessed, provision is made for the future mitigation of potential stormwater effects (stormwater quantity, stormwater quality and instream structures) by identifying the space required for stormwater management devices (for example drainage channels and ponds) and incorporating land for that purpose into the proposed designation footprint. These devices have been designed to attenuate the 100year ARI event using 10% of the total roading impervious catchment area (proposed and existing) in accordance with Auckland Council and Waka Kotahi guidance.[22,23] Note for existing roads being widened this allows for greater impervious area than the road widening alone.

The assessment considers that flooding effects will be subject to further assessment at a detailed design stage. It is expected that coordination and integration of the corridor design with FUZ development will be undertaken to confirm and address potential future adverse effects.

[22] Auckland Council's Stormwater Management Devices in the Auckland Region, Guideline Document 2017/001 (December 2017)
[23] Waka Kotahi NZTA's Stormwater Design Philosophy Statement (May 2010)

19.2 Positive Natural Hazard – Flooding Effects

The positive effects of each transport corridor proposed for natural hazards are summarised in Table 19-1 below.

Table 19-1: Project specific positive effects on flooding

NOR	Effect
Whenuapai	
W1: Trig Road (North)	Trig Road (North) upgrade flooding effects have been assessed as negligible.
W2: Māmari Road	The new bridge over Sinton Stream provides an improvement to flood resilience. The bridge has a freeboard greater than 1.2 m between the 100 year flood level and bridge soffit and the 100 year ARI flood difference shows there is a decrease in water levels upstream and downstream of the bridge crossing.
W3: Brigham Creek Road	The proposed new bridge over Waiarohia Stream provides a significant improvement to flood conveyance upstream of the bridge and a decrease in flood levels downstream has been identified through modelling. Upstream of the proposed bridge shows a reduction of 0.58 m in the 100 year ARI flood levels post-development and an associated increase in freeboard between the habitable building floor level and the 100 year ARI flood level. The 100 year ARI flood difference map for the upgraded culvert crossing at 153 Brigham Creek Road presents a decrease in water levels of -1.97 m upstream and -0.22 m downstream due to the upsizing of culverts at this location. This will result in positive effects through increasing the freeboard of the road.
W4: Spedding Road	The new bridges over Totara Creek, Trig Stream and Rāwiri Stream provide an improvement to flood resilience. The new bridges have freeboards >1.2 m between the 100 year ARI flood level and bridge soffit levels. The 100 year ARI flood difference at Totara Creek bridge shows there is no effect on the water levels upstream and downstream, and the Trig Stream bridge shows a decrease of water levels upstream and downstream. The property at 25 Trig Road (North) shows a reduction in the 100 year ARI flood levels benefiting the urbanisation that will occur on this FUZ land.
W5: Hobsonville Road	Hobsonville Road upgrade does not have any identified positive flooding effects and flooding effects have been assessed as negligible.
Redhills and Riverhead	
RE1: Don Buck Road	The corridor lies on a ridgeline and away from any existing flood prone areas and no increased flooding risks are anticipated. Whilst there are no increased flood risk the corridor has been adapted for climate change and the future road will sit above the existing alignment.
RE2: Fred Taylor Drive	The corridor lies on a ridgeline and the proposed road is mostly elevated compared to the existing vertical alignment therefore increasing the freeboard and reducing the potential flooding risks.
R1: Coatesville-Riverhead Highway	The proposed road is elevated compared to the existing vertical alignment at the low points at 1368, 1335, 1295 and 1210 Coatesville-Riverhead Highway to increase freeboard and allow for space to upgrade the stream crossings.

19.3 Assessment of Construction Effects on Flooding

The following construction works can result in flooding effects:

- Construction of new culvert crossings or upgrading of existing culvert crossings
- Construction of new bridges over streams or overland flow paths (the interim design proposes bridges on Māmari Road, Brigham Creek Road and Spedding Road; however there is the potential to upgrade currently proposed culverts to bridges at the detailed design stage)
- Installation of diversion drains and realignment of existing overland flow paths
- Construction of new dry ponds or wetlands and upgrading of existing dry ponds or wetlands
- Temporary use of lay down areas.

The potential effects of these works are:

- Bulk earthworks to complete the contouring for new landscape features e.g., dry ponds or stormwater wetlands and new or upgraded culverts require a dry works area and can alter overland flow paths or generate erosion and sediment effects
- The construction of new bridges over streams will require temporary staging platforms for piling rigs and cranes to be constructed on the banks and possibly over the stream bed and potentially causing a constriction to flood flows and raising upstream flood levels
- The siting of dry ponds or stormwater wetlands within an existing overland flow path can obstruct runoff and result in flows being diverted towards existing properties.

There is the potential for the above effects on each transport corridor, however effects may vary based on the location of works in terms overland flows or known flood extents in the vicinity.

It should be noted that the construction lay down areas for each proposed transport corridor are located outside flood plains and major overland flow paths and therefore do not result in an increased flood hazard risk.

19.4 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

The management and mitigation measures for construction effects within each of the proposed designation footprints are as follows:

Construction of extended and / or upgraded transport corridors

- Carrying out earthworks during the summer or dry months to reduce the risk of flooding
- Locating lay down areas outside of existing overland flow paths
- Managing the overland flow paths to make sure flows are not diverted toward existing buildings or properties
- Developing a CEMP prior to construction by an experienced Stormwater Engineer which considers the effects of temporary works, earthworks, storage of materials and temporary diversion and drainage on flow paths, flow level and velocity.

Construction of new and existing culvert crossings, stormwater wetlands and dry ponds

- Existing culvert extensions should be completed prior to commencement of bulk earthworks to allow for the passage of clean water across the site

- Installing temporary diversions or to allow flows to be maintained while new culverts, stormwater wetlands and dry ponds are constructed
- For larger embankments requiring a longer duration of works or for overland flow paths with more regular and higher flow rates diversions should be installed prior to works commencing
- Where no diversion is required a six metre working clearance between any earthworks and the designation footprint is adopted to accommodate access and materials
- For larger diameter pipes a working clearance of ±20 metres from the upstream extent and ±15 metres from the downstream extents is provided.

Construction of new bridges

- Temporary platforms should generally be set back as far as practicable from the stream banks and main channel to minimise the risk of flooding
- Staging of earthworks for the abutments and stockpiling of materials outside the flood plain to mitigate the potential for blocking flow paths and flood plains.

19.5 Assessment of Operational Effects on Flooding

There are a range of operational effects particularly from proposed new bridges and waterbody crossings. The model used in the Assessment of Flood Hazard Effects is based on an indicative design which is subject to further refinement, and it may be that some of these structures are modified in the future. Future detailed design will be subject to a separate flooding assessment.

For the proposed transport corridors, the assessment of operational flooding effects considered:

- New culvert crossings (≥ 600 mm diameter)
- New bridge structures crossing creeks and streams
- Significant areas where the new road embankment encroaches existing flood prone areas.
- The extent of flooding on existing properties due to the new project corridor.

The effects of these are:

- Increasing impervious areas resulting in increased runoff and potentially increased flood levels
- Altering existing overland flow paths resulting in flows being redirected towards existing properties
- Obstructing an existing overland flow path resulting in ponding at existing low points or newly created depressions along the corridor
- Improving flows under the road reducing upstream flood levels and increasing flood levels at properties further downstream.

The new bridge structures have been assessed to result in overall positive effects. For the new and upgraded culverts the effects are considered to be negligible to moderately negative prior to mitigation. Some effects were assessed as moderate based on an increase in flood level of greater than 0.15 metres for habitable buildings and 0.5 metres for general property. These effects are a result of the changing terrain, based on the spatial land take for the new infrastructure, which obstructs existing overland flows and flood plains. These effects are likely to be overstated as they can be addressed through detailed design of the bridges, culverts and crossings to manage flows upstream and downstream to minimise flooding effects.

The mitigation measures set out in Section 19.6 have been designed to ensure that flood effects are adequately addressed during the future detailed design and that adverse flood effects are avoided or mitigated. With implementation of mitigation measures during the detailed design phase and

construction there is unlikely to be any adverse flood effects from the operation of each of the proposed transport corridors.

To avoid operational flooding effects, the design features set out in Table 19-2, have been incorporated into the interim design. Specific measures below will be confirmed through the development of the design.

Table 19-2: Summary of design features to avoid operational flooding effects on each project

NOR	NOR specific measures (in addition to general conditions)
Whenuapai	
W1 Trig Road (North)	No specific measures are required as there is only a small risk of flooding from culvert blockages
W2 Māmari Road	• Diverting the existing overland flow path at the northern section of Māmari Road to discharge to Sinton Stream • Increasing the culvert sizes at 11 Māmari Road, 9 and 7 Spedding Road and 80 Trig Road (North) so that the upstream and downstream water level differences within the stream do not increase by more than 0.5 m on land zoned for urban and future urban development.
W3 Brigham Creek Road	• Creating new overland flow path diversions on both sides of the corridor to discharge to nearby overland flow paths or streams to mitigate ponding and decrease flood levels at affected properties • Increasing the culvert sizes at 41-43 and 155-157 Brigham Creek Road so that the upstream and downstream water level differences do not increase by more than 0.5 m on land zoned for urban and future urban development • Design check dams in the proposed diversion drain between 153 and 157 Brigham Creek Road to decrease the peak flow towards the culvert inlet at 155-157 Brigham Creek Road • Upgrading the culvert at Waiarohia Stream by adding smaller culverts to create a balance between the flood level differences upstream and downstream or optimizing the proposed bridge span and freeboard.
W4 Spedding Road	• Upsizing the proposed culvert crossings to increase the flow through the culverts therefore decreasing the flood levels upstream • Realign overland flow path north of corridor and optimize culvert design to discharge into overland flow path • Lift the vertical alignment of the road to increase freeboard and realign an overland flow path to discharge into culvert to reduce flood risk • Creating a new diversion for an existing overland flow path to discharge into the stream and decrease flood levels at the property on 15-19 Spedding Road.
W5 Hobsonville Road	• Upgrading the proposed inlet and pipe capacities at 283 Hobsonville Road to discharge to the existing underground drainage network to reduce the flood levels off-site • Increasing the pond outlet capacity at 18 Williams Road to allow more flow to discharge downstream.
Redhills and Riverhead	
RE1 Don Buck Road	No specific measures are required as there is a minimal risk of flooding.

NOR	NOR specific measures (in addition to general conditions)
RE2 Fred Taylor Drive	• Increase existing culvert size at 160 Fred Taylor Drive and include a realign overland flow path running alongside the corridor • Upgrade overland flow path located between the building and the corridor to decrease the flood extents • Provide diversion drains for the flood prone area at 132-136 Fred Taylor Drive to divert flow and discharge to a pipe network at 140 Fred Taylor Drive or to an existing overland flow path at 122 Fred Taylor Drive.
R1 Riverhead-Coatesville Highway	• Temporary diversion during earthworks for stormwater wetland to mitigate flooding during minor rainfall events • Increasing culvert sizes at 1368, 1335, 1295 and 1210 Coatesville-Riverhead Highway so that the upstream and downstream flood levels do not increase by more than 0.05 m • New 5 m wide channel/drain west of the corridor between 1186 to 1170 Coatesville-Riverhead Highway with an inlet structure to connect to an upgraded underground pipe network to allow more flow through to discharge to the open channel east.

At the detailed design stage the following outcomes, which form part of the Flood Hazard condition for each NOR, will be achieved:

- No increase in flood levels for existing authorised habitable floors that are already subject to flooding
- No more than a 10% reduction in freeboard for existing authorised habitable floors
- No increase of more than 50 mm in flood level on land zoned for urban or future urban development where there is no existing dwelling
- No new flood prone areas
- No more than a 10% average increase of flood hazard (defined as flow depth times velocity) for main access to authorised habitable dwellings existing at time the Outline Plan is submitted.

19.6 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

Measures to avoid, remedy or mitigate potential adverse effects may include:

- Creating new overland flow path diversions to discharge to nearby overland flow paths or streams to mitigate ponding and decrease flood levels at affected properties
- Increasing culvert sizes so that the upstream and downstream water level differences do not increase by more than 0.5 metres on land zoned for urban and future urban development
- Upgrading culverts by adding smaller culverts to create a balance between the flood level differences upstream and downstream
- Installing drains at the toe of embankments. Sloping towards the culverts can also allow for additional storage to decrease the velocity and peak flow through the culvert crossings
- Optimising the proposed bridge span and freeboard during detailed design
- Integrating development design requirements for FUZ upstream and downstream of the proposed transport corridor.

19.7 Summary of Effects on Flooding

The Assessment of Flooding Effects for the proposed transport corridors was based on an indicative design of the new transport network.

A number of positive effects have been identified associated with the development particularly where new bridges are proposed. The bridges will raise the existing road levels reducing the potential for flood levels to overtop the road and reducing flood hazard. Additional positive effects can be realised through upgrades to existing culverts or new culvert crossings to improve overland and stream flow under the roads.

The assessment found that there was unlikely to be additional risk of flood effects during construction as all proposed laydown areas are outside of the flood plain and overland flow paths. For those areas where there is an increased risk mitigation measures such as carrying out construction works during dry weather and using diversion drains will be adequate to manage this risk.

Potential operational effects include increased flood levels upstream and downstream of crossings and bridges. Design considerations and management measures have been incorporated to ensure that adverse effects are addressed. Based on the findings and recommendations of the Assessment of Flood Hazard Effects, adverse effects of the extended and / or upgraded transport corridors associated with flood hazard are able to be appropriately managed.

20 Terrestrial Ecology

The Assessment of Ecological Effects for Whenuapai, and Redhills and Riverhead, provided in Volume 4, assesses the potential ecological effects of each of the proposed transport corridors on the environment. This is in relation to ecological effects that are subject to district plan controls in the AUP:OP. The summary below should be read in conjunction with this report.

For ecological effects that relate to regional plan and / or National Environmental Standards for Freshwater, these will be assessed and resource consents sought through a future consenting process. Any required mitigation will be identified as part of that future consenting process. Whilst not required to inform the AEE, potential ecological effects relating to future regional resource consents and/or wildlife permits have been considered to inform the alignment and the proposed designation footprint for each proposed transport corridor.

20.1 Methodology

The ecological assessment of effects follows the Ecological Impact Assessment (EcIA) Guidelines (EIANZ, 2018). These guidelines were used to assess the ecological value of identified ecological features and evaluate the magnitude and level of potential effects that extended and / or upgraded transport networks could have on these features as summarised in Figure 20-1 below.

20.1.1 Ecological Impact Assessment Guideline Process

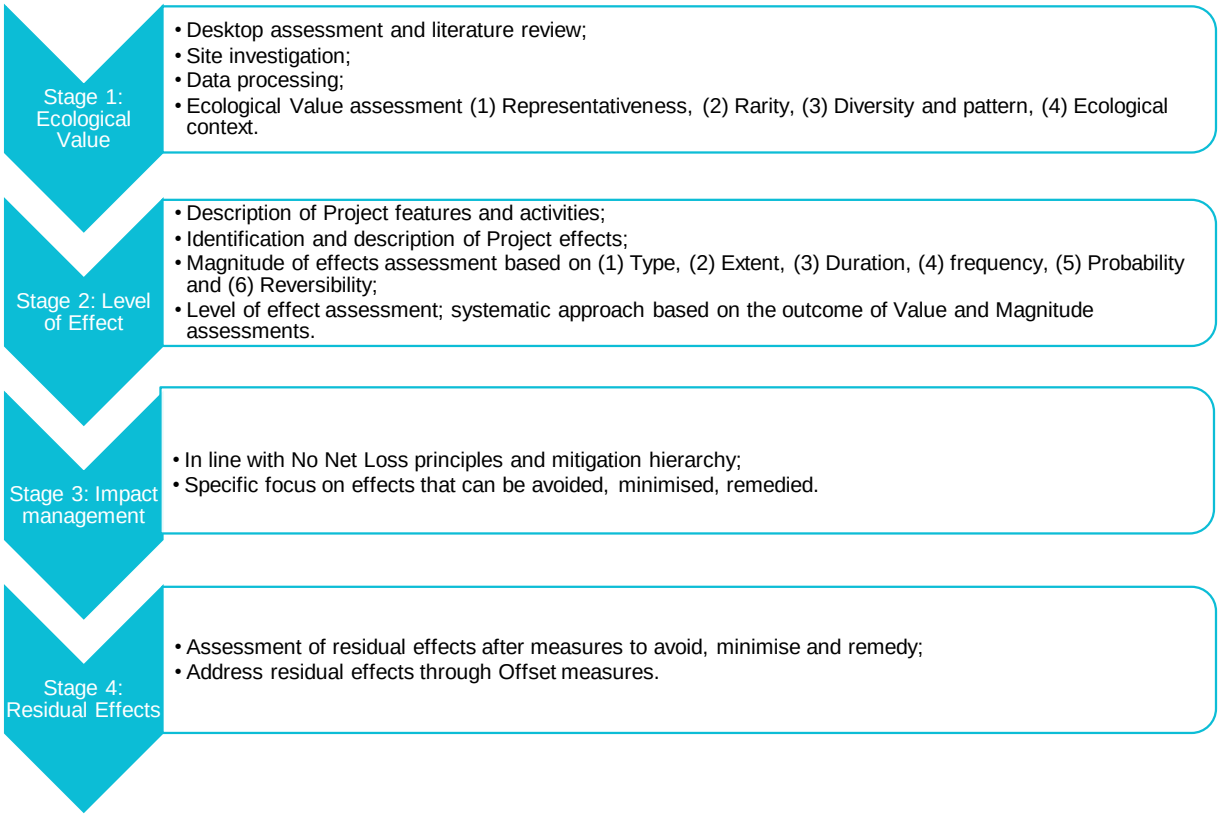


Figure 20-1: Approach process followed for Assessment of Ecological Effects

The Environment Institute of Australia and New Zealand (EIANZ) Guidelines provide guidance to assist with the assessment of the likely future ecological environment in this report. The assessment states:

"The ecologist needs to consider the permitted baseline in order to describe the potential "future ecological environment and to assess effects at that time, and should discuss this with the project planner or legal advisor if in any doubt".

In line with the above, the ecological assessment has been informed by:

- **The permitted baseline** – The AUP:OP permits certain activities which provide for infrastructure, and as such would not require resource consent. These activities include vegetation clearance and the removal of trees, excluding notable trees and street trees
- **The likely future environment** – This takes account of the permitted activities for infrastructure, consented activities, but also the planned urbanisation of FUZ land in the Whenuapai, Redhills, and Riverhead growth areas. This is because assessing the effects on the environment solely as it exists today would not provide an accurate reflection of the environment in which ecological effects, resulting from the construction and operation of each of the proposed transport corridors, will be experienced, i.e. existing greenfields on FUZ land will be urbanised in the future.

Desktop and site investigations

Desktop and site investigations were undertaken for ecological features within each transport corridor. Ecological features within the proposed designation footprint and approximately 100 m^4 radius of the designation have been mapped and included onto the Assessment of Ecological Effects. Vegetation, stream and wetland features were investigated and mapped to provide context for potential adjustments to the proposed designation boundary. In addition to the secondary study area, potential habitat for native fauna was considered within the Zone of Influence[24].

Site investigations were undertaken in order to:

- Prepare an ecological baseline of terrestrial, freshwater and wetland ecology
- Inform the assessment of each of the NORs against the relevant district matters (terrestrial ecology)
- Set out freshwater and wetland matters which may be considered as part of a future regional resource consent, or under relevant wildlife legislation
- Inform the designation footprint.

Additional bat surveys were carried out which confirmed the presence of bat activity[25] (but low frequency) in the broader landscape.

20.2 Positive Effects on Terrestrial Ecology

The following positive effects were identified for each of the extended and / or upgraded transport corridors:

- The ability for future landscape planting within each transport corridor to tie into stream and riparian corridors. Most notably for the corridors associated with Totara Creek, Sinton Stream, Trig Stream, Rāwiri Stream, Waiarohia Stream and unnamed tributaries crossed by Coatesville-Riverhead Highway

[24] The ZOI of the NOR relates to an area occupied by habitats and species that are adjacent to and may go beyond the boundary of the transport corridor. It is defined in the EIANZ Guidelines as "the areas/resources that may be affected by the biophysical changes caused by the proposed Project and associated activities."

[25] Bat monitors were placed upstream of Totara Creek and at the Brigham Creek crossing and downslope of Waiarohia Stream and Brigham Creek crossing. Monitors were deployed between November 2021 and January 2022 for 14 suitable days.

- Net increase in green infrastructure and associated habitats within the designation footprint associated with street trees, berm and stormwater plantings and planted stormwater wetlands
- There are stream and wetland crossing upgrades identified for individual transport corridors. Most notably the existing undersized culvert associated with Waiarohia Stream crossing will be upgraded to a bridge resulting in a positive effect on stream habitat and stream connectivity.

Specific positive effects for each transport corridor are summarised in Table 20-1 below.

Table 20-1: Project specific positive terrestrial ecology effects

NOR	Ecological Feature	Effect
Whenuapai		
W1: Trig Road (North)	N/A	N/A
W2: Māmari Road	Sinton Stream Farm pond (7 Spedding Road)	Riparian corridor of Sinton Stream associated with proposed downstream green corridor (T + T 2020). Native landscaping of the roadside upslope and downslope of the stream crossing can have a positive effect on the riparian features and associated ecological functions of the Sinton Stream. Decommissioning of a farm pond will have a positive effect on the stream water quality of Sinton Stream tributary.
W3: Brigham Creek Road	Waiarohia Stream	Existing undersized culvert upgrade to bridge crossing at Brigham Creek Road and Waiarohia Stream crossing. This will have a positive effect on the ecological integrity of the Waiarohia Stream and improve connectivity through the Waiarohia catchment.
W4: Spedding Road	Trig Stream complex (Rāwiri , Trig Tributary, Trig Stream and associated wetlands)	These features will be bridged. However, native landscaping will tie into existing restoration efforts on Rāwiri Stream and roadside planting on the State Highway. Positive effects relate to a decrease in pest plants and an increase in native plants along the riparian corridors associated with these streams.
W5: Hobsonville Road	N/A	N/A
Redhills and Riverhead		
RE1: Don Buck Road	N/A	N/A
RE2: Fred Taylor Drive	N/A	N/A
R1: Coatesville-Riverhead Highway	Unnamed tributaries to Rangitopuni catchment	Existing undersized culvert upgraded throughout the transport corridor. This will have a positive effect on the ecological integrity and improve connectivity through the Brigham Creek and Rangitopuni catchment.

20.3 Assessment of Construction Effects on Terrestrial Ecology

Summary of Potential Effects

The construction activities associated with each extended and / or upgraded transport corridor have the potential to cause adverse effects on ecological features within or adjacent to the designation footprint, without mitigation. Potential construction effects that relate to the activities authorised by the proposed designation are:

- Vegetation removal effects, including the loss of foraging habitat and mortality or injury to bats. Note this is limited to vegetation clearance which is a district plan matter and is not otherwise permitted
- Disturbance and displacement to roosts/nests and individual (existing) birds and lizards due to construction activities (noise, light, dust etc.). It is assumed that this effect will occur after vegetation clearance (subject to regional consent controls) has been implemented and is therefore likely to happen in habitats adjacent to the transport corridor or underneath structures such as bridges.

The following sections detail the level of effect on ecological features (habitat and species), as relating to district plan matters only.

Terrestrial Vegetation

Vegetation to be removed as part of construction of each transport corridor that is subject to district controls is presented in the Assessment of Ecological Effects. Due to the small extent and low likelihood that edge effect and additional fragmentation will occur, the overall level of ecological effect associated with vegetation removal is assessed as very low to low. As such no specific impact management (mitigation) has been proposed.

Species

Bats

The ecological value of bats is assessed to be very high. Bats may utilise the land surrounding each of the proposed transport corridors for roosting, foraging or commuting. During construction, night works may be required and site compounds are likely to be lit overnight. Lighting at night has the potential to affect the behaviour of bats if foraging within this area or roosting in nearby isolated stands of mature trees.

Noise and vibration during construction can be an issue if bats are roosting in the immediate vicinity of construction works. While bat foraging has been confirmed in the area, surveys at the corridor scale cannot confirm roost occupation within or adjacent to proposed transport corridors. However, it can be assumed that bats will utilise roost sites within the proposed designation footprint based on:

- Confirmed habitat suitability (numerous trees with moderate to high bat roost potential, connected to linear stream corridors and wetlands)
- Confirmed foraging presence
- Frequent utilisation of numerous roosting sites throughout their home range.

During construction of the extended and / or upgraded Trig Road (North), Māmari Road, Brigham Creek Road, Spedding Road and Coatesville-Riverhead Highway transport corridors, the overall level of effect of disturbance and displacement to roosts and individual bats, prior to mitigation, is assessed

as moderate due to the relatively short period of construction related effects, and the low baseline bat activity rate. The overall level of effect due to the removal of vegetation and associated loss of foraging habitat and mortality or injury to bats is assessed as low to moderate, prior to mitigation. With mitigation the level of effect reduces to negligible.

The overall level of effect on bats associated with construction of the upgraded Hobsonville Road, Don Buck Road and Fred Taylor Drive have been assessed as very low due to existing urbanisation of the surrounding areas. As such no impact management (mitigation) is required during construction at these corridors.

Birds

The ecological value of non-TAR birds in the context of the habitat features along each corridor is assessed to be low. During construction of the extended and / or upgraded Trig Road (North), Māmari Road, Spedding Road, Hobsonville Road and Fred Taylor Drive transport corridors, the overall level of effect on birds is assessed as low due to the low presence of native birds associated within several habitat features. As such no impact management (mitigation) is required during construction at these corridors.

Noise, vibration and lighting disturbance caused by construction activities could potentially displace native birds from suitable nesting and foraging habitat within and adjacent to the proposed upgrades of Brigham Creek Road, Don Buck Road and Coatesville-Riverhead Highway.

During construction of the Brigham Creek Road upgrade, the overall level of effect is assessed as moderate, prior to mitigation, due to the potential presence of the Spotless Crake using the existing stormwater pond at 167A Brigham Creek Road and the high ecological value of the Spotless Crake, in the context of habitat features on the corridor. With mitigation the level of effects reduces to low.

During construction of the Don Buck Road upgrade, the overall level of effect is assessed as moderate, prior to mitigation, due to the very high probability of disturbance of the At Risk Dabchick and the ecological value of this species. With mitigation the level of effects reduces to low.

During construction of the Coatesville-Riverhead Highway upgrade, the overall level of effect is assessed as high, prior to mitigation, due to the very high probably of disturbance of the Spotless Crake and Dabchick and the ecological value of these species. With mitigation the level of effects reduces to negligible to low.

Lizards

During construction activity associated with the upgrade of existing transport corridors lizards are likely to be habituated to noise and vibration from the existing road. For extensions to existing corridors, lizards will not be habituated to noise and vibration in greenfield areas which increases the likelihood of adverse effects occurring.

The ecological value of Copper skink (At Risk – Declining), which has the potential to be present within vegetation impacted during construction of each corridor, is assessed as high. The overall level of effect for all proposed transport corridors however is assessed as very low due to the unlikely probability of lizard disturbance associated with construction related noise and vibration. As such no impact management (mitigation) is required.

Level of Construction Effects

Table 20-2 provides a summary of district plan matter ecological level of effect during construction prior to any mitigation. The summary represents the level of effect based upon the ecological baseline and also the likely future ecological environment as the level of effect does not differ.

Table 20-2: Summary of ecological effects during construction prior to mitigation

NOR	Terrestrial vegetation	Bats	Birds (non-TAR)	Birds (TAR) on existing environment	Lizards
Whenuapai					
W1 Trig Road (North)	Low	Moderate	Low	NA	Very Low
W2 Māmari Road	Very Low	Low to Moderate	Low	Low	Very Low
W3 Brigham Creek Road	Very Low to Low	Moderate	Low	High	Very Low
W4 Spedding Road	Low	Low to Moderate	Low	NA	Low
W5 Hobsonville Road	Very Low	Very Low	Very Low	NA	Very Low
Redhills and Riverhead					
RE1 Don Buck Road	Low	Very Low	Very Low	Moderate	Very Low
RE2 Fred Taylor Drive	Very Low	Very Low	Very Low	NA	Very Low
R1 Coatesville-Riverhead Highway	Low	Moderate	Low	Spotless Crake: High Dabchick: Moderate	Very Low

20.4 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

The Assessment of Ecological Effects recommends the following construction mitigation measures:

- A Bat Management Plan for Trig Road (North), Māmari Road, Brigham Creek Road, Spedding Road and Coatesville-Riverhead Highway extension and / or upgrades. Details of the Bat Management Plan will depend on bat habitat within the FUZ and is likely to include bat habitat surveys prior to construction, siting of compounds and laydown areas to avoid bat habitat, lighting design to reduce light levels and spill from construction areas and restriction of nightworks around tree land bat habitat

- A Bird Management Plan will be required for Brigham Creek Road (the existing Brigham Creek stormwater pond), Don Buck Road and the Coatesville-Riverhead Highway upgrades. Considerations for bird management will include avoiding the bird breeding season (September to February) during construction (as it relates to the existing stormwater pond), or bird survey prior to construction to confirm TAR species are not present and to provide guidance if TAR species are present.

Table 20-3 provides a summary of district plan matter ecological level of effect during construction with the implementation of the above proposed mitigation measures. Terrestrial habitat and fauna that has a low to negligible level of effect, and therefore does not require impact management, is not included below.

Table 20-3: Summary of ecological effects during construction post mitigation

NOR	Bats	Birds (TAR) on existing environment
W1 Trig Road (North)	Negligible	
W2 Māmari Road	Negligible	
W3 Brigham Creek Road	Negligible	Low
W4 Spedding Road	Negligible	
RE1 Don Buck Road		Low
R1 Coatesville-Riverhead Highway	Negligible	Spotless Crake: Low Dabchick: Negligible

20.5 Assessment of Operational Effects on Terrestrial Ecology

Summary of Potential Effects

The operational activities associated with each of the proposed transport corridors have the potential to cause adverse effects on ecological features within or adjacent to designation footprint. The potential operational effects are:

- Loss in connectivity for indigenous fauna, in particular bats, birds, lizards, associated with light, noise and vibration effects from the operation of the road, leading to fragmentation of habitat; and
- Disturbance and displacement of indigenous fauna and their nests/roosts, in particular bats, birds, herpetofauna, associated with light, noise and vibration effects from the operation of the road.

For corridors or the section of corridors that are being upgraded, i.e. all corridors with the exceptions of the extension to Māmari Road and Spedding Road, it should be noted that many of the operational effects are likely to be pre-existing. Bats, birds and particularly lizards may therefore be habituated to noise, light and vibration from the existing road operations. The following sections detail the level of effect on ecological features (habitat and species), as relating to district plan matters only.

Species

Bats

The ecological value of bats is assessed to be very high. The loss of connectivity through permanent habitat loss and disturbance such as operational noise, vibration and light from the operation of each transport corridor can lead to an overall reduction in size and quality of bat foraging habitat and can impact on bat movement in the broader landscape. Lighting spillage from street lighting could disturb commuting and foraging bats at night and adversely affect insect prey populations.

Specific to the Hobsonville Road, Don Buck Road and Fred Taylor Drive upgrades the overall level of operational effect on bats is assessed as low due to the low probability of disturbance and negligible loss in connectivity. As such impact management (mitigation) is not required for these corridors.

On all other transport corridors, in terms of the loss in connectivity due to habitat loss, light and noise effects, the overall level of effect is assessed as moderate to high prior to mitigation. In terms of disturbance and displacement of roosts and individuals associated with lighting, noise and vibration effects, the overall level of effects has been assessed as low to moderate due to the relatively localised extent of additional disturbances to individual bats and roosts. With mitigation the level of effect reduces to negligible.

Birds

The ecological value of non-TAR birds in the context of the habitat features along each extended and / or upgraded corridor is assessed to be low. Noise, vibration and lighting disturbance caused by the presence of each of the extended and / or upgraded transport corridors has the potential to displace indigenous birds from suitable nesting and foraging habitat within and adjacent to proposed designation areas, while noise, light and vibration may also affect connectivity in the broader landscape.

The overall level of effect associated with disturbance, displacement and loss of connectivity is assessed as being low for all extended and / or upgraded transport corridors. As such impact management (mitigation) is not required.

Lizards

Suitable habitat (exotic scrub, exotic treeland edge and rank grassland) has been identified within the proposed designation footprint for each corridor which could potentially support native copper skink. Native lizards require vegetated corridors to facilitate natural dispersal, although they are considered to be relatively resident species and do not require migration or large-scale movement to support reproduction, refuge and feeding.

The proposal involves the extension and / or upgrades to an existing transport network. The proposed designations are therefore not expected to result in the additional fragmentation of lizard habitat. Similarly, Copper skink (At Risk – Declining) are likely to be habituated to disturbance such as noise, vibration and lighting and no additional effect on copper skink is expected.

Level of Operational Effects

Table 20-4 provides summary of district plan matter operational level of effect without mitigation due to the presence of road resulting in disturbance or loss in connectivity to bats, birds and lizards. The summary represents the level of effect for the ecological baseline and also the likely future ecological environment (where they are the same) and with a '*' where they differ.

Table 20-4: Summary of ecological effects during operation prior to mitigation

NOR	Bats - Disturbance and displacement	Bats - Loss in connectivity	Birds - Disturbance	Birds - Loss in connectivity	Lizards - Disturbance	Lizard - Loss in connectivity
Whenuapai						
W1 Trig Road (North)	Low	Moderate *Negligible	Very Low		Low	
W2 Māmari Road	Moderate	High	Low		Low	
W3 Brigham Creek Road	Moderate	High	Very Low		Low	
W4 Spedding Road	High	Very High	Very Low		Low	
W5 Hobsonville Road	Very Low	Very Low	Very Low		Low	
Redhills and Riverhead						
RE1 Don Buck Road	Very Low	Very Low	Very Low		Very Low	
RE2 Fred Taylor Drive	Very Low	Very Low	Very Low		Very Low	
R1 Coatesville-Riverhead Highway	Low	Moderate	Very Low to Low		Very Low	

*Indicates a level of effect associated with the future ecological environment that is different from the baseline level of effects. Level of effect assessed as negligible as bat habitat will likely be removed and the corridor does not cross any ecological features of value to bats that will be present in the FUZ.

20.6 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

Operational mitigation measures include a Bat Management Plan for Trig Road (North), Māmari Road, Brigham Creek Road, Spedding Road, Coatesville-Riverhead Highway.

The Bat Management Plan should include buffer planting along road corridors associated with stream crossings, sensitive lighting design at key locations such as stream crossings and retention of large,

mature trees wherever practicable to act as hop overs. The proposed designation area for corridor has sufficient room to provide these features.

Table 20-5 provides summary of district plan matter operational level of effect with mitigation due to the presence of road resulting in disturbance or loss in connectivity to bats. Terrestrial habitat and fauna that has a low to negligible level of effect, and therefore does not require impact management, is not included as the level of effect does not change.

Table 20-5: Summary of ecological effects during operation post mitigation

NOR	Bats - Disturbance	Bats - Loss in connectivity
W1 Trig Road (North)		Low
W2 Māmari Road	Low	Low
W3 Brigham Creek Road	Low	Low
W4 Spedding Road	Low	Low
R1 Coatesville-Riverhead Highway		Low

20.7 Summary of Effects on Terrestrial Ecology

Following the implementation of the identified mitigation measures the residual level of construction effects on terrestrial ecology associated with the construction of all extended and / or upgraded transport corridors is assessed as negligible or low. Potential effects are therefore able to be appropriately managed.

Following the implementation of the identified mitigation measures the residual level of operational effects on terrestrial ecology associated with the operations of all extended and / or upgraded transport corridors is assessed as very low or low. Potential effects are therefore able to be appropriately managed.

21 Landscape and Visual

The Assessment of Landscape and Visual Effects for Whenuapai, and Redhills and Riverhead, provided in Volume 4, assesses the potential effects on landscape character, natural character and visual effects associated with the construction and operation of the proposed transport corridors and recommends ways of mitigating these effects. The summary below should be read in conjunction with this report.

21.1 Methodology

Landscape effects are a result of physical change in the landscape, which may change the character of the landscape over time. Landscape effects relate to biophysical: abiotic (geophysical processes (landform) and drainage patterns), biophysical: biotic (vegetation cover, quality and pattern) and human attributes (land uses, active and passive recreation, amenity and built form).

Effects are assessed based on the following two categories:

Temporary Effects (Construction Effects): Describes the anticipated impacts on the bio-physical elements and features of the landscape resource (landform, vegetation and hydrology) resulting from the construction of the transport corridors. It also includes visual amenity effects for both public and private viewing audiences from construction works.

Permanent Effects (Operational Effects): Describes the effects on the landscape of completed works (including integrated landscape mitigation measures), the significance of physical landscape change and ultimately the resulting effects of the transport corridors on landscape character, natural character and visual amenity for both public and private viewing audiences.

Natural character effects pertain to changes to the coastal environment, wetlands, and lakes and rivers and their margins. Effects are primarily concerned with the degree to which natural processes, natural patterns and natural elements have undergone human modification.

The natural character assessment applies to the existing water bodies and wetlands associated with the Sinton Stream, Pikau Stream, Totara Creek, Waiarohia Stream, Rāwiri Stream and Trig Stream. Visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape.

21.2 Positive Landscape and Visual Effects

Positive effects in relation to landscape and visual elements are primarily associated with the provision or improvement of urban design and landscape amenity associated with the transport corridors and / or specific mitigation measures.

The positive effects of each of the extended and / or upgraded transport corridors are summarised below:

- A streetscape to support emerging urban form within adjacent landscape
- A net increase in green infrastructure within existing urban areas associated with street trees, berm and stormwater plantings and planted stormwater wetlands, resulting in improved visual amenity for road users and adjacent audiences within the context of the streetscape and the expected future environment

- Slower speed limits adjacent to existing dwellings and commercial activities improving the experiential qualities of the corridor for users as well as private properties adjacent to the road corridor.

21.3 Assessment of Construction Landscape and Visual Effects

Construction Areas

Adverse construction effects are expected to be primarily related to the presence of construction plant within corridors which are to be upgraded and the new extensions to Māmari Road and Spedding Road which cross undeveloped land. Additional construction effects relate to lighting of night works, construction sites, the construction of wetlands and where existing buildings and development are removed.

The phasing of construction will increase the intensity of construction traffic moving as active construction moves along the transport corridors throughout the construction period. Phasing of works will reduce the length of time audiences are expected to experience adverse effects.

Private Properties

Residential properties within and adjacent to the extended and / or upgraded corridors (including those which are partially designated) have the potential to be impacted during construction in the following ways:

- Surface level changes between private property boundaries and the upgraded transport corridor, requiring existing drivers and private accessways to be regraded
- Encroachment into private yard areas and the removal of private garden plantings and trees, ancillary buildings and boundary fences
- Potential construction of implemented noise mitigation measures and retaining walls.
- Demolition of existing dwellings and ancillary buildings (required properties).

Vegetation Clearance

Broad areas of street side vegetation will be removed to accommodate the wider transport corridors and batter slopes. This consists of trees and shrubs located within the road-side boundaries of private properties, within proposed designation footprint. Exotic pasture, trees, shelterbelt plantings, private gardens, exotic forest patches and cropland make up the vegetation to be removed.

Temporary Visual Effects

It is anticipated that activities during construction of the extended and / or upgraded transport corridors will be generally consistent in nature and scale to road works and infrastructure activities commonly anticipated by public transient viewing audiences within an arterial corridor. Another important consideration is that landscape change by way of vegetation removal and land modification forms part of the expected backdrop of the existing environment as the area urbanises.

Notwithstanding the above, some public and private vantage points within transport corridors are likely to witness heightened adverse visual effects through the construction phase due to the magnitude of vegetation removal, proximity to construction compounds and / or earthworks. The effects will however be moderated by factors such as existing road corridors which form part of the existing visual composition, the staged construction process and as construction activities of the

upgraded corridors will be of a nature and scale which is typical of construction work within an arterial corridor.

The private properties which will experience landscape and visual effects are outlined in Table 21-1 below:

Table 21-1: Landscape and Visual Effects on Private Properties

NOR	Private Properties	Level of Effect
Whenuapai area		
W1 Trig Road (North)	• Private properties where physical landscape effects will occur along roadside boundaries • Private properties in proximity to the northern site compound at 139 Brigham Creek Road. This is also the location of a proposed stormwater pond • Private properties in proximity to the southern site compound at the intersection with the SH18 on ramp. This is also the location of a proposed stormwater pond and the Trig Road over bridge upgrade for active modes.	• Moderate adverse effects, without mitigation • Low-moderate adverse effects, with mitigation.
W2 Māmari Road	• Private properties where physical landscape effects will occur along roadside boundaries • Private properties in proximity to the northern site compound at 5, 7 and 28 Māmari Road, Timatanga Community School and the rear of properties at 7, 8, 9 and 10 Tama Quadrant. This is also the location of proposed stormwater pond and the Sinton Stream Bridge • Private properties in proximity to the southern site compound at 10 Spedding Road. This is also the location of a proposed stormwater pond.	• Moderate adverse effects, without mitigation • Low-moderate to low adverse effects, with mitigation.
W3 Brigham Creek Road	• Private properties where physical landscape effects will occur along roadside boundaries • Private properties in proximity to the site compounds at 20-22 Brigham Creek Road, 131-137 Brigham Creek Road and 1 Sinton Road.	• Moderate-high adverse effects, without mitigation • Low-moderate adverse effects, with mitigation.
W4 Spedding Road	• Private properties where physical landscape effects will occur along roadside boundaries • Private properties in proximity to the site compounds at 119 and 125 Fred Taylor Drive, 15-19 Spedding Road and 53 Trig Road .	• Low-moderate adverse effects, without mitigation • Low adverse effects, with mitigation.
W5 Hobsonville Road	• Private properties where physical landscape effects will occur along roadside boundaries to Hobsonville Road	• Moderate-high adverse effects, without mitigation • Low-moderate adverse effects, with mitigation

NOR	Private Properties	Level of Effect
	• Private properties in proximity to the site compounds at 2 Hobsonville Road, 92 Hobsonville Road, 118 Hobsonville Road • Outdoor space, classrooms and buildings within Hobsonville School which directly overlook the construction areas.	• Adverse effects on Hobsonville School will be moderate-high, without mitigation • Adverse effects on Hobsonville School will be moderate, with mitigation.
Redhills and Riverhead		
RE1 Don Buck Road	• Private properties where physical landscape effects will occur within private gardens • Private properties in proximity to stormwater wetland within the Rush Creek Reserve.	• Moderate to low-moderate adverse effects, without mitigation • Low-moderate to low adverse effects, with mitigation.
RE2 Fred Taylor Drive	• Private properties where physical landscape effects will occur along roadside boundaries to Fred Taylor Drive.	• Moderate to low-moderate adverse effects, without mitigation • Low and very low adverse effects, with mitigation.
R1 Coatesville-Riverhead Highway	• Private properties where physical landscape effects will occur within private gardens • Private properties in proximity to the site compound at 1210 Coatesville-Riverhead Highway. This is also the location of a proposed stormwater pond • Private properties in proximity to the site compound at 182 Old Railway Road.	• Moderate to moderate-high adverse effects, without mitigation • Low-moderate adverse effects, with mitigation.

21.4 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

The mitigation measures for all activities and built elements are outlined below and will be incorporated into the Urban and Landscape Design Management Plan (ULDMP), CEMP, and CTMP which are proposed as conditions of each NOR:

- Reinstatement of construction and site compound and earthworked areas by removing any left-over fill and shaping ground to integrate with surrounding landform
- Hoarding around the boundaries of site compounds that face on to adjacent residential properties
- Where practicable, during construction, install construction hoardings with interpretive panels in selected areas which are in close proximity and visible to the public, to provide information about the project and its progress
- Limit the removal of notable trees (trees that have no protection but are an identifiable feature within the landscape) and indigenous vegetation
- Consideration in locating stockpiles at the edge of site compounds to provide visual screening
- Wherever practicable retain stockpile and re-use topsoil from existing pastoral land (within project areas) to reduce the amount of truck movements and associated visual effect
- Measures to limit lighting during night time works by using directional lighting to prevent sky glow and glare/spill light falling on residential properties.

With the mitigation proposed, it is considered that adverse landscape and visual effects on both public and private audiences are able to be appropriately mitigated and managed through the construction phase.

21.5 Assessment of Operational Landscape and Visual Effects

Natural Character Effects

Natural character forming elements, features and processes within transport corridors are limited, with the exception of specific features identified on each corridor and on the largely rural Coatesville-Riverhead Highway. Specific natural character features are identified in Table 21-2.

Table 21-2: Natural Character Features

NOR	Natural Character Feature
Whenuapai area	
W1 Trig Road (North)	Within the footprint of the transport corridor and the proximate surrounding landscape, there are no existing watercourses or water bodies.
W2 Māmari Road	Along the corridor indigenous riparian vegetation is more pronounced in the Sinton Stream than the branches of the Pikau Stream. Vegetation clearance will be required at Sinton Stream for bridge construction.
W3 Brigham Creek Road	Indigenous riparian vegetation is more pronounced at Totara Creek than for the branches of the Waiarohia Stream. Vegetation clearance will be required for the bridge crossing Totara Creek.
W4 Spedding Road	Indigenous vegetation is limited throughout the heavily modified pastoral landscape. Indigenous riparian vegetation is more pronounced in Totara Creek, Trig Stream, Rāwiri Stream and Waiarohia Stream. The proposal will not have an impact on the terrestrial SEA adjacent to the Totara Creek. Clearance of indigenous riparian vegetation and habitat will be necessary to facilitate the construction of the SH16, SH18 and Rāwiri Stream over-bridges. This will be limited to the areas required for construction.
W5 Hobsonville Road	Clearance of indigenous vegetation along the corridor is expected as part of the required works, however these clearance areas will be limited and will not comprise any large areas of protected habitat.
Redhills and Riverhead	
RE1 Don Buck Road	The stormwater wetland positioned within the Rush Creek Reserve will be upgraded and will require the alteration of the of the existing stream and wetland. This will require the re-instatement of the riparian features as part of the mitigation.
RE2 Fred Taylor Drive	The manmade stormwater wetland positioned within Kopupaka Reserve will be upgraded. The landscape plan will be required to mitigate the natural character effects.
R1 Coatesville-Riverhead Highway	There are four watercourses which are currently culverted on the existing corridor and will be impacted by the upgraded transport corridor. The proposed widening will require earthworks within proximity of the watercourses and the removal of riparian vegetation. This will require the re-instatement of the riparian features as part of the mitigation.

Across each of the corridors indigenous vegetation is limited in the heavily modified pastoral landscape. Indigenous riparian vegetation is more pronounced adjacent to watercourses. Overall, the natural character value in the landscape is comparatively low across the entirety of the proposed designation footprint for each transport corridor.

Clearance of indigenous vegetation within road corridors is expected as part of the required works, however these clearance areas will be limited and will not comprise any large areas of protected habitat. This does have the potential to alter the character of these areas by heightening the impression of human modification. Clearance of indigenous riparian vegetation and habitat will be necessary to facilitate the construction of proposed bridges however this will be limited to the areas required for construction.

A planting plan and vegetation protection plan would be developed as part of the detailed design of transport corridors. Any planting proposed as mitigation through the regional consents process would be integrated through these plans. This will ensure that natural character values are preserved as an outcome of the transport corridors. On this basis, adverse natural character effects are anticipated to be low.

Visual Amenity Effects

Across each of the extended and / or upgraded corridors there are likely to be a range of visual amenity effects on public and private viewing audiences relative to their proximity to transport corridors.

Table 21-3: Visual Amenity Effects – Private Views

NOR	Private View	Level of Effect
All NORs	Existing properties that are set back from each of the corridors by up to approximately 60 m.	Very Low
	For properties where land is required, visual amenity and residential character effects will be heightened as a result of driveway regrading, potential loss of yard space and by the introduction of an urban style carriageway and footpaths/cycleways to private dwellings.	Moderate-high adverse to low-moderate adverse, without mitigation. Low adverse effects once mitigation planting has established.

Table 21-4: Visual Amenity Effects – Public Views

NOR	Public View	Level of Effect
W1 Trig Road (North) W2 Māmari Road W3 Brigham Creek Road W4 Spedding Road RE2 Fred Taylor Drive	In greenfield, FUZ areas, few public viewing audiences in the existing environment have a direct view of the works due to the lack of connectivity to rural roads and publicly accessible land. Over time as the surrounding FUZ land is developed adverse visual effects are anticipated to reduce for the public viewing audience, based on improved visual amenity for users associated with	Low adverse effects, without mitigation. Low to very low adverse effects once mitigation planting has established.

NOR	Public View	Level of Effect
	streetscape works, maturing street trees, berm planting and accessibility to active modes of transport.	
W3 Brigham Creek Road (within the existing Whenuapai centre) W5 Hobsonville Road RE1 Don Buck Road	In existing urbanised locations public viewing audiences will continue to engage with a similar transport environment, within the context of an increasingly urban neighbourhood character resulting in very low adverse effects. Over time, visual effects are anticipated to be positive for the public viewing audience, based on improved visual amenity for users associated with streetscape improvements, maturing street trees, berm planting and accessibility to active modes of transport.	Very low adverse effects, without mitigation. Positive effects overtime, with mitigation and design considerations.
R1 Coatesville-Riverhead Highway	Audiences will engage with an expanded road corridor, particularly within the urban section of the corridor. Within the rural sections of the road corridor the road will be similar to the existing road. Visual effects for this audience are expected to be very low adverse in the context of the urbanisation of the surrounding landscape to the north. Specific to landscape amenity of urban properties on Grove Way, it is anticipated that vegetated strip that separates Grove Way from Coatesville-Riverhead Highway will be able to be retained reducing potential impacts. Over time, visual effects are anticipated to be neutral for the public viewing audience, based on visual amenity for users associated with the streetscape being replaced with a similar landscape and increased accessibility to active modes of transport.	Low adverse effects, without mitigation. Neutral effects overtime, with the streetscape being replaced with a similar landscape.

Visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period that will mature as the transport corridors become operational. These will reduce the long-term residual visual effects of the corridors, however new and modified transport networks will be a noticeable new feature within the landscape. Extended and / or upgraded transport corridors will be less apparent as the surrounding area is urbanised over time.

On that basis, visual effects within designated areas are likely to be very low for transient viewers once operational. For the private viewing audiences, the visual effects following completion of all construction will be low, reducing over an extended period of time as the landscape planting matures.

Landscape Character Effects

For the corridors or sections of corridors located in currently greenfield FUZ locations and on Coatesville-Riverhead Highway, the principal elements will permanently alter the character of the existing rural features. These corridors are characterised by the lack of streetscape features, informal intermittent vegetation, shelterbelt and hedgerows along field boundaries and existing adjacent rural land uses. In regard to the existing arterial roads such as Hobsonville Road, Don Buck Road and Fred Taylor Drive the principal elements of the upgrades will generally be in accordance with existing urban arterial roads.

At the completion of the transport corridors, the extended and / or upgraded corridors will resemble that of urban arterial roads on account of the active modes of transport, reduced speed limit, structured street tree planting, integrated stormwater management and engineered roading elements that are inherently urban aesthetic.

A planting plan and vegetation protection plan would be developed as part of the detailed design of proposed transport corridors. Any planting proposed as mitigation through the regional consents process would be integrated through these plans ensuring natural character values are preserved.

It is assessed that the new street tree plantings, in conjunction with stormwater management and berm plantings, will generally mitigate the landscape character effects associated with broad vegetation clearance within the proposed designation area.

21.6 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

The mitigation measures for all activities and built elements associated with each transport corridor will be achieved through the implementation of a ULDMP, proposed as a condition of each NOR. The objective of the ULDMP is to:

- Enable integration of permanent works into the surrounding landscape and urban context; and
- Ensure potential adverse landscape and visual effects are managed as far as practicable, contributing to a quality urban environment.

To achieve the objective, in response to potential landscape effects outlined above, the ULDMP will provide details of how the project is designed to integrate with the adjacent urban and landscape context, including the surrounding existing or proposed topography, urban environment, natural environment, landscape character and open space zones

21.7 Summary of Landscape and Visual Effects

Overall adverse landscape and visual effects (with mitigation) range from low to moderate-low for the construction phase and positive to moderate-low for the operational phase. Any adverse effects are able to be appropriately managed and reduced over time in relation to the urbanisation of the surrounding landscape. The surrounding landscape context has a lower level of sensitivity to change due to the existing context of the transport network. There are a number of positive landscape and visual effects that will result from the extended and / or upgraded transport corridor including the opportunity to formalise the streetscape and amenity provide consistent amenity throughout transport corridors.

22 Historic Heritage

An Assessment of Effects on Historic Heritage / Archaeology, for Whenuapai, and Redhills and Riverhead, provided in Volume 4 assesses the potential effects on historic heritage and archaeology as a result of the construction and operation of the proposed transport corridors. The report assesses the potential effects on any identified recorded historic heritage sites and unidentified subsurface archaeological remains that might be exposed during future construction. The summary below should be read in conjunction with this report.

22.1 Methodology

There are two main pieces of legislation in New Zealand that control work affecting heritage and archaeological sites. These are the HNZPTA and the RMA. Both have been relied upon in the assessment of effects.

The assessment criteria assesses first the archaeological values within the site context (condition, rarity/uniqueness and information potential), and second the archaeological values between sites (archaeological landscape/contextual value, amenity value, cultural association).

22.2 Positive Historic Heritage Effects

Positive effects in terms of heritage and archaeology are generally due to the disturbance during construction works as follows.

- Construction around wetlands and / or streams on each of the transport corridors will allow environmental archaeological research to be undertaken that could clarify the dates, sequence and details of the anthropogenic vegetation change from forest to open fern lands
- Pre-Contact horticulture has not been observed in the North West and linear developments like the proposed transport corridors are a rare opportunity to close this knowledge gap.

22.3 Assessment of Construction Effects on Historic Heritage

Topsoil removal associated with each of the extended and or upgraded transport corridors, including for construction areas has the potential to uncover archaeological features, both pre-Contact and post-Contact.

There is the potential for adverse effects from the discovery of and subsequent disturbance of unrecorded archaeological features near waterbody crossings and from pre-Contact seasonal camps, which were established to exploit local resources. If discovered, it should be noted seasonal camps have the potential to be a high information source due to there being few recorded or documented sites.

In terms of effects, as any uncovered archaeological sites would be sub surface, they have no existing amenity value; their cultural association would be related to the iwi and hapū of the area. Effects are therefore considered to be low and can be appropriately managed with implementation of the mitigation measures identified in Section 22.5 below.

Corridors with identified features or potential features are set out below:

On Hobsonville Road there is a recorded midden and possible gum digger camp (CHI No. 12363) near the proposed designation footprint for the Hobsonville Road upgrade. Recent earthworks associated with development within the Hobsonville Corridor Precinct (carried out under an archaeological authority) have not led to the discovery of archaeological features. There is the possibility that the Hobsonville Road upgrade could impact these archaeological features. If remains are encountered, they are not rare, but are rarely recorded due to their ephemeral nature. There is only limited information potential from the discovery and as they would be sub-surface, they do not hold amenity value. However specific links to manawhenua are likely to be established from the discovery of any remains. The effects on CHI No. 12363 are considered to be low and can be appropriately managed with implementation of the mitigation measures identified in Section 22.5 below.

On Spedding Road, there is low risk of encountering sub-surface ancillary structures belonging to the World War II era heavy anti-aircraft gun emplacements (CHI No. 20469). As works associated with the transport corridor are limited to the frontage of the property it is assessed that the features and therefore potential effects are able to be avoided.

On Fred Taylor Drive, there is a recorded site connected with a crash site of a B17 bomber during World War II (CHI No. 20445). The crash debris field crossed the current location of Fred Taylor Drive and therefore elements of the debris field could still be within the road or near to the road.

22.4 Assessment of Operational Effects on Historic Heritage

On completion of earthworks there will be no effects on archaeological or heritage sites during operation of the proposed network. Therefore, no ongoing mitigation is proposed post construction.

22.5 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

The following mitigation applies to all transport corridors:

Any potential previously unrecorded archaeological deposits that are exposed during the works can be mitigated by obtaining a precautionary authority under HNZPTA and the means of mitigation detailed in a Historic Heritage Management Plan (HHMP) which will be prepared for the HNZPTA authority application.

The earthworks or topsoil stripping undertaken during construction of each extended and / or upgraded corridor should be included in the precautionary archaeological authority.

Specific mitigation is recommended on Fred Taylor Drive in relation to the B17 bomber crash site. Such as the induction of all earthwork contractors to the signs of archaeological features, especially relating to the B17 crash site.

22.6 Summary of Effects on Historic Heritage

The nature of historic heritage, especially archaeological features recorded and unrecorded, is that all disturbances including construction have a negative effect that is unable to be remediated, only mitigated. Nonetheless construction around wetlands and streams will allow environmental archaeological research to be undertaken. The positive effect of investigation is that it could clarify the dates, sequence and details of the anthropogenic vegetation change from forest to open fern lands.

All transport corridors have potential for adverse effects occurring during construction activities. Heritage and archaeology features have been identified and assessed for each corridor with the key features outlined above. Potential effects are able to be appropriately managed through the implementation of mitigation detailed in a HHMP prepared for a HNZPTA authority for each of the corridors.

On completion of earthworks there will be no effects on archaeological or heritage sites during operation of the proposed network. Therefore, no ongoing mitigation is proposed post construction.

23 Māori Culture, Values and Aspirations

This section draws on engagement with manawhenua and inputs provided by manawhenua representatives during the development of each corridor. In developing the transport corridors, recognition has been given to both the relationship of Tangata Whenua to their lands, culture and traditions in this area and the commitment to partnership between manawhenua and Auckland Transport (as a representative of the Crown) founded through Te Tiriti o Waitangi.

A CIA has been provided by Te Kawerau ā Maki, included in Volume 4, which assesses the potential effects on cultural values and the landscape on Te Kawerau ā Maki, resulting from the future construction and operation of the extended and / or upgraded transport corridors.

23.1 Methodology

Only manawhenua can speak to the impact that a project may have on their cultural values, heritage and aspirations. The methodology for assessing effects has been to engage with manawhenua representatives and seek input on the potential impacts of each corridor.

Te Tupu Ngātahi maintains a Manawhenua Forum (for operational and kaitiaki level discussions), with specific discussion on the future network proposed by Te Tupu Ngātahi for the North West. This has involved presenting to manawhenua on a regular basis, seeking input on the corridor development and potential effects on cultural values. This has informed the corridors alignments and the mitigation measures proposed.

At the beginning of the Te Tupu Ngātahi programme, all iwi representatives were invited. As specific projects developed, iwi interests became more focused. Therefore, whilst all manawhenua groups were initially invited, hui attendees have become more focused. Iwi invited to the Northern Te Tupu Ngātahi hui includes Ngai Tai Ki Tamaki; Ngāti Maru; Ngāti Whanaunga; Ngāti Whātua o Kaipara; Te Ākitai Waiohua; Ngāti Paoa Trust Board; Te Kawerau a Maki; Ngāti Tamatera, Te Runanga o Ngāti Whātua and Ngāti Manuhiri.

23.2 Manawhenua feedback

23.2.1 Cultural Impact Assessment

An invite was made for CIAs to be prepared for the project at the Te Tupu Ngātahi hui on the 3 March 2022, which was attended by Ngāti Whanaunga, Te Patukirikiri, Ngai Tai Ki Tāmaki, Ngāti Paoa Trust Board (Ngāti Paoa), Ngāti Manuhiri, Ngāti Tamaterā. The team received the following responses during the hui:

- Ngāti Whanaunga - will not provide a CIA
- Ngāti Paoa Trust Board - will not provide a CIA
- Te Patukirikiri - will not provide a CIA
- Ngāti Tamatera - will not provide a CIA

The team received one acceptance to prepare a CIA by Te Kawerau ā Maki, this is attached at Volume 4.

23.3 Manawhenua Treaty areas and site of significance

The extended and / or upgraded transport corridors do not directly affect any identified properties or land currently being negotiated under Treaty settlements, land returned under a Treaty settlement, marae, Māori freehold lands, Tupuna Maunga Affected Areas, Tangata Whenua Management Areas, or Sites of Significance under the AUP:OP. The sites are also not within the coastal environment under the Marine and Coastal Area (Takutai Moana) Act 2011, therefore there are no customary marine title areas/groups or protected customary rights that need to be considered in relation to these corridors.

Both Don Buck Road and Coatesville-Riverhead Highway corridors fall within or are proximate to Te Kawerau ā Maki's statutory acknowledgement area (recorded in Appendix 21.7 of the AUP:OP. As such, the relevant consent authorities must have regard to the statutory acknowledgement relating to the area.

23.3.1 Te Kawerau ā Maki

Te Kawerau ā Maki are associated with the area surrounding both the NW Local Arterial Package and the NW Strategic Package. The CIA prepared by Te Kawerau ā Maki addresses both areas.

Specific points from the Te Kawerau ā Maki CIA are noted under Section 23.3.2, denoted by (CIA) to distinguish from wider manawhenua feedback.

23.3.2 Key matters raised by manawhenua

As part of the regular hui and CIA, manawhenua have provided commentary on the corridors. This is set out below:

Support for the future transport network

- Manawhenua has set out support for all corridors within the NW Local Arterial Package in the North West
- The CIA notes the potential positive operational benefits of the NW Local Arterial Package through walking and cycling provision and opportunity for cultural design and place making. This has also been recognised by manawhenua as part of the hui discussions.

Impacts on streams and ecology

- A number of streams were also identified as having significance to Te Kawerau ā Maki in the CIA, such as Lucas Creek. The CIA notes that where works are occurring near streams (Brigham Creek Road, Spedding Road, Coatesville-Riverhead Highway, Māmari Road) there is the potential for adverse impacts on freshwater systems and receiving environment, and notes that there is a need for protection during construction
- Manawhenua outlined the importance of streams and wetlands mauri, including lower quality ecological areas and vegetation. This informed the optioneering process to minimise or avoid impacts on streams and wetlands, where feasible and practicable
- Manawhenua raised concerns relating to effects on native bats, lizards, birds and fish from projects as well as potential loss of native vegetation along corridors and near stream crossings
- Manawhenua were interested in stormwater treatment and were presented to by the Te Tupu Ngātahi Flooding specialists

- Te Kawerau ā Maki identified in the CIA that the stormwater management approach proposed as having minor beneficial effect. The CIA also notes that there is a need for stormwater treatment before discharges from the road corridors.

Spedding Road, Whenuapai

- Manawhenua has partnered with Auckland Council on the restoration of the Rāwiri Stream (Spedding Road) and are keen for the restoration works to be maintained and opportunities to enhance the ecology to be identified. In response a bridge across the stream is proposed with opportunities for enhance existing within the proposed designation footprint.

Māmari Road, Whenuapai

- Manawhenua supported the steps taken to avoid / minimise ecological impacts, especially on awa (streams), particularly on the section being extended south of Spedding Road.

Don Buck Road, Redhills

- The CIA identified direct temporary and permanent construction and operation impacts from the proposed upgrade to the stormwater wetland at Don Buck Road (within awa at Rush Creek Reserve)
- Don Buck Road and Fred Taylor Drive follow an important ridgeline that was a historic walking trail, and the intersection is the site of a historic strategic pā (Pukewhakataratara), both have High cultural value. The pā site is heavily modified and will be further impacted by the intersection works.

Brigham Creek Road, Whenuapai

- CIA identified that upgrade works at eastern end as having direct, cumulative permanent construction and operation adverse impacts on the awa.

Coatesville-Riverhead Highway, Riverhead

- Earthworks and increased impervious surface having direct adverse effects on Te Ahipekapeka, a wahi tapu site between Te Awa Pitoitoi and Te Awa Kumeū.

Productive soils

- It was acknowledged that the option would either impact existing residential land or productive soils. Manawhenua conveyed to us that productive soils are scarce and valuable. These comments were provided in relation to the proposed Alternative State Highway (assessed as part of the NW Strategic Package AEE) and an extension to Northside Drive (not a Te Tupu Ngātahi project)
- The CIA states that alluvial soils have a unique composition and organic content which makes them highly productive and hence have a strong sense of mauri, all soils are also associated with Papatūānuku (the earth mother).

Wider feedback and coordination between projects

- Manawhenua requested information on traffic volume calculations and population growth projection and demographics, with the transport specialists providing an explanation of the 2048 modelling and the growth projections set out in the FULSS
- There was interest in the public transport facilities connecting and operating on the RTC

- The need for wider engagement with other Council Controlled Organisations was expressed, with the approach to engagement sent out to manawhenua.

23.4 Recommended measures to avoid, remedy or mitigate potential adverse effects

General

To invite manawhenua to prepare a Cultural Advisory Report in advance of the detailed design. To assist in understanding and identifying treasures affected by the project and inform their management and protection.

Cultural design and expression

Manawhenua will be invited to participate in the development of the ULDMP to input into relevant cultural landscape and design matters on each corridor. This includes the management of potential effects on cultural sites, landscapes and values. The ULDMP is provided for via a condition on each NOR.

Risk of archaeological discovery

A Cultural Monitoring Plan will be prepared prior to the start of construction works or enabling works. These plans will be prepared in collaboration with manawhenua to ensure that effects are managed appropriately, including features discovered by accident.

Archaeological mitigation will be in line with the recommendations of the Assessment of Heritage / Archaeology Effects (Volume 4) and this AEE Section 23.4.

Construction environmental controls

Concerns relating to construction works and potential impacts of sediment on streams and wetlands will be considered through the CEMP, and future regional consents, refer to AEE Part A, Section 9.2 for construction environment controls. Detailed design will provide the opportunity to reduce earthwork extents, where practicable.

Impacts on biota

Construction and operational impacts on fish, lizards, birds and bats have been considered through the Assessment of Ecological Effects (Volume 4) and this AEE Section 23.4. Refer to Section 20 for recommendations and mitigation recommended.

Riparian vegetation

Effects and mitigation for impacts on riparian vegetation will be considered at detailed design, for those corridors that have impacts on streams. Where there is a known impact on riparian vegetation due to a crossing or culvert design, suitable space for future mitigation planting has been included in the designation footprint, however mitigation will be confirmed under future regional consents.

23.5 Summary of Māori culture, values and aspirations

Te Tupu Ngātahi has engaged with manawhenua from the commencement of the Te Tupu Ngātahi programme, through corridor identification, development and NOR preparation. The extended and / or

upgraded transport corridors do not directly impact on AUP:OP mapped sites of significance, however there is the potential for impacts on cultural values to the natural environment and cultural landscape context, identified through direct engagement with manawhenua.

Provision for cultural input and engagement will be enabled through the ULDMP and monitoring plans to manage adverse effects on cultural heritage and the potential for new archaeological discovery. The ULDMP will also consider how corridor features, which will be the subject of future regional consents, integrate with the corridor as a whole, including any proposed mitigation, and how the transport corridors can contribute to or reduce effects on the relevant cultural landscape.

24 Community

The NW Local Arterial Package will have impacts on the existing and future communities of Whenuapai, Redhills and Riverhead. This section of the AEE assesses the potential effects from changes to the local social and community facilities on existing and future communities.

It should be noted that the existing communities in the North West will undergo change as urbanisation occurs. Over the next 30 years an extra 100,000 people are expected to live in the area, along with 40,000 new dwellings and 20,000 new jobs.

Section 24 considers effects on the community generally. Specific effects on property and business are considered in Section 25 Property and Land Use.

24.1 Methodology

To determine the social and community impacts (effects) and an understanding of the existing and future communities, the following steps have been undertaken:

- A desk top research which included a review of:
  - The AUP:OP, Whenuapai Structure Plan (2016) and the Spatial Land Use Strategy – North West (2021) (Spatial Strategy)
  - Review of Te Tupu Ngātahi consultation and engagement feedback
  - Population and other growth statistics within the FULSS
- Online mapping
- Additional primary research included:
  - Site visits to each of the corridors
  - Engagement with Council Officers, the Local Board and a Member of Parliament
  - Discussion with landowners, the wider community, and partners and stakeholders at open days, meetings, hui and public consultation vents.

24.2 Positive Effects on Community

The proposed extension and / or upgrade of each transport corridor will:

- Provide certainty regarding the location of required transport infrastructure to support the planned growth in the North West, which will avoid build out into the corridor and subsequently reduce future community disruption, which would be greater if the routes were designated later over intensified land use
- Ensure that the corridors can be delivered in a way that supports their integration with surrounding land use and supports quality urban design outcomes for future communities
- Provide corridors aligned with Safe Systems and Vision Zero which enhances community health and safety, by minimising the likelihood of DSIs to users
- Improved connectivity through the North West area, including by active modes and public transport, to access:
- Employment opportunities, retail and services located within existing centres and business areas in Whenuapai, Hobsonville and Westgate, and future centres and business areas on FUZ land
- Social and community infrastructure, including schools (e.g., Whenuapai School on Brigham Creek Road, Hobsonville School on Hobsonville Road, St Paul's Primary School on Don Buck Road, Timatanga Community School on Māmari Road), recreational facilities (Massey Leisure Centre on

Don Buck Road, Fred Taylor Park and future sites within Whenuapai, Redhills North and Riverhead.

24.3 General Construction Effects

Construction of the transport corridors will not occur simultaneously and is likely to be staged in line with urbanisation demand from growth areas. This means residents will be exposed to construction effects over different times and varying levels of directness. Similar construction effects are anticipated along urbanised corridors, potential effects include:

- Disruption of normal business
- Alteration or limitations to existing access for vehicles, pedestrians, or cyclists
- Changes to normal traffic flows because of route diversion
- Capacity and speed restrictions
- Changes to amenity

In terms of impacts on existing communities, it should be noted that for corridors (or sections of corridors) on FUZ land there is likely to be change in the community once urbanisation occurs. In these areas construction is anticipated to take place before or alongside urbanisation.

Construction will be undertaken in a staged and linear manner, limiting prolonged impacts on any businesses, community facilities and residential properties (excluding areas immediately adjacent to construction laydown areas which will be required for a prolonged period). Engagement with businesses can also limit the extent of impacts, by for instance identifying peak business hours or the timing of deliveries which construction works can be planned around, as far as is practicable.

Business and commercial

For existing businesses and commercial properties there is the potential for impacts from construction work along each corridor, these impacts include traffic disruption and impacts on visibility and accessibility, including for services and deliveries, of shops, office and other commercial areas. These impacts can be mitigated and / or managed via a Construction Environmental Management Plan and ongoing engagement with businesses and the wider community, via Community Consultation Plan.

For businesses and commercial properties that fall entirely within the designation footprint these businesses will be acquired to allow the upgrade of the corridor. The landowners of these businesses will have recourse through the PWA, communication with the impacted businesses will be required to allow them to plan ahead. In terms of the wider community, while they will no longer have access to the displaced businesses, they will have access to new businesses and centres as the FUZ areas urbanise.

For businesses and commercial properties, where the designation extends along the frontage of sites, access will be re-instated with temporary access arrangements identified as part of a CTMP (if required). Land required for the construction of the road will be made good and returned once the road upgrades are complete.

Where a partial acquisition of a site is required communication with the landowner and occupier will be required to discuss the ongoing operation of the site. Depending whether the partial acquisition will impact on the operation of the business, landowners may have recourse through the PWA.

Disruption can be managed through the CEMP and CTMP, implementation of recommendations from the Specialist Assessments, including the CNVMP, to manage amenity impacts and communication with stakeholders/operators to ensure work is undertaken in a way which minimises impacts, e.g., avoiding construction servicing and deliveries during peak school drop off / pick up times.

24.4 Construction Effects on Whenuapai Community

The Whenuapai area is predominantly FUZ with existing urbanised for extended sections on the north side and along the length of the south side of Hobsonville Road, the area around the Whenuapai Centre on Brigham Creek Road and Māmari Road intersection.

Commercial facilities

The works occur outside frontage of several businesses in Whenuapai, however impacts are generally limited to canopies. Along Hobsonville Road, there are multiple commercial facilities (such as supermarkets) and whilst community access will be disrupted during works this can be managed.

Community facilities

There is the potential for disruption to community facilities and social infrastructure from construction works on specific corridors. Key community facilities and social infrastructure are identified in Table 24-1.

Table 24-1: Whenuapai – key community facilities and infrastructure

Corridor	Asset	Commentary on the potential impact
Brigham Creek Road	• Open Space - Informal Recreation Zone (Corner of Brigham Creek Road and Totara Road)	• The upgrade of Brigham Creek Road will impact the frontage of the Whenuapai Settlement Playground Open Space. Active mode facilities will be upgraded along the Brigham Creek Road and Totara Road frontage to integrate with the wider network. The remainder of the open space and playground will not be impacted.
Hobsonville Road	• Hobsonville School (104 Hobsonville Road) • Hobsonville Point Secondary School (70 Hobsonville Point Road) • West Harbour Fire Station (21 Hobsonville Road)	• The upgrade of Hobsonville Road will impact on the frontage of the school, including a limited number of car parking spaces, the building and the remainder of the site are not impacted. • The Hobsonville Point Secondary School buildings will not be directly impacted. A stormwater pipe is proposed across an area of open space within the school site. The pipe is to serve a stormwater pond to the north of the school. • Upgrades to road reserve and access ties ins necessary.
Māmari Road	• Timatanga Community School (9 Māmari Road)	• The upgrade of Māmari Road will impact on the frontage of Timatanga Community School, the building and the remainder of the site are not impacted.

Residential

Existing and future residents will experience temporary disruptions to traffic, access restrictions or diversions due to construction works on each of the corridors. Along Hobsonville Road in particular a

number of driveway tie-ins are required to be modified to achieve adequate levels between private property and the road corridor. This will result in temporary disruption to each site as the works are carried out. These effects can be managed by a CTMP.

There is the potential for amenity impacts during the period construction works occur in proximity to residents. These can be mitigated and / or managed via the CNVMP (which will include measure to minimise the impacts on residents, as far as practicable), complaints processes and ongoing and proactive communication, via the Stakeholder Communication and Engagement Management Plan (SCEMP).

24.5 Construction Effects on Redhills Community

The Redhills Package includes upgrades to Don Buck Road and Fred Taylor Drive. Both propose upgrades to existing arterials routes that run through predominantly urban environments, with the northern section of Fred Taylor zoned FUZ. Together the two routes form a key north-south route parallel to SH16 and SH18.

Unlike Whenuapai, the majority of the Redhills area is live zoned, with residential uses to the west and industrial and commercial zoning on the east. The area of FUZ in the northern section of Fred Taylor Drive has yet to be structure planned and so its land use future is unconfirmed. Construction and operation of the corridors is anticipated to take place in this urban environment.

Commercial facilities

There will be impacts on the existing industrial and commercial area at Don Buck Road, with the corridor fronting onto the sites. The majority of these properties except 3/575 Don Buck Road have access from the rear at Cabernet Crescent, Pinot Lane and Cellar Court as alternative access which will reduce dependence on Don Buck Road. Direct impacts are relatively limited with changes to the access tie ins. The upgrade of the roundabout at Fred Taylor Drive into a signalised intersection will require rerouting of traffic during construction and changes to how community uses the space, however over time the new arrangement will be known to the community.

Along Fred Taylor Drive limited widening works will be carried out, with permanent works within the existing designation. This is not expected to result in business displacement or loss.

Community facilities

Disruptions to the way people use the public spaces may occur as construction reduces recreational amenity or ease of access. Along Don Buck Road existing community facilities include a local school at 490A Don Buck Road, Churches and Massey Leisure Centre as key community focal points. Although the works will have limited direct impact on these facilities, during construction access may be altered or limited which can decrease patronage through inconvenience or changing normal operating amenity. St Pauls School has two access options along Don Buck Road, giving more flexibility to manage construction impacts, the school is also reasonably set back from the road. Similarly, Massey Leisure Centre main access is off Westgate Drive which has been provided for in the proposed road upgrade, see Table 24-2.

Fred Taylor Drive has few community facilities along its length, the main facility being Fred Taylor Park at the northern end which is outside of the proposed designation footprint.

Table 24-2: Redhills – key community facilities and infrastructure

Corridor	Asset	Commentary on the potential impact
Don Buck Road	• St Paul's School (498 Don Buck Road) • Westridge School (488e Don Buck Road) • Jehovah Witness Hall (513 Don Buck Road) • Massey Leisure Centre (Corner of Don Buck Road and Westgate Drive)	• The upgrade of Don Buck Road will have limited impact on St Paul's School and Westbridge School. • The Jehovah's Witness Hall will require the vehicular access / driveway to be re-instated but can otherwise remain operational. • There is an access to Massey Leisure Centre affected on Don Buck Road, but the main access on Westgate Drive and the car parking is not affected. The impacted access should be considered in the CTMP.

Residential

Existing and future residents will experience temporary disruptions to traffic and access restrictions or diversions due to upgrades and intersection works. This may impact the way they travel to work, existing and proposed, recreation and around their neighbourhood. Community use and access of Fred Taylor Drive and Don Buck Road will be restricted during construction, causing temporary inconvenience to users. The amenity of residential areas and social may be temporarily reduced due to dust and noise from construction.

24.6 Construction Effects on Riverhead Community

In Riverhead, Coatesville-Riverhead Highway is predominantly a rural corridor (and will remain rural under the AUP:OP) with the exception of the existing urban and FUZ to the north of the corridor.

Community Facilities

As the area is predominantly rural, there are few community facilities affected along the corridor and no sites required in full, with works relatively limited.

Table 24-3: Riverhead – key community facilities and infrastructure

Corridor	Asset	Commentary on the potential impact
Coatesville Riverhead Highway	• Hare Krishna School (1229 Coatesville-Riverhead Highway)	• The upgrade of Coatesville Riverhead Highway will impact the Hare Krishna School site; however the closest building is 18m from the corridor.

Commercial facilities

As the area is predominantly rural, there are fewer community commercial sites affected along the corridor and no sites required in full, with works relatively limited. Two key business impacted are Huapai Golf course (1261 Coatesville-Riverhead Highway) and Hallertau Brewery (1169 Coatesville-Riverhead Highway) The works will impact the Huapai Golf Course entrance and frontage, however, do not impact the main buildings. Similarly at the brewery, works have minor changes to the site frontage and parking, but no buildings are impacted.

Residential

Existing and future residents will experience temporary disruptions to traffic and access restrictions or diversions due to upgrades and intersection works. This may impact the way they travel to work,

existing and proposed, recreation and around their neighbourhood. Community use and access of Coatesville-Riverhead Highway will be temporarily disrupted. The amenity of residential areas and social may be temporarily reduced due to dust and noise from construction. However fewer receivers are immediately adjacent and along the rural majority, set back from the corridor.

24.7 Assessment of Operational Effects on Community

Overall, the projects are anticipated to have significant positive effects on the future community in which they will operate. The extension and / or upgrades of the corridors will improve connectivity within Whenuapai, Redhills and Riverhead, assisting people to move freely around the area. In particular, the provision of safe, separated active mode facilities on each road will assist the local community in accessing their daily needs and activities, as well as providing for exercise and recreation. The extensions and / or upgrades will support mode choice for the community, i.e., shifting from private cars to active modes and public transport.

Where on-street car parking is impacted this will be mitigated by the provision of active mode facilities and the provision of facilities to support public transport. This will provide the opportunity for people to access facilities, business and other areas within the local community, via modes other than driving. This also applies to the Whenuapai town centre on Brigham Creek Road, where on-street car parking will be rationalised, this aligns with the Draft AT Parking Strategy which identified a number of North West corridors (including Brigham Creek Road, Hobsonville Road, Don Buck Road, Fred Taylor Drive) as part of the strategic transport network, where general vehicle parking is the lowest kerbside space priority.

There are no existing requirements for minimum parking to be provided under the AUP:OP, other than for accessibility (e.g., disabled) parks. Where private parking areas are permanently affected, this is considered a property matter and will be addressed through the PWA process.

24.8 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

Construction Effects

It is anticipated that community effects during the construction of the extended and / or upgraded corridors will be temporary and able to be minimised. A SCEMP will be prepared prior to the start of construction to identify how the public and stakeholders (including directly affected and adjacent owners and occupiers of land) will be communicated with throughout the construction works. Ongoing communication with the business community, schools and public facility operators (e.g., Massey Leisure Centre) will occur to meet business and recreation requirements and manage potential impacts.

Access and trip disruption including measures to avoid disruptions at peak travel times or school pickups and drop-offs will be managed by the CTMP and SCEMP proposed as conditions. This will allow the contractors to identify movement and access requirements of residents and businesses along the corridor and enable alternate access or access at peak times and minimise trip disruption where practicable. Access to community resources including churches, parks and Massey Leisure Centre will be maintained.

Construction effects on amenity values of property and recreation areas can be managed by engagement with corridor residents and stakeholders (identified through the SCEMP), noise management (CNVMP), and the overall CEMP to manage potential effects.

Operational Effects

Significant positive effects are anticipated from the operation of the transport corridors therefore no mitigation is required. The implementation of mitigation measures identified in the Operational Noise Assessment allow noise impacts to be appropriately managed. Additionally, the implementation of an upgraded corridor informed by measures within the ULDMP, will not only mitigate effects but enhance the appearance of corridors.

24.9 Summary of Effects on the Community

The extension and / or upgrade of each corridor will provide significant positive effects to the community in which it will operate. The corridors will support planned urban growth and will have significant safety and transport benefits providing a safe and resilient connection that provides for active transport and public transport connections. Transport corridors will also improve community cohesion and access to community resources.

The adverse construction effects can be managed with the development and implementation of the appropriate management plans and mitigation measures outlined above and communication with the community and affected landowners and occupiers. Where construction effects cannot be fully mitigated, they can be managed through discussions with the affected parties.

25 Property and Land Use

25.1 Methodology

The NW Local Arterials Package has sought to reduce potential adverse effects on existing private properties and businesses through alignment and corridor design, where practicable, while acknowledging the planned urban growth will result in substantial changes to the area over the next 10-20 years. The assessment has included specific consideration of the potential property and business impacts in the assessment of alternatives, as detailed in Appendix A. Efforts have been made through engagement with affected stakeholders to refine the corridor design and the proposed designation footprint.

This section relates to directly affected properties and landowners where impacts cannot be avoided. Potential effects on properties and businesses affected by proximity to the transport corridors have been discussed in Section 24 Community .

The NW Local Arterial Package proposes to designate land to provide a sufficient footprint to enable the construction, operation and maintenance of the extended and / or upgraded transport corridors. Private properties directly affected vary across the corridors between primarily rural, rural-residential, open space/reserve and commercial/industrial land use. A detailed description of the existing land use of the land adjacent to the transport corridors is provided in AEE Part A.

25.2 Positive Effects

The proposed extension and / or upgrade of each corridor will support the intensification of land, in line with the AUP:OP in the following scenarios:

- Where the land is currently undeveloped live zoned land on Hobsonville Road and west of Don Buck Road
- Redevelopment and intensification may also occur as a result of the NPS-UD, enabling greater density. Auckland Council's Plan Change 78 (Intensification), in response to the NPS-UD and Medium Density Residential Standards, is applicable to sections of Māmari Road, Brigham Creek Road, Hobsonville Road and Don Buck Road (see Section 28 for detailed NPS-UD analysis and AEE Part A for receiving environment impact)
- In FUZ areas impacts on land and existing property can be viewed in the context of a changing environment from greenfield to urban with increased density of development.

25.3 Post-Designation Confirmation Effects

The proposed designations have lapse durations ranging from 15 to 20 years. This is to provide a sufficient timeframe to enable the construction of each of the corridors in response to the progressive urbanisation of the FUZ areas and to align with planned release of land and funding for the corridors (see AEE, Part A Section 5 for lapse date discussion).

When considering an extended lapse period, it is appropriate to balance the need for that lapse period against the potential prejudicial or "blighting" effects resulting from restrictions on private property in the proposed designation footprints, prior to construction of the corridors. 'Blight' is characterised as 'the harmful effects of uncertainty about likely restrictions on the types and extent of future development in a particular area on the quality of life of its inhabitants and the normal growth of its

business and community enterprises'. An extended lapse periods effects are generally associated with a lack of certainty as to:

- When construction will commence;
- How long an affected party will be subjected to construction effects and the degree to which they will be affected by those effects; and
- The form of the potential effects of the future operation of the designation.

Notwithstanding any mitigation proposed, the significance of potential effects resulting from this lack of certainty is generally proportional to the length of the lapse period. In other words, a longer lapse period can create uncertainty for a longer period of time than a shorter lapse period.

In the absence of a specific construction commencement date, and other precise information regarding construction duration within any specific area, we consider that the most workable method for managing any outstanding uncertainty associated with the lapse period being sought is ongoing communication and we discuss the adequacy of proposed conditions (including those relating to ongoing communication) in more detail below.

Project delivery timeframe uncertainty

The proposed designations will provide long term certainty regarding the alignment of each corridor and the future transport network as a whole. This will inform directly impacted landowners' and future residents' future investment and operational decisions about how land may be impacted. In order to manage uncertainty of restrictions and project delivery timeframes for individual properties AT will establish information platforms following confirmation of the designations and before construction starts to inform owners of project progress.

Landuse and the section 176(1)(b) process

The proposed designations will not preclude the continued (unchanged) use of any directly affected properties prior to construction. However, in accordance with section 176(1)(b) of the RMA, anyone (other than a requiring authority with an earlier designation) is restricted from carrying out work on the designated land that would prevent or hinder the designated work without first obtaining the requiring authority's written consent. For properties partially designated, those areas outside the designation are not required to obtain written consent.

Where feasible, AT will work with landowners and developers through the section 176(1)(b) process to help them integrate earthworks, road upgrades (or extensions to roads), stormwater solutions and development so that those works will not prevent or hinder the work authorised by the proposed designation, and to enable written consent to be provided. For those properties adjacent or in proximity to the proposed designations, before implementation of the extended and / or upgraded corridors, urban development and investment can continue to occur, informed by the designation.

Where landowners contact AT in advance of the property acquisition process AT will engage with those owners and refer them to public information on the PWA[26] process and ATs timeframes for the corridor delivery.

[26] https://www.linz.govt.nz/regulatory/15703#:~:text=The%20Public%20Works%20Act%201981%20(PWA)%20sets%20out%20the%20procedures,the%20process%20of%20land%20acquisition.

25.4 Effects during and post construction

Land impacted permanently

Land required for the ongoing operation and maintenance of each corridor will be acquired typically in a period of 2-3 years leading up to main construction. The PWA is the legislative framework under which entitled landowners will receive compensation. This is a non-RMA process.

Land impacted temporarily

The proposed designations include land required for temporary construction and permanent works. These areas are shown as indicative in the NOR plans and will not be confirmed until detailed design.

If temporary occupation of the land is required at construction, it will typically be leased. Potential effects from the temporary lease / use of land within the proposed designations include:

- Disruption to business access and parking
- Disruption to farm activities, temporary loss of grazing pasture, stock-proof fencing (given the proposed urbanisation in Redhills North and Whenuapai, this is most likely to be an issue on the rural section of Coatesville-Riverhead Highway)
- Changes to driveways including gradient or alignment, loss of yard vegetation and construction impacts (including noise and vibration, and visual amenity). Note where driveways are required to be re-graded the driveways have been included within the designation.

Post Completion

On completion of the works:

- Private land not required for on-going operation, maintenance or effects management will be reintegrated in coordination and discussion with directly affected landowners. This may include the reinstatement of private driveways, parking, fences, gardens, and yards, and re-integrating construction areas (e.g., batters, stormwater wetlands) with the surrounding landform
- As per section 182 of the RMA, the designation footprint will be reviewed upon completion of the project and will be uplifted from those areas not required for the on-going operation, maintenance or effects mitigation associated with corridors.

Refer to Volume 3 Drawings for the NOR footprint of each corridor.

25.5 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

Land use uncertainty and property impacts

Following confirmation, establishing a project website or other suitable information source with information on the Project such as status and anticipated construction timeframes.

As requested, additional measures for landowners available include:

- Provide information on the section 176(1)(b) process and a AT contact details to support the integration of development with the extension and / or upgrade of each corridor, where practicable
- Provide information on the PWA to address uncertainty on landowners, noting that the PWA is a non-RMA process.

Implementation of a SCEMP will occur prior to the start of construction to identify how the public and stakeholders (including directly affected and adjacent owners and occupiers of land) will be communicated with before and during construction works. Including:

- Determine adequate notice periods for the commencement of construction activities and works that affect access to properties
- Identify appropriate communication channels to support property owners and occupier to understand and plan around works, (such as a project website). The selected communication channels will include:
- Inform parties of the expected timing, duration and staging of works
- Type and nature of effects to be anticipated and regular updating of progress
- Provide avenues for feedback, inquiries and complaints during the construction process.

Access

Disruption to traffic and transport patterns will be managed via the implementation of a CTMP, the CTMP will include methods to:

- Maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be practicable
- Communicate traffic management measures to affected parties.

Noise and Vibration

Reductions in amenity from noise and vibration disturbing normal residential and business use will be managed by implementation of a CNVMP, the CNVMP will include methods to:

- Communicate and engage with nearby residents and stakeholders
- Minimise construction disruption for affected properties during construction
- In addition to a CNVMP, it may be necessary to produce site specific or activity specific Construction Noise and Vibration Management Schedules where noise and/or vibration limits are predicted to be exceeded for a more sustained period or by a large margin.

Construction activities

Construction activities can be expected to temporarily reduce amenity, effects such as dust, graffiti etc will be managed and minimised through implementation of a CEMP. At detailed design stage:

- Engage with affected parties on ATs approach to temporary and permanent land impacted (including any leasing or acquisition required, covered under the PWA).

Land re-integration

Where property features are damaged, features will be re-instated, as far as practicable, including private driveways, parking, fences, gardens, and yards, and re-integrating of construction areas with the surrounding landform. This will be discussed at the time with those landowners and follow those provisions under the PWA. Once project completed:

- Review of the designation footprint as per section 181 of the RMA, to review any areas no longer required for the Project.

25.6 Summary of effects on property, business, and amenity

The extended and / or upgraded transport corridor can be expected to have a range of effects on normal property and land use activity from confirmation. These include the restrictions imposed on private property through the duration of the designation on site, and uncertainty this can create for landowners. Before and during construction, effects will include changes to the existing environments amenity, disturbance to enjoyment whilst works are carried out, as well as direct permanent changes to private property in some cases.

Prior to construction, measures are proposed which will alleviate the associated uncertainty for landowners and enable those activities in the interim, which will not prevent or hinder the projects. Measures have also been proposed to manage effects of the works during construction and suitable RMA management plans are proposed to enable this. Property impacts outside the scope of the RMA will be managed under other legislative processes, as appropriate.

Given the proposed mitigation, it is considered that effects on property, business and amenity will be appropriately managed.

26 Urban Design Evaluation

This urban design evaluation (UDE) provides an overview of the urban design considerations and inputs for the NW Local Arterials Package as well as the evaluation and identification of future transport and land use integration outcomes and opportunities.

The UDE 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. The recommendations are summarised as urban design outcomes sought and where additional urban design opportunities have been identified during the evaluation, they are identified 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.

26.1 Methodology

The UDE provides an evaluation based on the guidance and principles established in the Te Tupu Ngātahi Design Framework (Design Framework). It provides urban design focused commentary on the proposed corridor design and recommends the framework for how and where any urban design outcomes should be considered in future design stages.

The Design Framework takes a systems approach as the basis on which urban areas are organised and understood and considers these in 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 (as part of the Design Framework) within these layers to provide high level guidance (appropriate to the NOR stage) 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.

26.2 Strategic Plans, Policies and Design Guidance

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-UD, Government Policy Statement (GPS) on Land Transport, Medium Density Residential Standards (MDRS), NZ Transport Agency Bridging the Gap, Regional Land Transport Plan); and
- Local level (e.g. Auckland Plan 2050, Auckland Transport Alignment Project (ATAP), AT Roads and Streets Framework, Transport Design Manual, AUP:OP, 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.

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-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, have compact urban forms, a strong sense of place and a community focal point.

Auckland Council

At a local level, the key urban design considerations and provisions of the AUP:OP relevant to the Project include Policies B2, B3, B4, Chapter H, Chapter I.

The specific urban design commentary within the corridor evaluations (outlined in the sections below) broadly address the objectives and policies of the relevant sections of the Regional Policy Statement and Chapters of the AUP:OP 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 in the Design Framework.

26.3 Urban Design Evaluation

Table 26-1 provides an evaluation of the current design against the Te Tupu Ngātahi Design Framework principles. The table applies to all proposed transport corridors, where features are specific to certain transport corridors these are stated.

Table 26-1: Urban Design Evaluation for NW Local Arterials Package

Principle	Explanation
ENVIRONMENT	
1.1 Support and enhance ecological corridors and biodiversity	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors
• The proposed arrangement and alignment of each of the extended and / or upgraded transport corridors provide sufficient spatial provisions to support ecological connectivity and biodiversity in the local environment by providing contiguous space for a diverse planting response. • The proposed arrangement of Māmari Road has spatial provision to support ecological connectivity including riparian margins and/or wetlands around Sinton and Pikau Stream crossings.	

Principle	Explanation
1.2 Support water conservation and enhance water quality in a watershed	Consider and work with the existing watershed as part of a whole system.
• The proposed corridor cross sections allow spatial provisions to provide natural drainage to stormwater ponds to address water quality and reduce hard engineering solutions. Water quality and detention/retention will be decided in future regional consents. • Further refinement of the ponds is recommended to define the interface with the surrounding land uses as well as exploring opportunities to be a part of an integrated system. For example, the ponds, if practicable, should be configured in a naturally shaped manner and fully integrated with existing natural drainage features and vegetation. • The proposed corridor cross sections allow spatial provisions to provide stormwater management systems such as swales and raingardens. Stormwater ponds have been identified for each corridor. • The proposed Spedding Road arrangement minimizes effects on Totara Creek. There is opportunity to incorporate hydrologically sensitive design into the infrastructure to limit the effects on downstream ecology and to improve connectivity in the detailed design.	
1.3 Minimise land disturbance, conserve resources and materials	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.
• The corridor concept design generally utilises existing corridors and demonstrates a close and connected alignment to the existing landform, generally balancing earthworks while minimising unnecessary disturbance and materials. • Where significant earthworks batters are likely (such as at State Highway bridges), the detailed design should consider how to minimise earthwork extent and integrate with future urban environment. • The proposed transport corridors demonstrate a generally efficient alignment in relation to existing property boundaries along the corridor minimising land impacts and inefficient residual land portions. The ULDMP identified measures to re-instate private property boundary treatments and to re-integrate construction areas with surrounding development. • Vertical integration of the bridging structures over waterbodies and the approach has considered future flood level by raising bridge structures. • If practicable, opportunities will be explored at future detailed design stages to integrate residual land around the dry stormwater ponds and stormwater wetlands with the adjacent land uses.	
1.4 Adapt to a changing climate and respond to the microclimatic factors of each area	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.
• Each extended and / or upgraded corridor adopts a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice. • The proposed corridor design provides for street tree planting that, when delivered will contribute to reducing urban heat island effects in the future urban area where 'islands' of higher temperatures can be caused by high concentrations of structures such as buildings, roads and infrastructure in one area. • Each corridor provides for active modes to support modal shift. • Further details and definition at future design stages for the proposed amenity planting and water sensitive design elements is an opportunity to demonstrate consideration of this principle.	
SOCIAL	
2.1 Identity and place	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

Principle	Explanation
	the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.
• 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. • In future design stages, Manawhenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values. • 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, urbanised spaces and plazas and vegetation appropriately scaled to built form. • There is opportunity to improve connectivity to and interface with local waterbodies to enhance their distinctive landscape qualities (character drivers) for the community, such as the Rāwiri Stream (crossed by Spedding Road). • Aside from Hobsonville Road and Don Buck Road, proposed transport corridors pass through a largely greenfield environment and while this is planned for urbanisation, the interim design has spatial flexibility that is capable of responding to a range of characteristics that may arise from this change. • Trig Road (North) and Brigham Creek Road's proximity to the RNZAF airbase provides opportunities for broader character drivers for the corridors. • Māmari Road's crossing of Sinton Stream which provides the opportunity to respond to this ecological corridor in combination with identity around the Timatanga School. • The Hobsonville Road corridor maintains the residential character on the southern side of Hobsonville Road and has greater potential to be integrated into the future land use scenarios on sites which have not been developed or consented within the Hobsonville Road Corridor. • Coatesville-Riverhead Highway has additional land for green infrastructure reflecting the rural character of the corridor.	
2.2 Respect culturally significant sites and landscapes	Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.
• Don Buck Road and Fred Taylor Drive follow an important ridgeline that was a historic walking trail, and the intersection is the site of a historic strategic pā (Pukewhakataratara), both have High cultural value. The pā site is heavily modified and will be further impacted by the intersection works. • Section 23 sets out how manawhenua feedback has informed the development of the corridors. In future design stages, Manawhenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.	
2.3 Adaptive corridors	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.
• The proposed corridor has the spatial provisions to be flexible, re-configurable and adaptable at a detailed design stage for changing contextual needs. • The interim design 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.	
2.4 Social cohesion	Provide clear, effective and legible connectivity between community and social functions.
• Further development at a detailed design stage of midblock crossings near centres will support local connectivity and cross corridor access to destinations.	

Principle	Explanation
• The proposed corridors can deliver a positive contribution to the sense of belonging and participation, as well as community resilience by supporting access to community facilities such as town centres, playgrounds, parks and local schools, located in Whenuapai, Redhills and Riverhead. • Māmari Road upgrade provides the potential at detailed design stage to improve the interface and permeability across the multi-adjacent land uses; namely the planned business use, local centre, the northern residential housing and the Timatanga Community School. • Hobsonville Road 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 the Hobsonville Town Centre and the Hobsonville Primary School.	
2.5 Safe corridors	Provide a safe and convenient network of routes accessible to people of all ages and abilities.
• The proposed corridors will accommodate the universal design approach and accessibility to all parts of user journeys. • 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. • Further development at a detailed design stage of the final active mode crossing points across the intersections will reinforce the sense of personal safety.	
BUILT FORM	
3.1 Align corridors with density	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.
• The proposed corridors provides an even and easy access network for the proposed growth areas around Whenuapai, Redhills and Riverhead, supporting future urban land uses adjacent to the corridors. • The alignment and arrangement of the proposed corridors provide a safe, connected walking and cycling network, and proximity to public transport.	
3.2 Corridor scaled to the surrounding context and urban structure	Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).
• 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 and the provision of mixed mode travel.	
3.3 Facilitate an appropriate interface between place and movement	Facilitate the opportunity for place as well as movement in corridors (people-oriented streets).
• The proposed corridors provide the opportunity for place as well as movement function, for example by separated active mode facilities, potential road median spaces that provide safe waiting zones for pedestrians. • The proposed corridor cross section also provides flexibility in supporting appropriate public-private interfaces and connectivity at a pedestrian level, for example direct pedestrian access from future development with FUZ areas is accommodated and encouraged by placing pedestrian circulation closest to the transport corridor boundary. • Pedestrian permeable interfaces or active frontage interfaces are supported where adjacent to the future urban areas.	

Principle	Explanation
MOVEMENT	
4.1 Connect nodes	Provide tangible connectivity between identified activity nodes.
• The Trig Road (North) and Brigham Creek upgrades provide tangible and direct connectivity between complementary destinations in Whenuapai local centre and adjacent community facilities. • The Māmari Road upgrade provides a direct link and a FTN bus link with public transport priority lanes to connect commuters from Whenuapai to Westgate and to the future City Centre to Westgate rapid transit station. • The Spedding Road extension and upgrade enables east-west connection and also to future bus station on SH18 and integration with this facility. • The Hobsonville Road upgrade provides enhanced connectivity between complementary destinations in Hobsonville Point, Hobsonville centre, Westgate, and Whenuapai via Brigham Creek Road and Spedding Road. • The Don Buck Road and Fred Taylor Drive upgrades provide enhanced connectivity between complementary destinations in Redhills, Westgate, Whenuapai and Kumeū-Huapai. • The Coatesville-Riverhead Highway upgrade enables connectivity between Riverhead and the wider North West.	
4.2 Connect modes	Provide for choice in travel and the ability to connect at interchanges between modes.
• The extended and / or upgraded transport corridors will provide simple but complete connectivity for all modes (walking, cycling, public transport and private vehicle). • Further consideration of how the network can connect with adjacent FUZ and future active mode network is an opportunity as detailed design progresses.	
4.3 Support access to employment and industry	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.
• The Trig Road (North) and Brigham Creek upgrades provide direct and legible access to the employment opportunities within the Whenuapai local centre as well as connection to future employment areas. • The Spedding Road extension and upgrade enables active mode and public transport connectivity between residential land use in Hobsonville and employment land use in Whenuapai. • The Māmari Road upgrade provides access to the employment opportunities in Westgate, via the future Northside Drive extension (Designation 1473), and to existing and future employment areas in Whenuapai. • The Hobsonville Road upgrade provides direct and legible access to the employment opportunities within the Hobsonville area as well as connection to future employment area via Spedding Road and Trig Road (North). • The Don Buck Road and Fred Taylor Drive upgrades enables active mode and public transport connectivity between Redhills and Whenuapai to employment area of Westgate. • The Coatesville-Riverhead Highway upgrade provides direct and legible access to employment areas throughout the North West.	
4.4 Prioritise active modes and public transport	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.
• The proposed corridors accommodate high-quality active travel facilities, for example separated pedestrian and cycle pathways. • 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.	

Principle	Explanation
• The cross section proposed for the corridors accommodates high-quality public transport and active travel facilities, for example separated pedestrian, cycle pathways and bus routes.	
4.5 Support inter-regional connections and strategic infrastructure	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, wastewater, water) to the network.
• The Trig Road (North) corridor provides a north-south connection for all modes within Whenuapai and access SH18 and local destinations such as Hobsonville and Whenuapai. • The Brigham Creek Road corridor provides an east-west connection for all modes within Whenuapai and access SH16, SH18 and local destinations such as Hobsonville and Kumeū-Huapai. • The Spedding Road corridor provides direct connection to Fred Taylor Drive and Hobsonville Road and connection through Trig Road (North) to Brigham Creek Road and Hobsonville. • The Hobsonville Road corridor provides a connection for all modes within Hobsonville and access to SH16, SH18 and local destinations such as Redhills and Whenuapai. • Don Buck Road and Fred Taylor Drive provide a north-south connection for all modes and access SH16 and local destinations such as Redhills and Whenuapai. • The Coatesville-Riverhead Highway corridor provide a connection for all modes between Riverhead to SH16 and the wider North West.	
4.6 Support legible corridor function	Consider how areas can be clearly navigated and understood by users moving from place to place.
• The proposed corridors accommodate a range of modes with clear allocation of street spaces, and inherently supports future community connectivity, mobility and travel choice. • Further development of the intersection crossings at the detailed design stage will provide safe, clear and legible cross corridor access and connectivity between future development areas.	
LAND USE	
5.1 Public transport directed and integrated into centres	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.
• The Māmari Road, Hobsonville Road, Don Buck Road and Fred Taylor Drive upgrade can accommodate future FTN transport stops. All other corridors are able to accommodate future local public transport stops.	
5.2 Strategic corridors as urban edges	Strategic corridors as potential definers of a land use edge.
• This principle is not relevant to the proposed NW Local Arterial Package as corridors are not definers of land use edge.	

26.4 Summary of Urban Design Evaluation and Recommendations

The proposed corridors within NW Local Arterials Package are generally supportive of the Te Tupu Ngātahi Design Framework. A summary of the recommended urban design outcomes and opportunities are outlined in Table 26-1. These are recommended to form part of the ULDMP) in future delivery stages. This will ensure the detailed design of each corridor responds appropriately to the principles and the project specific outcomes sought.

The ULDMP should address the following Project specific outcomes:

ENVIRONMENT

- A landscape plan that considers recommendations from the landscape and visual, arboriculture, flooding and ecological assessments including street tree and stormwater raingarden and wetland planting, construction compound and private property reinstatement and treatment of batter slopes. The landscape plan should also demonstrate integration of Sinton, Pikau, Waiarohia and Rāwiri Streams, Totara Creek and their tributaries where the corridor intersects with the existing Blue-Green Network. The landscape outcomes should support the principles of Auckland's Urban Ngahere Strategy and 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 raingardens and 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.

SOCIAL

- In future design stages, Manawhenua shall be invited to provide input on the cultural, landscape and design matters including how Project outcomes reflect their identity and values.
- The identification, development and integration of key local community and identity drivers within the NW Local Arterials Package should be demonstrated. Key local identity community functions to be addressed include:
    - Business – The General Business Zone, Business – Neighbourhood Centre Zone and Business – Light Industry Zones;
    - RNZAF Airbase and its associated Special Purpose Area;
    - The Hobson Centre and Memorial Park; and
    - Timatanga School;
- Key NW Local Arterials Package distinctive landscape character qualities of open spaces, stream and conservation zones including Sinton, Pikau, Waiarohia and Rāwiri Streams, Totara Creek and their tributaries.
- The proposed corridor alignment and function can deliver a positive contribution to the sense of belonging and participation, as well as community resilience by supporting direct access to existing local, neighbourhood and town centres, schools, community functions and open spaces. Key school, community and business functions within the NW Local Arterials Package to be addressed include:
    - The Hobson Centre and Memorial Park;
    - Timatanga School; and
    - The Whenuapai Settlement Playground.
    - A CPTED review of each NW Local Arterials Package corridor should address, at a minimum, the current identified CPTED risks including any isolated active mode corridor functions, any proposed underpass environments, any under bridge environments at the stream / creek crossings or bridges.

BUILT FORM

- Known or planned changes of land use and residential density that have the potential to alter the perceived scale and impact of the proposed corridor functions should be identified and addressed.
- Resolution of any potential conflict between placemaking aspirations within local communities and the scale and operating speed of the proposed movement functions of the corridors should be addressed.
- An urban interface approach within the corridor that:
    - provides an appropriate interface to the existing local, neighbourhood and town centres and enables buildings and spaces to positively address and integrate with the NW Local Arterials Package corridors;
    - 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; and
    - recognises the transition of densities from Residential – Terrace Housing and Apartment Building to Residential to Mixed Housing Suburban Zone 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.

MOVEMENT

- 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, connectivity demands, safety and modal priority for active modes should be addressed for intersections within NW Local Arterials Package corridors.
- A modal integration strategy that addresses the potential conflict between any proposed freight function of the corridors and placemaking opportunities arising from future growth.

LANDUSE

- Demonstration of how any residual land portions following the construction of the Project are redefined and integrated with the expected future land use function.

27 Proposed measures to manage adverse effects

The majority of adverse effects have been avoided and mitigated via alignment decisions and design choices. Where potential effects have not been designed out, measures are proposed to avoid, remedy or mitigate the potential adverse effects, these are summarised in Table 27-1 and included in the proposed conditions for each NOR as relevant.

Table 27-1: Summary of measures to avoid, remedy or mitigate potential adverse effects

AEE Section /Topic	Specific Measures
Traffic and Transportation	• Construction Traffic Management Plan (CTMP)
Traffic Noise and Vibration	• Application of AC-14 or equivalent low noise road surface has been recommended for each extended and / or upgraded transport corridor with additional mitigation for W2, W5 and RE1 to be considered
Construction Noise and Vibration	• Construction Noise and Vibration Management Plan (CNVMP) • Construction Noise and Vibration Management Schedule (Schedules)
Network Utilities	• Network Utility Operators (Section 176 Approval)
Natural Hazards	• Construction Environment Management Plan (CEMP) • Flood risk outcomes to be achieved at detailed design (demonstrated through the Outline Plan(s))
Terrestrial Ecology	• Pre-construction ecological survey • Bat Management Plan for W1, W2, W3, W4 and R1
Landscape and visual	• Urban Landscape and Design Management Plan (ULDMP)
Historic Heritage	• Historic Heritage Management Plan (HHMP) for RE2
Māori culture, values and aspirations	• Invitation to prepare a Cultural Advisory Report • Invitation to participate in development of the ULDMP • Preparation of a Cultural Monitoring Plan
Community Effects	• Stakeholder Communication and Engagement Management Plan (SCEMP) • Construction Traffic Management Plan (CTMP) • Construction Noise and Vibration Management Plan (CNVMP) • Construction Environment Management Plan (CEMP) • Urban and Landscape Design Management Plan (ULDMP) • Operational noise mitigations (as relevant)
Property, business and amenity	• Project information resource • Stakeholder Communication and Engagement Management Plan (SCEMP) • Designation boundary review under s181 of the RMA • Construction Traffic Management Plan (CTMP) • Construction Noise and Vibration Management Plan (CNVMP) • Construction Environment Management Plan (CEMP)
Urban Design Evaluation	• Urban Landscape and Design Management Plan (ULDMP)

28 Resource Management Amendment Act 2020

To date, the overlap between the RMA regime and climate change has been limited as sections 104E and 70A of the RMA have constrained the ability of local authorities to account for climate change considerations in exercising their roles and functions. However, the amendment to the RMA that came into effect on 30 November 2022 is intended to better align the RMA with the CCRA. The Resource Management Amendment Act 2020 repeals the restrictions under the RMA in relation to climate change with the following consequences:

- The repeal of section 104E means that effects on climate change of a discharge to air of greenhouse gases can in future be considered in the context of an application for a discharge permit or coastal permit to do something that would otherwise contravene section 15 or section 15B.
- The repeal of section 70A means that when making a rule to control the discharge into air of greenhouse gases a regional council may now have regard to the effects of such a discharge on climate change.
- An amendment to section 74(2)(c) means that when preparing or changing a district plan, a territorial authority must now have regard to any ERP or national adaptation plan made in accordance with the CCRA.

The above RMA amendments do not directly affect the North West Local Arterial Package NORs as no resource consent is sought or required for the discharge of contaminants to air. The control of discharges of contaminants into air remains a regional council function in accordance with s 30(1)(f) of the RMA. As such, the effects associated with a discharge to air will remain a regional plan matter. The proposed implementation timeframe for the NW Local Arterial Package (15-20 years) means that only designations are proposed at this stage and the designations will not authorise regional plan consenting requirements. Resource consents will be required in the future to authorise activities controlled under the regional plan matters of the AUP:OP or the relevant planning document that applies at the time of implementation.

29 Assessment against section 171 and Part 2

Section 28 follows the order of requirements under section 171(1) of the RMA, concluding with an assessment against Part 2 of the RMA. To reduce duplication, cross reference is made to the preceding sections of this report in addition to the Assessment of Alternatives, see Appendix A.

29.1 Section 171(1)(a) Relevant Planning Provisions

Section 171(1)(a) of the RMA sets out that a territorial authority in making a recommendation on a NOR must have particular regard to any relevant provisions of:

> *(i) a national policy statement:*
> *(ii) a New Zealand coastal policy statement:*
> *(iii) a regional policy statement or proposed regional policy statement:*
> *(iv) a plan or proposed plan*

Table 29-1 sets out the NW Local Arterials Package assessment against section 171(1)(a) in addition to those plans and strategies considered relevant matters under RMA section 171(1)(d). The assessment was undertaken by:

- **Reviewing:** Identifying within National Policy Statements and the AUP:OP the key objectives and policies relevant to the transport corridors

- **Grouping**: Where similar themes were identified across documents, provisions were grouped and assessed collectively. Similarly, where assessment against the relevant provisions of RMA planning documents is consistent between the NORs within the NW Local Arterials Package, a combined assessment is provided. The blue table sections set out each key theme
- **Bespoke**: Where required, bespoke assessment for each NOR is also provided.

Figure 29-1 shows the RMA Section 171(1)(a) planning documents considered.

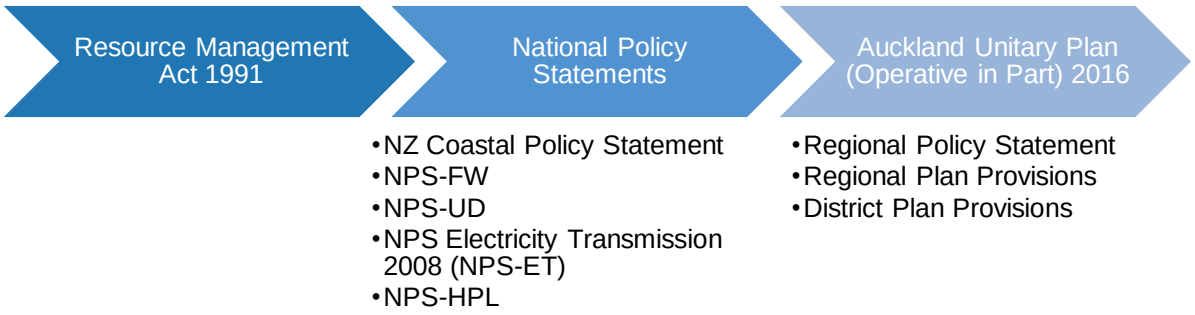


Figure 29-1: Statutory Framework Applicable to the NW Local Arterial Package

Table 29-1: Statutory Assessment

Applicable Notice	Key Objectives and Policies	Analysis
Urban growth and development capacity • Development capacity is planned and sequenced with infrastructure to meet the future needs of communities. • Urban growth and its associated infrastructure is provided for (and integrated) in appropriate locations, whilst recognising the values of highly productive rural land.		
All	NPS-UD Objective 1 & 6. Policy 1(c)(e)(f), Policy 6. AUP:OP [RPS]: B2.2.1(1), B2.4.1(6), B2.4.2(6), B3.2.1(5), B3.3.1(1)(b), B3.3.1(1)(c), B3.3.2(4)(b), B3.3.2(5)(a), B9.2.1(2) AUP:OP [DP]: E27.2(1), E27.2(2), E27.2(5), E27.2(6).	**Summary of Objectives and Policies** • The National Policy Statement on Urban Development (NPS-UD) seeks to ensure urban environments are well-functioning and enable all people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety. Within the NPS-UD Auckland is recognised as a Tier 1 urban environment and therefore is subject to a greater policy direction in terms of intensification and density of urban form. The NPS-UD directs that urban development is integrated with infrastructure planning and funding decisions and is strategic over the medium to long term. • The objectives and policies of the AUP:OP seek to provide sufficient feasible development capacity for housing with set dwelling targets over the next 30 years. In order to reach these targets adequate infrastructure must be existing or provided prior to or with development. • Provisions in Chapter E27 – Transport seek to ensure that land use and all modes of transport are integrated in a manner that realises the benefits of an integrated network and manages the adverse effects of traffic generation. **Assessment** • The objectives and policies emphasise the importance of providing short, medium and long term residential and business capacity. This includes medium and long-term strategic planning for urban development. The NW Local Arterials Package is consistent with these objectives and policies by providing for the necessary transport infrastructure to support the zoning of land in the North West future urban areas and the establishment of the necessary development capacity. This is becoming increasingly important as a result of private plan changes being lodged with Auckland Council and developer interest in the North West identified via engagement with developers and landowners. • Route protection will ensure that the necessary transport infrastructure is planned and identified in the AUP:OP to meet the feasible development capacity targets over the next 30 years. This will support integration with future landuse. • The NPS-UD and AUP:OP recognise the benefits of urban development where they contribute to peoples social, economic, cultural and environmental wellbeing. Of particular relevance to the NW Local Arterial Package is the requirement that: good accessibility is provided for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or

Applicable Notice	Key Objectives and Policies	Analysis
		active transport. The transport corridors will ensure land is protected to contribute to the accessible, high quality, effective, efficient and safe transport routes (including public and active transport modes) that support the movement of people, goods and services for the future urban areas in the North West. **Conclusion** Each of the transport corridors within the NW Local Arterials Package give effect to these objectives and policies by protecting corridors to deliver an accessible, high quality, effective, efficient and safe transport system to positively contribute to, and support, quality, connected urban environments.
Enabling Infrastructure • Infrastructure is enabled and where appropriate protected. • Benefits of infrastructure are recognised while adverse effects are avoided, remedied or mitigated.		
All	AUP:OP [RPS]: B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.1 (4) B3.2.2(1), B3.2.2 (3) B3.3.1(1), B3.3.2(1), B3.3.2(3). AUP:OP [DP]: E26.2.1(1), E26.2.1(2), E26.2.1(4), E26.2.1(9), E26.2.2(4),	**Summary of Objectives and Polices** • Objectives and policies in the Regional Policy Statement (RPS) Chapter B3 of the AUP:OP recognise the importance infrastructure plays in realising Auckland's economic potential. This includes integrating the provision of infrastructure with urban growth, avoiding incompatible land uses and increasing resilience. The policy direction recognises the importance of the transport network in the movement of people, goods and services, urban form, enabling growth, and providing choices. • Objectives and policies in Chapter E26 of the AUP:OP identify that infrastructure is critical to the social, economic, and cultural well-being of people and communities and the quality of the environment. The development, operation, use, repair, maintenance, upgrading and removal of infrastructure is anticipated and enabled, and the benefits infrastructure can have, as well as a range of adverse effects, are acknowledged within the objectives and policies. **Assessment** <u>NW Local Arterial Network Benefits and Land Use Integration</u> • The NW Local Arterials Package strongly supports and meets these objectives and policies by providing for a wide range of transport benefits for the community both individually and part of the wider integrated regional network planned for the area. • The North West Local Arterial network will significantly improve transport facilities for all modes, providing for a range of mode choices to support the projected growth in transport demand from urban development. The NW Local Arterial Network will integrate well with proposed surrounding land uses and the wider transport network responding to the timing, scale and form of urban

Applicable Notice	Key Objectives and Policies	Analysis
	E26.2.2(14), E26.2.2(15). AUP:OP [DP]: E27.2(1), E27.2(2), E27.2(5). AUP:OP E17.2(1), E17.2(3), E17.3(1). NOR W5: I603.2(3), I603.2(5A), I603.2(6), I603.2(10), I603.3(16), I603.3(17) NOR RE1 & RE2: I610.2(7), I610.3(4)-(7) NOR RE2: I615.2(8)-(11), I615.3(15), I615.3(19) – (21)	development triggers and staging of future infrastructure corridors. This will help to facilitate and unlock urban development and enable the general social and economic growth of North West and the wider area. • The North West network will result in improved safety for those that travel by car, active modes and public transport, as well as the movement of goods and services. The risk of death and serious injuries will be significantly reduced. Safety and amenity for vulnerable users will be significantly improved with the provision of segregated walking and cycling facilities including crossing facilities at all intersections. • The North West network will improve corridor capacity, resulting in improved journey times and reliability for future freight and public transport demand. • As well as the future communities in the FUZ areas the North West network is planned to serve, the positive impacts of the proposed infrastructure upgrades will also benefit the existing communities by providing a safer, more efficient and reliable transport network and an increase in mode choice enabling the movement of people, goods and services. • The RPS and district plan provide objectives and policies that seek to ensure infrastructure is provided in an integrated manner, with both land use and existing infrastructure. Waka Kotahi and AT have been working closely with Auckland Council, Watercare, First Gas, Transpower and other providers to ensure the network is delivered in an integrated way with existing and future infrastructure. <u>Adverse effects are avoided, remedied or mitigated</u> • Infrastructure has operational and functional needs that need to be recognised to ensure that the relevant infrastructure is effective. The Project has sought to avoid adverse effects as far as practicable and where possible, demonstrated this through the upgrade of existing roads and through the alternatives assessment process. • Sections 13 to 24 (and in the accompanying technical reports) assess the potential effects of the designations. The proposed designations have been designed and located to avoid potential adverse effects where possible and mitigate/remedy where appropriate. • Further refinement of the design will occur at the outline plan stage. This will be supported by the management framework which identifies key environmental outcomes and design principles that direct further design and assessment to be undertaken to provide for adaptability to the specific requirements of the future urban context. The proposed designations provide sufficient areas to enable this and respond to effects. **Conclusion** Each NOR within the NW Local Arterial Package achieves these objectives and policies by enabling upgrades and proposed new transport infrastructure providing a wide range of transport benefits for the community whilst ensuring that adverse effects are avoided, remedied or mitigated.

Applicable Notice	Key Objectives and Policies	Analysis
National Grid • Significance of the National Grid is recognised. • Allow development where it does not compromise the National Grid's effective development, operation, maintenance and upgrading are enabled.		
W3, W4	NPS-ET: Objective, Policies 1, 10, AUP:OP B3.2.1(7), B3.2.2(7) AUP:OP D26.2(1), D26.3(1) AUP:OP E26.2.1(7)	**Summary of Objectives and Policies** • The relevant objectives and policies of the NPS-ET and the AUP:OP Regional Policy Statement (RPS) seek to enable and provide for the National Grid, recognising the national significance of the electricity transmission network and to manage the adverse effects of other activities on the network to ensure its operation is not compromised. • The objectives and policies of Chapter B3 of the AUP:OP RPS also encourage co-location of infrastructure where safe to do so and operational and technical requirements are satisfied. • Specific AUP:OP objectives and policies aim to ensure the efficient development, operation, maintenance, upgrading and removal of the National Grid is not compromised by subdivision, use and development by ensuring operational and technical requirements and standards are satisfied. **Assessment** • The National Grid Overlay is located within the areas of Brigham Creek Road (NOR W3) and Spedding Road (NOR W4), including a tower in proximity to proposed Spedding Road alignment. • Brigham Creek Road (NOR W3) is currently crossed by the National Grid Yard Uncompromised overlay (220kV lines) with the proposed upgrade resulting in additional widening within the overlay. The Spedding Road (W4) extension will extend across the overlay. Consultation has been undertaken with Transpower and it is proposed to remove the existing tower. Works will be managed to reduce the potential adverse effects from working beneath and around the National Grid. • At detailed design ongoing engagement will be undertaken with Transpower to confirm working room clearance around the 110kV lines and 220kV lines during construction. Any potential adverse effects on the National Grid can be managed appropriately. **Conclusion** It is considered that the transport corridors contributes to the achievement of these objectives and policies by recognising the national significance of the National Grid and by appropriately managing any potential adverse effects to ensure its operation is not compromised.
Indigenous Biodiversity and Ecological Values		

Applicable Notice	Key Objectives and Policies	Analysis

• The protection and enhancement of indigenous biodiversity and ecological values (including in degraded areas) is promoted.
• Protect scheduled values but provide for infrastructure in sensitive areas considering:
  • the benefits and value of providing that infrastructure;
  • the functional or operational need to locate or traverse that location;
  • whether any practicable alternatives would avoid or reduce effects on the scheduled values;
  • how the infrastructure contributes to the planned growth and intensification of Auckland.		

All	AUP:OP [RPS]: B7.2.1(2), B7.5.1(2), B7.5.2(1)(f). AUP:OP [DP]: E12.2(1), E12.3(1), E12.3(2)(c). AUPOP E15.2(1), E15.2(2), E15.3(2), E15.3(3) E15.3(4)(b), E15.3(7) AUP:OP [RPS]: B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.2(1), B3.3.1(1),	**Summary of Objectives and Policies** • The AUP:OP objectives and policies seek to protect and enhance ecological values across terrestrial, freshwater and coastal environments. • The primary method the AUP:OP uses to protect biodiversity is the identification of SEAs. These areas receive the highest level of protection. Biodiversity values outside SEAs also need to be considered and effects on them addressed. • Adverse effects on biodiversity are to be avoided as far as practicable, and where avoidance is not practicable adverse effects are to be minimised. Other adverse effects on biodiversity and ecosystems should be avoided, remedied or mitigated. The provisions recognise that avoidance of areas with biodiversity values is not always practicable for infrastructure. Where biodiversity is affected, measures to protect and restore biodiversity through legal protection and active management should be considered. • While the objectives and policies of the AUP:OP generally seek to recognise the benefits, functional and operational needs and value of investment in infrastructure and to enable the safe, efficient and secure provision of infrastructure where appropriate, the objectives and policies also anticipate that there may be some adverse effects as a result of the provision of such infrastructure. The objectives and policies recognise that in some instances such adverse effects may be appropriate given the necessity of, and essential services provided by, infrastructure. **Assessment** • Although resource consents are not being sought for the NW Local Arterials Package at this time, ecological effects arising in respect of activities that require consents have been considered to inform the alternatives assessment, transport corridor design, the assessment of environmental effects and the proposed designation footprints. • In light of this, generally, the transport corridors within the NW Local Arterial Network have sought to avoid or minimise impacts on a range of high value ecological areas including SEAs, wetlands and streams. This is demonstrated through the comprehensive

Applicable Notice	Key Objectives and Policies	Analysis
	B3.3.2(1), B3.3.2(3). AUP:OP [DP]: E26.2.1(9), E26.2.2(4), E26.2.2(6)	alternatives assessment process undertaken and design refinement. The proposed transport infrastructure is critical to enable existing and future communities to provide for their social, economic, and cultural well-being. **Conclusion** It is considered that the transport corridors contributes to the achievement of these objectives and policies by having sought to avoid or minimise impacts on high value ecological areas. The proposed designations and management plans provide a framework for mitigation of adverse effects.
Freshwater • The health and well-being of water bodies and freshwater ecosystems is prioritised • The permanent loss and significant modification or diversion of lakes, rivers, streams (excluding ephemeral streams), and wetlands are to be avoided unless, amongst other matters, it is necessary to provide for infrastructure and no practicable alternative exists.		
All	NPS-FW Objective 1, Policies 6, 7, 8, 9. AUP:OP [RPS]: B7.2.1(2), B7.3.1(3), B7.3.2(1), B7.3.2(4), B7.3.2(5), B7.3.2(6), B7.4.1(4), B7.4.1(5), B7.4.2(1)(a), B7.4.2(1)(d), B7.4.2(7)(b), B7.4.2(9),	**Summary of Objectives and Policies** • The NPS-FW objective and policies seek to ensure that natural and physical resources are managed in a way that prioritises first, the health and well-being of water bodies and freshwater ecosystems followed by the health needs of people and then the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future. In particular, the NPS-FW seeks to protect natural wetlands, rivers, outstanding waterbodies and habitats of indigenous freshwater species. • The relevant AUP:OP objectives and policies seek to protect and enhance ecological values in freshwater environments. The permanent loss and significant modification or diversion of lakes, rivers, streams (excluding ephemeral streams), and wetlands are to be avoided unless, amongst other matters, it is necessary to provide for infrastructure and no practicable alternative exists. The objectives and policies seek to manage subdivision, use, development, including discharges and activities in the beds of lakes, rivers, streams, and in wetlands, to limit the establishment of structures within the beds of lakes, rivers and streams and in wetlands to those that have a functional need or operational requirement to be located there. **Assessment** • Ecological effects arising in respect of activities that require regional consents have been considered to inform alternatives assessment, transport corridor design and the proposed designation footprints, however the AEE is focused on district plan matters. Regional resource consents (such as NES FW) are not being sought for the NW Local Arterial Package at this time.

Applicable Notice	Key Objectives and Policies	Analysis
	AUP:OP [DP]: E12.2(1), E12.3(1), E12.3(2)(c).	• However, generally, the transport corridors within the North West network have sought to avoid or minimise impacts on streams and high value wetlands. This is demonstrated through the comprehensive alternatives assessment process undertaken and design refinement. Specifically, high value wetland environment has been avoided and / or reduced where practicable, new bridge structures are proposed over high value streams. • The alignment and design refinement process for each proposed designation has sought to avoid or minimise impacts on high value natural wetlands and streams, unless there is a functional requirement for any such impacts. There will be further opportunities to minimise any impacts within the transport corridor alignment during the detailed design. • As discussed under the indigenous biodiversity assessment above, some freshwater environments have been impacted where there is a functional and operational need to do so. In considering the potential future effects arising from activities that may require regional consents in the future, the Assessment of Ecological Effects identified that any potential effects of the North West network on ecological features within or adjacent to the transport corridors, can be adequately managed and will be subject of future regional consent processes. There is flexibility in the proposed designation to further minimise impacts at detailed design. • The proposed transport infrastructure is critical to enable existing and future communities to provide for their social, economic, and cultural well-being. **Conclusion** The NW Local Arterial network is consistent with these objectives and policies as the proposed alignments have sought to avoid or minimise impacts on streams and wetlands unless there is a functional requirement for any such impacts. In considering the potential future effects arising from activities that may require resource consent in the future, the Assessment of Ecological Effects identified that any potential effects of the North West network on ecological features within or adjacent to the transport corridors, can be adequately managed in any future consent processes.
Ngā Manawhenua • Mana Whenua values are recognised and protected • Mana Whenua are to be included in resource management processes, particularly in decision making in their role as kaitiaki		
All	AUPOP [RPS] B4.2.1(2), B6.2.1(1), B6.2.1(2), B6.3.1(1),	<u>Kaitiakitanga</u> **Summary of Objectives and Policies**

Applicable Notice	Key Objectives and Policies	Analysis
	B6.3.1(2), B6.3.1(3), B6.3.2(1), B6.3.2(2)(d), B6.3.2(3), B6.3.2(6), B6.5.1(1), B6.5.1(3), B6.5.1(5), B6.5.2(1), B6.5.2(4), B6.5.2(5), B6.5.2(6), B6.5.2(9), B7.4.1(6). AUP:OP [DP] E12.3(1), E12.3(2)(c), E12.3(4). AUP:OP [RP/DP] D9.2(3), D9.3(17) NPS-UD Objective 5, Policy 1(a)(ii)	• The RPS requires recognition of and provision for the principles of Te Tiriti o Waitangi, in particular through Manawhenua participation in resource management processes. **Assessment** • Recognition of Te Tiriti o Waitangi partnerships is a key objective for the NW Local Arterial Package and Manawhenua have been involved in the NW Local Arterial Network from the start of the Supporting Growth Programme. • Manawhenua have since been actively involved throughout development of the early concepts, through alternatives assessment and identification of the preferred options. This partnership approach has allowed understanding and the incorporation of manawhenua values and expression of kaitiakitanga throughout the NW Local Arterials Package. This has included participation in identifying any opportunities for mitigation, and any opportunities for representing cultural features in the landscape. • Further incorporation of manawhenua values and the expression of kaitiakitanga was enabled through regular hui with manawhenua and a site visit where discussion with manawhenua was had, including information sharing, the approach and methodology for assessment of environmental effects, updates from project environmental specialists and discussion and the preferred approach to cultural impact assessments (CIAs). Te Kawerau ā Maki confirmed their interest in preparing a CIA. Other iwi invited to prepare a CIA declined, but continued engagement through hui. • Waka Kotahi and AT are committed to ongoing engagement with Manawhenua which aligns closely with the RPS' long term view. Manawhenua will continue to be involved in the NW Local Arterial Package to help maintain consistency with these objectives and policies. The proposed designation conditions set out ongoing engagement and participation of manawhenua in the future design and implementation of the transport corridor. These conditions have been developed in consultation with manawhenua. <u>Māori values</u> **Summary of Objectives and Policies** • The principles of the Te Tiriti o Waitangi are also recognised and provided for in the sustainable management of natural and physical resources, wāhi tapu and other taonga. Sites and places of significance to Manawhenua are recognised and provided for in the objectives and policies of the AUP:OP. **Assessment** • The adopted partnership approach with manawhenua, means that Māori values are included in the NW Local Arterials Package which gives effect to the provisions of the AUP:OP. The partnership approach has meant manawhenua have been involved in

Applicable Notice	Key Objectives and Policies	Analysis
		corridor development and decision-making on each of the extended and/or upgraded corridor alignments and design. This has enabled the incorporation of the holistic and long-term inter-generational Māori world view. • The NW Local Arterial Package has also recognised manawhenua cultural values, particularly with regards to the mauri of, and the relationships of manawhenua with natural and physical resources including freshwater, land, air and coastal resources. Significant adverse effects on these values are required to be avoided, with lesser adverse effects avoided, remedied or mitigated as appropriate. This is the case for each corridor. • The NW Local Arterial Package has no Sites of Significance to Manawhenua as identified in the AUP:OP. • Designation conditions for each of the proposed designations are proposed to provide for ongoing consultation with manawhenua as well as accidental discovery protocols which require manawhenua involvement. Appropriate actions will be taken ensuring tikanga Māori is adhered to particularly where any kōiwi are accidentally discovered. **Conclusion** The NW Local Arterial Package has actively involved Manawhenua throughout the project life including through assessment of alternatives and recognition of cultural values.
Natural hazards • Avoid increasing risk of adverse effects in areas subject to natural hazards (including climate change) • Where infrastructure and development is required in these areas, natural hazard risks must be managed		
All	NPS-UD Objective 8, Policy 1(e)(f), Policy 6(e). AUP:OP [RPS] B2.3.1(1)(f), B10.2.1(2), B10.2.1(3), B10.2.1(5), B10.2.1(6), B10.2.2(7), B10.2.2(8),	**Summary of Objectives and Policies** • The NPS-UD directs that urban environments support reductions in greenhouse gas emissions and are resilient to the current and future effects of climate change. • The objectives and policies of Chapter B10 of the AUP:OP enable and recognise the importance of infrastructure to support urban growth which includes integrating the provision of resilient transport networks and infrastructure in these areas and avoiding effects in areas subject to natural hazards and risk and adapting to the effects of climate change. • Specific AUP:OP objectives and policies reinforce the unique requirements of infrastructure and that it can have an operational or functional need to locate within a natural hazard area. Where infrastructure is required to locate within a hazard area, significant adverse effects on people and property are sought to be first avoided, and otherwise mitigated to the extent practicable. **Assessment**

Applicable Notice	Key Objectives and Policies	Analysis
	B10.2.2(12), B10.2.2(13). AUP:OP [DP] E12.2(1), E12.3(5), E12.3(6). AUP:OP [DP] E36.2(1), E36.2(2), E36.2 (3), E36.2 (4), E36.2(5), E36.3(21-28), E36.3(35)	• The NW Local Arterial Package supports the direction set out in the objectives and policies. • The NW Local Arterial Package will deliver better accessibility and mode choice by providing upgrades which will support public transport on all corridors with specific FTN facilities provided on Fred Taylor Drive, Don Buck Road, Māmari Road and Hobsonville road. As well as walking and cycling on all corridors, therefore reducing the reliance on low occupancy vehicles. This provides an important component to realising the regional emissions benefits of an integrated network. This shows alignment with the objectives and policies, and a positive contribution towards a reduction in greenhouse gas emissions. • A number of design measures to provide resilience to flooding, inundation and climate change have been adopted across the North West Local Arterials. Flood modelling undertaken for the NW Local Arterial Package assessed the existing terrain and proposed network terrain – both using maximum probable development with 10 and 100 year average recurrence interval plus climate change rainfall considerations. In doing so, the modelling took into consideration flood hazard and risk associated with both rainfall events, climate change and the coastal inundation 1 per cent AEP Plus 1m control. The flood risk assessment has recommended outcomes to ensure at detailed design that existing flooded properties are not exacerbated, no flood prone areas are created and any increase in flood risk for existing or future habitable floor levels or access to properties are less than minor. Final measures to achieve these outcomes will be confirmed through detailed design at the OPW stage. • The proposed designations provide for street tree planting that, when delivered, will contribute to reducing urban heat island effects in the future as well as contribute to the amenity of the area by providing shade and microclimatic cooling qualities. **Conclusion** Each NW Local Arterial Package corridors is consistent with these objectives and policies by supporting modal choice, contribute to reducing urban heat island effects and providing resilient transport infrastructure that will support urban growth. The transport corridors will generally provide positive flood resilience effects and will avoid, remedy and mitigate potential adverse effects on people and property in areas subject to natural hazards and risk, adapting to the effects of climate change.
Urban form and quality design • Transport networks support a quality urban form and are designed to achieve high levels of amenity and safety for users • The place function of transport networks is balanced with the functional movement purpose		
All	AUP:OP B2.2.1(1)(e), B2.3.1(3),	**Summary of Objectives and Policies** • The objectives and policies seek to create and protect urban environments that are both functional and enjoyable for people, by balancing the place and movement function of transport networks achieving high levels of amenity and safety for users.

Applicable Notice	Key Objectives and Policies	Analysis
	B2.3.2(1)(d-f), B2.3.2(2)(b), B2.3.2(4), B3.3.1(1)(d), B3.3.2(4)(a), B3.3.2(7). AUP:OP E12.2(1), E12.3(2). E12.3(3) AUP:OP E17.2(1), E17.2(2), E17.2(3), E17.3(1), E17.3(4). AUP:OP E24.2(1), E24.2(2), E24.3(1), E24.3(2). AUP:OP E25.2(1), E25.2(2), E25.3(2), E25.3(5)]. **NOR W5:** I603.2(19)	• To achieve balance between place and movement, the objectives and policies recognise a necessary mode shift, minimising private vehicle travel in favour of public transport, walking and cycling. • The objectives and policies also require that the impacts of construction on amenity is managed (dust, noise and vibration) whilst acknowledging that some disturbance and reduced amenity is inevitable. **Assessment** • Each transport corridor in the NW Local Arterials Package gives effect to the objective and policies providing for separated and safe active mode facilities and integrating transport infrastructure with existing and future urban areas to support urban development. • The designation footprint enables integration with adjacent landuse development and environmental features. As part of the OPW and Management Plan process the detailed design will be confirmed. Likewise amenity will be considered as part of this process, and finalised at detailed design stage. • A ULDMP is proposed as a condition of the proposed designations. The ULDMPs build on the assessments, to support integration of the permanent works of each transport corridor into the surrounding landscape and ensure that the NW Local Arterial Network contributes to a quality urban environment and manages potential adverse landscape and visual effects. The ULDMPs will be consistent with the Bridging the Gap: NZTA Urban Design Guidelines (2013) (or later best practice iteration). • Amenity of the corridors during construction have been assessed as part of this NOR. The effects will be managed appropriately through engagement with residents, the community and stakeholders, and through the construction noise and vibration, and construction management plans proposed as conditions of the designations. **Conclusion** Each transport corridor within the North West Local Arterial network will provide separated and safe active mode facilities and will integrate with the existing and future urban areas to support urban development. The NW Local Arterial Package will manage adverse effects on amenity during construction and sets outcomes and further opportunities through the ULDMPs to integrate permanent works into the surrounding landscape and urban context. This will ensure that the North West network contributes to a quality urban environment and manages potential adverse landscape and visual effects.

Applicable Notice	Key Objectives and Policies	Analysis
Historic Heritage • Recognises the importance of heritage to the identity of Auckland by avoiding significant adverse effects on scheduled historic heritage, where practicable, and encouraging new development to have due regard to significant historic heritage • Protect scheduled values but provide for infrastructure in sensitive areas considering: • the benefits and value of providing that infrastructure; • the functional or operational need to locate or traverse that location; • whether any practicable alternatives would avoid or reduce effects on the scheduled values • how the infrastructure contributes to the planned growth and intensification of Auckland.		
All	AUP:OP [RPS]: B5.2.1(1), B5.2.2(6), B5.2.2(7), B5.3.1(2), B5.3.2(4)(c), B5.3.2(4)(d). B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.2(1), B3.3.1(1), B3.3.2(1), B3.3.2(3). AUP:OP [DP] E26.2.1(9), E26.2.2(4), E26.2.2(6).	**Summary of Objectives and Policies** • The RPS recognises the importance of heritage to the identity of Auckland, and the importance of active stewardship to protect it from inappropriate subdivision use and development. The provisions seek to avoid significant adverse effects on scheduled historic heritage, where practicable, and to encourage new development to have due regard to significant historic heritage. • The policies of Chapter B3 and E26 seek to enable the development, operation and maintenance of infrastructure, even in sensitive areas that are scheduled in the AUP:OP in relation to historic heritage, provided adverse effects are avoided or managed where practicable and an operational or functional need to locate in sensitive areas arises. • While the objectives and policies of the AUP:OP generally seek to recognise the benefits, functional and operational needs and value of investment in infrastructure and enable the safe, efficient and secure provision of infrastructure where appropriate, the objectives and policies also anticipate that there may be some adverse effects as a result of the provision of such infrastructure. However, the objectives and policies recognise that in some instances such adverse effects may be appropriate given the necessity of, and essential services provided by, infrastructure. **Assessment** • The NW Local Arterial Package will not impact on any AUP:OP scheduled historic heritage sites. There is potential that previously unrecorded deposits may be exposed during construction. • A HHMP will be prepared at detailed design before construction commences. As part of the HHMP, further research and survey of the transport corridor area, and specific sites, will be undertaken to support a precautionary HNZPTA authority for the Project footprint. • Any adverse effects to potential previously unrecorded archaeological deposits that are exposed during the works will be mitigated under the provisions of a precautionary HNZPTA authority, and the means of mitigation detailed in an Archaeological Management

Applicable Notice	Key Objectives and Policies	Analysis
		Plan prepared for the HNZPTA authority application. An authority under the HNZPTA will be sought at a later date prior to construction of the transport corridor. **Conclusion** The NW Local Arterial Package is consistent with the objectives and policies as the transport corridors does not impact on scheduled historic heritage and it recognises the importance of historic heritage through the implementation of the HHMP, specific mitigation measures, and providing a precautionary approach to the potential for identification previously unrecorded sites during construction.
Natural Landscapes • Natural landscapes and features with outstanding values are to be protected from inappropriate subdivision use, and development by avoiding where practicable, and otherwise remedying or mitigating, adverse effects on those areas or features		
All	AUP:OP RPS B4.2.1(1), B4.2.1(3), B4.2.2(3), B4.2.2(6), B4.2.2(7), B4.2.2(8), B4.3.1(1), B4.3.1(2), B4.3.2(3), B4.5.1(1), B4.5.2(4). AUPOP [DP]: D13.2(1), D13.3(2).	**Summary of Objectives and Policies** • The RPS seeks to recognise and protect natural heritage. In particular, the policies of the RPS seek to identify features with outstanding natural values, evaluate and schedule those outstanding natural features, protect the physical and visual integrity of those features from inappropriate subdivision use, and development, and, where practicable and appropriate, enhance outstanding natural features. • The RPS identifies that the volcanic heritage of Auckland is a particularly notable feature across the region. The RPS also indicates that notable trees are a particularly important natural feature. Therefore, the RPS seeks to protect the values of both volcanic features and notable trees. • The Notable Trees overlay seeks to retain and protect notable trees from inappropriate use and development. Notable trees are required to be retained and protected by considering alternative methods that could result in retaining the trees, whether the values that would be lost if the tree is removed, and the extent to which removal is necessary to accommodate the efficient operation of the road network. **Assessment** • There are no identified AUP:OP outstanding natural landscapes, features or characters within the NW Local Arterials Package, nor any volcanic viewshafts affected. • There are however notable trees (#1980 and #1812) that are in close proximity to the Hobsonville Road designation.

Applicable Notice	Key Objectives and Policies	Analysis
		• Significant adverse landscape and visual effects have been avoided through a substantive alternatives assessment process involving specialist inputs and design refinement to minimise effects and integrate the transport corridor works within the landscape. As a result, the transport corridor seek to limit physical effects on SEAs, high value streams and wetlands and other high value landscape features within the local landscape. **Conclusion** • Throughout the NW Local Arterial Network, there is generally significant opportunity for natural character values to be improved and opportunities to integrate with the proposed Auckland Council Blue-Green network. The proposed designation conditions require the implementation of an ULDMP during the detailed design. With this in place, and through future regional consenting stages, the proposed features and scale of the transport corridors within the NW Local Arterial Network are able to be integrated into the existing and future landscape to remedy any potential adverse effects on landscapes arising from the transport corridors.
Open Space Zones • Enable infrastructure while protecting values of open space zones and avoiding, remedying or mitigating adverse effects on residents, communities and the environment.		
W3, R1, R2	AUP:OP E16.2(1), E16.2(2), E16.3(2), E16.3(3) H7.2(2), H7.6.2(1), H7.6.2(2), H7.6.3(4), H7.6.3(1)	**Summary of Objectives and Policies** • The general objectives and policies of open space zones in the AUP:OP seek to enable infrastructure while avoiding, remedying or mitigating adverse effects on residents, communities and the environment. Objectives and policies in Chapter E16 of the AUP:OP seek to protect the cultural, amenity, landscape and ecological values of trees in open space zones and increase the quality and extent of tree cover in open space zones. **Assessment** • The transport corridors within the NW Local Arterial Network have sought to reduce adverse effects on Open Space Zones and community facilities as far as practicable and this is demonstrated through the alternatives assessment process. • The transport corridors have sought to reduce impact on open space zones where practicable. In particular: • NOR W3, while W3 includes widening into open space zones (Whenuapai Settlement Playground), the works have avoided the large mature trees within the open space zone. However, three smaller trees within the open space zone will need to be removed to facilitate the widening and active mode lanes.

Applicable Notice	Key Objectives and Policies	Analysis
		• NOR R1, works for a stormwater wetland will occur within Rush Creek Reserve. These works will occur within an existing wetland asset. As the corridor occurs in an urbanised environment limited alternative locations were available, and the enlarged wetland will not be out of character with the park environment. • NOR R2, will include works to enlarge an existing wetland in open space at Kopupaka Reserve. The works will be keeping with the open space character and utilise an existing asset. • Potential construction effects on amenity values of Open Space Zones can be managed through engagement with residents, the community and stakeholders (through a SCEMP), and through construction noise and vibration management (CNVMP), and construction management plans (CTMP and CEMP) to minimise potential effects. A ULDMP is recommended as a condition of the designation which will require all areas be reinstated at the completion of the construction period and will require any left-over fill to be removed from construction areas and shaping of the ground to integrate with surrounding landform. • The transport corridors will provide for improved and new opportunities for active modes of transport and the ability to provide improved connectivity to open space areas, reserves and recreation facilities. • Within the Open Space Zones, the effects of tree loss can be mitigated by comprehensive planting within berms in the new road layout. Replacement planting will be decided through a planting plan for the Project under the ULDMP proposed as a condition on the proposed designation. • Existing stormwater ponds on Don Buck Road, Fred Taylor Drive and on Hobsonville Road are proposed to be upgraded to increase the capacity of the ponds. Indigenous vegetation will be re-instated with enhancement opportunities identified via the ULDMP where practicable. • Notable trees within the design will be protected where possible through detailed design stage, in addition, a Tree Management Plan will be developed prior to construction to identify the existing trees protected under the District Plan, confirm the construction methods and impacts on each tree and detail methods for all work within the rootzone of trees that are to be retained. **Conclusion** The transport corridors are consistent with the objectives and policies by providing for infrastructure while avoiding, remedying or mitigating adverse effects on residents, communities, trees and the environment.
Residential Zones • Use land efficiently to increase housing capacity and improve choice and access to public transport • Non-residential development provides for communities' wellbeing and avoids adverse effects on residential amenity		

Applicable Notice	Key Objectives and Policies	Analysis
All	AUP:OP H5.2(1), H5.2(4), H5.3(8), H5.3(10) AUP:OP H6.2(1), H6.2(4), H6.3(8), H6.3(9)	**Summary of Objectives and Policies** • The relevant objectives and policies of the Residential – Mixed Housing Urban and Residential – Terraced Housing and Apartment Building zones seek to ensure land is efficiently used to provide higher density urban living, increase housing capacity and improve choice and access to public transport. • Specific objectives and policies also seek to recognise the functional and operational requirements for development, in particular that non-residential activities provide for communities' social, economic and cultural well-being while avoiding, remedying or mitigating adverse effects on residential amenity. **Assessment** • The NORs are consistent with these objectives and policies by providing for the necessary transport infrastructure to support the residential zoning currently under development within the transport corridor areas and to increase the development capacity. • The NORs will ensure land is protected to contribute to the accessible, high quality, effective, efficient and safe transport routes (including public and active transport modes) that support the movement of people, goods and services for residential zoned areas enabling communities' social, economic and cultural wellbeing to be provided for. • A ULDMP is proposed as a condition of the proposed designations. The ULDMPs will integrate the permanent works of each transport corridor into the surrounding landscape and urban context and ensure potential adverse landscape and visual effects are managed. • Amenity of the corridors during construction will be managed appropriately through engagement with residents, the community and stakeholders, and through the construction noise and vibration, and construction management plans proposed as conditions of the designations. **Conclusion** It is considered that the NORs contribute to the achievement of these objectives and policies by providing the necessary transport infrastructure required to support the growth of these areas while avoiding, remedying or mitigating adverse effects on residential amenity.
Business Zones • Positively contribute towards planned future form and quality, creating a sense of place, amenity and convenience • Recognise requirements of development while avoiding, remedying or mitigating adverse effects		

Applicable Notice	Key Objectives and Policies	Analysis
All	AUP:OP H10.2(5), H10.2(6), H10.2(7), H10.2(8), H10.3(15), H10.3(16), H10.3(17), H10.3(21) AUP:OP H11.2(3), H11.2(7), H11.2(8), H11.3(3), H11.3(12), H11.3 (20) AUP:OP H12.2(3), H12.2(7), H12.3(3), H12.3(12), H12.3(17) AUP:OP H13.2(3), H13.2(9), H13.3(3), H13.3(12), H13.3(20), H13.3(21) AUP:OP H17.2(1), H17.2(3),	**Summary of Objectives and Policies** • The relevant objectives and policies for all centre zones and the Business – Mixed Use Zone in the AUP:OP seek development to positively contribute towards planned future form and quality, creating a sense of place particularly with regard to streets by providing pedestrian amenity, movement, safety and convenience for people of all ages and abilities. • The relevant objectives and policies for the Business – Heavy Industry Zone in the AUP:OP seek to ensure heavy industry operates efficiently and is not unreasonably constrained by other activities. • Objectives and policies of the relevant business zones also seek to recognise the functional and operational requirements of activities and development while avoiding, remedying or mitigating adverse effects on amenity values and the natural environment of adjacent public open spaces and residential areas. **Assessment** • The NW Local Arterial Package will positively contribute towards the planned future form and quality. They will create a sense of place particularly for streets by providing improved pedestrian amenity, movement, safety and convenience for people of all ages and abilities. The transport corridors in the NW Local Arterial Package provide a safe and reliable arterial network including walking and cycling and public transport facilities that supports growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities. • The Transport corridors will improve the reliability of the transport network enabling business zones to operate efficiently, particularly with regard to improved efficiency of freight movements and better transport connections. • A ULDMP is proposed as a condition of the proposed designations. The ULDMPs will integrate the permanent works of each transport corridor into the surrounding landscape and urban context and ensure potential adverse landscape and visual effects are managed. • Amenity of the corridors during construction will be managed appropriately through engagement with residents, the community and stakeholders (through the SCEMP), and through the construction noise and vibration, and construction management plans (in particular the CTMP) proposed as conditions of the designations. **Conclusion** It is considered that the transport corridors contribute to the achievement of these objectives and policies by positively contributing towards planned future form and quality of centre and business zones, improving the efficiency of these zones through better transport

Applicable Notice	Key Objectives and Policies	Analysis
	H17.2(4), H17.3(4), H17.3(7) H10, H11, H12, H13, H17	connections and reliability and mitigating adverse effects on amenity values and the natural environment of adjacent public open spaces and residential areas.
Rural Zones and Future Urban Zone • Maintain and complement rural character and amenity • Protect elite soils and manage prime soils		
All	AUP:OP H18.2(1), H18.2(2), H18.2(3), H18.2(4), H18.3(1), H18.3(2), H18.3(3), H18.3(4), H18.3(5), H18.3(6) AUP:OP H19.2.1(1), H19.2.1(3), H19.2.2(3), H19.2.2(4), H19.2.2(5) R1 National Policy Statement on Highly	**Summary of Objectives and Policies** • The relevant objectives of Chapter H18 seek for land to be developed to achieve the objectives of the Rural Production Zone until such time as it has been rezoned for urban purposes, and that urbanisation is avoided until the sites have been rezoned. • The relevant policies seek to avoid use and development that may result in the efficient and effective operation of the local and wider transport network, require significant upgrades to infrastructure, inhibit the efficient provision of infrastructure or undermine the form or nature of future urban development. Further, use and development is required to maintain and complement rural character and amenity. • The relevant objectives and policies of Chapter H19 seek to protect elite soils and manage prime soils. Chapter H19 enables rural production activities on elite and prime soil and avoid land-use activities and development not based on, or related to, rural production from locating on elite soil and avoid where practicable such activities and development from locating on prime soil. • R1 Coatesville-Riverhead Highway widens into existing rural zone, the project has a functional need to be on HPL, and woks are associated with upgrade of specified infrastructure. R1s edge treatment has sought to reduce reverse sensitivity effects and be in keeping with rural character. **Assessment** • The NW Local Arterial Network traverses the FUZ, with exception of R1 Coatesville-Riverhead Highway which is existing and also traverses' the Mixed Rural Zone. The NOR's will positively contribute towards the future urban form and quality. The NOR's will enable efficient provision of infrastructure for existing activities and future urban development. • In terms of maintaining rural character and amenity prior to rezoning and urbanisation, it is considered that the road upgrades and new roads will serve and improve connectivity (through new roads and active modes) for both existing rural areas and future urban areas.

Applicable Notice	Key Objectives and Policies	Analysis
	Productive Land 2022 (NPS-HPL) s 3.9 (2)(j)(i)	**Conclusion** It is considered that the transport corridors contribute to the achievement of these objectives and policies by positively contributing towards planned future form of the future urban zone, improving the efficiency of rural zones through better transport connections and reliability and mitigating adverse effects on rural character and amenity values.

29.2 Section 171(1)(b) Adequate Consideration of Alternatives

Section 171(1)(b) requires the territorial authority to have particular regard to whether adequate consideration has been given to alternative, sites, routes and methods for undertaking the work, if:

> *(i) The requiring authority does not have an interest in the land sufficient for undertaking the work; or*
> *(ii) it is likely that the work will have a significant adverse effect on the environment.*

The process by which Auckland Transport has considered alternative sites, routes and methods of the transport corridors is summarised in AEE Part A, Section 7. A range of alternatives have been investigated for addressing the transport needs of the North West growth area. The process and conclusion for each corridor is documented in the Assessment of Alternatives, at Appendix A.

The preferred options are based on a comprehensive and robust optioneering process taking into account engagement feedback and specialist assessment inputs. As such it is concluded that adequate consideration has been given to alternative sites, routes and methods for undertaking the work, satisfying the requirements of section 171(1)(b) of the RMA.

29.3 Section 171(1)(c) Reasonable Necessity

Section 171 (1)(c) of the RMA requires a territorial authority to have particular regard to:

> *'Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought'.*

The proposed designations and alterations to existing designations are reasonably necessary for achieving the relevant NOR project objectives, as set out in AEE Part A, Section 8. The protection of the transport corridors through designation will:

- Enable flexibility and ability to construct, operate and maintain the transport corridor in accordance with the proposed designations and proposed alterations to existing designation
- Enable the future works to be undertaken in a comprehensive and integrated manner
- Provide certainty to landowners, the community and stakeholders through identifying in the AUP:OP the location, nature and likely extent of the transport corridors and the Requiring Authority's intended use of that land
- Protect the land from incompatible development by third parties
- Protect the land so the transport corridor can be implemented when required in line with growth
- Enable the Requiring Authority to avoid, remedy and mitigate any adverse effects of the transport corridors.

29.4 Section 171(1)(d) Other Matters

Section 171(1)(d) requires the territorial authority to have particular regard to:

> *'Any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement'*

It is considered that there are no other matters under s171(1) d) that are reasonably necessary to make a recommendation on the NORs.

29.5 Other Policy Considerations

Other legislation and policy that has informed development and will inform the future implementation of the North West Local Arterial Package is set out in Table 29-2, Table 29-3, and Table 29-4.

Table 29-2: Assessment against other potential matters - national

National
Government Policy Statement on Land Transport for 2021/22 – 2030/31
The GPS on Land Transport 2021 continues the strategic direction of GPS 2018, but provides stronger guidance on what Government is seeking from land transport investments. The GPS outlines the Government's strategy to guide land transport investment over the next 10 years, influencing decisions on how money from the National Land Transport Fund will be invested across activity classes, such as state highways and public transport. The overall strategic priorities for GPS 2021, the national objectives for land transport and the themes and the results the Government wishes to achieve through the allocation of the Fund are summarised as follows: • Safety – a safe system, free of death and serious injury • Access – a system that provides increased access to economic and social opportunities • Climate change – a low carbon transport system that supports emissions reductions, while improving safety and inclusive access • Improving freight connections – improving freight connections for economic development. The NW Local Arterial Package provides a safe and reliable arterial network that supports growth, enables travel choice, addresses safety concerns and improves access to employment and social amenities. The NW Local Arterial Package is anticipated to significantly reduce the risk of DSIs and improve road safety for all users. The NW Local Arterial Package will improve all transport facilities for all modes, resulting in improved safety for those that travel by car, freight, active mode and public transport. It improves corridor capacity, resulting in improved journey times and reliability for future freight and public transport demand. The GPS 2021 prioritises reduction of greenhouse gas emissions and a shift to active modes, public transport and low emission vehicles. This focus is well aligned to the transport corridors which provides an increase in modal choice including active modes and public transport, both which support a reduction in greenhouse gas emissions compared to trips taken in private vehicles. Overall, the NW Local Arterial Package positively contributes towards the strategic priorities in the GPS.
The Thirty Year New Zealand Infrastructure Plan 2015
The Thirty Year New Zealand Infrastructure Plan looks to advance the debate of long-term provisions, make changes to the current approach to planning and management and to encourage investment in New Zealand's infrastructure while recognising the challenges the country needs to navigate. The Plan envisages that by 2045 New Zealand's infrastructure will be resilient and co-ordinated and contributes to a strong economy and high living standards.

National
In regards to Auckland, the Plan notes that challenges exist around projected population growth with Auckland forecast to grow by another 716,000 people by 2045 meaning Auckland will need to provide 400,000 more dwellings. The NW Local Arterial Package provides an integrated approach to land-use and infrastructure planning which is critical to deliverng good urban outcomes. The NW Local Arterial Package forms part of this spending and falls within the scope of this plan by supporting future urban growth in North West Auckland.
Waka Kotahi Amended Statement of Intent 2021-2026
This document sets out how Waka Kotahi will realise the vision of its new strategic direction, Te kāpehu | Our compass. Te kāpehu was developed in response to changes to the strategic and operating environments, including release of the GPS on land transport 2021/22 – 2030/31. The Waka Kotahi focus is on creating an efficient and sustainable transport system that is safe, easy and connected providing one integrated land transport system that helps people get the most out of life and supports business. The NW Local Arterials Package provides a safe and reliable arterial network that supports growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities, therefore, is consistent with the Waka Kotahi Amended Statement of Intent.
Road to Zero: New Zealand's Road Safety Strategy 2020-2030
Road to Zero outlines a strategy to guide improvements in safety on our roads, streets, footpaths, cycleways, bus lanes and state highways in New Zealand over the next 10 years. The vision of the strategy is a *New Zealand where no one is killed or seriously injured in road crashes.* The Strategy focuses on achieving this vision through system management, road user choices, vehicle safety, work-related road safety and infrastructure improvements and speed management. The NW Local Arterial Package plays a key role in providing the opportunity to plan and design system improvements that embed the Road to Zero strategy. The NW Local Arterial Package is anticipated to significantly reduce the risk of DSIs and improve road safety for all users. The NW Local Arterial Package will significantly improve all transport facilities for all modes, resulting in improved safety for those that travel by car, freight, active mode and public transport.

Table 29-3: Assessment against other potential matters - Regional

Regional
Auckland Transport Alignment Project
ATAP is a joint project involving Auckland Council, the Ministry of Transport, AT, Waka Kotahi, the Treasury and the State Services Commission. The final report (April 2018) sets out a clear direction for the development of Auckland's transport system over the next 10 years. The vision seeks transport investment decisions that deliver broad economic, social, environmental and cultural benefits to Auckland and New Zealand by providing safe, reliable and sustainable access to opportunities. Specifically, this includes easily connecting people, goods and services to where they need to go; providing high quality and affordable travel choices for people of all ages and abilities; seeking to eliminate harm to people and the environment; supporting and shaping Auckland's growth, and; creating a prosperous, vibrant and inclusive city. The ATAP package highlights the need for significant investment in transport infrastructure to enable urban growth in greenfield FUZ areas, encourage the use of public transport and active modes, and to provide a reasonable level of service to future residents. ATAP specifically notes investment into three main areas including for arterial roads and footpaths (including bus and cycle lanes where required). The NW Local Arterial Package is consistent ATAP as it will provide a safe and reliable arterial network that integrates with land use planning, supports growth, enables sustainable travel choice for all transport users, addresses safety concerns and improve access to employment and social amenities.
Auckland Regional Land Transport Plan 2018-2028

Regional
The Regional Land Transport Plan (RLTP) sets out the funding programme for Auckland's transport services and activities over a 10-year period. Planned transport activities for the next three years are provided in detail while proposed activities for the following seven years are outlined. The RLTP is jointly delivered by AT, Waka Kotahi and KiwiRail, and forms part of the National Land Transport Programme. The Supporting Growth Programme is identified as a committed, ongoing programme in the RLTP which it identifies will enable the sequence of land release specified in the FULSS, and improves access to places where people live and work.
Hauraki Gulf Marine Park Act 2000
The Hauraki Gulf Marine Park Act seeks to integrate the management of natural, historic and physical resources of the Hauraki Gulf, the islands and its catchment which includes the Whenuapai, Redhills and Riverhead areas that fall within Schedule 3 'catchment' indicating areas that drain to the Hauraki Gulf. The Act recognises the national significance of the Hauraki Gulf and life supporting capacity of the environment of the Gulf. The NW Local Arterials are all designed with provision for stormwater treatment through provision of ponds and or swales. These are enabled through the proposed designations to treat the runoff from the corridor before discharge into the receiving environment of the Hauraki Gulf. This enables the protection of the Hauraki Gulf environments life supporting capacity.
Auckland Plan 2050
The purpose of the Auckland Plan is to contribute to Auckland's social, economic, environmental and cultural well-being through a 30 year vision for Auckland's growth. It sets a strategic direction for Auckland and its communities that integrates social, economic, environmental, and cultural objectives. The Auckland Plan's Development Strategy outlines the direction Auckland will take managing expansion in future urban areas noting the constraint that these areas are predominantly rural at present and have little or no infrastructure in place to cope with urban development. The Auckland Plan outlines the need to provide the required bulk infrastructure (water, wastewater, storm water and transport) to these areas in the right place at the right time. The Auckland Plan also seeks that Aucklanders will be able to get where they want to go more easily, safely and sustainably. The NW Local Arterial Package will provide a safe and reliable arterial network that integrates with land use planning, supports growth, enables sustainable travel choice for all transport users, addresses safety concerns and improve access to employment and social amenities. The development NW Local Arterial Package has been a direct response to the Auckland Plan. The NW Local Arterial Package will help facilitate the sustainable growth of the North West area enabling the bulk transport infrastructure required to unlock development potential.
Vision Zero for Tāmaki Makaurau: a transport safety strategy and action plan to 2030
Developed in 2019, Vision Zero extends the existing safe system approach to stop the human sacrifice of mobility, placing safety at the forefront of the future transport system for all modes by designing safe places for people. Vision Zero has a goal to eliminate transport deaths and serious injuries by 2050 (in line with the Auckland Plan 2050). The NW Local Arterial Package plays a key role in providing opportunity to plan and design system improvements that embed Vision Zero principles, and specifically contribute to the Vision Zero priorities. The NW Local Arterial Package is anticipated to significantly reduce the risk of DSIs and improve road safety for all users. The NW Local Arterial Package will significantly improve all transport facilities for all modes, resulting in improved safety for those that travel by car, freight, active mode and public transport.
Auckland Long-term Plan 2018-2028/ The 10-Year Budget 2021-2031 (Our Recovery Budget)
The Auckland Long Term Plan 2018-2028, which is required under Local Government Act 2002, sets out the Council's 10-year financial plan, and is guided by the strategic direction set by the Auckland Plan, as described and assessed above. The budget was superseded by 'Our Recovery Budget' 2021-2031 as a result of COVID19. The new budget responds to investment demands from rapid growth, transport demand, aging assets response to climate change. NW Local Arterials Package supports investment in transport, as well as support rapid growth demands. It proposes upgrades to existing assets (roads) and future proofs them for

Regional
example through provision for new rainfall/flooding expectations and supporting shift to active mode for changing communities.
Auckland Parks and Open Spaces Strategic Action Plan (2013)
This Action Plan seeks to protect, and conserve Auckland's environment, heritage and landscape, expand and develop Auckland's park and open space networks, and to connect and utilise these parks and open spaces. The frontage of Whenuapai Settlement Playground on Totara Road will be required as part of upgrade of the Brigham Creek Road / Māmari Road intersection and existing stormwater ponds located in open space zoned areas on Fred Taylor Drive and Don Buck Road will be required to allow the upgrade of the ponds. The works to Whenuapai Settlement Playground on Totara Road will reduce the amount of park space available to the community. However, the majority of the park will remain useable. The upgraded stormwater ponds will not significantly impact the community's use of these spaces as they are currently used for ponds. In addition, once complete, each of the Projects within the NW Local Arterials Package will reinstate impacted features and provide new connections between existing parks and open spaces via proposed walking and cycling infrastructure.
Auckland Sport and Recreation Strategic Action Plan 2014-2024 (refreshed 2017)
This plan seeks to increase the availability to, and participation in, physical activities, recreation and sport within Auckland. In particular, the Plan focuses on increasing participation in informal recreation, providing infrastructure to improve access to open spaces and waterbodies, sporting achievement and improving Council's parks and recreation sector. Through the Alternatives Assessment for the NW Local Arterials Package, existing sports and recreation facilities have been actively avoided, where practicable. The NW Local Arterials Package will also provide cycleway and walkway connections which will help increase informal physical activity and improve access to existing open spaces and to existing and future recreation facilities.
Te Tāruke-ā-Tāwhiri: Auckland's Climate Action Framework and Plan
The purpose of Auckland's Climate Action Framework and Plan is to increase Auckland's resilience to the impact of climate change and reduce emissions that cause climate change, with one of the key moves identified to deliver clean, safe and equitable transport options. The NW Local Arterials Package has been designed having regard to and taking into account climate change and resilience. The NW Local Arterials Package will deliver better accessibility and mode choice (thus reducing the present reliance on low occupancy vehicles). This provides an important component to realising the regional emissions benefits of an integrated network. This shows alignment with, and a positive contribution towards the Climate Action Framework and Plan.
Auckland's Urban Ngahere (Forest) Strategy
The Auckland Urban Ngahere (Forest) strategy recognises the ecosystem services as well as economic and cultural benefits delivered by green infrastructure within the urban environment and sets out objectives of the strategy which include the need to grow and protect urban ngahere in existing and future urban areas. Although the NW Local Arterial Package seeks the removal of some street trees, trees within open space zones and notable trees (i.e., trees that are protected by the district plan rules), this will be mitigated by planting within the new road layouts and results in overall net increase of trees from existing, due to the general lack of trees within the North West area. The long-term outcome of comprehensive street tree planting will be more trees in the public realm and increased amenity value within the road network, consistent with the Auckland Urban Ngahere (Forest) strategy.

Table 29-4: Assessment against other potential matters - local

Local
Local Board Plans
The NW Local Arterial Package is situated within three local board areas: Rodney, Upper Harbour and Henderson-Massey. The Local Board Plans outline outcomes for the respective local board areas. The plans identify outcomes relating to an improved and well-connected transport system, including active modes, managing growth, economic prosperity and protection and care for the environment. The NW Local Arterial Package is consistent with the outcomes of the Local Board Plans. The upgrade will integrate well with proposed surrounding land uses and the wider transport network, to respond to the timing, scale and form of urban development triggers and staging of future infrastructure corridors. In doing so the NW Local Arterial Package manages any adverse effects on the environment. The NW Local Arterial Package will provide a multimodal, safe and reliable arterial network that supports growth, enables sustainable travel choice for all transport users, address safety concerns and improve access to employment and social amenities. The NW Local Arterial Package will also support the economic outcomes sought by supporting economic growth and increased productivity. The NW Local Arterial Package will help facilitate the sustainable growth of the Rodney, Upper Harbour and Henderson-Massey areas.
Whenuapai Structure Plan (2016)
The Whenuapai Structure Plan is the strategic planning document for Whenuapai, supported by objectives with seven themes. These themes comprise of; sustainable urban development, a quality built urban environment, a well-connected Whenuapai, the national significance of the Whenuapai Airbase, the provision of infrastructure, an enhanced natural environment and protection of heritage, and the provision of quality open spaces. The objectives around transport involve higher residential densities around Rapid Transit stations and park and ride facilities, as well as ensuring Whenuapai will have a well-connected cycling and pedestrian network. Specifically, the Structure Plan seeks to ensure that: • The transport network responds to anticipated growth and maximises connectivity for commuters and freight within Whenuapai and to surrounding areas. • Frequent, attractive public transport options are supported by greater density along key routes, and good local and regional connections exist. • Dedicated cycle and pedestrian footpaths provide safe, connected and high amenity linkages between areas of activity at a local scale. All of the proposed corridor upgrades within Whenuapai contain separated walking and cycling facilities, achieving safe, connected and high amenity linkages. Public transport will be able to utilise the upgraded roads and several of the corridors, including the Māmari Road, Fred Taylor Drive, Bon Buck Road and Hobsonville Road corridor which have dedicated bus provisions.

29.6 RMA Part 2 Assessment

With regard to the relevance of Part 2, it has been well established, that where a plan has been competently prepared under the RMA it may be that in many cases there will be no need to refer to Part 2. However, if there is doubt that a plan has been "competently prepared" under the RMA, then it will be appropriate and necessary to have regard to Part 2. That is the implication of the words "subject to Part 2" in section 171(1) of the RMA.

In the context of these NOR application's, the objectives and policies of the relevant statutory documents were prepared having regard to Part 2 of the RMA, they capture all relevant planning considerations and contain a coherent set of policies designed to achieve clear environmental

outcomes. They also provide a clear framework for assessing all relevant potential effects, and there is no need to go beyond these provisions and look to Part 2 in making this decision. However, in the interests of caution, an assessment has been provided.

Section 29.6 considers the NW Local Arterials Package against the purpose and principles of Part 2 of the RMA.

29.6.1 Section 6 Matters of national importance

In considering if confirmation of the NORs for the NW Local Arterial Package would achieve the purpose of the RMA, matters of national importance are to be recognised and provided for. Section 6 matters considered relevant are addressed in Table 29-5.

Table 29-5: Part 2, section 6 matters of national importance

Part 6 Matter	Assessment
the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development	This matter is most relevant to the transport corridors surrounding the Totara Creek and Rāwiri Stream and tributaries. These areas are considered to have moderate to heightened localised natural character value. Other stream and wetland environments within the NW Local Arterial Package area including Trig Stream, Sinton Stream, Pikau Stream, Waiarohia Stream and associated tributaries and floodplains have been modified by historic vegetation clearance and rural land use. Adverse effects on natural character values identified have largely been avoided through the alternatives assessment process. As a result, the Projects avoid significant landscape features and seek to limit physical effects on SEAs, streams and other high value landscape features within the local landscape. The corridors will preserve the natural character of the stream environments through reinstatement and mitigation planting at the completion of works. The Projects provide opportunities for natural character values to be improved through enhancements to landscaping.
the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development	The transport corridors in the NW Local Arterial Package avoid outstanding natural features and landscapes.
the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna	The transport corridors within the NW Local Arterial Package have sought to avoid or minimise impacts on a range of high value ecological areas including high value wetlands, streams and SEAs. This is demonstrated through the comprehensive alternatives assessment process undertaken and assessment provided in this AEE. Where avoidance or minimisation of effects is not practicable, measures are proposed to mitigate effects of the works. Additionally, the proposed designations have provided further opportunities to minimise any impacts within the transport corridor alignments during the detailed design. The proposed designation is sufficient width to enable further mitigation related to regional resource consent requirements where required. In considering the potential effects on areas of significant indigenous vegetation and habitats and measures proposed through the conditions, it is considered that potential effects of the NW Local Arterial Package are adequately managed.

Part 6 Matter	Assessment
the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers	The proposed designations will not impact upon any existing public access to streams or the CMA. The NW Local Arterial Package has the potential to provide enhanced access to streams and the CMA in the transport corridor areas through the provision of active transport facilities and future integration with AC's proposed Blue-Green Network.
the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	This matter is recognised and provided for throughout the NW Local Arterial Package. Manawhenua have been actively involved throughout development of the corridors, including through alternatives assessment and identification of the preferred options. The opportunity to provide CIA's was provided and a CIA from Te Kawerau ā Makis has been considered by the Project team. The ongoing partnership with Manawhenua has provided an understanding and the incorporation of Manawhenua values and expression of kaitiakitanga throughout the development of the transport corridors. There are no sites of significance to Manawhenua, wāhi tapu, other taonga or Māori land identified under the AUP:OP within the transport corridors. The relationship of the respective iwi with the transport corridors, their ancestral lands, wāhi tapu and taonga will be recognised and provided for through the involvement of Manawhenua in developing and implementing various mitigation measures and management plans at the time of detailed design and construction.
the protection of historic heritage from inappropriate subdivision, use, and development	The corridors within the NW Local Arterials Package will not adversely affect any recorded historic heritage sites. While the transport corridors avoid any recorded historic heritage sites, previously unrecorded deposits may potentially be exposed during construction. The potential to disturb unrecorded sites is managed by the requirement for an accidental discovery protocol and implementation of a HHMP.
the protection of protected customary rights	None of the transport corridors within the NW Local Arterial Package impact upon any known protected customary rights.
the management of significant risks from natural hazards	The NW Local Arterial Package manages risk from natural hazards during both the construction and operation phases. Measures to mitigate flood risk during construction (measures included in the CEMP proposed as a condition of the designation) and future flood risk modelling will ensure the design does not exacerbate flood risks. Additionally, the transport corridors will improve the resilience of stream crossings to flood hazard and climate change through improved freeboard and slight decreases in flood depth and velocity.

On that basis the NW Local Arterial Package is considered to be consistent with section 6 of the RMA.

29.6.2 Section 7 Other matters

Particular regard has been given to the matters in section 7 of the RMA. In particular:

- Manawhenua kaitiakitanga has been recognised through engagement at each stage and will continue at construction and operation.
- Ethic of stewardship is recognised through engagement and participation with stakeholders and partners who have a specific interest in or exercise stewardship over particular resources.
- Input from various stakeholders has enabled development of an integrated transport solution providing important community and environmental outcomes.

- The alternatives assessment process, the most efficient use of natural and physical resources has been determined, particularly in utilising existing corridors.
- Alignment selection and design process has sought to avoid adverse effects on existing and future amenity. Particular regard has been given to the management of amenity values during construction and on streams and tributaries, considered to have moderate to heightened, localised natural character values. Walking and cycling facilities will be notably improved throughout the North West, improving the safety and amenity of the urban environment.
- Corridor development has sought to avoid adverse effects on ecosystems as far as practicable while allowing flexibility for refinement during detailed design.
- Each corridor is designed to provide adaptation resilience to flooding taking into account climate change and reducing urban heat island effects through the provision for street tree planting.

On that basis the NW Local Arterial Package is considered to be consistent with Section 7 of the RMA.

29.6.3 Section 8 Treaty of Waitangi

Section 8 of the RMA requires that the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) are taken into account when managing the use, development, and protection of natural and physical resources.

AT has partnered with manawhenua throughout the development of the NW Local Arterial Network. This has resulted in the selection of transport corridors which avoid and minimises adverse effects on cultural values where practicable. This has included avoiding or minimising impacts on SEAs, wetlands and streams and ensuring that construction management plans will be in place to protect water quality and any previously unrecorded items of cultural heritage encountered.

Further engagement will be undertaken in the detailed design and construction phases to ensure that the principles of the Treaty of Waitangi are taken into account. Given these factors, the development of the NW Local Arterial Network is considered to be consistent with the principles of the Treaty of Waitangi.

29.6.4 Section 5 Purpose and Principles

Section 5 states the purpose of the Act is to promote the sustainable management of natural and physical resources.

Sustainable management is defined in section 5(2) to mean *"Managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while-*

a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment."

The NW Local Arterial Package will meet this by:

Part 2 S5 (2) enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety

- Enabling planned urban growth within the North West growth areas by providing critical transport infrastructure required to unlock growth and capacity of the FUZ land resource
- Providing a safe and reliable arterial network that supports and integrates with planned growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities by:
  - Increasing active modes and public transport choices
  - Reducing the risk of DSIs and improving road safety for all users
  - Improving connectivity between future town centres and within the North West area
  - Improving corridor capacity, resulting in improved journey times and reliability for future freight and public transport
- Improving amenity through upgraded transport corridors which can be integrated with the surrounding environment. There are also opportunities for dedicated walking and cycling facilities and berm planting within the upgraded corridors.

Part 2 S5 (a) Sustaining the potential of natural and physical resources for future generations

- Improving the resilience of the transport network to flood hazard by accounting for future rainfall predictions and inclusion of stormwater facilities for each corridor
- Meeting the future transportation needs of the North West area by generally utilising existing road corridors, enabling the efficient use of existing physical resources. Where required, substantial extensions to existing new corridors are enabled for Spedding Road and Māmari Road
- Not precluding opportunities for staged improvements to existing corridors to public transport.

Part 2 S5 (b) Safeguards the life supporting capacity of air, water, soil and ecosystems by

- Improving mode choice and reducing congestion, which has the potential to benefit air quality at a local level;
- Providing sufficient land to manage water quality and quantity at future consenting stage;
- Managing future construction works;
- Avoiding (where practicable), remedying and mitigating the adverse effects on high value ecological areas including wetlands, streams and SEAs; and
- Having significant positive effects on the transport network, urban growth capacity and potential economic growth.

Part 2 S5 (c) Avoiding, remedying or mitigating any adverse effects

Each of the corridors within the NW Local Arterials Package avoids, where practicable, and otherwise remedies or mitigates adverse effects on the environment through the designs developed to date, and through identification of mitigation measures to be captured in the subsequent outline plan of works phases of the NW Local Arterial Package.

On that basis the NW Local Arterial Package is considered to be consistent with section 5 of the RMA.

30 Other statutory approvals required

Further and separate approvals under other legislation will be required and will be sought in future. This report does not seek authorisation or approval for those works, but they are set out under Table 30-1 for clarity purposes.

Table 30-1: Other statutory approvals required

Other statutory authority required	Discussion
Outline Plan of works	In accordance with section 176A of the RMA, AT (as the requiring authority) will submit to the Council (as the territorial authority) one or more outline plan(s), detailing all relevant aspects of the transport corridors following the completion of detailed design and prior to the commencement of construction.
Land subject to existing designations	Some land to be designated for the transport corridors is subject to existing designations by other requiring authorities. In order to undertake work in accordance with a designation on land with an existing designation, written consent from the requiring authority of the earlier designation is required under section 177(1)(a). The section 177(1)(a) approvals required for each corridor are set out in AEE Part A, under existing planning environment. Written approval is required in order to undertake works within the earlier designations where those works may prevent or hinder the earlier designation's purpose or project. Consultation has occurred with these authorities to confirm acceptability of indicative designs; however it is appropriate that written consent is sought at detailed design prior to construction when further detail will be known and to account for any changes to status of earlier designation. Therefore, written approval under section 177(1)(a) of the RMA will be sought closer to construction.
Future resource consents	The transport corridors will require NES and regional resource consents to enable works. Although not being sought at this stage, their implications have been considered in the indicative designs, options assessment and the proposed designation footprints. These consents will be sought when the detailed design for each of the transport corridors is completed.
Considerations under other legislation	Other matters which will need to be considered include: • PWA – the acquisition of required land • HNZPTA – authorities for works on or in any archaeological sites • Reserves Act 1977 – as required for affected reserves • Wildlife Act 1953 – the disturbance or relocation of protected species (e.g., taking and / or killing of wildlife for certain purposes and / or causing damage)

PART C

Appendices

TE TUPU NGĀTAHI
SUPPORTING GROWTH

Appendix A

Assessment of Alternatives

WAKA KOTAHI
NZ TRANSPORT AGENCY

New Zealand Government

TE TUPU NGĀTAHI
SUPPORTING GROWTH

Appendix B

NOR Conditions