TE TUPU NGĀTAHI
SUPPORTING GROWTH

VOLUME 2

South Frequent Transit Network
Assessment of Effects on the Environment

October 2023

Version 1.0

WAKA KOTAHI
NZ TRANSPORT AGENCY

New Zealand Government

Document Status

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Revision Status

Version	Date	Reason for Issue
1.0	13/10/23	Final for Lodgement

The Assessment of Effects on the Environment report and supporting documents are structured as set out in the table below:

Volume	Title	Contents
1	NoR 1 Form 18 NoR 2 Form 18 NoR 3 Form 18 NoR 4 Form 18	Attachment A: Designation Plans Attachment B: Schedule of Directly Affected Properties Attachment C: Proposed Conditions for the Designation
2	Assessment of Effects on the Environment	Appendix A: Assessment of Alternatives Report Appendix B: CVA (partially redacted)
3	Design Drawings	General Arrangement Drawings
4	Supporting Technical Reports	Assessment of Arboricultural Effects Assessment of Archaeological and Heritage Effects Assessment of Construction Noise and Vibration Effects Terrestrial Assessment of Ecological Effects Assessment of Operational Noise Effects Assessment of Landscape and Visual Effects Assessment of Traffic and Transport Effects Assessment of Flooding Effects Social Impact Assessment Urban Design Evaluation Report

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Glossary of Defined Terms and Acronyms

We note that 'Takaanini' (with double vowels is used throughout the Report Acknowledging the ongoing kōrero and guidance from Manawhenua on the cultural landscape. 'Takanini' is used where reference is made to a specific and existing named place (e.g., Takanini Road, Takanini Town Centre etc.). Manawhenua is also used throughout the Report as while gifting the programme name as Te Tupu Ngātahi, Manawhenua confirmed this was an appropriate spelling (capital 'M' and one word). Notwithstanding this, the term is spelled as two words in other fora and the proposed designation conditions – Mana Whenua.

Acronym/Term	Description
AEE	Assessment of Effects on the Environment (this Report)
AEP	Annual Exceedance Probability
AFC	Auckland Forecasting Centre
AT	Auckland Transport
ARI	Average Recurrence Interval
AUP:OP	Auckland Unitary Plan: Operative in Part
BPO	Best Practicable Option
CCRA	Climate Change Response Act 2022
CEMP	Construction Environmental Management Plan
CHI	Cultural Heritage Inventory
CIA	Cultural Impact Assessment
CNVMP	Construction Noise and Vibration Management Plan
CTMP	Construction Traffic Management Plan
CVA	Cultural Values Assessment
DBC	Detailed Business Case
DP	District Plan
ERP	Emissions Reduction Plan
FENZ	Fire and Emergency New Zealand
FTN	Frequent Transit Network
FDS	Future Development Strategy
FUZ	Future Urban Zone
GPS	Government Policy Statement
HHMP	Historic Heritage Management Plan

Acronym/Term	Description
HNZPT / Heritage NZ	Heritage New Zealand Pouhere Taonga
IBC	Indicative Business Case
ISPP	Intensification Streamlined Planning Process
ISTN	Indicative Strategic Transport Network
KiwiRail	KiwiRail Holdings Limited
LGACA	Local Government (Auckland Council) Act 2009
LIP	Land Use Integration Process
LMP	Lizard Management Plan
LTMA	Land Transport Management Act 2003
MCA	Multi-Criteria Assessment
MPD	Maximum Probable Development
N/A	Not Applicable
NES	National Environmental Standard
NIMT	North Island Main Trunk railway
NoR	Notice of Requirement
NoR 1	Notice of Requirement 1: Great South Road FTN Upgrade
NoR 2	Notice of Requirement 2: Great South Road Upgrade (Drury section)
NoR 3	Notice of Requirement 3: Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades
NoR 4	Notice of Requirement 4: Takaanini FTN - Porchester Road and Popes Road Upgrades
NPS	National Policy Statement
NPS:ET	National Policy Statement on Electricity Transmission
NPS:FM	National Policy Statement on Freshwater Management
NPS:IB	National Policy Statement on Indigenous Biodiversity
NPS:UD	National Policy Statement on Urban Development
NUMP	Network Utility Management Plan
NZAA	New Zealand Archaeological Association
NZUP	New Zealand Upgrade Programme
OSMP	Open Space Management Plan

Acronym/Term	Description
PBC	Programme Business Case
PC78	Plan Change 78 to the Auckland Unitary Plan: Operative in Part
PPF	Protected premises and facilities
PPV	Peak Particle Velocity
Programme Partners	Auckland Transport, Waka Kotahi and Manawhenua
The Project	The Four NoRs proposed to authorise transport upgrades along key sections of roads which fall within the South FTN network (subject of this report / application).
PWA	Public Works Act
RLTP	Auckland Regional Land Transport Plan
RMA	Resource Management Act 1991
RPS	Regional Policy Statement
RPTP	Regional Public Transport Plan
SAPs	Site Access Points
SCEMP	Stakeholder and Communication Engagement Management Plan
SEA	Significant Ecological Area
SH1	State Highway 1
SIA	Social Impact Assessment
SNA	Significant Natural Areas
South FTN	South Frequent Transit Network
TAR	Threatened and At Risk
TfUG	Transport for Future Urban Growth
THAB	Terrace Housing and Apartment Buildings Zone
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth
TMP	Tree Management Plan
UDE	Urban Design Evaluation
ULDMP	Urban and Landscape Design Management Plan
VKT	Vehicle Kilometres Travelled
Waka Kotahi	Waka Kotahi NZ Transport Agency

Acronym/Term	Description
ZOI	Zone of Influence

1 Introduction

This Assessment of Effects on the Environment (**AEE**) has been prepared by Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**) and supports the Notices of Requirement (**NoRs**) for the South Frequent Transit Network (**South FTN**). Four NoRs are proposed to authorise transport upgrades along key sections of roads which fall within the South FTN network.

The transport upgrades authorised by the NoRs are referred to in this AEE as the **Project**. Auckland Transport (**AT**) is the Requiring Authority for the NoRs/Project under the Resource Management Act 1991 (**RMA**).

1.1 The South FTN network

The South FTN comprises a range of road upgrades including bus priority measures, new and upgraded active mode facilities, and intersection improvements along existing arterial road corridors in South Auckland. In particular, the proposed road upgrades provide for:

- Operation of high-quality Frequent Transit Network (**FTN**) bus services (defined[1] as bus routes operating at least every 15 minutes between 7am-7pm, 7-days-a-week, supported by priority measures) along Great South Road between Manukau and Drury (the **Great South Road FTN** route);
- Operation of high-quality FTN bus services along existing roads between Manurewa, Takaanini, and Papakura (the **Takaanini FTN** route); and
- Upgrades of adjoining **key connections** to FTN routes – Popes Road to the east of Takaanini, and the Drury section of Great South Road between Waihoehoe Road and State Highway 1 (**SH1**).

The total extent of the South FTN network is shown in Figure 1-1.

The South FTN is intended to address deficiencies in the existing transport network between Manukau and Drury including a lack of provision for high-quality public transport, and a lack of safe active mode facilities which result in an over-reliance on public vehicles. Without network upgrades, these deficiencies will be exacerbated by planned growth and increased travel demand. The South FTN is intended to alleviate these existing transport deficiencies, support planned urban growth, and enable mode shift to public transport and active modes in South Auckland.

1.2 The NoRs – proposed spatial extent

Of the full South FTN network extent shown in Figure 1-1, only a portion falls within the NoRs/Project (see Figure 1-2). This is because the proposed corridor upgrades do not always require additional land take, can be undertaken within the existing road reserve, and therefore do not require new designations.

Accordingly, the focus of this AEE and its constituent specialist assessments is on the activities proposed to be authorised by the four NoRs as part of the Project. The parts of the South FTN that fall outside of the four NoRs can be carried out within the existing road reserve and are therefore permitted activities or readily consentable without designation.

[1] In Auckland Transport's *Regional Public Transport Plan* (**RPTP**).

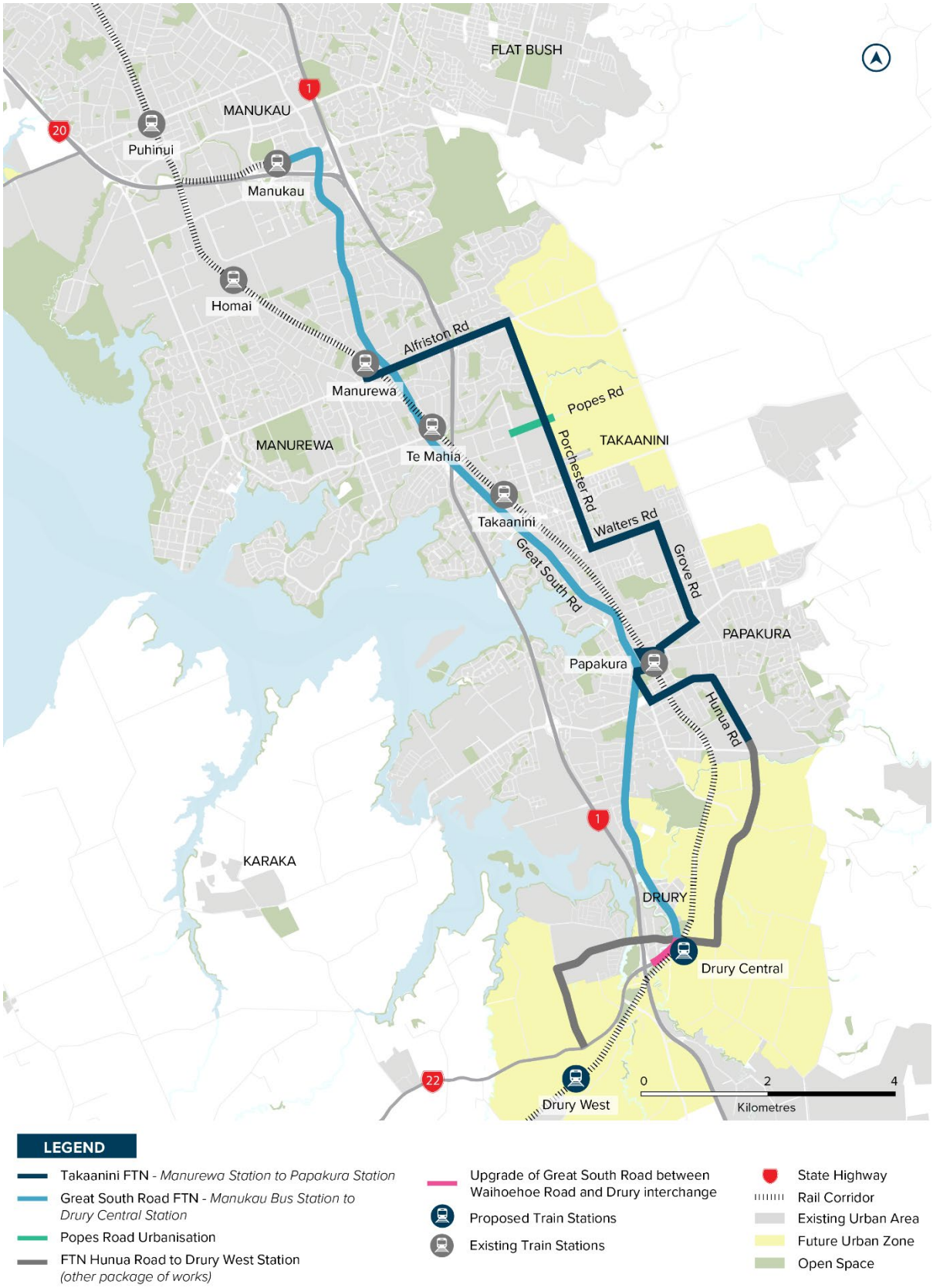


Figure 1-1: South FTN – full network extent

Figure 1-2: South FTN - NoR extents

Some limited additional third-party land may be required in the future to provide for intersection upgrades between Takaanini and Ōpaheke. The relative cost-benefit assessment of these areas did not favour route protection at this time given the projected time scale for future urban growth in this area.

1.3 Description of the NoRs

AT seeks four NoRs to enable the implementation of the South FTN network. The NoRs seek generally to provide for road widening to accommodate bus priority measures, walking, and cycling facilities, key intersection upgrades, replacement of existing bridges and other associated works. These are described in more detail in Table 1-1, and the extents are shown in Figure 1-2.

The NoRs/Project are described in greater detail in Section 3 of this AEE.

Table 1-1: Summary of the proposed Project

NoR reference	Project component	Description
NoR 1	Great South Road FTN Upgrade	• Road upgrades and transport upgrades providing for the Great South Road FTN route along Great South Road between Manukau and Drury. • NoR comprises eight separate areas along Great South Road (see Figure 1-2) providing for bus priority measures, walking and cycling facilities, key intersection upgrades, replacement of the existing Otūwairoa / Slippery Creek bridge, and stormwater management devices.
NoR 2	Great South Road Upgrade (Drury section)	• Road upgrades and transport upgrades providing for upgrade of a 520m section of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange. • NoR enables road widening to provide for four lanes, active mode facilities, replacement of the existing Hingaia Stream bridge, and stormwater management devices.
NoR 3	Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades	• Road upgrades and transport upgrades providing for the Takaanini FTN route along Weymouth and Alfriston Roads between Selwyn Road and Saralee Drive; and for an adjoining section of the Great South Road FTN route between Halver Road and Myers Road. • NoR enables road widening to accommodate bus priority measures, walking and cycling facilities, key intersection upgrades, replacement of existing bridges along Weymouth Road over the North Island Main Trunk (**NIMT**) and Alfriston Road over SH1, and stormwater management devices.
NoR 4	Takaanini FTN – Porchester Road Upgrade; and Popes Road Upgrade	• Road upgrades and transport upgrades providing for the Takaanini FTN route along Porchester Road generally between Alfriston Road and Walters Road; and for the urbanisation of Popes Road generally between Takanini School Road and Porchester Road. • NoRs provide for urbanisation of both corridors – two traffic lanes, walking and cycling facilities, key intersection upgrades, and stormwater management devices.

1.4 Auckland Transport's Requiring Authority Status

AT is financially responsible for Auckland's transport network and services (excluding state highways), including roads, footpaths, cycling, parking, and public transport services such as rail. 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 and include managing and controlling the AT 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"*. Accordingly, AT may designate land to construct, operate and maintain roads and any other activities in relation to the Auckland transport system that it has financial responsibility for.

1.5 Notification

AT requests that the four NoRs are publicly notified.

1.6 About Te Tupu Ngātahi Programme

Te Tupu Ngātahi programme involves a collaboration between 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. The South FTN is one of the projects comprising this future network.

The key objective of Te Tupu Ngātahi is to protect land for future implementation of the required strategic transport 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 the transport infrastructure required to support planned growth in South Auckland. A designation is important as it provides certainty for the Requiring Authority that it can implement the work. It also provides property owners, businesses and the community with increased certainty regarding future infrastructure, so they can make informed decisions. It can also significantly reduce long-term costs for local and central government and enable more effective land use and transport outcomes.

2 Background and Context

2.1 Growth in South Auckland

Over 70,000 people currently live in the area of South Auckland between Manukau and Drury. Planned growth in adjoining Future Urban Zone (**FUZ**) areas in Ōpaheke-Drury is projected to double this population over the next three decades, and the additional development potential provided for by the forthcoming Plan Change 78 (**PC78**) across the existing urban area will further increase the overall growth quantum. This growth poses significant transport challenges for the area. The Project is part of a strategic transport network planned to meet this growth challenge.

2.2 Origins of the South FTN – Business Case Process

The South FTN comprises a series of transport upgrades along existing arterial roads between Manukau and Drury. As noted above, the Project is part of a wider strategic transport network planned to meet the demands of growth in South Auckland. This network in turn has been identified through an iterative business case as follows:

- In 2015, AT, Waka Kotahi and Auckland Council formed the Transport for Future Urban Growth (**TfUG**) Programme. TfUG identified at a high level the transport networks needed to connect the urban growth areas across North, North West and South Auckland over the next 30 years. This work formed the basis of the Programme Business Case (**PBC**) finalised in 2016, which identified route protection as the priority for the next steps of the programme (which became Te Tupu Ngātahi);
- In 2019, the AT and Waka Kotahi Boards approved Indicative Business Cases (**IBC**) for each growth area (Warkworth, North, North West and South) to further test and develop the recommendations of the PBC. The South IBC identified an Indicative Strategic Transport Network (**ISTN**) (see Figure 2-1) comprising numerous recommended projects, including several FTN routes between Manukau and Drury; and
- From 2020, Detailed Business Cases (**DBC**) were initiated for the route protection of individual projects identified as part of the ISTN. This included a DBC for the South FTN, which commenced in late 2021, and was approved by the AT and Waka Kotahi Boards respectively in August and September 2023.

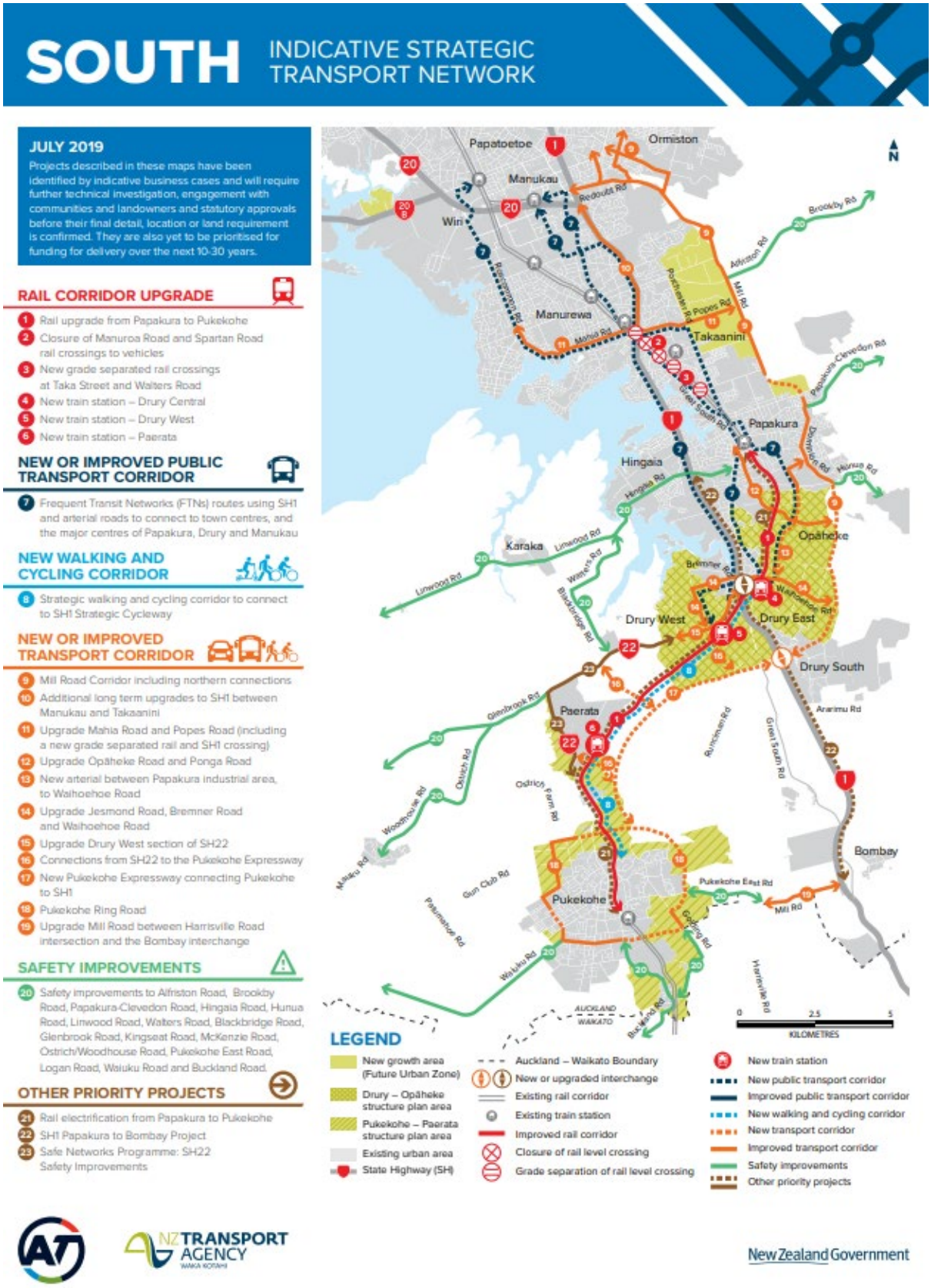


Figure 2-1: South Indicative Transport Network

3 The South FTN

3.1 Components of the South FTN

3.1.1 South FTN routes

As described in Section 1.2 above, the South FTN comprises a range of proposed road upgrades including bus priority measures, new and upgraded active mode facilities, and intersection improvements along sections of the following planned FTN routes (see Figure 1-1):

- The **Great South Road FTN** route, which runs along Manukau Station Road and Great South Road between Manukau to Drury; and
- The **Takaanini FTN** route, which runs along Weymouth Road, Alfriston Road, Porchester Road, Walters Road, Grove Road, Clevedon Road, Railway Street West, Wood Street, Great South Road, Ōpaheke Road, Settlement Road, and Hunua Road.

The proposed transport upgrades along the two FTN routes were identified through an investment logic mapping process as part of the DBC outlined in Section 2.2 above. This includes a process of identifying the transport problems that need to be solved, the benefits to be derived from solving the problems, and a resultant set of investment objectives. The problem statements developed for the South FTN are summarised in Table 3-1 below. In general, these problem statements show that the Project aims to rectify a number of existing deficiencies in the transport network in South Auckland, including a lack of public transport accessibility and resilience, and car dependency stemming from a lack of transport choice. Without intervention, these deficiencies will be exacerbated by planned growth and increased travel demand.

Table 3-1: South FTN DBC problem statements

Problem Statements	
Problem Statement 1: Access	• Lack of access to the public transport network for existing and new urban areas between Drury and Manukau, especially areas not serviced by rail resulting in the deteriorating accessibility to economic and social opportunities.
Problem Statement 2: Travel Choice	• A lack of high quality, accessible and competitive public transport will continue to drive an over reliance on private vehicle travel in Takaanini and the South.
Problem Statement 3: Resilience	• Public transport will experience poor reliability as demand grows if investment is not made in the transport network.
Problem Statement 4: Climate Change	• The current transport system has an over-reliance on private vehicles. This combined with the limited low carbon transport alternatives results in significant transport emissions which is incongruent with current climate change goals.
Problem Statement 5: Integration	• The existing corridor form and function creates conflicts between modes and a failure to integrate a high-quality public transport corridor will not support future growth.

The investment objectives defined in the DBC reflect what needs to be achieved to address the problem statements, and are as follows:

- **Access** – Enable access to economic and social opportunities by providing high quality public transport between Drury and Manukau that integrates with the rail network;
- **Integration** – Support planned growth by integrating with the existing transport system, land use and the planned public transport network; and
- **Travel Choice and Climate Change** – Support growth and mode share shift towards low carbon transport modes.

3.1.2 Key Connections

In addition to the two FTN routes, the South FTN also includes Key Connections along which provision for corridor widening and urbanisation, new and upgraded active mode facilities, and intersection improvements are proposed. The Key Connections adjoin the two FTN corridors, and are as follows (see Figure 1-1):

- The section of **Great South Road in Drury** between Waihoehoe Road and the SH1 Drury Interchange; and,
- **Popes Road** between Takanini School Road and Porchester Road.

The Key Connections were identified through the same process of investment logic mapping through the DBC as described above for the two FTN routes. The relevant problem statements are summarised in Table 3-2 below.

Table 3-2: Key connection problem statements

Key Connections Problem Statements	
Problem Statement 1: Access	• The current form and function of the corridor does not support future growth and will constrain access to economic and social opportunities in the South.
Problem Statement 2: Integration	• The existing transport corridor is not commensurate with the level of urban growth in this area limiting development potential and the quality of the future urban environment.
Problem Statement 3: Climate Change	• The current transport system has an over-reliance on private vehicles. This combined with limited low carbon transport alternatives results in significant transport emissions which is incongruent with current climate change goals.
Problem Statement 4: Travel Choice	• A lack of dedicated active mode facilities along Popes Road will result in more private vehicle trips as growth occurs.
Problem Statement 5: Safety	• Future growth and a lack of separated, and safe active mode facilities will result in inappropriate quality of service on the corridor.

The investment objectives defined in the DBC reflect what needs to be achieved to address the problem statements, and are as follows:

- **Access** – Improve access to economic and social opportunities by providing and integrated multi-modal corridors;
- **Integration** – Provide corridor protection to support planned growth and flexibility enable future land use and transport integration;

- **Travel Choice** – Enable transformational mode share in Takaanini by providing a high quality, low carbon transport network; and
- **Safety** – Provide improvements on the corridors that contributes to a transport network that is free from deaths and serious injuries.

3.2 South FTN: description of overall upgrade works plus NoR specific sections

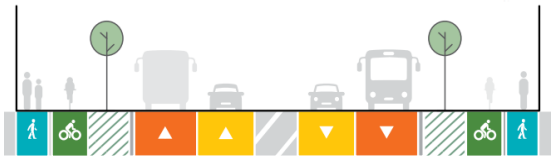
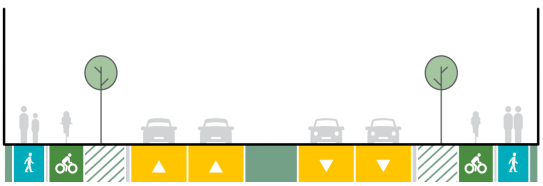
3.2.1 General Overview

As noted at Section 1.2, some of the proposed upgrades do not require third-party land and therefore do not fall within the proposed NoRs. The South FTN as a whole proposes:

- **Bus priority measures** – including 5km of two-way bus lanes and 7.7km of northbound bus lanes on Great South Road as part of the Great South Road FTN route, and 1.7km of two-way bus lanes on Alfriston Road as part of the Takaanini FTN route;
- **Active mode improvements** over the full Project extent;
- **Intersection improvements** – including 20 intersection upgrades requiring third-party land, including both signalised intersections and roundabouts;
- **Bridges** – replacement of existing Great South Road bridges across Otūwairoa/Slippery Creek and the Hingaia Stream; the existing Weymouth Road bridge over the NIMT, and the existing Alfriston Road bridge over SH1; and
- **Stormwater management devices** – including six wetlands, localised sections of raingardens and swales, culvert extensions.

This AEE specifically relates to the four NoRs proposed to enable the South FTN. Several typical cross-sections were used to inform the concept design for different sections of the Project. These are summarised in Table 3-3.

Table 3-3: Typical cross-sections

Cross-section	Applicable sections of the Project/relevant NoR
	**Four-Lane FTN Arterial** – applied to: • Sections of the Great South Road FTN (NoR 1); and • The Weymouth/Alfriston Road section of the Takaanini FTN (NoR 3).
	**Three-Lane FTN Arterial** (northbound bus lane) – applied to sections of the Great South Road FTN (NoR 1).
	**Four-Lane Arterial** – applied to the Drury section of Great South Road (NoR 2).

Cross-section	Applicable sections of the Project/relevant NoR
	**Two-Lane Arterial** – applied to Porchester Road and Popes Road (NoR 4).

The indicative design has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final design will be refined and confirmed at the detailed design stage. Other key features of the works common across NoRs include the following:

- The widening of the existing road corridors and intersections;
- Bridge structures across waterways, the NIMT, and SH1;
- Works to tie in with existing roads;
- Vegetation removal within the proposed designation boundaries to enable construction;
- Cut-and-fill batters and retaining structures; and
- Areas identified for construction related activities including site compounds, construction laydown, alternative access, and construction traffic manoeuvring.

Further details of the Project elements provided for in each of the four NoRs is provided in the following subsections. The General Arrangement Plans in Volume 3 also shows the indicative design.

3.2.2 NoR 1 – Great South Road FTN Upgrade

NoR 1 is not contiguous but rather comprises eight separate intersection upgrades for the Great South Road FTN route between Manukau and Drury (see Figure 3-1). The NoR applies to a collective linear extent of approximately 2.5km of a total route length of 15.5km, reflecting that the existing road reserve along Great South Road is sufficient to accommodate the desired corridor form and function for the majority of the route length (and does not therefore fall within the NoR 1 extent).

The eight NoR sections provide for bus priority measures, walking and cycling facilities, upgrades to eight key intersections (see Table 3-4), replacement of the Otūwairoa / Slippery Creek bridge, and localised provision for stormwater treatment raingardens. Figure 3-2 shows the location of each key intersection for NoR 1. The indicative design at each of the sections can be seen in the General Arrangement Plans in Volume 3. The four-lane and three-lane FTN arterial cross-sections are used as the basis for concept design (see Table 3-3).

NoR 1 affects approximately 171 properties.

Figure 3-1: Extent of NoR 1 – Great South Road FTN Upgrade

Table 3-4: NoR 1 Key Intersections

NoR 1 Great South Road Key Intersections (North to South)	**Corresponding labels in** Figure 3-2
Great South Road/ Browns Road/ Orams Road	1A
Great South Road/ Grand Vue Road	1B
Great South Road/ Mahia Road	1C
Great South Road/ Taka Street/ Walter Strevens Drive	1D
Great South Road/ Subway Road	1E
Great South Road/ Wellington Street	1F
Great South Road/ Beach Road/ Settlement Road	1G
Great South Road/ Park Estate Road	1H
Great South Road / Otūwairoa Stream / Slippery Creek Crossing	1I

Figure 3-2: NoR 1 - Specific intersection references

3.2.3 NoR 2 – Great South Road Upgrade (Drury section)

NoR 2 enables the upgrade of an approximately 520m section of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange (see Figure 3-3). It should be noted that the Drury section of Great South Road is not part of the FTN route but is rather one of the Key Connections described in Sections 1.2 and 3.1.2.

The NoR enables two general traffic lanes per direction, walking and cycling facilities, replacement of the Hingaia Stream bridge, localised provision for stormwater treatment raingardens, and an extension of one existing culvert. The indicative design for this NoR can be seen in the General Arrangement Plans in Volume 3. The four-lane arterial cross-section is used as the basis for concept design (see Table 3-3).

NoR 2 affects approximately 47 properties.

Figure 3-3: Extent of NoR 2 - Great South Road Upgrade (Drury section)

3.2.4 NoR 3 – Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades

NoR 3 enables upgrades of approximately 1.7km in extent along Weymouth and Alfriston Roads as part of the Takaanini FTN route; and for an adjoining 590m length of the Great South Road FTN to the south of the intersection of Great South Road, Weymouth Road, and Alfriston Road (see Figure 3-4).

The NoR enables a four-lane FTN arterial cross-section for the Weymouth and Alfriston Road extent, and for part of its extent as it applies to Great South Road (see Table 3-3). Accordingly, the NoR enables bus lanes in both directions, walking and cycling facilities, upgrades and tie-ins to eight key intersections (see Table 3-5), replacement of the existing Weymouth Road bridge over the NIMT and the Alfriston Road bridge over SH1, and four stormwater treatment wetlands. The indicative design for this NoR can be seen in the General Arrangement Plans in Volume 3.

NoR 3 affects approximately 430 properties.

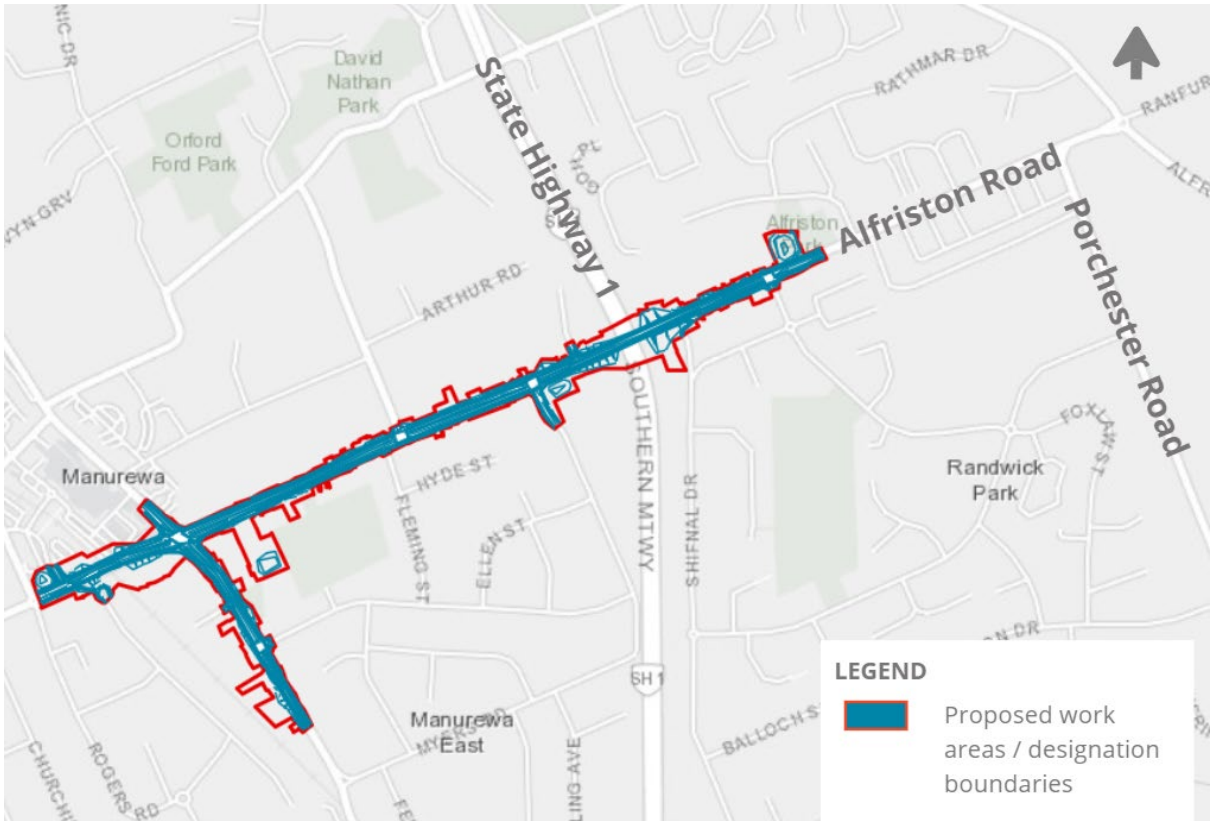


Figure 3-4: Extent of NoR 3 – Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades

Table 3-5: NoR 3 Key Intersections

NoR 3 Great South Road Key Intersections
Weymouth Road/ Train Interchange
Weymouth Road/ Beaumonts Way
Great South Road/ Weymouth Road/ Alfriston Road
Alfriston Road/ Fleming Street
Alfriston Road/ Claude Road
Alfriston Road Road/ Scotts Road
Alfriston Road/ Magic Way
Great South Road/ McAnnalley Street

3.2.5 NoR 4 – Takaanini FTN – Porchester Road and Popes Road Upgrades

NoR 4 enables upgrades of approximately 3km in extent along Porchester Road between Alfriston Road and Walters Road as part of the Takaanini FTN route; and for 0.5km along Popes Road between Takanini School Road and Porchester Road (see Figure 3-5). While Porchester Road is part of the Takaanini FTN route, Popes Road is not part of the FTN route but is rather one of the Key Connections described in Sections 1.2 and 3.1.2.

The NoR enables two vehicular traffic lanes, walking and cycling facilities, upgrades and tie-ins to six key intersections (see Table 3-6) along both routes; and stormwater management devices comprising two treatment wetlands (on Porchester Road) and treatment swales (on Popes Road). The indicative design for this NoR can be seen in the General Arrangement Plans in Volume 3.

NoR 4 affects approximately 99 properties.

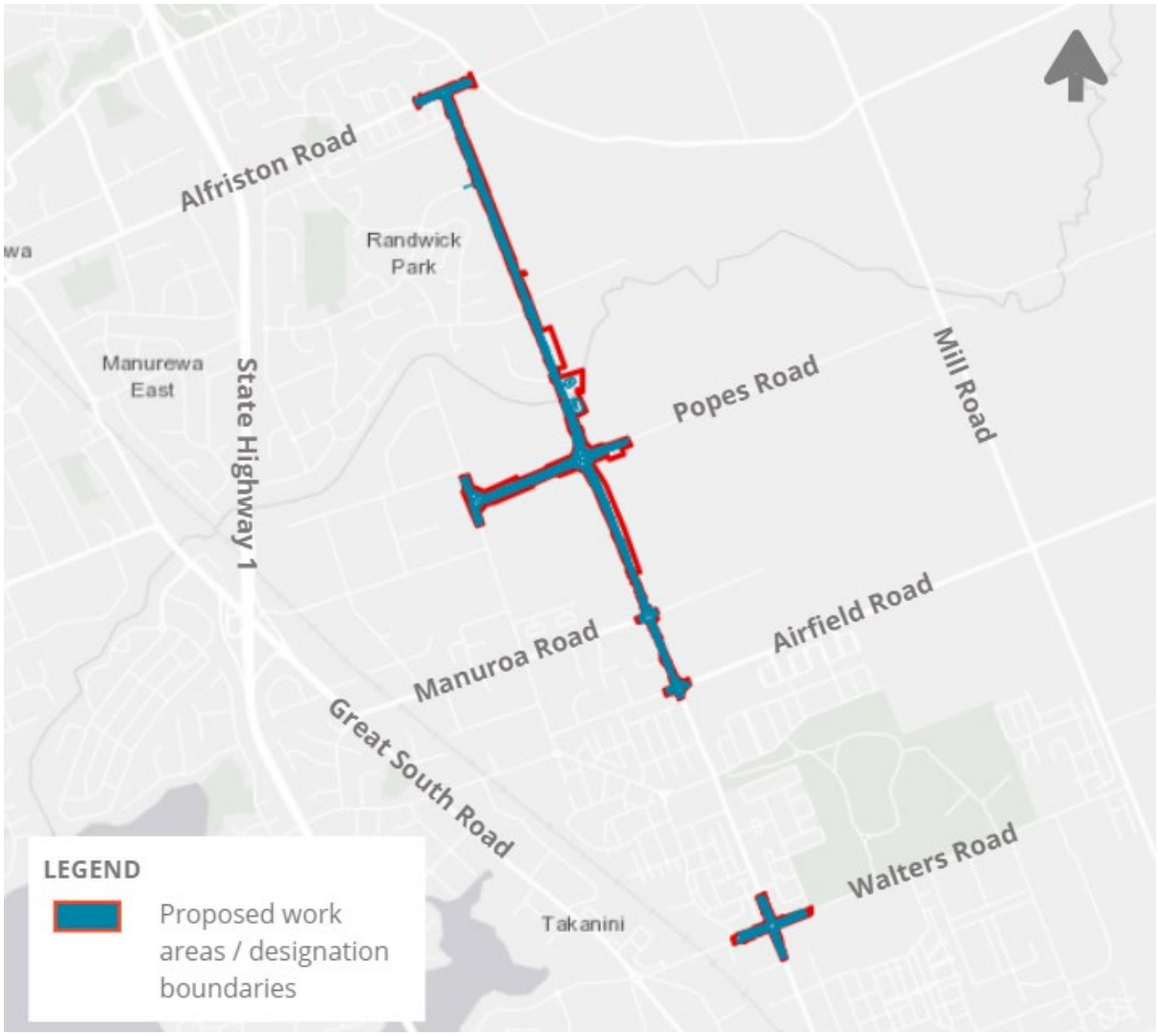


Figure 3-5: Extent of NoR 4 – Takaanini FTN - Porchester Road and Popes Road Upgrades

Table 3-6: NoR 4 Key Intersections

NoR 4 Key Intersections
Porchester Road/ Alfriston Road
Porchester Road/ Popes Road
Porchester Road/ Manuroa Road/ Berywn Avenue
Porchester Road/ Airfield Road
Porchester Road/ Walters Road
Popes Road/ Takanini School Road

3.3 Project Objectives

Section 171(1)(c) of the 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 the NoRs for the purposes of section 171(1)(c) were developed from the DBC investment objectives outlined in Section 3.1. This approach reflects the clear parallels between the DBC investment objectives which identify the need for transport investment to address defined problems and to inform the options assessment process; and the NoR Project objectives developed to identify whether the work(s) and designation(s) are reasonably necessary to achieve the Requiring Authority's Project outcomes, and to guide the alternatives assessment for the Project as well.

Under section 171(1)(c) the reasonable necessity of the work and the designation to achieve the Project Objective is a matter for the decision maker to have particular regard to in the context of considering Project's effects on the environment; subject to Part 2 of the RMA.

The Project Objective for NoRs 1-4 is set out below:

Provide for upgraded multi-modal transport corridors between Manukau and Drury[2] that:

- ***a) Improve connectivity and access to economic and social opportunities;***
- ***b) Improve safety;***
- ***c) Improve efficiency, resilience, and reliability;***
- ***d) Integrate with and support existing development and planned urban growth;***
- ***e) Integrate with and support the existing and future transport network; and***
- ***f) Improve travel choice and contribute to mode share shift.***

The assessment of the reasonable necessity of the proposed works and NoRs to achieve this objective under section 171(1)(c) of the RMA is contained at Section 7 of this AEE.

3.4 Overview of Notices of Requirement

Table 3-7 provides an overview of the purpose, objective, lapse period and affected properties for the four NoRs.

Table 3-7: Overview of the NoRs

Notice	Purpose	Project Objective	Lapse period	Overview of properties
NoR 1 – Great South Road FTN Upgrade	Construction, operation and maintenance of	Provide for upgraded multi-modal transport corridors	15 years	171 directly affected properties

[2] Each NoRs have specific routes which are covered within the Form 18s.

Notice	Purpose	Project Objective	Lapse period	Overview of properties
NoR 2 –Great South Road Upgrade (Drury section)	upgraded arterial transport corridors and associated infrastructure.	between Manukau and Drury that: Improve connectivity and access to economic and social opportunities; Improve safety; Improve efficiency, resilience, and reliability; Integrate with and support existing development and planned urban growth; Integrate with and support the existing and future transport network; and Improve travel choice and contribute to mode share shift.	10 years	47 directly affected properties
NoR 3 – Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades			15 years	430 directly affected properties
NoR 4 – Takaanini FTN - Porchester Road and Popes Road Upgrades			15 years	99 directly affected properties

4 Engagement

4.1 Introduction

This section provides an overview of partner, stakeholder, and public engagement for the Project. It summarises the approach to engagement during each phase of the Project and sets out the common feedback themes raised, and how these have informed the development of the Project.

Where engagement has affected a specific design outcome, such as alternatives consideration or identification and management of environmental effects, this has been considered in either Appendix A: Assessment of Alternatives (**Appendix A**) or the AEE, as relevant.

Prior to detailed design and construction, further engagement will be undertaken by AT, as needed to manage impacts of the Project as discussed in the conditions.

4.2 Engagement stages and approach

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

- Seek the community's views, and keep the community informed of the Project's progress;
- Provide information to landowners on how the Project might impact their property, the route protection and anticipated timelines;
- Identify and understand constraints including any characteristics or features of properties and the area not previously known to the Project Team, in order to inform and develop the Project;
- Integrate and collaborate with other network providers to achieve strategic co-benefits where practicable and / or not preclude future network plans; and
- To avoid, remedy and manage potential adverse effects, where practical, either created by or likely to impact on the Project.

Following the broad engagement at the business case stage, which indicated a high level of support, for the South FTN to move into the pre lodgement NoR engagement phase, focusing on directly affected landowners and stakeholders. These engagement phases are summarised in Figure 4-1 below.

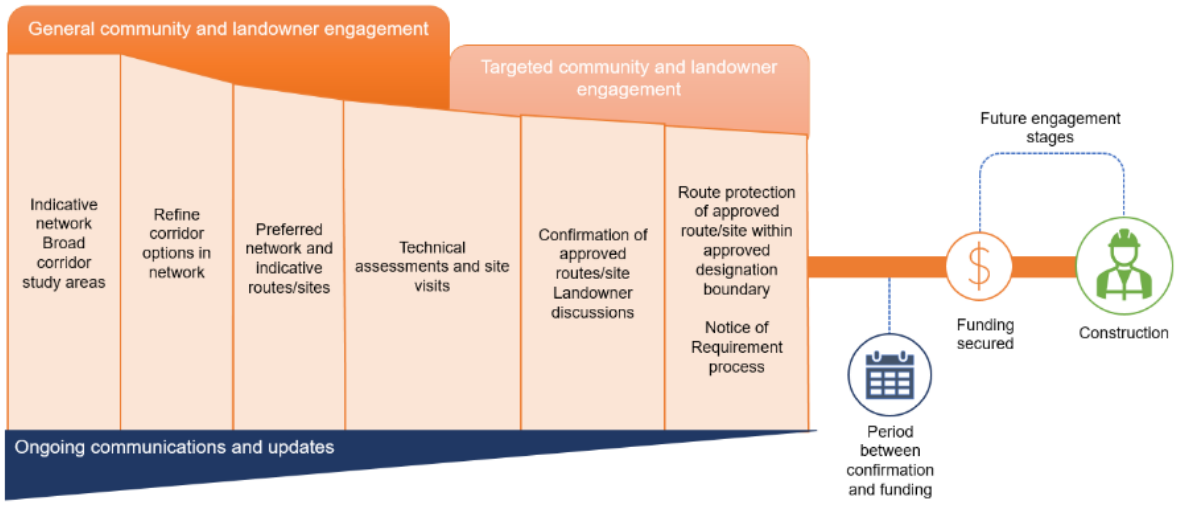


Figure 4-1: Te Tupu Ngātahi consultation and engagement phases

Project stakeholders have been engaged using a variety of tools and methods (see Figure 4-2 below). Online engagement tools were increasingly used during and following the COVID-19 pandemic but was supported with additional face-to-face engagement both for the general public and for directly affected landowners during later engagement phases.

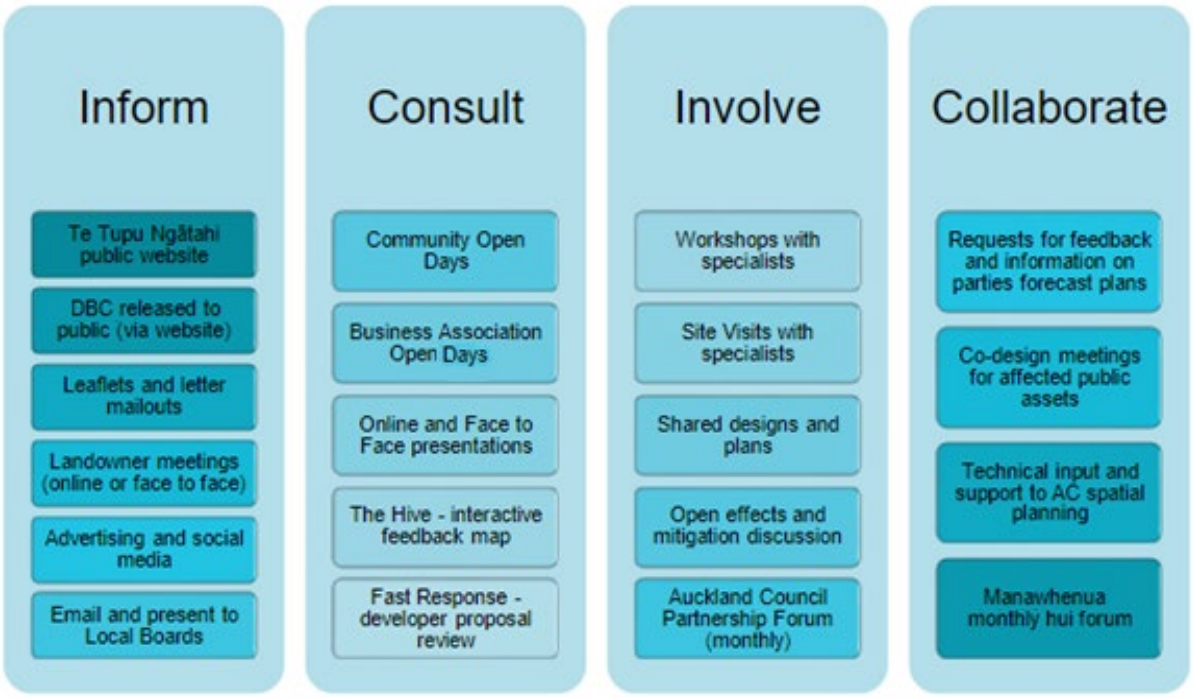


Figure 4-2: Spectrum of engagement tools and methods used by Te Tupu Ngātahi

The phases of engagement undertaken for the Project are summarised in Table 4-1 below.

Table 4-1: Summary of engagement undertaken for the Project

Project stage	Timing	Engagement purpose
Indicative Business Case	2017 - 2019	The purpose of IBC engagement was to receive feedback from partners, stakeholders and the public on the short-listed options and draft preferred network in the South. This included sending flyers to 42,000 households in South Auckland, 6 community open days, as well as engagement with Local Boards, Manawhenua and other key stakeholders. Some key feedback themes included safety concerns about walking and cycling facilities being insufficient and unsafe, particularly for school students, elderly and those with a disability. People also felt that public transport took too long, and services were too infrequent.
Detailed Business Case	Early 2023	The purpose of DBC engagement was to provide information on preferred FTN routes and to gather feedback to inform the emerging preferred routes as part of the South FTN. Between 8 March and 8 May 2023, the Project Team engaged with over 2000 community members and key stakeholders. This included community events, joint engagement events with AT and Waka Kotahi, school and tertiary engagement and meeting with advocacy groups and business associations. Some key feedback themes included support for the FTN routes, support for separate walking and cycling facilities, a need for the FTN to happen sooner and a desire to reduce congestion.
Notice of Requirement	July 2023 - onwards	This phase of engagement began with briefings to Elected Members and Local Boards. Following this, the Project Team contacted directly affected landowners to discuss potential property impacts.

4.3 Partnership with Manawhenua

AT and Waka Kotahi recognise and respect Te Tiriti o Waitangi as Te Tūāpapa (foundation). This underpins the way AT and Waka Kotahi partner with Manawhenua, to build strong, meaningful and enduring relationships. To this end, Ngā Manawhenua o Tāmaki Makaurau are partners in Te Tupu Ngātahi.

Partnership in the context of this Project is a commitment to ongoing and regular engagement with Manawhenua at all levels (including governance and kaitiaki) in a manner that is open and transparent to ensure Manawhenua continue to have the space and resources to influence decision making at all phases of the Project. The partnership dates back to the PBC and IBC of the programme.

The sections to follow summarise the partnership with Manawhenua to date. Note that Project-specific engagement and effects assessment through Cultural Impact Assessment (**CIA**) and Cultural Values Assessment (**CVA**) are documented in Section 10.12 of this AEE.

4.3.1 Partnership in previous phases of the Project

Manawhenua have been involved in all previous phases of the Project. This involved monthly hui and project workshops over the course of the previous business case processes to seek feedback from Manawhenua on key project decisions through the AT's Southern Manawhenua Table.

4.3.2 Programme Business Case

During the PBC engagement phase, letters were sent out to all nineteen iwi groups in Auckland (based on the Auckland Council database). These groups were invited to participate in the programme moving forward.

Twenty-two collective hui were held over a six-month period with a total of fourteen Manawhenua groups participating in at least one of these hui to provide feedback on the options developed by the Project Team. These participating groups included:

- Makaurau Marae Māori Trust (Te Ahiwaru - Waiohua);
- Ngāti Manuhiri Settlement Trust (Ngāti Manuhiri);
- Ngāti Maru Rūnanga Trust (Ngāti Maru);
- Ngāti Paoa Iwi Trust (Ngāti Paoa);
- Ngāi Tai ki Tāmaki (Ngāi Tai);
- Ngāti Tamaoho Trust (Ngāti Tamaoho);
- Ngāti Tamaterā;
- Ngāti Whanaunga;
- Ngāti Whātua o Kaipara (Kaipara);
- Ngāti Whātua Ōrākei;
- Ngātiwai Trust Board (Ngātiwai);
- Te Ākitai Waiohua Iwi Authority (Te Ākitai Waiohua);
- Te Ara Rangatu o Te Iwi o Ngāti Te Ata Waiohua;
- Te Kawerau a Maki (Te Kawerau);
- Te Patukirikiri.
- Te Rūnanga o Ngāti Whātua (Ngāti Whātua); and
- Te Uri o Hau Settlement Trust (Te Uri o Hau).

A set of Manawhenua values was developed in consultation with these groups, to be incorporated into the Multi-Criteria Assessment (**MCA**). The values identified are as follows:

- Papakāinga, Māori land and Marae (existing and future);
- Manawhenua heritage (tangible and intangible);
- Giving effect to treaty settlement outcomes and the principle of redress;
- Te Taiao (air, land, water, coast, taonga); and
- Manawhenua well-being.

4.3.3 South Indicative Business Case

In November 2017, a dedicated forum for Te Tupu Ngātahi was established with Manawhenua to provide regular updates and input to the IBC.

Ngāti Tamaoho, Te Ahiwaru - Waiohua, Ngāi Tai, Ngāti Manuhiri, Ngāti Maru, Ngāti Te Ata Waiohua, Ngāti Whanaunga, Ngāti Whātua, Kaipara, Te Ākitai Waiohua, Te Patukirikiri, Ngāti Pāoa, and Te Kawerau chose to be further involved in the development of the ISTNs for Te Tupu Ngātahi, as Manawhenua with an interest in the southern Project areas.

Ngāti Tamaterā attended a hui in 2017 and Ngātiwai attended two in 2018, however they did not attend any subsequent hui.

Manawhenua attended the South IBC workshops and two Cultural Specialist Hui (4th July 2018 and 8th October 2018).

4.3.4 Detailed Business Case

The Project Team has engaged and collaborated closely with Manawhenua on the Project prior to and during wider community engagement, and feedback and involvement was actively sought during the DBC process.

Te Tupu Ngātahi held a Southern Projects Hui with Manawhenua representatives, occurring twice a month from September 2021. The purpose of these hui was to collaborate with Manawhenua on option development and assessment processes, update Manawhenua on progress on the South FTN as part of the DBC phase, present technical information, and findings from investigations to involve Manawhenua as partners. In May 2023 frequency of Project hui were reduced to once a month as many Te Tupu Ngātahi Projects had entered the post-lodgement phase.

Te Tupu Ngātahi Manawhenua Southern Hui involved representatives from the following:

- Te Ākitai Waiohua;
- Ngāti Tamaoho;
- Ngāti Te Ata Waiohua;
- Ngaati Whanaunga;
- Ngāi Tai ki Tamaki;
- Ngāti Maru;
- Ngāti Pāoa;
- Ngāti Tamaterā; and
- Te Ahiwaru Waiohua.

The Project Team's close engagement with Manawhenua during the DBC process has led to careful consideration of values, issues, concerns, and considerations pertinent to Manawhenua into the Project Team's decisions. Te Tupu Ngātahi will continue to engage with Manawhenua as Project partners as the Project progresses and a monthly Manawhenua forum for operational and kaitiaki level interaction will be maintained. Moreover, the Project conditions (contained in **Appendix B**) make provision for a Mana Whenua Kaitiaki Forum which is intended to facilitate continued participation by Manawhenua as Project partners at the detailed design and implementation stages of the Project.

4.4 Detailed Business Case engagement undertaken for the Project

During the business case stage, engagement was undertaken with Programme partners, elected members, potentially affected landowners, and other key stakeholders. A summary of the engagement methods is set out in Table 4-2 below and a summary of key themes set out in Table 4-3.

Table 4-2: Engagement activity by stakeholder group

Who we engaged	How we engaged
Partners	• **Southern Manawhenua table** – ongoing twice monthly hui with Manawhenua and the Project Team. • **Auckland Council Partnership Forum** – twice monthly meetings to update Council on Te Tupu Ngātahi projects. • **KiwiRail** – Partnership Forums.
Elected Members Local Board areas: • Otara-Papatoetoe • Manurewa • Papakura • Franklin	• **Memos** – various memos distributed to elected members of the four appliable local board areas, the mayor, all applicable Ward Councillors and Local Members of Parliament to update them on the South FTN and community engagement. • **Presentations –** in-person Project updates to the Manurewa Local Board, Papakura Local Board and Otara-Papatoetoe Local Board. • **Written updates** - Franklin Local Board**.** • **Email** – interactions with elected members with informal email updates as community engagement progressed. In general, there was overall support from elected members. • Papakura Local Board is particularly engaged, given elected members understanding of the importance of the Great South Road corridor and the Papakura Commercial Projects Group membership.
Business Associations: • Manukau • Manurewa • Takaanini • Papakura • Pukekohe	• **Direct communications** – informative emails sharing full details of the proposed FTN routes. • **1:1 session** interaction via email and phone calls updating the BID Manager about the South FTN. • Both Takaanini Business Association and Papakura Business Association sit on the Papakura Commercial Project Group - online presentation to the PCBG on Wednesday, 14 June 2023.
Papakura Commercial Projects Team	• Online presentation to the group providing updates regarding the South FTN. • Its membership comprises local board members, Papakura and Takanini Business Association members and local business representative.
Key stakeholders	• **Schools** – phone call and information email provided to all schools in the vicinity of both proposed routes requesting information be placed in school newsletters. • **Direct communication** – social clubs, recreational clubs, and places of worship were contacted as advocacy stakeholders. • **1:1 session** – held with the AT Freight Working Group on 3 April 2023. • Informative emails, Hive campaigns and direct communication with Kāinga Ora regarding the South FTN routes.

Who we engaged	How we engaged
Community	• **Flyer** – a community flyer drop to 8,000 households and businesses along the proposed routes to socialise the South FTN and encourage feedback. • **Media advertising –** comprehensive media campaign using different channels such as print, social and radio. Focussed on ethnic and community-based media. • **The Hive** – Our online engagement platform with South FTN information and a place to submit feedback through a place for the public to place online feedback, e.g. Have your say / Find out More Webpage / organisation email campaigns. • **Email campaigns** – numerous email campaigns sent out to let subscribers know of key dates across the formal consultation period. • **Community open days –** seven community information events from 2 March to 6 May 2023 across the three council ward areas. • **School and tertiary engagement -** a dedicated student survey to gather feedback regarding public transport in next 20-30 years. • **Auckland Council People's Panel survey** - a survey was conducted to collect feedback about transport in South Auckland. The participants of survey participants were residents who live in Local Boards: Mangere-Otahuhu Otara-Papatoetoe Manurewa, Papakura, and Franklin.
Developers	• **Meetings –** the Project Team met with several developers across 2022 and 2023 with respect to their proposed development and the FTN proposals. Where practicable adjustments were made to accommodate land use plans.
Utilities	• **Meetings** - met with Vector, First Gas, Transpower, and Watercare to discuss the interface between the South FTN and utilities on a programme wide basis throughout 2022. Conversations will continue in 2023.

Table 4-3: Summary of key themes

Key theme	Comments
Public transport	Support for the proposed FTN route and interest in more reliable, efficient and frequent public transport.
Active modes	Support for safe walking and cycling infrastructure that is grade separated from public transport and general traffic.
Freight Networks	Feedback from the Freight Working Group and NZ Heavy Haulage Association that the proposed FTN on Great South Road is an important strategic network for freight.
Integration into town centres	Takaanini rail station and Takaanini town centre need to be integrated into the FTN route via Arion Road.

4.5 Engagement during NoR phase of the Project

The following sections summarise the engagement undertaken for the NoR phase of the Project with partners, key stakeholders, and directly affected landowners.

Given the extent of the Project, and in turn multiple local board areas, variety of communities and people affected, the team undertook some more bespoke forms of engagement to ensure we successfully reached these communities.

4.5.1 Auckland Council

A briefing and site visit with Auckland Council officers was held. The Project Team has also provided updates in relation to key Project milestones and decisions.

4.5.2 Local Board and Elected Members

The Project Team have provided regular updates to Papakura Local Board, Manurewa Local Board, Franklin Local Board and Otara-Papatoetoe Local Board. The purpose of these updates was to provide an overview of the Project, including key social opportunities, proposed consultation and past consultation with the public/landowners and outcomes for the local communities. Potential effects of the Project were discussed, and opportunities were provided to seek clarification about these effects.

Briefings were provided to Members of Parliament and Elected Representatives.

Key matters that were discussed through these engagements included:

- Overview of the Project including timings;
- Engagement with the community and key stakeholders;
- Why the Project is needed; and
- Key matters raised by the local community.

In particular, the Project Team held online briefing sessions on 3 August 2023 and 1 September 2023 to provide local Elected Members with an update on the proposed Project and upcoming landowner engagement.

4.5.3 Auckland Council Community Facilities – Parks

The Project Team met with Auckland Council Parks to discuss the Project and potential impacts of the Project to adjoining parks. These discussions also provided an opportunity for Auckland Council Parks to share information on the future uses and upgrades planned for parks and reserves. Ongoing discussions with different parts of Council as landowner/asset manager will continue.

4.5.4 Eke Panuku

The Project Team has engaged with Eke Panuku to discuss potential effects to several properties. This includes a 55+ residential village and 2 Popes Road. These discussions will continue as needed with the Development and Property teams at Eke Panuku.

4.5.5 Kainga Ora

The Project Team has engaged with Kāinga Ora to discuss the Project and its relationship with Kāinga Ora properties. Kāinga Ora has a large landholding along the Project corridor.

Kāinga Ora expressed interest in a variety of the proposed conditions and assessments completed by the specialists including flooding/stormwater and noise. There was general support for the Project and an interest in maintaining communication throughout the NoR process to help inform their future development plans.

4.5.6 Fire and Emergency New Zealand (FENZ)

Manurewa Fire Station is located in NoR 3. The Project Team has met with FENZ on multiple occasions to discuss the Project and any potential impacts to the site. The key areas of interest for FENZ were retaining access into and out of the site during construction and reducing the NoR's impact on the fire station's daily operations.

4.5.7 Network Utility providers

Engagement with network utility providers such as Vector, Spark, First Gas and Transpower has been ongoing throughout the development of the Project.

Conversations relating to the Project have included:

- The Project extent including proposed designation boundaries;
- Project overview, updates and information sharing;
- Timeframes and likely commencement of construction; and
- Conditions – specifically those relating to network utility operators.

Key points of engagement with specifically impacted network utility operators are summarised in the Table 4-4 below.

Table 4-4: Key network utility provider engagement

Network Utility Operator	Key points of engagement
Transpower	• Regarding a pylon falling within NoR 3 near the SH1 Alfriston Road bridge, Transpower confirmed that the associated high voltage overhead line will be decommissioned in the short term, prior to the implementation of the Project. Accordingly, Transpower confirmed there will be no interface with the asset by the time the Project is implemented. • Regarding a pylon adjacent to NoR 4 at the intersection of Airfield and Porchester Roads, Transpower noted the proximity of proposed active mode facilities and potential impact on an embedded pile foundation. In response, the design was amended, and it was further noted that a Network Utilities Management Plan condition would provide a means of managing this interface at the time of implementation. • Regarding a Transpower underground fibre cable along Porchester Road adjacent to NoR 4, it was again agreed that a Network Utilities Management Plan condition would provide a means of managing this interface at the time of implementation.
Spark	• NoR 4 has a partial impact on the Spark Data Centre site at 23 Popes Road. Spark noted that a number of critical infrastructure items fall within the proposed extent. In response, the designation boundary was revised to reduce the extent on this frontage.

Works in relation to any network utility will be undertaken in accordance with a Network Utilities Management Plan (**NUMP**) (as provided for by the proposed conditions set out in Volume 1) and any agreements made with each network utility operator to ensure compliance with their methodologies, standards, and requirements. The exact scope of works will be confirmed through site investigations and the respective utility operators will be consulted once detailed design of the Project is complete.

4.5.8 Community Events

To increase awareness of the South FTN and Project, the Project Team attended the following community events:

- Worship day at Takanini Gurdwara Sri Kalgidhar Sahib Sikh Temple– 20 August 2023;
- REWAVibes at Te Matariki Clendon Community Centre – 26 August 2023;
- Manurewa Markets – 27 August 2023; and
- Papakura to Drury Information Day – 9 September 2023.

The Project Team spoke with over 300 people at these events about route protection, current attitudes towards public transport, and the heavy reliance on cars within the community. It was the intention that by increasing both awareness of the South FTN (and Project) and visibility of the Project Team, more landowners would feel encouraged to get in contact about the letters they had received in the mail.

4.5.9 Engagement with directly affected landowners

In August 2023, 551 letters were mailed to directly affected landowners and couriered where possible. Any landowners the Project Team had previously contacted for other Te Tupu Ngātahi projects were also pre-emptively contacted via email. Each letter included a plan of the affected property, showing the property boundary and the extent of the proposed designation within the property, as well as information about translation services.

Flyers were placed at local libraries, supermarkets and community centres local to the FTN route to advertise the wider community events and to inform affected landowners to reach out to the team to discuss the letters they had received.

Directly affected landowners were invited to meet with the Project Team to discuss the impacts to their property either face to face at a local venue, at a drop-in session, at Te Tupu Ngātahi offices or online from 14 August 2023.

Phone call and email discussions were also held with affected landowners during the consultation period and will be continued.

Drop-in sessions were held on 22, 28 and 31 August at local community venues in Manurewa and Takaanini. The drop-in sessions provided an opportunity for landowners to meet with the Project Team without the need for a pre-booked appointment. The drop-in session at Manurewa Library on 31 August 2023 was particularly well-attended – the Project Team met with 40 affected landowners in one day.

To date, 31 landowners have spoken to the team on the phone or via email, and 100 landowners (18% of landowners) had a meeting with the Project Team in relation to 212 property titles (28% of total property titles). In the meetings, the Project Team assisted landowners by:

- Providing an overview of Te Tupu Ngātahi and the South FTN;
- Explaining the rationale for the concept design of the Project and plan in front of them;
- Explaining the NoR process, including lodgement timing, the ability to make a submission and attend a hearing;
- Listening to landowners concerns and history of the area; and

- Providing an information pack on the NoR process, Route Protection Information sheet and AT Landowner Guide.

During landowner engagement, questions were raised about property (including the acquisition process, loss of value, and access), implementation timing, and likelihood of construction. Specific queries regarding ongoing tenure of property, traffic modelling, property subdivision, and noise were also raised. Many landowners also expressed concern about impacts to tenants and their ability to plan for the future given the uncertain project timings.

Specific matters identified through engagement with directly affected landowners were used to make changes to designation boundaries where possible.

Note that property-related effects of the Project are addressed further in Section 10.10 of this AEE.

4.6 Summary of engagement outcomes

Engagement has occurred for the Project through all project stages which includes the IBC, the DBC (including options assessment) and NoR preparation stages. Engagement has been with partners, other network providers, stakeholders, directly affected landowners, and the wider community. Engagement has been used by the Project Team to inform and as appropriate update or change the Project provided for by the NoRs. As noted, further detail on engagement outcomes is set out in relevant report sections of Assessment of Alternatives (refer to Appendix A).

4.6.1 Ongoing and future consultation

The Project Team will continue to meet and engage with directly affected landowners as required, to ensure landowners have adequate information about the Project.

Prior to detailed design and construction, further engagement will be undertaken by the Requiring Authority as needed to manage the effects of the Project. Specific provision for ongoing engagement is set out in the proposed conditions in Volume 1. These include the requirement for a Stakeholder and Community Engagement Plan (**SCEMP**) to be prepared to identify how the public and stakeholders (including directly affected landowners and adjacent owners and occupiers of land) will be communicated with, prior to and throughout the construction of the Project.

5 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 of the Act) have particular regard to when considering the effects of the environment of allowing a NoR.

Table 5-1 below sets out these matters and identifies the relevant sections of the AEE in which the matters are primarily addressed.

Table 5-1: Section 171 of the RMA

Matter to consider **1) 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-**	**Section of the AEE where the matter is primarily addressed**
Whether particular regard has been had of any relevant provision of:[3] *a) A national policy statement;* *b) A New Zealand coastal policy statement;* *c) A regional policy statement or proposed regional policy statement;* *d) A plan or proposed plan*	Refer to Section 11.1
Whether adequate consideration has been given to alternative sites, routes or methods of undertaking the work if:[4] *e) The requiring authority does not have an interest in the land sufficient for undertaking the work; or* *f) It is likely that the work will have a significant adverse effect on the environment.*	Refer to Section 6 and Appendix A: Assessment of Alternatives for discussion on alternative routes and methods. Refer to Section 10 for the Assessment of Effects on the Environment.
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 7
Any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement[6]	Refer to Section 11.2

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

6 Assessment of Alternatives

6.1 Statutory requirement to consider alternatives

Section 171(1)(b) of the RMA provides that when making a recommendation on a NoR, a territorial authority shall consider whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work in circumstances where the requiring authority does not have an interest in the land sufficient for undertaking the work; or where it is likely that the work will have significant adverse effects on the environment.

A requiring authority must consider and apply well-established principles when undertaking an assessment of alternatives and identifying a preferred option. Of note are the following:

- The process should be adequately transparent and robust, and clearly recorded so that it can be understood by others;
- An appropriate, but not necessarily exhaustive, range of alternatives should be considered; and
- The extent of options considered, and the assessment of these options, should be proportional to the potential effects of the options being considered.

AT does not have sufficient interest in the land required for the Project, and as such is required to give adequate consideration to alternatives. AT has accordingly considered an appropriately broad range of possible alternative routes and other methods for undertaking the Project noting in this context that the assessment is to a certain extent limited in scope due to its corridor widening focus. The Assessment of Alternatives Report sets this out in detail, and is included at Appendix A.

6.2 Assessment of alternative sites and routes – methodology

This section provides an overview of the assessment of alternatives methodology used to develop and assess network options for the Project and ultimately determine the preferred option(s). This methodology was applied to both the IBC and the DBC processes albeit the DBC assessment was informed by a greater level of technical and survey assessment. The assessment of alternatives from those two processes are part of the assessment of alternatives for the NoRs. In some instances, where specific circumstances required, deviation from the process set out below occurred. If so, this was identified and described in the relevant sections of the Assessment of Alternatives Report together with the rationale for doing so (refer to Appendix A).

The general methodology used for the assessment of alternatives involved the following steps, and is set out in full in Appendix A. The process is illustrated in Figure 6-1.

- Steps to identify the preferred **routes** for the Project;
- Steps to identify the preferred **form and function** for each part of the Project to determine its physical extent; and
- Steps to refine the detailed **location** of any road widening/realignment required to accommodate the preferred form and function along the preferred route.

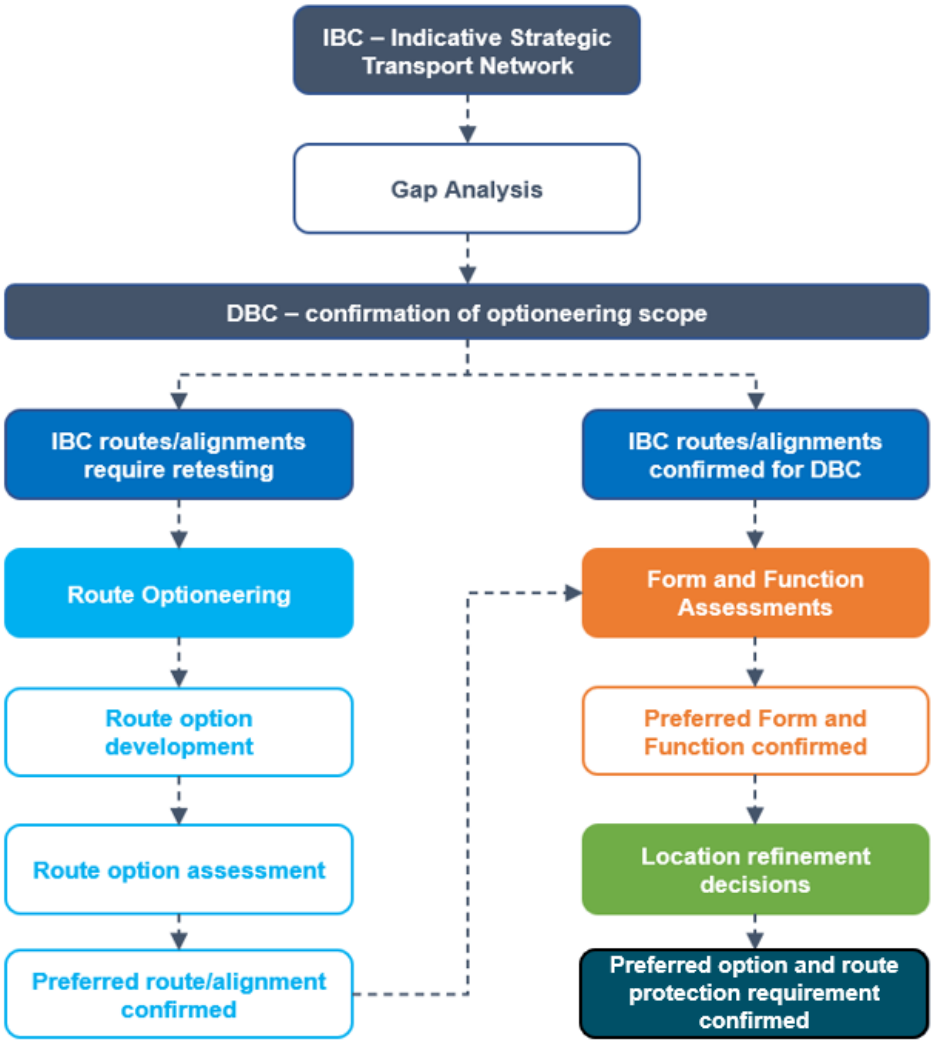


Figure 6-1: DBC optioneering process

Route Optioneering

At the outset of the DBC, a gap analysis was undertaken to capture the key contextual changes that had occurred since preceding IBC analysis. This informed the scope of route optioneering required at the DBC stage. For the Great South Road route and key connections, preferred routes identified in previous optioneering were validated through this process. For the Takaanini FTN route, further retesting through an MCA process was required. This optioneering process is set out in full in the Assessment of Alternatives and is not repeated here.

Form and Function and Location Refinement

Following the identification of a preferred route for each part of the Project, the preferred form and function was then identified to determine its physical extent through transport planning assessment. Once the form and function were confirmed, a location refinement process was then undertaken to identify and refine the physical footprint of the Project. This step required reconciliation of a number of expert and technical inputs in a workshop setting, considering factors such as:

- Opportunities to avoid or reduce impacts on known environmental and cultural features, values, and/or constraints including all relevant national policy freshwater and indigenous biodiversity constraints;
- The need to set designation boundaries which ensure that reasonable access to and use of adjoining properties and buildings can be maintained;
- Any advantages or disadvantages associated with requiring land that relate to its ownership status (e.g. publicly or privately-owned) or zoning/planning controls (e.g. urban or future urban); and
- The need for designation boundaries to provide for the construction, operation, and maintenance of the Project.

Preferred Option and Concept Design

Following the above location refinement considerations, the emerging preferred options was able to be defined and progressed to concept design. This included consideration of vertical and horizontal alignment, allowances for earthworks, the configuration of access for affected properties, and stormwater requirements including indicative attenuation and treatment devices.

The resultant concept design has formed the basis of the Project assessed in this AEE. As part of this assessment process the concept design has been further refined to reflect expert assessment matters and engagement feedback from third parties and affected landowners. Recent policy direction through the draft Future Development Strategy (**FDS**) on the status of future zoned urban areas in the Takaanini area has also informed the spatial extent of proposed urban upgrades to corridors where urbanisation is no longer anticipated.

Finalising route protection requirement

The final consideration in the alternatives assessment process was whether there is a clear case to proceed with route protection (via designation or alternative method – see Section 6.3 below) now. This qualitative assessment considered a range of factors which inform the strategic context for route protection, including:

- Transport and urban form benefits of route protection;
- The scale and cost of route protection;
- The ability to achieve route protection in an urbanised context;
- The level of development pressure along the routes;
- Consideration of any interdependent projects; and
- Likelihood of future funding prioritisation.

6.3 Consideration of alternative methods

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

a) Designations;
b) Resource consents;
c) Plan Changes/Overlays; and
d) Landowner/developer agreements.

Designations were identified as the preferred route protection method for the Project. Designations were considered the most logical and effective method to protect the route in an evolving environment for the following reasons:

- Provides certainty to all parties including the community, affected landowners, and developers;
- Well recognised and understood tool for route protection which links with future land acquisition processes through the Public Works Act 1981 (**PWA**);
- Maximises flexibility for future implementation – enables progression of detailed design and implementation at the appropriate time;
- Negates the need for additional land use consents to implement works otherwise authorised under section 9(3) of the RMA; and
- Reduces future cost risk in cases where route protection and associated land purchase can be undertaken prior to upzoning and/or development which induces a land value increment.

The other methods strengths and weaknesses were considered, based off of this assessment they were discounted. These strengths and weaknesses are summarised below:

- **Resource consents** are not a route protection mechanism unless land is already under the ownership of the requiring authority. Resource consents are not included in a District Plan and not able to utilise the Outline Plan of Works process;
- **Plan changes and overlays** were considered, however aside from the Intensification Streamlined Planning Process (**ISPP**) (i.e. PC78) there are no substantial new plan changes anticipated in these corridors beyond those already operative. While provisions within Precincts such as road frontage setbacks and indicative roads can be negotiated as an 'interim' route protection measure, these are unlikely to be practical at a corridor-wide scale given the scale of the Project and the level of urbanisation/land ownership fragmentation; and
- **Landowner and developer agreements** were considered as interim route protection measures can be negotiated with developers. However, ownership within the corridors is fragmented and so developer negotiations would be impractical for the Project at large given the number of parties involved.

6.4 Summary

The preferred option provided for by each of the NoRs has been based on a comprehensive and robust optioneering process considering specialist assessment, engagement with Manawhenua and feedback from stakeholders and landowners. 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.

7 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. In our view:

- Necessary falls somewhere between desirable and essential; and
- Reasonably allows for some tolerance in terms of where necessary falls.

With this in mind, we consider that the threshold of "reasonable necessity" allows for a contextual assessment, proportionate to the circumstances to determine whether the proposed works are reasonably necessary for achieving AT's objectives in terms of section 171(1)(c) of the RMA.

As noted in Section 3.3, the objective for the four NoRs is as follows:

> ***Provide for upgraded multi-modal transport corridors between Manukau and Drury [7] that:***
>
> ***a) Improve connectivity and access to economic and social opportunities;***
> ***b) Improve safety;***
> ***c) Improve efficiency, resilience, and reliability;***
> ***d) Integrate with and support existing development and planned urban growth;***
> ***e) Integrate with and support the existing and future transport network; and***
> ***f) Improve travel choice and contribute to mode share shift.***

The proposed works are reasonably necessary to achieve this objective because:

- The DBC investment logic mapping process (summarised in Section 3.1) identified that the existing arterial network in South Auckland between Manukau and Drury has a number of deficiencies which result in an over-reliance on private vehicles. These deficiencies include a lack of provision for high-quality public transport, and a lack of safe active mode facilities. Failure to address these deficiencies will result in continued car dependence, congestion, poor public transport accessibility, lack of travel choice and network resilience, elevated safety risks, and increased transport emissions. Without intervention, these deficiencies will be exacerbated by planned growth and increased travel demand. Accordingly, the current road network in the Project area cannot achieve the Project Objective.
- The proposed works comprising the Project respond to and address these issues. The proposed works include provision for bus priority measures along Great South Road, Weymouth Road, and Alfriston Road; as well as new and upgraded active mode facilities and intersection improvements along the full Project extent.
- The works therefore are reasonably necessary to achieve the Project Objective insofar as they directly provide for the outcomes sought by the objective. As a whole, the works will result in increased accessibility, will provide transport choice, and encourage mode shift to sustainable transport modes as the population of South Auckland continues to grow.

[7] Each NoRs have specific routes which are covered within the Form 18s.

The designations are reasonably necessary to achieve this objective because:

- As evaluated in Section 6.3 above, designations were identified as the most appropriate method under section 171(1)(c) to secure route protection for the Project. Alternative mechanisms evaluated (including resource consents, landowner/developer negotiations, and plan changes) do not provide for the full extent of route protection required given that AT does not own all of the land required to implement the work, nor do they provide for the requisite design flexibility and certainty.
- The proposed extent of the designation reflects the needs of the Project and has accounted for inputs from technical specialists and feedback from AT, Waka Kotahi, Manawhenua, public engagement, and from landowners and stakeholders. The process of identifying the designation extent is therefore considered robust.
- The proposed extent enables the ongoing operation and maintenance of the proposed infrastructure as well as its construction. Accordingly, the designation extent includes areas required for the construction process such as laydown areas and construction yards and enables areas that may be utilised to implement mitigation measures recommended by technical specialists.

For these reasons, the designations are considered reasonably necessary to achieve the Project Objective.

Notwithstanding the above, Section 1.3 notes that the proposed transport upgrades requiring third-party land are a smaller subset of the total South FTN extent, and that many of the proposed upgrades can be accommodated within existing road reserves. Works not requiring third-party land are either permitted activities or are readily consentable without designation, and accordingly designation was not considered reasonably necessary to achieve the Project Objective in those instances. This consideration has directly informed the proposed designation extents and is particularly relevant along the Great South Road FTN route where existing road reserves are sufficient to accommodate the proposed works in numerous locations. For this reason, NoR 1 is not contiguous (see Section 3.2.2).

8 Lapse period sought and rationale

Under section 184(1) of the RMA, lapse periods consistent with the implementation timeframes for the Project are sought. AT seeks lapse periods for the proposed designations ranging from 10-15 years for consistency with the proposed implementation timeframes for the designated works.

A key objective of Te Tupu Ngātahi is to identify and protect land now for transport networks required in the future. We consider that lapse periods on each of the four proposed designations is a method reasonably necessary to achieve this route protection 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 and is consistent with anticipated implementation timeframes and funding availability.

The proposed lapse periods and underpinning rationale are set out in Table 8-1.

Table 8-1: Lapse periods sought for NoRs and rationale

NoR	Proposed lapse period	Rationale
1	15 years	• Transport assessment and DBC recommend that the Great South Road FTN transport upgrades are implemented within the 2028-2038 period. A 15-year lapse period enables this likely implementation timeframe. • Provides AT with sufficient time to undertake detailed design, obtain necessary resource consents, obtain funding, undertake tendering/procurement, undertake property and access negotiations (noting that there are 171 affected properties), and construct the Project. • Provides AT with sufficient flexibility to coordinate Project delivery with related public works. • The nature of the work and designation is such that it is highly likely to be implemented in stages, so the flexibility afforded by a 15-year lapse period is merited.
2	10 years	• The rationale/premise for the upgrade of the Drury section of Great South Road is the need to provide for integration with three adjacent projects – the SH1 Drury Interchange, the upgrade of Waihoehoe Road, and the Drury Train Station. These projects are funded under the New Zealand Upgrade Programme (**NZUP**), are designated and largely consented, and are proposed to be implemented in the mid-to-late 2020s. • Transport assessment and DBC recommend that NoR 2 is implemented in the 2028-2038 period, but acknowledge that it is likely to be the first stage of the wider Project to be implemented in light of the need to integrate with the NZUP projects identified above. A 10-year lapse period in our view reflects that the urgency afforded by the NZUP projects means that this part of the Project is likely to be required at the earlier end of the 2028-2038 range identified in the transport assessment and DBC. • Provides AT with sufficient time to undertake detailed design, obtain necessary resource consents, obtain funding, undertake tendering/procurement, undertake property and access negotiations (noting that there are 47 affected properties), and construct the Project. • Provides AT with sufficient flexibility to coordinate Project delivery with related public works – notably the three NZUP Projects cited above.

NoR	Proposed lapse period	Rationale
3	15 years	• Transport assessment and DBC recommend that the Takaanini FTN transport upgrades along the Weymouth/Alfriston Road corridor are implemented within the 2028-2038 period. A 15-year lapse period enables this likely implementation timeframe. • Provides AT with sufficient time to undertake detailed design, obtain necessary resource consents, obtain funding, undertake tendering/procurement, undertake property and access negotiations (noting that there are 430 affected properties), and construct the Project. • Provides AT with sufficient flexibility to coordinate Project delivery with related public works – in particular the coordination between the Weymouth Road NIMT bridge replacement and the future four-tracking of the NIMT and consequent changes to the layout of Manurewa Train Station. • The nature of the work and designation is such that it may be implemented in stages, so the flexibility afforded by a 15-year lapse period is merited.
4	15 years	• Transport assessment and DBC recommend that the Takaanini FTN transport upgrades along Porchester Road, and the Popes Road West upgrade, are implemented within the 2028-2038 period. • Notwithstanding the above, the surrounding land use zoning to the east of Porchester Road includes a large area of the Takaanini FUZ which is recommended at the time of writing to be removed as part of the Council's FDS. The area to the west of Porchester Road remains live-zoned. • The adjoining sections of FTN to the south are recommended as longer term prospects – the southern end of the Takaanini FTN is identified in the transport assessment and DBC as very long term (2048+) requirement, and the adjoining Ōpaheke North-South arterial is provided for through an operative designation which traverses areas not planned to be urbanised until the 2040s. Accordingly, a 15-year lapse period on NoR 4 appropriately 'bridges' the staging gap between sections of FTN to the north and south. • Given the above uncertainty, we consider that it is likely that this part of the Project will not be fully implemented until the later end of the 2028-2038 range identified in the transport assessment and DBC. • Provides AT with sufficient time to undertake detailed design, obtain necessary resource consents, obtain funding, undertake tendering/procurement, undertake property and access negotiations (noting that there are 99 affected properties), and construct the Project. • Provides AT with sufficient flexibility to coordinate Project delivery with related public works. • The nature of the work and designation is such that it may be implemented in stages, so the flexibility afforded by a 15-year lapse period is merited.

9 Design and assessment approach

It is anticipated that the Project will not be constructed in the short term. As such, the approach to design and assessment of effects has been developed in a manner that reflects the long-term implementation of the Project within environments that may be subject to further urban intensification.

9.1 Approach to design

The design undertaken for the Project has focused on developing an indicative design 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 an evolving environmental context – both within urbanised areas and future urban areas traversed by the Project.

The proposed Project 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. Resource consents will also need to be applied for in the future.

The final design for the Project (including the design and location of associated works including bridges, culverts, stormwater management systems, soil disposal sites, signage, lighting, 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 includes General Arrangement Plans for each NoR.

9.2 Construction methodology

9.2.1 General approach

An indicative construction methodology has been developed based on the level of design undertaken to date and the current land use / landform in which the Project is located.

The construction of the Project will be undertaken within a Management Plan framework. The conditions of each of the proposed designations which will be in place to manage the effects of the construction activities. Should the contractors wish to undertake construction activities in a manner which is not within the scope of the proposed designations, or any future resource consents, additional authorisations will need to be obtained at that time.

Management Plans form an integral part of the construction methodology for the Project setting out how specific matters will be managed. A suite of Management Plans are proposed for the Project. Management Plans most pertinent the construction methodology include the following:

- Construction Environmental Management Plan (**CEMP**);
- Construction Noise and Vibration Management Plan (**CNVMP**);
- Construction Traffic Management Plan (**CTMP**);
- Stakeholder and Communication Engagement Management Plan (**SCEMP**);
- Network Utility Management Plan (**NUMP**); and

- Historic Heritage Management Plan (**HHMP**).

The management of any potential or actual effects arising from construction activities that relate to regional resource consenting matters will be provided for when these consents are sought, in the future.

The Management Plans and future Outline Plans required for the proposed designations will be submitted to Auckland Council prior to the commencement of construction.

Following the completion of construction, the designation boundaries will be reviewed and any land that is not required for the permanent work or for the on-going operation, maintenance or mitigation of the Project will be reinstated in coordination with directly affected landowners or occupiers.

9.2.2 Construction area requirements

Typical offsets for construction areas of various construction work have been adopted to inform the proposed designation boundaries. These offsets and typical construction areas have been based on similar transport infrastructure projects of this size and nature.

The Table 9-1 below provides guidance on the minimum offsets and construction areas. These are intended to allow sufficient working areas to facilitate the construction of the Project and are indicative only. Final areas will be determined during detailed design and informed through the Outline Plan process.

Table 9-1: Typical construction work areas

Construction Element	Typical area or offset required for construction
Earthworks - construction of batter slopes (urban environment, minimal earthworks cut/ fill)	2m from earthworks batter slopes
Earthworks - construction of batter slopes (rural environment, moderate earthworks cut/ fill)	6m from earthworks batter slopes for construction access and environmental controls
Stormwater wetland	6m around for access and environmental controls
Bridge construction (substructures: abutments, piers)	20m either side of the bridge, and minimum 40m behind each abutment ends for construction access, e.g. cranes, piling rigs, trucks
Bridge construction (Superstructure)	20 m either side of bridge for typical crane access, truck access
Retaining wall construction (minor/ small retaining walls e.g. timber or blocks works)	Typically, 6m outside the wall in cut, 2m for fill retaining walls
Retaining walls (large) e.g. secant pile wall, sheet piles,	Typically, 15m outside of wall in cut, 5m behind wall for fill retaining walls
Main site compound	5,000 - 10,000m^2 (depending on scale of project packages)

Construction Element	Typical area or offset required for construction
Additional/ satellite site compounds	1,000 – 2,000m^2 (located near critical work areas, e.g. bridge, retaining walls, culverts, major drainage works, major earthworks for site staff and crews)
Culverts and headwalls	Typically 10m beyond extent of permanent works for culverts and larger headwall construction.
Construction areas for large scale complex construction works, e.g. bridges works, large embankment retaining walls	Up to 2,000 m^2 for construction laydown areas for plant and material storage (located near critical work areas, e.g. bridge, retaining walls, culverts, for site staff and crews)
Construction yards (laydown)	500m^2 to 1000m^2. Site laydown for material storage, evenly spread out along the proposed alignment every 200 m to 500 m Larger areas may be needed for critical construction works such as bridges, larger retaining walls, intersection or roundabout construction, major drainage works (pipe jacking))

9.2.3 General construction activities

This section contains a description of the following general construction considerations across the whole Project including:

- Site establishment;
- Temporary traffic management;
- Construction yards and site compounds;
- Protection and/or relocation of existing network utilities;
- Bridge and structures works;
- Earthworks;
- Works in watercourses; and
- Pavement construction, streetscape and finishing works.

9.2.4 Enabling works, utility relocation, and protection

The Project traverses a predominantly urban environment. As a result, there a several network utilities crossing the Project. The key services within the NoRs include:

- High voltage overhead and underground transmission line;
- Gas transmission line;
- Fibre telecommunication lines;
- Water and wastewater network; and
- Electrified rail overhead lines and rail underground lines.

Initial discussions have been undertaken with network utility operators (summarised in Section 4.5.7 of this AEE). Works in relation to any network utility will be undertaken in accordance with any future agreements made with each network utility operator to ensure compliance with their methodologies, standards and requirements.

The exact scope of works for service relocation will be confirmed through site investigations and developed in consultation with the respective utility operators once detailed design of the Project is complete.

9.2.5 Site Establishment

9.2.5.1 Construction areas

Construction areas include main site compounds and site laydown areas. The main site compound will be used as office facilities for project and administration staff. Typically, the main compound will be located in a strategic location with easy access from a nearby road or public transportation.

Where possible, the main site compound will utilise an existing site or building(s) that are within the proposed designation boundaries due to being impacted by the Project. The use of the main site compound will only be required during the construction period and the site will be reinstated upon completion of the works.

Construction areas are located with the various project areas near works sites for example, major earthworks and bridges. These areas are relatively flexible and can evolve as the construction progresses. Areas within the designation boundaries have been identified as indicative construction areas. These indicative areas are shown in the General Arrangement Plans (see Volume 3).

9.2.5.2 Site clearance and demolition

Site clearance to allow for construction activities across the Project may involve the removal of topsoil, fences, structures, trees, vegetation, and other clearance works such as building demolition.

Vegetation removal will be carried out by a suitably qualified contractor and will be undertaken in accordance with relevant designation conditions. Traffic management will be required during the clearing of vegetation adjacent to live carriageways.

In some instances, site clearance includes the demolition of existing buildings or structures. Property demolition will be carried out by a suitably qualified and experienced person/ contractor. The scope of demolition and accommodation works will be verified by the contractors once detailed design and construction planning progresses.

Demolition of existing bridges will typically be carried out using conventional methods such as using excavators with hydraulic hammers and crushers. This will be the quickest method, however, may cause higher levels of disruption to the surrounding area. Alternatively, a redundant bridge may be carefully deconstructed which will be less disruptive, however will take longer to execute.

The appropriate method will be assessed on a case-by-case basis pending further development in the detailed design phase.

9.2.6 Traffic management and access

Construction of the Project will involve disruption to the surrounding existing road network and property access. Additional traffic will be generated from general staff and workforce for the Project as well as construction specific traffic such as traffic movements for material delivery and movement within construction areas.

The contractor will be required to develop a CTMP, which will describe the overall strategy for managing traffic, including public and construction traffic. A suite of Traffic Management Plans will be further developed for specific temporary traffic management requirements that will be deployed on the affected roads. The development of these TMPs will require early planning by the contractor and will require approval from the road controlling authority.

Generally, access along the existing Project alignment will be maintained, however, some closures will be needed for critical activities at night or on weekends.

Depending on the final alignment developed in the detailed design, temporary roads may need to be constructed, or existing lanes widened or modified to enable the establishment of the temporary traffic diversion. Temporary traffic requirements have been allowed for within the designation, although detailed decisions on these may affect decisions on construction staging and methodology.

Site Access Points (**SAPs**) will be required to access the nominated construction zones and work areas. Each construction zone may require several access points to ensure adequate access and flexibility for the construction works. Access for construction vehicles, plant and materials will be via the designated SAPs.

The assessment and proposed temporary construction traffic management measures are summarised at Section 10.2 of the AEE and detailed in the Assessment of Transport Effects included in Volume 4.

9.2.6.1 Construction traffic

Construction of the Project will likely experience an increase in traffic volume and potential disruption to the surrounding existing road network. The assessment and proposed temporary construction traffic management measures are summarised at Section 10.2 of the AEE and detailed in the Assessment of Transport Effects included in Volume 4.

The Project will generate increased traffic volumes within the Project surrounding road network. Additional traffic will be generated from the general staff and workforce for the Project, as well as construction specific traffic such as truck movements for material delivery and movement within the various construction sites.

Further assessment and details of construction traffic effects are provided within the Assessment of Transport Effects. Once detailed design of each Project is confirmed in the future, movements, as well as construction noise effects will be reassessed as part of the applicable Outline Plan process.

9.2.7 Bridges and structures

Resource consents and/ or required building consents for bridges and other structures such as retaining walls or other building work, will be sought as part of the future consenting stage. The design of bridges and other structures will be confirmed during detailed design and be undertaken in

accordance with any specific conditions on the designation and the applicable consent conditions. There are four bridges within the Project scope – the Great South Road bridges over Otūwairoa / Slippery Creek (within NoR 1) and the Hingaia Stream (within NoR 2); and the Weymouth Road NIMT bridge, and Alfriston Road SH1 bridge (within NoR 3).

The bridge construction method shall typically follow conventional bottom-up bridge construction techniques. The construction sequence shall generally be as follows:

- Mobilisation and site establishment;
- Enabling works such as access construction, staging areas and temporary works;
- Piling, pile caps, and abutment construction;
- Columns and pier headstock construction;
- Bridge beam installation;
- Deck construction and barrier installation; and
- Finishing works, such as approach construction, settlement slabs, and end terminals.

The bridge beams will likely need to be lifted from the existing adjacent road, or from the bridge deck as it advances.

In order to maintain traffic on the existing bridge, certain bridges may need to be constructed in two or more stages where the alignment of the new bridge overlaps the existing one. The first stage will enable the new bridge to be constructed then the traffic diverted onto it. This will enable the existing bridge to be demolished or deconstructed, which the new bridge can then be completed in the subsequent stage(s).

A specialised or more complex bridge construction technique such as bridge lifting gantry, slip form, segmental precast, or others, may be considered/ adopted by the contractor for some of the larger, longer, or more complex bridges. This specialised equipment may require a larger site compound area to establish, operate, and dis-establish.

The final construction technique for these bridges will be further refined in the design development phase.

Bridges over rail will require specific KiwiRail approval to work adjacent live overhead lines and rail lines. These works will require to be carried out during a Block of Line, which are typically carried out during night-time, weekends, and public holidays. An extended Block of Line are typically available during the Christmas and New Years' period which the contractor may plan to carry out significant construction works to make use of the prolonged closure period.

The planning and approval process will be managed through a management plan framework by the contractor closer to the time of construction in consultation with AT and KiwiRail.

9.2.8 Earthworks

Bulk earthworks will typically be undertaken during summer earthworks months and minor earthworks and pavement construction can be carried out all year round provided sediment runoff and environmental controls are managed accordingly. Resource consents for bulk earthworks will be sought in the future at detailed design stage. Depending on final design, bulk earthworks may be required to accommodate road formation.

Earthworks will typically include the following activities once enabling works have been undertaken:

- Topsoil stripping and removal of any unsuitable materials;
- Cut and/ or fill to grade or formation, including conditioning and suitable compaction;
- Preparation and conditioning of the subgrade layer;
- Final trimming and topsoil placement; and
- Landscaping and site reinstatement.

Within each of the construction areas an earthwork compound for handling, stockpiling some topsoil, loading and conditioning site won material will be established to enable better utilisation of the existing material. Where required, topsoil stockpiles can also be utilised. The topsoil can be used as water diversion bunds for environmental control purposes. The remaining volume will need to be stockpiled in site laydown areas. Areas for these activities have been provided for within the proposed designation boundaries.

Suitable dust management measures will be considered for the Project and are anticipated to include:

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

Erosion and sediment control measures will be installed in the future, in accordance with any applicable resource consent conditions and the Auckland Council Erosion and Sediment Control Guidelines or subsequent amendments.

Ground or soil improvement techniques may be required to improve the parameters or characteristics of the ground. These may involve cement or lime stabilisation, preloading where additional fill is placed to accelerate the settlement process, wick drains, or undercutting and replacing with suitable backfill material.

Due to the urban and industrial environment of the Project, it is likely that unsuitable and contaminated materials will be encountered during the earthwork activities. These materials will be disposed of to a suitable tip site and managed through the Outline Plan process.

9.2.9 Pavement works and streetscape

The pavement construction will likely need to be completed in sections depending on the length of the proposed road for each Project and the layout of the available traffic management configuration. The pavement layers will be placed and compacted using standard pavement construction plant such as graders, rollers, and water trucks for dust suppression and conditioning.

The pavement design and composition will be developed in the detailed design phase. Pavement improvement techniques, such as cement stabilisation, bitumen stabilisation, or deep lift asphalt may be required to improve the condition of the existing pavement. These techniques will require specialised plant and equipment such as a paving machine, stabilising machine, truck spreader, and other specialised paving plant and equipment.

The pavement tie-ins and pavement rehabilitation will require the use of a pavement milling machine to remove a portion, or all of the pavement or asphalt layers. These works will be carried out under traffic management to ensure the safety of the public and workers.

Once the pavement construction is completed, new kerb and channels will be laid, followed by the structural asphalt layers. When all other works are complete the wearing course can then be laid.

Aggregates for pavement construction will need to be imported from designated quarry facilities. The aggregates will likely be transported in road going trucks and unloaded directly onsite to minimise any double handling of materials.

For smaller work sites, such as constrained narrow road widening, intersection upgrade, or active mode construction, these aggregates may be imported to a site laydown/ stockpile area and transported using smaller trucks/ plant to the work site. This double handling may be required where works are required to be completed under traffic management controls or night shifts.

The streetscape works will have a significant impact to pedestrian movement, residents, businesses and other stakeholders. These works will need to be staged/ sequenced to ensure disruption is limited and managed appropriately. Access to businesses and private property will need to be maintained at all times. The development of TMP will need to ensure pedestrian movements and accesses are adequately managed.

Pavement works on intersection will require a more complex traffic management configuration to manage the multiple traffic legs. These works may require full road closures or significant modification to the existing traffic configuration to make available the required work areas and will be managed in the TMP approval process.

In some instances, work on an intersection will need to be carried out in a piecemeal method, carried out during nightshifts only, and re-open to traffic during the daytime. Suitable laydown areas are therefore preferred nearby intersections works.

9.2.10 Indicative construction staging and programme

The specific staging and phasing of the work will be dependent on the:

- Procurement;
- Land acquisition;
- Final detailed design, construction staging and construction methodology;
- The construction duration, sequencing of projects, and targeted completion dates;
- Availability of contractors;
- Availability of other resources (such as materials and construction equipment);
- Traffic disruption impacts, including the perceived impacts of a prolonged construction works; and
- Final detailed design, construction staging and construction methodology.

Based on a high-level estimate of similar transport projects, the anticipated construction duration for each NoR is set out in Table 9-2 below. These durations are indicative and assume that each NoR will be constructed independently of each other. If the NoRs were to be constructed concurrently or sequentially, this may change these durations. It is further noted that:

- NoR 1 is not a contiguous extent but is rather made of several separate areas – accordingly the total duration can likely be disaggregated further than the estimated total duration of 2-3 years; and
- It is further noted that the estimated durations outlined in the Table 9-2 account only for the works within the NoR extents, and do not include any adjoining works within existing road reserves.

Table 9-2: Indicative construction duration for each NoR

NoR Reference	Approximate total extent	Estimated total duration
NoR 1 – Great South Road FTN Upgrade	2.47km	2 – 3 years
NoR 2 – Great South Road Upgrade (Drury section)	0.52km	2 – 3 years
NoR 3 – Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades	2.29km	2 – 3 years
NoR 4 – Takaanini FTN - Porchester Road and Popes Road Upgrades	5.2km	1 – 2 years

9.3 Approach to urban design

Urban design input has been considered to inform the Project's design, the alternatives assessment process and the proposed designation footprint. An Urban Design Evaluation (**UDE**), included in Volume 4 has been undertaken for the Project based on the principles set out in Te Tupu Ngātahi Urban Design Framework (appended to the UDE). The UDE provides commentary on the urban design considerations and inputs as well as an evaluation and identification of future transport and land use integration opportunities for the Project. An Urban and Landscape Design Management Plan (**ULDMP**) is recommended to be prepared prior to implementation which will allow further development of the design outcomes and opportunities identified in the UDE.

9.4 Approach to stormwater management

Effects of stormwater quantity, quality, and effects on streams are authorised under Regional Plan provisions and are not authorised by the proposed designations. Accordingly, these effects will be considered as part of a future consenting process. Stormwater assessment for this AEE is limited to flooding effects, is summarised at Section 10.7, and is set out in full in the Assessment of Flooding Effects included in Volume 4.

Notwithstanding this, the concept design and proposed designation boundary enables the future management of other stormwater effects (stormwater quantity and quality). The area required for stormwater devices within the proposed designation boundaries is based on a high-level indicative sizing of the device and area required for construction.

The stormwater design approach identifies preferred treatment approaches along the Project corridor and includes linear treatment, use and/or enhancement of existing public stormwater treatment ponds, raingardens and new treatment devices. The Assessment of Alternatives sets out the process of how stormwater management devices have been selected.

The stormwater infrastructure has been conceptually designed in accordance with:

- Auckland Council's Stormwater Management Devices in the Auckland Region, Guideline Document 2017/001 (December 2017);
- Auckland Transport's Stormwater Guidelines (February 2014);

- The Waka Kotahi Stormwater Design Philosophy Statement (May 2010); and
- Auckland Unitary Plan: Operative in Part (**AUP:OP**) Stormwater Management Requirements.

9.5 Approach to geotechnical design

Geotechnical effects resulting from earthworks and upgrades of roundabouts, intersections and bridges are largely authorised under the Regional Plan and therefore will be considered as part of a future consenting process. No numerical analysis has been undertaken. Notwithstanding this, the concept design and designation boundaries are underpinned by a number of general design assumptions as follows:

Slope stability

- Desktop assessment including review of recent and historic investigation data. Stability of slopes has been assessed based on the mapped geomorphology, and the performance of similar geological areas;
- 1V:3H slopes have been adopted as the default batter for cut and fill slopes to meet maintenance requirements. Within the Auckland region, similar slopes have been widely utilised successfully in soils that do not have known slope instability issues; and
- Typically, where the alignment crosses alluvial, or swamp deposits on the geological map, embankment side slopes of 1V:4H would be adopted and not the general 1V:3H applicable for the remainder of the soils in the Takaanini area. However, since the extent of the embankments on alluvial or swamp deposits are minor to negligible, persevering with the 1V:3H embankment slopes is recommended except for Great South Road Drury.

Retaining walls

- Vertical retaining walls have been placed where necessary to limit impact on properties and manage topographic constraints, e.g. low retaining walls are proposed at back of active mode paths to minimise third party land take associated with earthwork embankments. Fill walls have been assumed to be constructed using generic mechanically stabilised earth techniques.
- Given the limited geotechnical information available, the form of the retaining walls has not been determined, with the most suitable wall types identified to inform the construction method statement and cost estimation.

Bridge abutments

- Vertical abutment walls have been adopted as the default approach to bridge abutments within the existing urbanised/industrial area. The vertical abutment walls have been assumed to be constructed using mechanically stabilised earth walls.

9.6 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. All four proposed NoRs are new AT designations for the purposes of this assessment.

When assessing the actual or potential effects on the environment under section 171 of the RMA, the assessment of effects on the environment for the Project 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. Where National Environmental Standard (**NES**) or Regional Plan consenting requirements are triggered, these will not be authorised by the proposed designations and will require resource consents in the future where any related effects can be assessed and appropriately mitigated. Notwithstanding this, relevant national and regional resource consent matters have been considered to inform the Project's design, the alternatives assessment process and the proposed designation footprint.

In the future, prior to construction, the Project will require NES and regional resource consents for a number of activities to enable the proposed works. These resource consents are not sought at this time but will be sought when detailed design for the Project is completed so as to confirm consent requirements, understand the actual or potential effects of activities that require consent and define the measures proposed to manage any adverse effects.

Based on the above, the assessment of effects that have been undertaken to support the Project is limited to the following matters:

- Transport;
- Landscape and Visual;
- Noise and Vibration;
- Arboricultural;
- Terrestrial Ecology[8];
- Flooding;
- Social Impacts;
- Archaeology and Historic Heritage;
- Property; and
- Cultural.

9.7 Approach to assessing the likely receiving environment

As set out above, a key purpose of the NoRs is to route protect the necessary transport network that will support the growing population in South Auckland. It is anticipated that the Project will not be constructed and operational in the short term, but rather will be implemented as and when necessitated by growth and enabled by funding availability.

It is well established that the *"environment"* is the existing environment as well as elements of the future environment such as permitted activities under the relevant plans and resource consents that have or are likely to be implemented. In addition, it is acknowledged that the future environment requires consideration of that environment as signalled by operative objectives and policies of a District Plan.

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 the effects of the construction and operation of the transport infrastructure will be experienced.

[8] Specifically, those terrestrial ecological matters that fall with the AUP:OP district plan section.

Within the Project area, there a range of existing and future land use zoning patterns, which influence the likely future environment for assessment purposes. The Project Team has developed an approach to assessing the likely future environment. This has included consideration of:

- Existing zoning patterns, including areas traversed by the Project that have 'live' urban zoning, as well as FUZ zoning;
- Zoning patterns contemplated under proposed PC78 to the AUP:OP (see Figure 9-1). At the time of writing PC78 had been notified as Auckland Council's Intensification Planning Instrument under the ISPP provided for under the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 (**RMA Amendment Act**). Accordingly, PC78 constitutes the planning response to Policy 3 of the National Policy Statement on Urban Development (**NPS:UD**) which sets clear national direction on providing for urban intensification; and implements the Medium Density Residential Standards as required for by the RMA Amendment Act. It is noted at the time of writing that PC78 is not yet fully operative, but some provisions have legal effect. Hearings on PC78 will not occur until 2024. In any event, the RMA Amendment Act effectively imposes a mandatory baseline of intensification requirements which are reasonable to consider in any real word future environment assessment; and
- The likelihood and timing of urbanisation of FUZ areas, having regard to the Future Urban Land Supply Strategy, and the draft FDS.

Sections 9.7.1 - 9.7.5 set out the receiving environment for the Project at the date of lodgement and considering the assessment approach described in above.

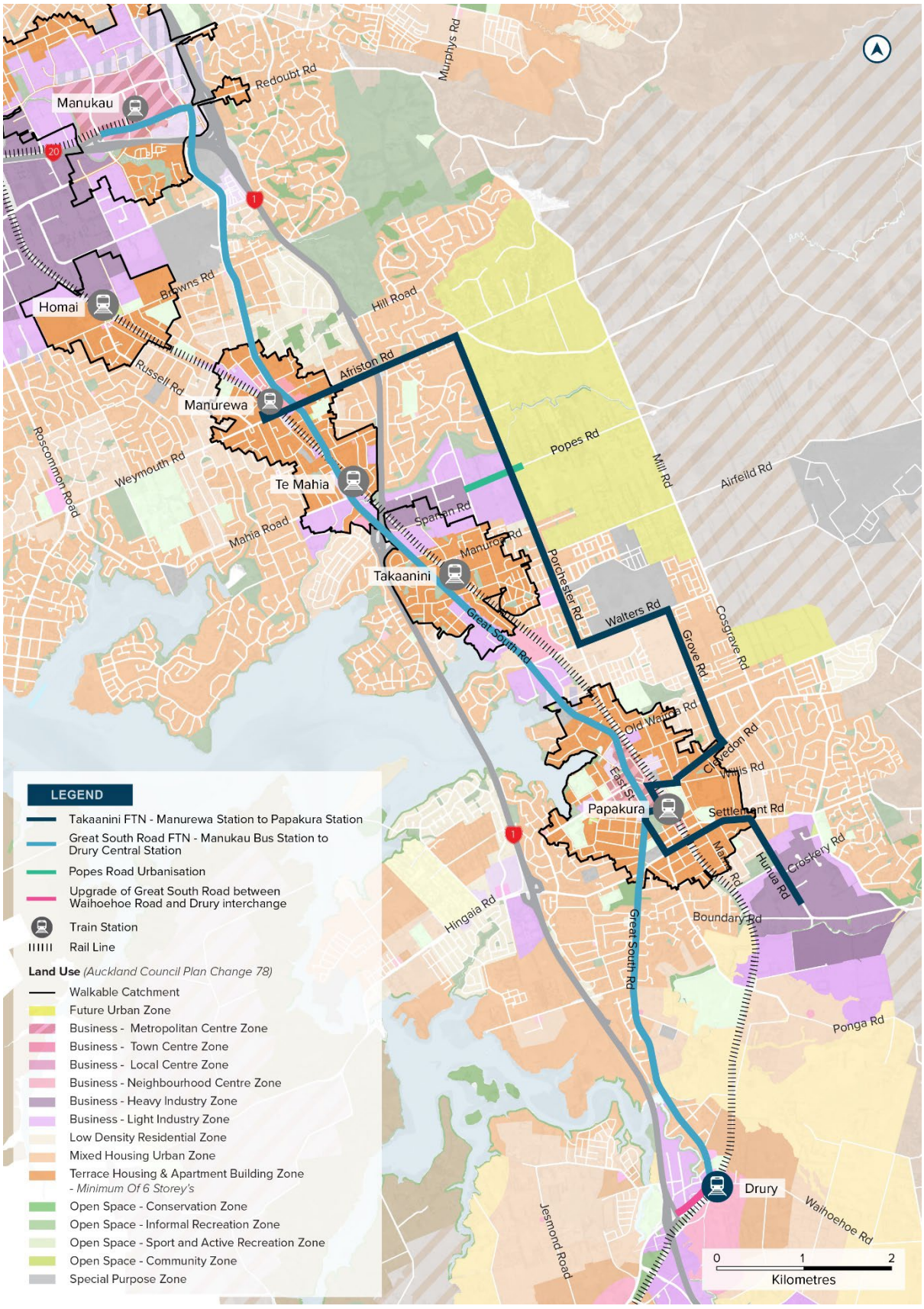


Figure 9-1: Application of the NPS:UD in the context of the Project

9.7.1 NoR 1 – Great South Road FTN Upgrade

The current zoning within and surrounding NoR 1 is shown in Figure 9-2, with a summary of the receiving environment provided in Table 9-3 below.

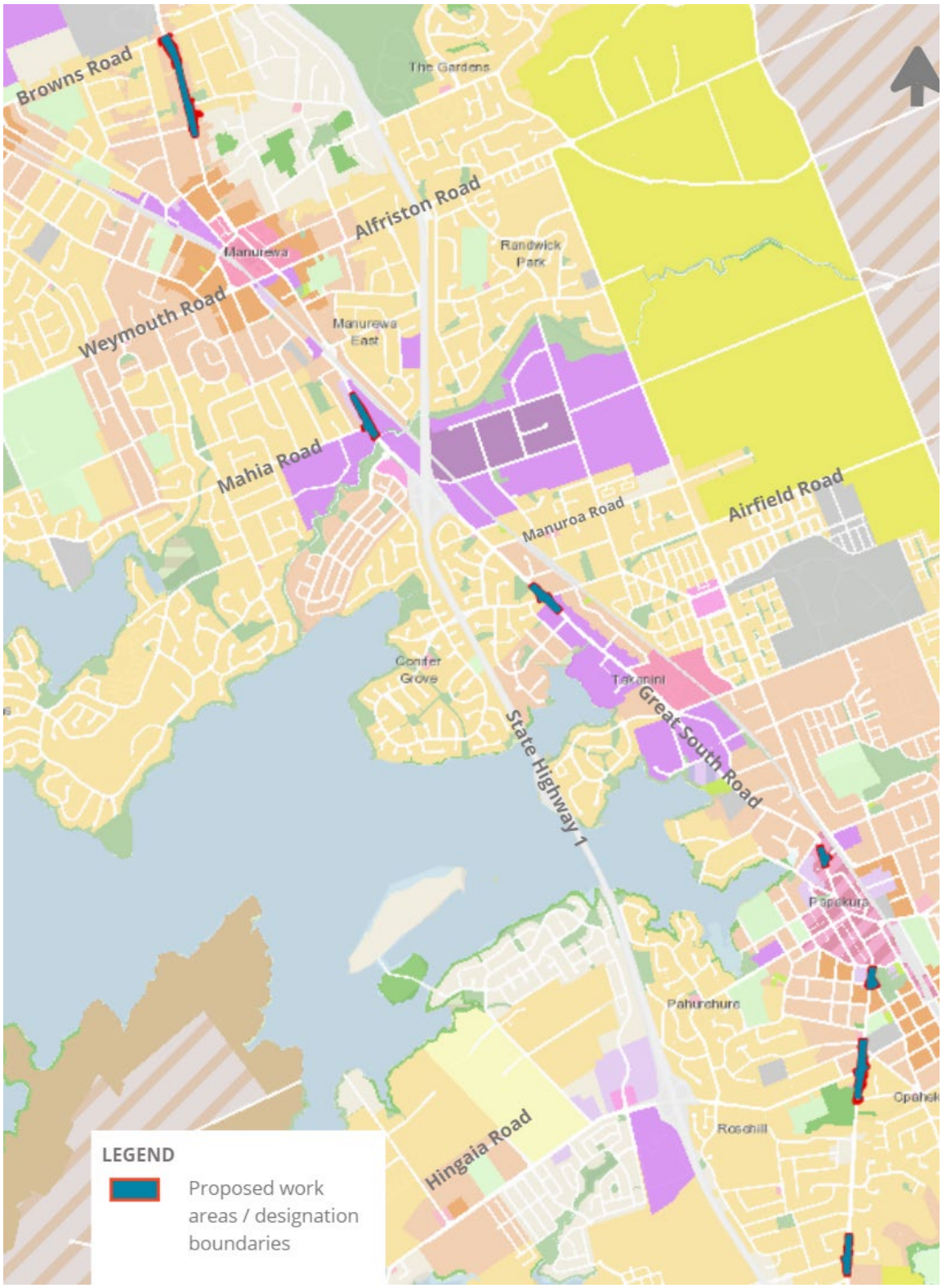


Figure 9-2: Current zoning surrounding NoR 1

Table 9-3: NoR 1 receiving environment

Features	Description
Current land use	• The land use surrounding the NoR comprises predominately of residential, commercial, and industrial uses • The intersections that make up the NoR start in Manurewa and end in Drury
Community and recreational facilities	• Ultimate Care Manurewa • Anderson Park • Nanaksar Educare Centre • Mobil - Service Station (319 Great South Road) • Caltex - Service Station (Great South Road) • First Presbyterian Church • Vets at 77 • Countdown Roselands • Central Park • Papakura District Court • Kirks Bush • Papakura Cemetery • Chisholm Corner • Franklin Vets • BP - Service Station (Great South Road) • All About Children Childcare – Opaheke • Slippery Creek Reserve
Watercourses	• Otūwairoa / Slippery Creek
Significant Ecological Areas	• Kirks Bush, SEA_T_5248, Terrestrial • SEA_T_4362, Terrestrial
Historic heritage and archaeological values	• Papakura Old Central School (R12/1154 NZAA; 02830 AUP:OP) • Papakura-Karaka War Memorial (12924 NZAA; 02801 AUP:OP) • Building (R12/1159 NZAA) • Papakura Library (R12/1161 NZAA) • Milepost 20 (CHI 3048) • Milepost 21 (CHI 20290) • Refer to Section 10.9 for further discussion
Precincts	• Gatland Road Precinct • Gatland and Great South Road Precinct
Areas of cultural value	• Treaty Settlements – Statutory Acknowledgments: Ngati Tamaoho • No specific areas identified within the Sites and Places of Significance to Mana Whenua Overlay under the AUP:OP • See Section 10.12 for further discussion on cultural values
Existing designations	• 200 Ardmore Airport purposes (Ardmore Airport Ltd) • 1102 Obstacle Limitation, Runway Protection and Ground Light Restriction (Auckland International Airport Ltd) • 6706, State Highway 1 – Takanini to Drury, Designations (Waka Kotahi NZ Transport Agency)

Features	Description
Overlays	• Notable Trees Overlay Within designation boundary ○ 2189, Gum, Verified position of tree Root zone of tree(s) may be within the designation boundary ○ 1664, Norfolk Island Pine, Verified position of tree ○ 2188, Oak (Memorial), Verified position of tree ○ 2206, Phoenix Palm, Verified position of tree ○ 2227, Phoenix Palm, Verified position of tree ○ 2218, Totara, Notable Group of Trees ○ 2209, Scarlet Gums, Notable Group of Trees
	• High-Use Aquifer Management Areas Overlay [rp] – Clevedon West Waitemata Aquifer • High-Use Aquifer Management Areas Overlay [rp] - Manukau Waitemata Aquifer • Significant Ecological Areas Overlay - SEA_T_5248, Terrestrial; SEA_T_4362, Terrestrial • High-Use Aquifer Management Areas Overlay [rp] - Clevedon West Waitemata Aquifer • National Grid Corridor Overlay – National Grid Yard Compromised • National Grid Corridor Overlay – National Grid Subdivision Corridor • Historic Heritage Overlay Extent of Place [rcp/dp] - 2830, Papakura Old Central School • Historic Heritage Overlay Extent of Place [rcp/dp] - 2801, Papakura-Karaka War Memorial
Other non statutory features	• Overland flow paths – 4000m² to 1ha (8,000), 1ha to 3ha (15,000), 3ha to 100ha (25,000), 100ha and above (25,000) • Flood prone areas • Flood plains • Stormwater Catchment • Underground services (including wastewater, stormwater, water, and Transpower). • Medium Wind Zone
Current zoning (refer to Figure 9-2 above)	Business - Heavy Industry Zone
	Business – Mixed Use Zone
	Business – Light Industry Zone
	Business – Local Centre Zone
	Business – Neighbourhood Centre Zone
	Business – Town Centre Zone
	Business - Metropolitan Centre Zone

Features	Description
	Residential – Mixed Housing Urban Zone
	Residential – Mixed Housing Suburban Zone
	Open Space – Informal Recreation Zone
	Future Urban Zone
	Special Purpose Zone – Healthcare Facility and Hospital
	Water
Likely future zoning	• See Figure 9-1 for zoning along the Great South Road FTN route contemplated under PC78. Note that the key change is the proposed application of Terrace Housing and Apartment Building (**THAB**) zoning along Great South Road where areas are within a walkable catchment of rail stations. This affects five of the eight areas which comprise NoR 1
Level of certainty of likely future zoning	• High

9.7.3 NoR 2 – Great South Road Upgrade (Drury section)

The current zoning within and surrounding NoR 2 is shown in Figure 9-2, with a summary of the receiving environment provided in Table 9-4 below.

Figure 9-3: Current zoning surrounding NoR 2

Table 9-4: NoR 2 receiving environment

Features	Description
Current land use	• The land use surrounding the NoR comprises predominantly of open space and industrial/commercial uses • The NIMT is located to the south of the designation • The area to the east of the rail line has been rezoned a mixture of Metropolitan Centre, Mixed Use, and THAB zoning via recent Plan Changes
Community and recreational facilities	• Town and Country Veterinary Services
Watercourses	• Hingaia Stream
Significant Ecological Areas	• None
Historic heritage and archaeological values	• None • Refer to Section 10.9 for further discussion

Features	Description
Precincts	• Drury Centre sub-precinct A
Areas of cultural value	• Treaty Settlements – Statutory Acknowledgments: Ngati Tamaoho • No specific areas identified within the Sites and Places of Significance to Mana Whenua Overlay under the AUP:OP • See Section 10.12 for further discussion on cultural values
Existing designations	• 6308 Drury Central Station, Designations (KiwiRail Holdings Limited) • 6706 State Highway 1 - Takanini to Drury, Designations (New Zealand Transport Agency) • 1840 Jesmond to Waihoehoe West FTN Upgrade, Designations (Auckland Transport)
Overlays	• National Grid Corridor Overlay - National Grid Yard Uncompromised • National Grid Corridor Overlay - National Grid Subdivision Corridor
Other non-statutory features	• N/A
Current zoning (refer to Figure 9-3 above)	Business – Mixed Use Zone
	Business – Light Industry Zone
	Special Purpose Zone
	Open Space – Informal Recreation Zone
	Water
Likely future zoning	See Figure 9-1 for zoning
Level of certainty of likely future zoning	• High

9.7.4 NoR 3 – Takaanini FTN - Weymouth, Alfriston and Great South Road Upgrades

The current zoning within and surrounding NoR 3 is shown in Figure 9-4, with a summary of the receiving environment provided in Table 9-5 below.

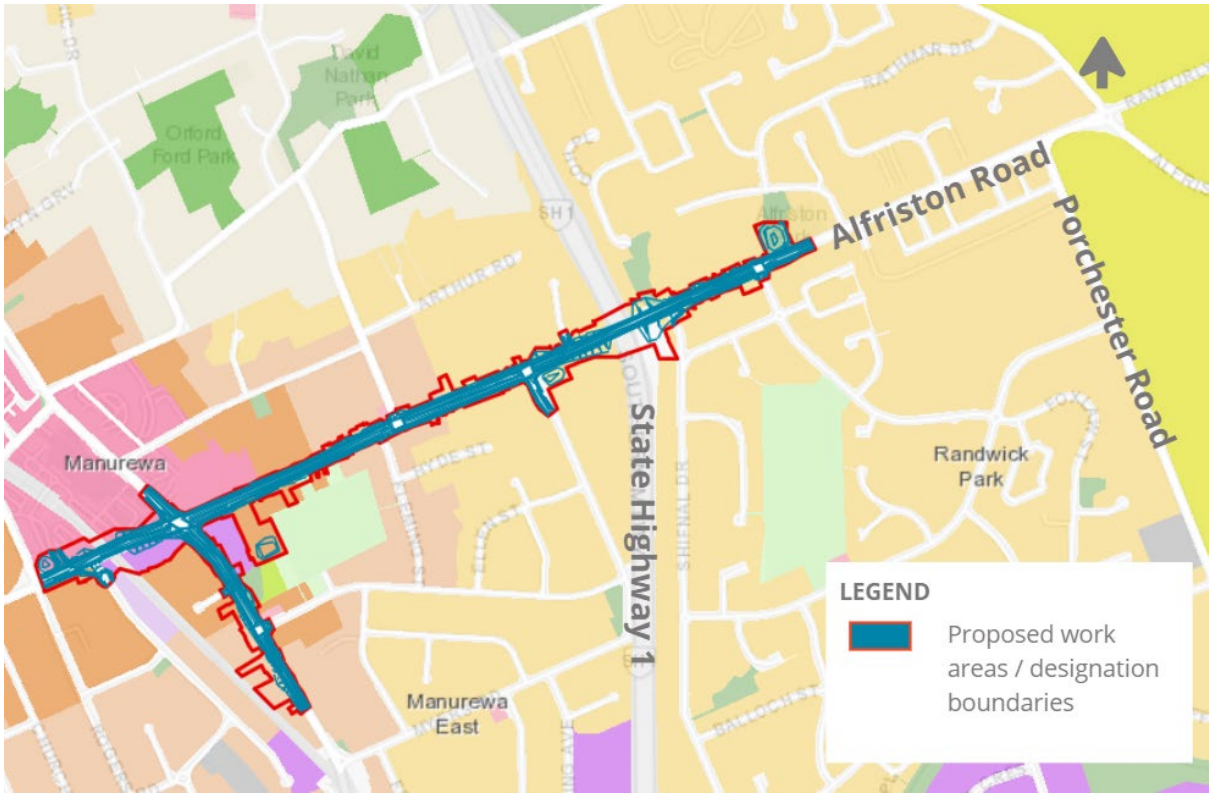


Figure 9-4: Current zoning surrounding NoR 3

Table 9-5: NoR 3 receiving environment

Features	Description
Current land use	• The land use surrounding the NoR comprises predominantly residential uses. There is however some commercial use on the west side of the NoR, which is towards Manurewa.
Community and recreational facilities	• Manurewa Methodist Church • Z - Manurewa - Service Station • Mac's Auto Clinic & Tyre Services • Manurewa Cosmopolitan Club • Oranga Tamariki - Ministry for Children • KFC Great South Road • McDonald's Manurewa • Gallaher Park • Alfriston Court – retirement village • Alfriston Fish and Chips • The rainbow corner – early childhood centre

Features	Description
Watercourses	• Several piped tributaries of Papakura Stream
Significant Ecological Areas	• None
Historic heritage and archaeological values	• Manurewa Railway Station (R11/3477 NZAA) • Refer to Section 10.9 for further discussion
Precincts	• None
Areas of cultural value	• No specific areas identified within the Sites and Places of Significance to Mana Whenua Overlay under the AUP:OP • See Section 10.12 for further discussion on cultural values
Existing designations	• 200 Ardmore Airport purposes (Ardmore Airport Ltd) • 1102 Obstacle Limitation, Runway Protection and Ground Light Restriction (Auckland International Airport Ltd) • 6714 State Highway 1: To undertake maintenance, operation, use and improvement to the State Highway network., Designations (New Zealand Transport Agency) • 6302 – North Island Main Trunk Railway (KiwiRail)
Overlays	• Notable Trees Overlay <u>Within designation boundary</u> ○ 1471, Norfolk Island Pine, Unverified position of tree *(Noted - removed as part of Plan Change 83: Additions and amendments to Schedule 10 Notable Trees Schedule)*
	• National Grid Corridor Overlay – National Grid Yard Uncompromised • National Grid Corridor Overlay – National Grid Subdivision Corridor
	• High-Use Aquifer Management Areas Overlay [rp] - Clevedon West Waitemata Aquifer
Other non statutory features	• N/A
Current Zoning (refer to Figure 9-4 above)	Residential – Mixed Housing Urban Zone
	Residential – Mixed Housing Suburban Zone
	Residential – Terrace Housing and Apartment Buildings Zone
	Business – Town Centre Zone
	Business – Light Industry Zone
	Business – Mixed Use Zone

Features	Description
	Business – Neighbourhood Centre Zone
	Open Space – Informal Recreation Zone
Likely future zoning	• See Figure 9-1 for zoning along the Drury section of Great South Road contemplated under PC78. Note that the key change is the increased application of THAB zoning along Great South Road where areas are within a walkable catchment of Manurewa Station.
Level of certainty of likely future zoning	• Moderate-High

9.7.5 NoR 4 – Takaanini FTN - Porchester Road and Popes Road Upgrades

The current zoning within and surrounding NoR 1 is shown in Figure 9-5, with a summary of the receiving environment provided in Table 9-6 below.

Figure 9-5: Current zoning surrounding NoR 4

Table 9-6: NoR 4 receiving environment

Features	Description
Current land use	• The land use surrounding the NoR to the east comprises predominantly a mix of community, rural residential, and horticultural uses • To the west of the NoR the land use is a mix of residential and commercial/industrial
Community and recreational facilities	• Manurewa Samoan Methodist Church • BestStart Porchester Road • Porchester Islamic Centre

Features	Description
	• The Church of Jesus Christ of Latter-day Saints • Te Kura Akonga O Manurew Cambodian Temple Takanini (Wat Khemeraphiratam) • PlaceMakers Takanini
Watercourses	• Papakura Stream
Significant Ecological Areas	• None
Historic heritage and archaeological values	• Gorrie McInnes Homestead (R11/2077 NZAA) • John de Carteret Flax Mill (R11/2078 NZAA) • Refer to Section 10.9 for further discussion
Precincts	• Takaanini sub-precinct A, Precinct • Takaanini sub-precinct C, Precinct
Areas of cultural value	• No specific areas identified within the Sites and Places of Significance to Mana Whenua Overlay under the AUP:OP • See Section 10.12 for further discussion on cultural values
Existing designations	• 200 Ardmore Airport purposes (Ardmore Airport Ltd) • 1102 Obstacle Limitation, Runway Protection and Ground Light Restriction (Auckland International Airport Ltd)
Overlays	• National Grid Corridor Overlay – National Grid Yard Uncompromised • National Grid Corridor Overlay – National Grid Subdivision Corridor
	• High-Use Aquifer Management Areas Overlay [rp] – Clevedon West Waitemata Aquifer • High-Use Stream Management Areas Overlay [rp]
Other non-statutory features	• N/A
Current zoning (refer to Figure 9-5 above)	Business – Heavy Industry Zone
	Business – Light Industry Zone
	Business – Neighbourhood Centre Zone
	Business – Local Centre Zone
	Residential – Mixed Housing suburban Zone
	Residential – Mixed Housing Urban Zone
	Residential – Single House Zone

Features	Description
	Residential – Terrace Housing and Apartment Buildings Zone
	Rural – Mixed Rural Zone
	Future Urban Zone
	Special Purpose Zone
	Open Space – Informal Recreation Zone
	Open Space – Sport and Active Recreation Zone
	Water
Likely future zoning	• Low likelihood of change under PC78 for live-zoned areas to the west of Porchester Road • Refer to Figure 9-1 above
Level of certainty of likely future zoning	• High (for live-zoned areas) • Low-moderate (for FUZ-zoned areas)

10 Assessment of Effects on the Environment

10.1 Summary of key effects

Table 10-1 provides a summary of the assessment contained within Section 10 of this report. Sections 10.2 to 10.12 provide a more detailed assessment.

Table Key:

Construction/ Temporary Effects	Operational/Permanent Effects

Table 10-1: Summary of key effects

Actual or potential effect	Positive	Adverse
Traffic and Transport Effects		
Improved provision for FTN bus services and walking and cycling along the corridors.		
Improved access to rail stations via bus services.		
Improved safety outcomes for vulnerable road users and for drivers, and consequently a reduction in deaths and serious injuries.		
Improved freight connections at Takaanini and motorway access at Drury.		
Need for temporary traffic management and temporary road closures to accommodate construction works.		
Increases in construction traffic volumes.		
Property access effects for residents and businesses.		
Reduced general traffic capacity resulting from reallocation of road space.		
Increased general traffic capacity resulting from widening of road corridor at Great South Road (Drury) and additional approach lanes at some intersections.		
Landscape and Visual		
Enhancement of streetscape character and improved visual amenity for road.		
Potential for planting within streetscape to provide visual and streetscape amenity.		
Vegetation clearance and temporary landform modification.		
Temporary effects on open spaces and reserves.		
Permanent loss of open space, particularly informal recreation space.		
Noise and vibration		
Potential for intermittent exceedances of relevant construction noise and vibration criteria.		
Perceptible increases in operational traffic noise at a small number of receivers.		
Same or reduced operational traffic noise for majority of receivers.		
Arboricultural		
Potential for an increase in tree canopy cover and improved quality of trees in the public realm through street tree planting.		

Actual or potential effect	Positive	Adverse
Removal of trees.		
Works in the root zone of trees.		
Terrestrial ecology		
Ecological benefit from landscape planting adjacent to stream and riparian corridors.		
New bridge structures replacing existing undersized structures will improve habitat connectivity for terrestrial and freshwater species.		
Loss of vegetation during construction and associated potential habitat loss for bats, birds, and lizards.		
High potential construction effects (pre mitigation) on native lizards associated with vegetation removal.		
Flooding		
Improved culvert capacities.		
Localised changes in road levels to reduce road flooding.		
Provision for stormwater treatment, water quality improvement, and retention/detention as part of the road corridors.		
Potential localised increase in flood hazard during construction of new bridges and culverts.		
Social impacts		
Designation provides certainty/indication of intent to improve transport.		
Greater transport choice, improved connectivity and accessibility, safer road environment.		
Uncertainty of property options during planning process for affected landowners.		
Opportunities for local employment during construction.		
Construction disruption – congestion, reduced connectivity, potentially reduced rental housing stock.		
Potentially reduce privacy for adjacent residents.		
Potential reductions in street parking.		
Archaeology and heritage		
Potential effects on eight recorded archaeological sites, two scheduled sites in the AUP:OP, four Cultural Heritage Inventory (**CHI**) items, and six houses with unrecorded built heritage values.		
Potential for unrecorded archaeological and heritage sites, particularly in undeveloped paddocks and near waterways.		
Property		
Designations enable greater certainty of future development activities.		
Uncertainty associated with extended lapse periods.		
Requirement to obtain section 176(1)(b) approval to work within designation.		
Inconvenience around permanent land acquisition or temporary leasing of land as applicable.		

Actual or potential effect	Positive	Adverse
Construction disruption on affected properties.		
Network Utilities		
Potential impacts on network utilities, including KiwiRail, Waka Kotahi, Transpower, Spark, and Watercare assets.		

10.2 Traffic and transport

An Assessment of Transport Effects for the Project is included in Volume 4. This section provides a summary of the assessment, including the methodology applied and the recommended measures to manage effects. It is noted that in the Assessment of Transport Effects and in this section of the report, 'the Project' refers to the overall South FTN network. Where assessment relates to works within the specific NoRs this is identified accordingly (i.e., 'the NoRs) (refer to Section 3.2.2.2 of the Assessment of Transport Effects for further rationale).

10.2.1 Assessment methodology

Construction effects

The assessment of traffic and transport effects during construction of the Project was based on the indicative construction methodology set out in Section 9.2 of this AEE. This assessment considered:

- Potential impacts to traffic, public transport, pedestrians and cyclists and property access; and
- Potential conflict areas with vulnerable road users that will need specific mitigation.

The impact of any temporary traffic management measures implemented to undertake the Project will be re-assessed to validate this assessment in the future, prior to construction, when a greater level of detail is available in terms of the specific construction methodology, the surrounding land use and the prevailing traffic environment.

The construction effects are based on a 2038 forecast year horizon that aligns with the likely timeframe of construction of the Project.

Operational effects

Potential operational transport effects have been assessed using:

- Transport planning assessment of expected outcomes and effects;
- Transport modelling to inform demands and network performance; and
- Alignment with policy documents.

An assessment of each key element of the transport system was undertaken including effects on safety, each transport mode, parking, and property access.

As this Project is not funded for immediate delivery, the assessment considered the likely future receiving environment that includes planned or expected changes to the existing land use and transport environment. Specifically, this includes urban growth as indicated in the AUP:OP. To define this future transport environment and identify the changes resulting from the Project, a range of different transport modelling tools were used to undertake quantitative assessment of the transport

system as a whole. The impacts of the Project on the future transport environment were assessed using forecasting transport models, owned by the Auckland Forecasting Centre (**AFC**).[9]

The main assessment of transport operational effects is based on a 2048 forecast year horizon. This aligns with the available regional models and represents the long-term future environment, providing a better understanding of the intergenerational nature of the infrastructure investment. The operational effects were considered in the likely future environment, against a baseline scenario where the Project does not exist. The baseline scenario assumed the same growth scenarios and all other planned transport investments in the wider network.

10.2.2 Positive effects

Table 10-2 below provides a summary of the positive operational transport effects of the Project.

Table 10-2: Summary of positive transport effects

Positive Effects	
Walking and cycling	• Enables improved walking and cycling facilities along the corridors, resulting in improved protection for vulnerable road users; and consequentially, a reduction in deaths and serious injuries (**DSIs**). • Improved integration with existing and planned facilities on the network, resulting in improved connectivity. • Environmental and health benefits due to the uptake of active modes. • Removal of several left turn slip lanes across the corridors, improving safety for walking and cycling. • Supporting growth in a sustainable manner. • Improved choice of travel modes, both to local destinations and to the public transport network. • Improved road crossing facilities due to traffic signal control at key intersections.
Public transport	• Better quality, frequency and reliability for public transport along the FTN routes, improving its attractiveness. • Better access to the wider public transport (rail) network. • Improved access to employment and social amenities via public transport. • Increase in public transport choice and resilience for the community especially in the event the rail line is full or closed. • Reduced conflicts between buses and cars with provision of bus lanes. • Supporting growth in a sustainable manner.
General traffic	• Supporting wider network outcomes such as improved public transport provision and reduced vehicle kilometres travelled (**VKT**) relative to future without the project (2048+). • Improved driver safety with the conversion of priority-controlled intersections to either roundabouts or signals. • Provision of more effective and reliable travel on Great South Road near the Drury interchange due to provision of additional lanes between adjacent traffic signals. • Increased flood resilience of stream bridges as they are upgraded to 1 in 100-year flood resilience, thereby minimising traffic disruptions in the event bridges are damaged in a flooding event.

[9] The AFC is jointly owned and operated between Auckland Council, Auckland Transport and Waka Kotahi.

Positive Effects	
Freight	• Improved operations along Popes Road West; and on Great South Road.

10.2.3 Construction effects

Project-wide construction traffic and transport effects

The majority of construction work required for the Project will likely be adjacent to or in the live carriageway (operating road corridors), which means that temporary traffic management will be required to delineate live traffic away from construction zones. It is expected that short-term temporary road closures for nights or weekends may be required for some specific activities, such as road surfacing, traffic switches, bridge construction and gas relocations. Other activities may require stop/go or contraflow traffic management, such as drainage, utility relocation, survey and investigation work.

The effect of temporary road closures or other traffic management methods on existing traffic should be confirmed in the future as part of the CTMP for each NoR on the basis of the prevailing land use and traffic environment. This will account for the level of growth and activities that have occurred in the area, the availability of alternative routes, and any additional sensitive land use activities.

The construction of the Project will require earthworks. Final cut and fill volumes will be confirmed following detailed design, prior to construction. The construction traffic movements to accommodate these earthworks will likely result in traffic volume increases on construction routes used during the construction period.

Traffic routes for construction vehicles are uncertain at this time, as the timing, staging, location of quarries/disposal sites, access points, and compound sites/layover areas for the Project are yet to be determined. It is anticipated that routes for construction traffic will likely be limited to arterial corridors, the adjacent SH1 and those intersections with adequate vehicle tracking. Overall, it is considered that with available connectivity to the strategic transport network and available capacity in the network, construction traffic will be able to be readily accommodated. Specific CTMPs for each NoR (or stage of work) will consider the suitability of traffic routes and effects and may include specific mitigation, such as restrictions on the number or time of day/week that construction vehicles could utilise those corridors.

Other Project-wide construction traffic and transport effects are likely to include the following:

- *Speed limit restrictions*: To main safety for all road users, safe and appropriate temporary speed limits are likely to be implemented on the network within the extent of proposed works and potentially (if needed) along construction routes. These speed limits will be detailed in the CTMP(s);
- *Effects on pedestrians and cyclists:* Although existing provision for pedestrians and cyclists varies across the network, demand for these modes is likely to increase as further development occurs, and some temporary diversions are likely to be required. Overall, effects are likely avoided or mitigated by temporary alternatives such as use of the existing network of parallel collector roads (which mostly have footpaths on both sides of the road), and off-road walking and cycling facilities. Effects and management measures will be addressed in more detail in the CTMP(s); and

- *Property access effects for residents and businesses:* During construction, temporary traffic management controls such as temporary concrete or steel barriers will be required along the corridors. Existing driveways that are required to remain operational during construction will require temporary access provision. It is anticipated that the contractor would undertake a property-specific assessment of any affected driveways and provide safe, temporary access arrangements if required. These requirements should be captured in the CTMP.

NoR-specific construction traffic and transport effects

Traffic and transport effects that are specific to individual NoRs are summarised in Table 10-3.

Table 10-3: Summary of NoR-specific traffic and transport effects during construction

NoR	Type of effect	Assessment
1	Public transport accessibility impacts	If the Slippery Creek bridge is closed during construction (under a worst-case scenario), this will impact the existing 365 bus route which services the community between Settlement Road and Sutton Road (assuming this bus route remains at the time of construction). A detour will require buses to bypass this section entirely, reducing accessibility to public transport. Other parts of the future bus network could also be temporarily impacted by construction activities.
1	Walking and cycling connectivity impacts	If Slippery Creek bridge is closed during construction (under a worst-case scenario), the detour for pedestrians and cyclists will be ~7km which is over an hour via walking and considered to be significant.
1	Network resilience impacts	Great South Road is a key north-south corridor and is a key alternative to SH1. With limited north-south corridors available, network resilience will be compromised if the Slippery Creek bridge is closed during construction under a worst-case scenario. However, noting that construction will be in the future, its role on the network may change and will be dependent on whether other planned corridors like Mill Road and / or the Opaheke N-S arterial (see Section 2.2) are in the network at the time of construction.
2, 3	Safety impacts	Potential increased safety risks at driveways and priority sections where additional lanes are proposed.
3	Public transport accessibility impacts	If the Alfriston Road bridge is closed during construction (under a worst-case scenario), this will impact the existing bus route which services the community (assuming this bus route remains at the time of construction). This is a key bus route into the Manurewa bus and train interchange.
3	Wider network impacts	If the Alfriston Road bridge is closed during construction (under a worst-case scenario), the likely detour route is likely to constrain existing corridors and have a flow on effect on the wider network. Further, Alfriston Road is a key east-west connection on the network.
3	Walking and cycling connectivity impacts	If the Alfriston Road bridge is closed during construction (under a worst-case scenario), connectivity impacts on pedestrians and cyclists would be significant, as this is a key link into the Town Centre and is a 'Major' cycle route.

Recommended measures to address these potential effects are described in Section 10.2.5 below.

10.2.4 Operational effects

Project-wide traffic and transport operational effects

In general, the Project retains all traffic movements along the Project corridors. The exceptions are specific to individual NoRs as discussed separately below.

In general, changes to traffic capacity are expected from the following Project elements:

- Removal of free left turns at signalised intersections;
- Reallocation of general traffic lane to bus lanes;
- Widening of the road corridor from two lanes to four lanes for the Great South Road (Drury section) upgrade (NoR 2); and
- Additional approach lanes at intersections increasing intersection capacity.

The Project is predicted to have some network-wide effects on general traffic, with the proposed bus lanes on Great South Road rerouting traffic onto parallel routes. Modelling with and without the Project indicates that there are some travel time disbenefits for general traffic resulting from the Project. However, for the majority of the route, this change is minimal at less than one minute or less than a 1% change. The greatest effect can be seen between Manurewa to Manukau along Great South Road where the increase in travel time is expected to increase to just under two minutes with the Project, which is also minor. The modelling also shows an estimated daily decrease of 54,800 VKT in 2048+ compared with the same model year without the Project, which is mainly attributable to the increase in mode share in public transport and active modes for local trips. This is not considered to be a significant adverse effect in relation to general traffic, and from a broader effects perspective is considered a positive effect in relation to reducing VKT.

Some localised delays at some locations are predicted as a result of changes to intersection forms i.e. from priority to signals. Conversely, signals can reduce delays for minor movements as drivers are less reliant on finding a gap in high volume traffic flow. In addition, signals provide operators the opportunity to manage traffic flow and demand. Overall, there are considered to be no significant adverse effects or delays for general traffic.

The Project corridor runs through and adjacent to the Takaanini and Drury industrial areas. Operational effects on freight are expected to be similar to effects on general traffic.

In relation to Project interdependencies (within the Project and between NoRs), it is not anticipated that implementation of parts of the Project will adversely impact the rest of the network given that:

- The upgrades along Popes Road West and Porchester Road are for the most part for walking and cycling;
- Alfriston Road will be widened to four lanes to accommodate bus lanes;
- The proposed upgrade of Great South Road in Drury is for a short section only and is anticipated to relieve a potential bottleneck at the Drury interchange;
- Buses will still be able to use their planned routes; and
- Upgrades along Great South Road are either intersection upgrades or bus lanes; although some general traffic lanes will be reallocated for bus lanes, this will have minimal impact on the wider network.

It is not anticipated that the Project or NoRs will have specific interdependencies with other Projects being proposed in the South for similar reasons as noted above.

Other Project-wide effects during operation include the following:

- *Impact on existing access/future arrangements:* For existing properties, the Project's design philosophy has been to retain existing access wherever feasible. There are a number of existing accesses that will be impacted as part of the Project. Due to the complexity of evaluating access arrangements which may change over time, it is not currently possible to determine the appropriate treatments. The best time will be during detailed design and prior to construction. For development accesses, direct property access onto arterial corridors is not advised where possible to better align with future arterial access requirements. Conditions are therefore proposed to manage this effect as part of the detailed design of the designated works; and
- *Impact on on-street and on-site parking:* All on-street parking will be removed as part of the Project. This is in line with AT's Parking Strategy and therefore considered acceptable. Due to the long-term nature of the Project and likely operators on the FTN routes at the time of implementation, it is difficult to ascertain the operational impacts of on-site parking removal with any certainty. It is worth noting that the NPS:UD specifically removes all parking minimum requirements from the AUP:OP so AT's Parking Strategy is consistent with the NPS:UD. In this regard, the removal of on-site parking spaces because of the Project will not infringe any relevant standards and is considered to comprise a minor adverse effect.

NoR-specific operational transport effects

During the Project development, it was identified that NoR 2 would lead to an increased safety risk at the intersection of Firth Street and Great South Road. In particular:

- Raising the Hingaia stream bridge reduces the intersection sight distance as it leads to a vertical crest in the roadway; and
- Widening of the road increases the crossing distance and exposure leading to an increased likelihood of crossing/turning type crashes at the intersection.

In response, the intersection was proposed to be signalised, which will minimise the safety risk by controlling traffic movements.

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

Construction measures

It is considered that the potential construction traffic effects can be accommodated and managed appropriately via a CTMP(s), including any detours that may be required. Based on the assessment of transport construction effects, it is recommended:

- A CTMP be prepared prior to the Start of Construction for a Stage of Work. Any potential construction traffic effects shall be reassessed prior to construction, considering the specific construction methodology and traffic environment at the time of construction.
- The objective of the CTMP should be to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. To achieve this objective, the CTMP shall include:
    - 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., businesses, residents, public, stakeholders, emergency services); and
- Auditing, monitoring, and reporting requirements relating to traffic management activities shall be undertaken in accordance with Waka Kotahi's Code of Practice for Temporary Traffic Management.

In relation to NoR-specific effects, it is recommended that the CTMP considers:

- For NoR 1: How public transport will be maintained for the community if the Slippery Creek bridge is to be closed for construction. This may include providing for additional or altering services to serve the affected communities. This requirement also applies to other bus routes that could be impacted by construction activity;
- For NoR 1: How active mode connectivity is maintained across Slippery Creek during construction;
- For NoR 1: How to maintain connectivity across Slippery Creek bridge during construction if Mill Road and/or the Opaheke N-S arterial corridors are not yet in the network. If one or more corridors are not in the network, the requirement for connectivity should be reviewed at the time; and
- For NoR 3: How a connection may be maintained for all modes across Alfriston Road bridge.

With these measures in place, potential adverse traffic and transport effects of the Project during construction are considered to be minor. The impact of any temporary traffic management measures implemented to undertake the Project will be re-assessed to validate this assessment in the future, prior to construction, when a greater level of detail is available in terms of the specific construction methodology, the surrounding land use and the prevailing traffic environment.

Operational measures

For each of the NoRs, a condition is proposed to demonstrate (in the Outline Plan) how safe access will be provided for each existing access that is altered by the Project.

As outlined above, potential safety risks at the intersection of Firth Street and Great South Road (associated with raising the Hingaia Stream bridge and widening the road) are proposed to be managed by signalising the intersection.

With these operational measures in place, potential adverse traffic and transport effects of the Project are considered to be less than minor. Overall, the NoRs will have significant positive effects, particularly for public transport and active modes.

10.3 Landscape and visual

The potential landscape character and visual effects associated with the NoRs have been assessed in the Assessment of Landscape and Visual Effects (**LVA**), provided in Volume 4. The assessment below should be read in conjunction with this report.

10.3.1 Assessment methodology

The LVA was undertaken using the best practice guidance for landscape assessment as provided by 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines', Tuia Pito Ora New Zealand Institute of Landscape Architects, July 2022.

The methodology used is best aligned with an area-based landscape assessment, which is typically a policy-driven assessment as opposed to a proposal-driven assessment. Area-based assessments are higher level assessments which assess the potential effects of generic activities, where specific project details are absent. As the LVA considers specific locations for each NoR, the methodology includes a degree of proposal-based assessment with respect to those proposed locations. This includes, where appropriate, visual assessment.

It is important to note that the LVA assessment is based on the NoRs having a medium-to-long term (10-15+ years) implementation timeframe. Therefore, it is anticipated that some areas will have changed by the time that the infrastructure is implemented, especially in areas affected by PC78 provisions, areas within a walkable catchment of rapid transit stops (under the NPS:UD), and in areas which are not currently urban but which are anticipated to urbanise in future.

The New Zealand Institute of Landscape Architects' seven-point scale of effects was used to assess the potential landscape effects arising from the Project. The effects scale ranges from 'Very Low' to 'Low' to 'Low-Moderate' to 'Moderate' to 'Moderate-High' to 'High' to 'Very High', as shown in Table 10-4 below.

Table 10-4: New Zealand Institute of Landscape Architects Scale of Effects Rating Table

Very Low (V-L)	Low (L)	Low-Moderate (L-M)	Moderate (M)	Moderate-High (M-H)	High (H)	Very High (V-H)

10.3.2 Positive Effects

Positive effects in relation to landscape and visual elements are primarily associated with the improvement of urban and landscape design and amenity associated with the Project or the specific mitigation measures implemented. A number of positive landscape and visual effects are anticipated as a result of the construction and operation of the Project including:

- An enhancement of streetscape character and improved visual amenity for road users and adjacent properties through the provision for a more coherent arrangement of the road structure (cross section) and clearly defined / dedicated multi-modal infrastructure elements;
- Land within the designations (including berm space in the cross sections) can be planted to provide visual and streetscape amenity, and contribute positively to place identity outcomes and Urban Ngahere objectives;

- The inclusion of dedicated walking and cycling facilities will increase walkability and improve cycle connectivity throughout the area and along the network which contributes to the enhancement of landscape amenity, people's enjoyment, and the pleasantness of the area. This includes increased connectivity of the open space network across the broader area;
- Local place identity can be enhanced through integration of Manawhenua cultural values and narratives relating to Te Ao Māori; and
- Hard landscaping measures can reflect and reinforce local character elements.

10.3.3 Construction effects

This section discusses the temporary potential landscape and visual effects which could arise during construction of the Projects. It is noted that bulk earthworks and works within waterbodies will be the subject of a future regional resource consent process where the effects of these works will be considered and assessed in detail, and mitigation measures will be confirmed. It is acknowledged that there is overlap in the consideration of the landscape and visual effects of these activities between the district and Regional Plan provisions of the AUP:OP.

Construction Footprint Effects

Potential adverse landscape and visual effects could arise from the following construction activities:

- The construction works footprint, with the footprint expected to be somewhat wider than each of the finished Projects. This may result in vegetation clearance or pruning (see below), temporary landform modification outside of the operational footprint of the proposed transport corridors, as well as building removal (see below);
- If vegetation, especially established trees (including but not limited to notable and protected trees) are removed within the designation boundary but outside of the permanent project footprint, this may result in a change in landscape character and amenity values;
- Building removal from within the construction footprint may present a temporary adverse effect on character; and
- Construction machinery, materials, structures and activities will be present, and may require temporary landform modification.

Effects on Open Spaces and Reserves

A total of ten open spaces and reserves will be affected during the construction phase – generally along the edge of the open space adjacent the street frontage, to enable construction activities. There is the potential for the removal of established trees from within designated areas of open spaces and reserves during the construction phase. Although construction activities will result in some disruption to these open spaces, in most instances they will remail accessible and usable.

Two of the open spaces / reserves will experience potentially greater construction impacts:

- NoR 3 will affect Alfriston Park and an unnamed informal recreation reserve located east of SH1. The unnamed information recreation reserve is currently occupied by a stormwater detention pond and has low landscape amenity values and a low level of useability. A considerable amount of fill will encroach into this unnamed reserve, changing the landscape character but maintaining the utilitarian function; and
- For Alfriston Park, a wetland is proposed which will occupy a significant portion of the reserve, disrupting access and resulting reduced utility during construction.

Magnitude of Construction Effects

Potential adverse temporary effects on landscape character resulting from the construction works are assessed to be moderate, overall. Potential adverse temporary effects on visual amenity are assessed to be moderate during the construction phase. This overall assessment varies slightly with localised assessment of each NoR (see LVA in Volume 4).

10.3.4 Operational effects

Landscape Character Effects

The proposed NoRs will provide either a full or partial upgrade to a number of existing roading corridors across the overall wider Project area within an existing and emerging urban environment. Although there will be an upgrade to existing roads and modification / additional elements implemented, there will only be a limited change to the character of the area, e.g. roads upgraded to improve transport infrastructure and include multi-modal uses.

The Projects will improve the transport infrastructure throughout the area to create a more coherent road cross section and configuration. The works will improve the landscape amenity values of the area, whilst enabling and supporting the anticipated urban growth. Although some FUZ areas may not have been developed at the time of the completion of the construction phase, the proposed roads will form part of the emerging and anticipated urban development enabled through the AUP:OP and PC78. The Projects associated with each NoR are in keeping with this character.

Effects on Open Spaces and Reserves

Although there is potential for the removal of established and some notable trees, and disruption to open spaces across the Project-wide area, these matters can be addressed through mitigation measures which include avoiding tree removal where possible, providing a significant planting response, and the reinstatement of the open space functions. The road improvements with multi-modal function will enhance connectivity throughout the area and to public assets such as open spaces.

Visual Amenity

In relation to visual amenity, the designations provide an upgrade to existing road corridors and will not be seen to be out of context, albeit through road widening to enable the movement of vehicles, buses and active modes to complement the anticipated urban growth in the area.

The new bridge across the Otūwairoa stream will present a new structure at a greater scale than existing, however it will visually integrate into the surrounding urban context, which is anticipated to intensifiy under the AUP:OP provisions. Its fill batters will be planted with native vegetation which will visually soften these forms and integrate with the planting proposed along the stream margin. As such, any potential adverse effects on visual amenity are assessed to be low.

Magnitude of Operational Effects

Potential adverse operational effects on landscape character are assessed to be low, overall. Potential adverse operational effects on visual amenity are also assessed to be low during the construction phase. This overall assessment varies slightly with localised assessment of each NoR (see LVA in Volume 4).

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

Landscape and visual mitigation measures for all construction activities and built elements will be incorporated into the ULDMP or CEMP as appropriate, which are proposed as conditions of each NoR, as outlined in Volume 1.

The LVA recommends a number of measures to be considered in the future preparation of these management plans across all NoRs, including:

- Where appropriate, select visually discrete locations for the placement of construction yards and material storage. Consider screening of construction yards as mitigation for temporary visual effects;
- Reinstate construction and site compound areas by removing any left-over fill and ground shaping to integrate with surrounding landform / anticipated future land use;
- Where possible, mitigate effects related to lighting during any nighttime works through the use of directional lighting to prevent glare / light spill falling on adjacent properties; and
- Where practicable and appropriate, retain established trees, particularly within open spaces / reserves.

The operational, landscape and visual effects of the NoRs will be mitigated through the implementation of best practice urban design principles. A ULDMP is recommended as a condition on the respective designations which should include the following measures to mitigate landscape effects:

- Adopt an outcomes-based approach to landscape mitigation that considers overall improvements to this urban landscape (including biophysical systems and processes), and enhances visual amenity;
- Continue to partner with Manawhenua in the ongoing design and implementation of landscape outcomes;
- In discussion with Manawhenua, support outcomes that contribute positively to Te Ao Māori cultural landscape;
- Include a landscape plan within the ULDMP that identifies opportunities for landscape enhancement such as establishing contiguous planting within an overall ‘green network’;
- Tree management including establishment and maintenance phases, should be undertaken in accordance with the Tree Management Plan (**TMP**) (as per Arboricultural Assessment report). Focus on canopy cover and landscape enhancement as the measure to mitigate vegetation loss rather than a like-for-like approach;
- Develop a landscape management plan that focusses on:
    - Creating an indigenous vegetation palette in favour of indigenous species;
    - Selecting trees that are suitable within the urban environment and are resilient to future predicted climate change;
    - Contributing to a connected green infrastructure that enhances the landscape ecosystem,
    - Selecting and growing locally eco-sourced indigenous species;
    - Using street trees to provide shade and soften the visual appearance of infrastructure in the corridor; and
    - Creating a distinctive planting palette that contributes to the unique signature and identity of the urban landscape.

- Design public access interfaces with bridge infrastructure (such as across the streams) to be of a human-scale;
- Use of shade trees and amenity planting, generous open space, attractive hard landscape features, wayfinding, sculpture, and art should be incorporated to contribute to high landscape amenity;
- Provide spaces and furnishings along active mode routes that support respite, comfort, rest and social connections. These spaces could be activated through providing elements such as seating, sculptures, art and play elements;
- Adopt Crime Prevention through Environmental Design principles in future design;
- Use non-reflective and recessive colours and materials to prevent visual intrusion of the infrastructure elements;
- Design being mindful of potential light effects, e.g. avoid light spill;
- Select locations for hard infrastructure (such as transformers) that will not be visually intrusive. Notwithstanding, provide mitigation of these elements; and
- Design to contribute positively to visual amenity for nearby residents who will view any infrastructure elements from close proximity. Consider the form, colour, bulk, textures and finishes to elements to create visual quality and interest. This also includes plant species selection.

10.4 Noise and vibration

The Assessments of Construction Noise and Vibration Effects and Operational Noise Effects included in Volume 4, respectively, assess the likely construction noise and vibration effects and operational traffic noise effects associated with the Project.

10.4.1 Assessment methodology

10.4.1.1 Construction noise and vibration

The following methods were followed in the assessment of construction noise and vibration effects:

- Analysing the ambient noise level data from surveys in the vicinity of the NoRs to determine if the recommended noise performance standards are appropriate;
- Reviewing the noise and vibration emission data for each indicative construction task / process based on equipment data previously measured for similar activities. Data from appropriate noise and vibration standards (e.g., British Standard 5228-1:2009) has also been considered, where relevant;
- Determining construction noise setback distances and vibration emission radii based on assumptions of construction activities and equipment, and using this to determine potential effects i.e. where any potential exceedances of the relevant criteria could occur; and
- Identifying a framework for managing effects.

A worst-case scenario (conservative) approach was taken to the assessment.

10.4.1.2 Operational noise

Road traffic noise effects at protected premises and facilities (**PPFs**)[10] were assessed based on:

[10] PPFs include dwellings (including those that have building consent but are not built yet), educational facilities and their playgrounds within 20m of any school building, boarding houses, retirement villages, Marae, hospitals with in-patient facilities and motels/hotels in residential zones.

- The noise criteria categories of NZS 6806 : 2010 Acoustics – Road-traffic Noise – New and altered roads; and
- Noise effects (both beneficial and adverse) through determination of noise level changes from the Project.

The assessment in accordance with NZS6806 was undertaken for each Project corridor section (NoR) individually, excluding other roads in the area, to focus the need for mitigation on the roads directly affected by the Project. The assessment of traffic noise level changes from the Project took account of all major roads in the vicinity to gain a good understanding of:

- Whether a corridor section (NoR) has an effect on the overall noise level received at individual PPFs; and
- The change in noise level assuming all NoRs have been implemented.

This means that the change in noise level takes account of the cumulative effect of all existing and future roads being used.

Computer noise modelling (using SoundPLAN) was undertaken for a:

- Do-nothing scenario: assuming the current road layout with traffic volumes at the design year of 2048 assuming full development of surrounding areas; and
- Do Minimum scenario: assuming the Project (all NoRs) is in place at the design year 2048, as well as full development of surrounding areas.

By comparing these two scenarios, the change in noise level with and without the Project was assessed.

Areas earmarked for future residential development are not PPFs as the location and specific type of the receiving buildings are not known. However, to provide information for future developers, traffic noise level predictions have also been provided over vacant land that is expected to be developed in future.

Active mode transport (i.e. walking and cycling) was not assessed in relation to operational noise, as it does not generate noise levels high enough to affect the ambient noise environment, particularly where the facilities are adjacent to busy roads.

Traffic vibration from new or upgraded roading projects is not generally expected to create issues and, therefore, was not assessed.

10.4.2 Construction noise effects

All the NoRs are located in well-established residential or commercial areas, with buildings in close proximity to construction works.

Exceedances of the construction noise criteria could occur intermittently across all NoRs, if high noise or vibration generating equipment is used near occupied buildings. The most impacted receivers will be located within 10m of the construction boundary.

The predicted noise levels and effects are worst case predictions based on indicative information as provided by the Project Team. Any assessment conclusions should be confirmed during the detailed design stage, taking account of the final equipment selections, methodology and receivers as they exist at the time of construction.

Regarding specific NoRs:

NoR 1: Great South Road FTN Upgrade; NoR 3: Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades; and NoR 4: Takaanini FTN - Porchester Road and Popes Road Upgrades

The closest existing receivers are approximately 2m away from the potential works. With mitigation in place, noise levels of up to 90 dB L_{Aeq} could still occur intermittently at the closest receivers, if high noise generating activities occur on the construction boundary. This is not expected to be frequent, due to the setback distances to most of the proposed works and the use of equipment with lower source noise levels for large portions of the works. It is therefore predicted that mitigated noise levels can comply with the 70 dB L_{Aeq} noise criterion for most of the construction works.

For NoR 1, bridge construction for the replacement of the Otūwairoa / Slippery Creek bridge is the noisiest activity that is currently proposed. These works will be at a limited location for a limited duration.

Construction noise standard exceedances will be managed via site-specific mitigation measures where appropriate (as provided through the proposed CNVMP schedule condition).

NoR 2: Great South Road Upgrade (Drury section)

The closest existing receivers are approximately 4m away from the potential works. With mitigation in place noise levels of up to 85 dB L_{Aeq} could still occur intermittently at the closest receivers, if high noise generating activities occur on the construction boundary. This is not expected to be frequent, due to the setback distances to most of the proposed works and the use of equipment with lower source noise levels for large portions of the works. It is therefore predicted that mitigated noise levels can comply with the 70 dB L_{Aeq} noise criterion for most of the construction works.

Construction noise standard exceedances will be managed via site-specific mitigation measures where appropriate (as provided through the proposed CNVMP schedule condition).

10.4.3 Construction vibration effects

Vibration effects associated with construction of the NoRs have been considered in terms of human response and building damage. Humans can generally perceive vibrations at a much lower level than when building damage is likely to occur. Without appropriate mitigation, adverse effects of construction vibration on building occupants could be significant for short periods 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 can typically be tolerated inside buildings if it occurs intermittently during the day, is of limited duration, and where there is effective prior engagement. 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. Furthermore, the emission radii assumed are conservative and vibration levels measured on site tend to be much lower than those predicted at the NoR stage of a project.

The daytime Category A vibration amenity criteria could be exceeded in existing or future buildings if they are occupied during the works and within ~21m of a roller compactor or within the emission radii identified for other vibration generating equipment identified in the assessment. The effect on receivers would be subject to their respective proximity to the works but could include steady vibration from the roller compactor or a small jolt from a digger, which could rattle crockery and glassware.

In regard to specific NoRs:

NoR 1: Great South Road FTN Upgrade; NoR 3: Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades; and NoR 4: Takaanini FTN - Porchester Road and Popes Road Upgrades

Existing receivers are mostly residential type structures. A number of existing dwellings may experience vibration levels exceeding the daytime Category B criterion (above 5mm/s peak particle velocity (PPV)), if a roller compactor is used on the construction boundary in the closest position to them. Some existing commercial receivers may also experience vibration levels above the 10mm/s PPV daytime criteria. The Category B criteria will be met once the compactor is ~8m away from existing or future dwellings and ~4m from commercial receivers.

NoR 2: Great South Road Upgrade (Drury section)

Existing receivers near Great South Road (Drury section) are predominantly commercial type structures. Vibration levels are predicted to meet the Category B criterion at existing residential receivers. One existing commercial receiver may experience vibration levels above the 10mm/s PPV daytime criteria. Once the compactor is 4m from the commercial receiver the Category B criterion will be met. The Category B criteria will be met once the compactor is ~8m away from existing or future dwellings and ~4m from commercial receivers.

10.4.4 Operational noise effects

Operational traffic noise effects of the NoRs are summarised in Table 10-5. The noise criteria categories (A, B and C) for altered roads are set out in Table as per NZ6806.

Overall, the implementation of the suite of NoRs is predicted to result in no noticeable noise level changes across the majority of PPFs i.e. similar noise levels between the Do Nothing and Do Minimum Scenarios. Only NoRs 3 and 4 meet the definition of an Altered Road under NZ6806, meaning further assessment of mitigation is required under the Standard.

Table 10-5: Summary of NZ6806 assessment and predicted changes in noise levels across the NoRs

NoR	Meets definition of Altered Road under NZ6806?	Number of PPFs under Do Nothing (without Project) and Do Minimum (with Project) Scenarios						Predicted change in noise level (Comparing Do Nothing and Do-Min scenario)
		Category A		Category B		Category C		
		Do Noth.	Do Min	Do Noth.	Do Min.	Do Noth.	Do Min.	
NoR 1 A-B Great South Road FTN Upgrade (Browns Road to Halsey Road)	No -no further consideration of mitigation	243	246	12	12	6	3	Similar at the vast majority of PPFs
NoR 1-C Great South Road FTN	No -no further	35	36	4	3	0	0	Similar at all PPFs

NoR	Meets definition of Altered Road under NZ6806?	Number of PPFs under Do Nothing (without Project) and Do Minimum (with Project) Scenarios						Predicted change in noise level (Comparing Do Nothing and Do-Min scenario)
		Category A		Category B		Category C		
		Do Noth.	Do Min	Do Noth.	Do Min.	Do Noth.	Do Min.	
Upgrade (Mahia Road)	consideration of mitigation							
NoR 1-D Great South Road FTN Upgrade (Taka Street and Walter Strevens Dr)	No -no further consideration of mitigation	52	51	0	1	0	0	Similar at all PPFs
NoR 1-E Great South Road FTN Upgrade (Coles Cres, Subway Rd and O'Shannessey St)	No -no further consideration of mitigation	18	18	0	8	0	8	Similar at all PPFs
NoR 1-F Great South Road FTN Upgrade (Wellington St)	No -no further consideration of mitigation	29	29	0	0	0	0	Similar at all PPFs
NoR 1-G Great South Road FTN Upgrade (Settlement Rd, Beach Rd, Liverpool St, Butterworth Ave)	No -no further consideration of mitigation	88	88	0	0	0	0	Similar at the vast majority of PPFs
NoR 1-H Great South Road FTN Upgrade (Park Estate Rd)	No -no further consideration of mitigation	102	101	4	5	0	0	Similar or reduced at all PPFs
NoR 1- Great South Road FTN Upgrade (Bridge over Slippery Creek)	No -no further consideration of mitigation	32	33	1	0	0	0	Similar at all PPFs

NoR	Meets definition of Altered Road under NZ6806?	Number of PPFs under Do Nothing (without Project) and Do Minimum (with Project) Scenarios						Predicted change in noise level (Comparing Do Nothing and Do-Min scenario)
		Category A		Category B		Category C		
		Do Noth.	Do Min	Do Noth.	Do Min.	Do Noth.	Do Min.	
NoR 2 – Great South Road Upgrade (Drury Section)	No-no further consideration of mitigation	18	18	0	0	0	0	Similar or reduced at all PPFs
NoR 3 – Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades	Yes – therefore consideration of mitigation required	438	439	37	39	5	2	Similar at the vast majority of PPFs
NoR 4 – Takaanini FTN - Porchester Road and Popes Road Upgrades	Yes – therefore consideration of mitigation required	530	561	74	64	30	9	Similar or reduced at all PPFs

Table 10-6: Traffic noise criteria categories (from NZS 6806)

Category	Altered Road dB $L_{Aeq(24h)}$
A (primary external noise category)	≤ 64
B (secondary external noise category)	64 – 67
C (internal noise category)	40 (provided the external noise level is > 67)

While some PPFs are predicted to receive noise level increases, overall, with mitigation in place, noise levels at the vast majority of PPFs will be lower with the Project implemented than would have been the case without. Recommended measures to manage effects are discussed in Section 10.4.5.2.

It is noted that some PPFs may no longer exist at the time of road construction. Therefore, the predicted effects may not be experienced by current residents, particularly where buildings between the proposed corridor and the PPFs have been demolished. For NoR 4, ambient noise levels will likely increase as the area urbanises and therefore changes in noise level, due to the Project may not be as noticeable at the time.

10.4.5 Recommended measures to avoid, remedy or mitigate noise and vibration effects

10.4.5.1 Construction noise and vibration

Construction noise and vibration can be mitigated and managed through the CNVMP proposed in the designation conditions to generally comply with the applicable noise and vibration criteria across all NoRs. The CNVMP will provide a framework for the development and implementation of best practicable options to avoid, remedy or mitigate the adverse effects of construction noise and vibration on receivers that exist at the time of construction. Communication and consultation will occur with the affected receivers and Schedules will be prepared if required.

Any future buildings will need to be assessed at the time of construction, and mitigation and management determined through the CNVMP. Where an 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 works should be limited to critical activities that cannot be carried out at any other time, as managed through the CNVMP.

Whilst vibration levels at the daytime Category A criteria can generally be tolerated if activity occurs intermittently and with prior notice, communication and consultation will be the key management measure to avoid annoyance and concern. Where vibration levels are predicted to exceed the Category B criteria, and where the construction methodology cannot be changed to reduce vibration levels, building condition surveys are recommended.

Overall, construction noise and vibration can be controlled for all NoRs to reasonable levels with the implementation of appropriate mitigation and management measures.

10.4.5.2 Operational (traffic) noise

Of all NoRs assessed, only NoR 3 (Weymouth, Alfriston and Great South Road) and NoR 4 (Porchester Road and Popes Road) require mitigation in line with NZS 6806. NoR 1 and NoR 2 cause either insufficient effects to require mitigation, or all PPFs receive noise levels within Category A.

For NoR 3, noise barriers were not considered to be a suitable mitigation option due to the gaps required for driveways which would significantly reduce the performance of barriers. A low noise road surface has already been implemented near the Category B and C PPFs in the Do Minimum scenario.

For NoR 4, a low noise road surface is proposed to replace chipseal roads in the Do Minimum scenario, and 2m barriers along the road or designation boundary have been assessed for a number of PPFs to test whether they would reduce noise levels from Categories B or C to Categories A or B. This was predicted to reduce the number of PPFs in Category B to 38 (from 64 under the Do Minimum Scenario) and the PPFs in Category C to eight (from nine under the Do Minimum Scenario). Noise barriers at these PPFs would not provide the reduction required by the Standard due to the gaps required for driveways, which significantly reduce the performance of barriers.

Noise barriers are recommended to be re-assessed at all Category B and C PPFs in NoR 3 and NoR 4 at the time of detailed design to determine if they represent the Best Practicable Option (**BPO**), noting that they are not currently considered appropriate or effective due to multiple accesses/driveways and while unlikely this context could change. For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, building modification should be investigated at the implementation of the Project.

It is noted that the Land Use Integration Process (**LIP**) condition is also proposed for all NoRs which provides a mechanism for future developers to request access traffic noise modelling contours to inform adjacent development. The designation once confirmed (including conditions and supporting schedules), will also be included in the AUP:OP which can be accessed and considered by future developers in the surrounding area.

10.5 Arboricultural

The Assessment of Arboricultural Effects included in Volume 4 provides an assessment of the actual and potential effects of the future construction and operation of the Project on existing trees which trigger a District Plan consenting requirement under the AUP:OP, and recommends ways of managing these effects. Any trees that trigger Regional Plan requirements will be assessed and managed through a future consenting process.

10.5.1 Assessment methodology

Trees were recorded singularly or in groups where logical groupings could be made based on species, configuration and / or size. Sufficient information was gathered to allow an assessment of the existing environment and consideration of the future environment. Where it was unclear whether a tree or tree group was located within the road reserve or on private property, the location that afforded the most stringent protection (within the road reserve or Open Space Zone) was adopted for the purpose of assessment. Tree details are contained in Appendix A of the Assessment of Arboricultural Effects included in Volume 4.

Given the delivery timing for the Project is to be determined but likely 10 - 15 years in the future, a verification assessment will be undertaken prior to construction to confirm the current arboricultural conditions are still relevant. Any future tree removal, tree planting or mass planting vegetation will be assessed at that time, with the current Assessment of Arboricultural Effects intended to provide a baseline survey to establish the scope of those reassessment requirements.

10.5.2 Positive Effects

In many locations within the assessment area, tree canopy cover is sparse, or comprised of poor-quality trees, including pest species. The Project provides an opportunity for a net increase in tree canopy cover and an improvement in the quality of trees within the public realm, through street tree planting within and adjacent to the transport corridor.

10.5.3 Construction effects

The removal of District Plan protected trees from the road reserve and from Open Space Zone land will be required to enable construction of the transport corridors. Works may also occur in the root zone of protected trees which are within the proposed designation boundary, or immediately adjacent to, but outside, the proposed designation boundary. Works may also require the trimming of trees.

Tree removal has the potential to result in adverse amenity and ecological effects on the surrounding environment, due to the loss of tree canopy cover and the associated ecosystem services benefits, and the amenity values attributable to trees. The Project is likely to require the removal of 40 groups of trees, and approximately 49 individual trees that would trigger reason for consent under the District Plan provisions for their removal. It is likely that all notable trees within and adjacent the proposed designation boundaries can be retained, subject to future detailed design and future consideration in

the TMP. All future works relative to the trees listed in Schedule 3 (if remaining) will be assessed in accordance with the TMP requirements and tree removals will be avoided where possible. A full tree schedule of specific trees likely to be affected by each corridor is provided in Schedule 3 appended to the proposed conditions, and Appendix A, of the Assessment of Arboricultural Effects in Volume 4.

Mitigation measures are described in detail below. Works near trees to be retained may involve works within the protected root zone or trimming of trees. These works have the potential to affect the health of trees where tree protection methodologies are not followed. The TMP will identify trees that are to be retained and protected and the specific design parameters and tree protection measures necessary to ensure effective preservation of the trees.

10.5.4 Operational effects

Once the Project has been completed, no further effects on trees are anticipated from transport corridor operation. Ongoing maintenance of street trees and trees retained adjacent to the road corridor is a standard operational requirement that does not generate adverse environmental effects.

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

Mitigation measures for tree works have been considered with the aim of avoiding, remedying and mitigating effects on trees. A TMP will be prepared prior to construction to address the potential effects identified on trees identified in Schedule 3 to the conditions and reconfirmed prior to construction. The TMP will confirm the construction methods and impacts on each tree and detail methods for all work within the root zone of trees that are identified to be retained.

The effects on trees protected by the district plan which cannot be retained will be confirmed in the future through the TMP, which in turn will identify the appropriate mitigation giving consideration to the arboricultural value lost in each case/context. The TMP is proposed as a condition for each NoR, and will include:

- Confirmation that protected trees/groups identified in the Assessment of Arboricultural Effects still exist;
- Advice on how the design and location of works can avoid, remedy or mitigate effects on the existing trees;
- Recommended planting to replace trees that require removal;
- Establishing tree protection zones and specifying tree protection measures such as protective fencing, ground protection and physical protection of roots, trunks and branches;
- Detailing methods for all work within the root zone of trees that are to be retained in line with appropriate arboricultural standards; and
- Where good quality trees are identified for removal, consideration of tree transplanting will be included in the TMP. An assessment of the quality of the trees and the feasibility of transplantation will form part of the plan.

The TMP is limited to trees identified in the Assessment of Arboricultural Effects that have trigger a consenting requirement under the District Plan. Trees protected under Regional Plan provisions will be addressed as part of a future consenting process.

The effects of tree loss can be mitigated by comprehensive planting within the new berms, and areas identified in the ULDMP which will be guided by the UDE and Assessment of Landscape, Natural

Character and Visual Effects (provided in Volume 4). Replacement planting will be confirmed through a planting plan for the Project under the proposed ULDMP condition. The ULDMP will also include methodologies to establish new trees within the road reserve, including creation of quality below ground environments, correct planting methods and appropriate maintenance. The replanting to be specified in the ULDMP will provide the appropriate mitigation for the potential effects from the removal of trees protected by the District Plan. The long-term outcome of comprehensive street tree planting will be more trees in the public realm and increased amenity value within the Project areas.

10.6 Terrestrial ecology

An Assessment of Ecological Effects for the Project is included in Volume 4. This section provides a summary of the assessment, including the methodology applied and the recommended measures to manage effects.

As the Project relates to proposed designations, the Assessment of Ecological Effects assessed District Plan ecological matters only.[11] Regional matters (along with Wildlife Act 1953 compliance) will be subject to a future consenting phase along with a supporting assessment of ecological effects. However, relevant regional matters have been considered to inform the designation boundaries and future regional resource consents, primarily through efforts to avoid areas of identified ecological value through the alternatives assessment process.

10.6.1 Assessment methodology

The approach followed for ecological assessment was consistent with the approach outlined in the Ecological Impact Assessment Guidelines. This process is summarised in Figure 10-1 below.

[11] Specifically, those terrestrial ecological matters that fall with the AUP:OP district plan section.

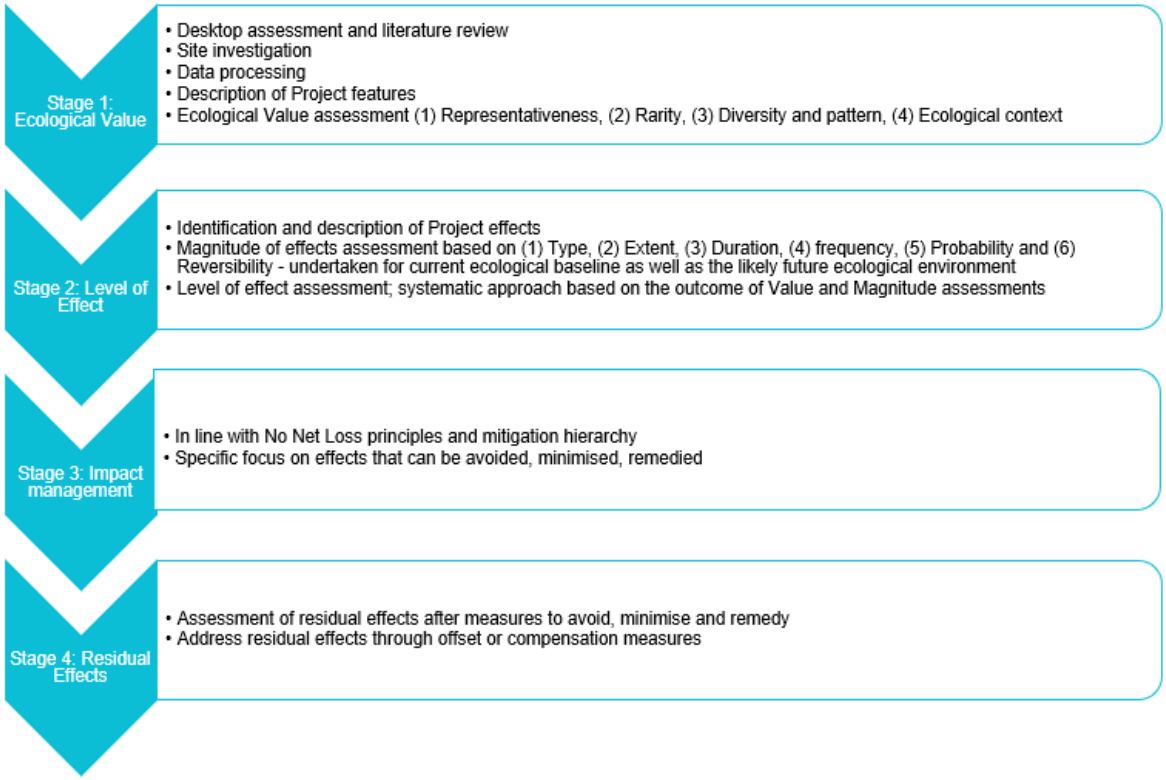


Figure 10-1: Ecological assessment approach

The overarching goal of the assessment was to determine the ecological effects of specific Project features or activities under two scenarios:

- The existing ecological baseline; and
- The likely future ecological environment.

The assessment included desktop review of existing ecological records to gain an understanding of the species and habitats that could be present within the Zone of Influence (**ZOI**) for each NoR. The ZOI is defined in the Environmental Institute of Australia and New Zealand Guidelines as "*the areas/resources that may be affected by the biophysical changes caused by the proposed Project and associated activities*."

Site investigations were also undertaken within the designation boundary in order to:

- Prepare an ecological baseline of terrestrial, freshwater, and wetland ecology;
- Inform the assessment for each NoR against the relevant district matters (terrestrial ecology);
- Identify freshwater and wetland ecological criteria which may be considered as part of a future regional resource consent, or under relevant wildlife legislation; and
- Inform the proposed designation footprint.

Not all sites were able to visited, due to private property access constraints.

As noted above, the assessment focused on district plan ecological effects; however regional matters such as freshwater ecology, were screened to inform the alternatives assessment, proposed designation boundaries and potential implications for future regional resource consents.

10.6.2 Positive effects

Potential positive ecological effects of the Project and individual NoRs are summarised in Table 10-7. This assumes some native planting will occur on the sides of the transport corridors as part of the landscape management proposed under the ULDMP condition.

Table 10-7: Summary of positive ecological effects associated

Positive Effect	Ecological Feature	Relevant NoR
The Project landscape planting will tie into stream and riparian corridors. Riparian vegetation will be retained (where practicable) and enhanced (weeds control and indigenous vegetation planted).	All streams and riparian corridors	All NoRs
Existing infrastructure upgrades will include new bridge structures replacing existing undersized structures. This will improve habitat connectivity for freshwater and terrestrial species due to improved fish passage and improved riparian habitat connectivity.	Papakura Stream, Slippery Creek and Hingaia Stream	NoRs 1, 2 and 4

10.6.3 Construction effects

The potential construction effects (direct and indirect) of the Project on terrestrial habitat, bats, birds, and lizards within and adjacent to the Project area (as they relate to district plan matters) include:

- Disturbance and displacement of long-tailed bats (*Chalinolobus tuberculatus*) including roost sites, birds (including nests), and lizards adjacent to construction activities (e.g., noise, light, vibration, and dust from construction activities).

In relation to AUP:OP district plan vegetation[12], the following potential effects have been identified:

- Permanent loss of habitat resulting in fragmentation and edge effects due to the removal of trees during construction;
- Loss of foraging habitat for bats, birds, and lizards due to the removal of trees protected by the AUP:OP district plan;
- Bat roost and bird nest loss through the removal of trees protected by the district plan; and
- Mortality or injury to bats, birds, and/or lizards due to the removal of trees protected by the AUP:OP district plan.

The ecological effects related to the removal of these trees are considered **Low** in magnitude and as such no impact management is recommended for these effects. However, the effect of the loss of these trees in relation to killing/injuring Threatened and At Risk (**TAR**) fauna species was considered separately and is summarised as follows.

Long-tailed bats

During construction of the NoRs, night works may be required, and site compounds may be lit overnight. Lighting at night has the potential to modify the behaviour of bats if they are foraging within

[12] As per the Assessment of Arboricultural Effects Report, a 'protected tree' is a tree that requires resource consent for alteration (including pruning and works within the root zone) or removal. This includes effects on 'notable trees', effects on trees in Outstanding Natural Feature (ONF), High Natural Character (HNC), Outstanding Natural Landscape (ONL) and Outstanding Natural Character (ONC) overlays, effects on trees in roads, except where adjacent to rural zoned and FUZ land in respect of infrastructure projects, and effects on trees in Open Space zones.

this area or roosting in nearby isolated stands of mature trees. Noise and vibration during construction can also be an issue if bats are roosting in the immediate vicinity of the construction works. The magnitude of effect was assessed as **Negligible** for all effects due to the existing urban environment and low habitat suitability for bats next to an existing road. Therefore, impacts on bats are considered to be highly unlikely. The ecological value of bats was assessed to be **Very High**, and the overall level of effect was assessed as **Low** prior to mitigation. As such no impact management is required. The likely future ecological environment assessment was considered to be the same as baseline.

Avifauna

Noise, vibration, and lighting disturbance caused by construction activities could potentially displace TAR birds and native birds from suitable nesting and foraging habitat within and adjacent to all NoRs. No current habitat within the NoRs presents breeding suitability for TAR avifauna. However, non-TAR birds may breed throughout the Project area, within suitable habitat such as planted vegetation and treelands within the NoRs. They therefore may be impacted by the removal of vegetation which is protected by the district plan provisions of the AUP:OP, which may result in mortality or injury to birds within the Project area.

The magnitude of effect for TAR birds was assessed as **Negligible** due to the existing roads in an existing urban environment and low habitat suitability for TAR species. Although TAR birds may occur in the vicinity, they are only likely to use the area fleetingly for foraging or roosting. As TAR birds are considered to be non-breeding and highly mobile in the wider landscape, disturbance or fragmentation are highly unlikely to impact these birds within the Project area. The ecological value of TAR birds was assessed to be **Very High**, and the overall level of effect was assessed as **Low** prior to mitigation. As such no impact management is required. The likely future ecological environment assessment was considered to be the same as the baseline.

The effect of habitat removal on native birds (specifically relating to mortality/injury and nest loss/disturbance) was also considered for the District Plan trees located in NoRs 1 – 4. All of these groups of trees have the potential for Non-TAR native bird habitat. Non-TAR native birds were assessed as having a **Low** ecological value, and the magnitude of effect was considered to be **Low**, with the overall level of effect assessed as **Very Low** prior to mitigation.

Herpetofauna

Noise and vibration during construction are unlikely to have impacts on native herpetofauna species. The potential species of lizard identified (ground skink species) have **High** ecological value and the magnitude of effect in relation to kill/injure lizard during vegetation removal is considered to be **Moderate**, with the overall level of effect assessed as **High** prior to mitigation. As such impact management is required and is discussed in Section 10.6.5 below.

10.6.4 Operational effects

During the operational phase of the Project, potential district matter ecological effects that were assessed include (prior to any mitigation identified) include:

- Disturbance and displacement to long-tailed bat roosts and threatened bird nests; and
- Loss in connectivity due to the presence of the road (including light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat).

Long tailed bats

The loss of connectivity through the presence of roads and associated disturbance such as operational noise, vibration, and light 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 also disturb commuting and foraging bats at night and adversely affect insect prey populations. This potential impact has been considered in light of the existing transport corridors and therefore existing disturbance.

The magnitude of effect was assessed as **Negligible** for all effects due to the existing urban environment and low habitat suitability for bats and fragmentation due to the existing roads. Therefore, impacts on bats are considered to be highly unlikely. The ecological value of bats was assessed to be **Very High**, and the overall level of effect was assessed as **Low** prior to mitigation. As such no impact management is required. The likely future ecological environment assessment was considered to be the same as baseline.

Avifauna

The potential loss of connectivity through the presence of the transport corridors and associated disturbance, such as operational noise/vibration and light, can lead to an overall reduction in size and quality of bird foraging habitat. This has the potential to impact on bird movements in the broader landscape.

The NoRs are largely within an urban environment with limited habitat that is unlikely to support TAR birds (although some native birds may utilise the remaining habitat within these areas). As such, the upgrading of the roads within the Project area are highly unlikely to cause fragmentation or disturbance to birds. A **Very Low** level of effect was determined for all NoRs, for all TAR and native birds.

Herpetofauna

Potential operational effects on herpetofauna in all the NoRs from the upgrading/widening of existing roads include:

- Loss in connectivity due to the extension of the transport corridors (including light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat and a change in population dynamics due to the presence of the infrastructure); and
- Disturbance and displacement of herpetofauna leading to a change in population dynamics due to light, noise, and vibration from the extension of the transport corridors.

The loss of connectivity through the presence of the roads and associated disturbance such as operational noise, vibration, and light could lead to an overall reduction in size and quality of suitable habitat for TAR herpetofauna within the broader landscape. However, due to the presence of the existing infrastructure, the overall level of effect due to operational disturbance from the upgrades was assessed as **Negligible** prior to mitigation. The likely future ecological environment was anticipated to be the same as the baseline.

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

Construction measures

Recommended mitigation measures to manage construction effects of the NoRs on ecology include the development of a Lizard Management Plan (**LMP**) for all NoRs. The LMP considers the following:

- Preconstruction surveys and/or habitat potential surveys to confirm (potential) presence and guide further management;
- Timing of the implementation of the management measures;
- A description of methodology for survey, trapping and relocation of lizards rescued including but not limited to salvage protocols, relocation protocols (including methods used to identify suitable relocation site(s)), nocturnal and diurnal capture protocols, supervised habitat clearance/transfer protocols, artificial cover object protocols, and opportunistic relocation protocols;
- A description of the relocation site(s); including discussion of:
    - provision for additional refugia, if required e.g., depositing salvaged logs, wood or debris for newly released native skinks that have been rescued;
    - any protection mechanisms (if required) to ensure the relocation site is maintained (e.g.) covenants, consent notices etc;
    - any weed and pest management to ensure the relocation site is maintained as appropriate habitat;
- Monitoring methods, including but not limited to: post-relocation lizard monitoring (subject to triggers identified in the LMP), and pest control monitoring (subject to triggers identified in the LMP);
- A post-vegetation clearance search for remaining lizards; and
- A suitably qualified and experienced ecologist/herpetologist approved to oversee the implementation of the LMP shall certify that the lizard related works have been carried out according to the certified LMP within two weeks of completion of the vegetation clearance works.

Lizard management should be consistent with any regional consent conditions (and the Wildlife Act 1953) that may be required for regional compliance.

The residual (post-mitigation) level of effect for all construction effects are considered **Negligible** to **Low**.

10.7 Flooding

An Assessment of Flooding Effects for the Project is included in Volume 4. This section provides a summary of the assessment, including the methodology applied and the recommended measures to manage effects.

Flooding is a natural hazard, which is a district planning matter and has therefore been considered as part of this AEE. There will be a subsequent process for seeking regional resource consents which will address a wider range of potential stormwater quantity and quality effects. The full range of stormwater quantity and quality effects has however been considered for the purposes of alternatives assessment and design footprint.

10.7.1 Assessment methodology

The assessment of flooding effects for the Project has involved the following steps:

1. Desktop assessment to identify potential flooding locations;
2. Modelling of the pre-development terrain (i.e. without the Project) with Maximum Probable Development (**MPD**)[13] and a future 100 year Average Recurrence Interval (**ARI**) plus rainfall that accounts for climate change;
3. Modelling of two climate scenarios: one allowing for 2.1 degrees of temperature increase and one for 3.8 degrees of temperature increase, with the higher climate change scenario used to undertake a sensitivity analysis; and
4. Inspection and review of flood depths at key locations such as pedestrian crossings, footpaths and where there is more vulnerable development e.g. dwellings.

This assessment considered whether the proposed designation areas are large enough for a future road upgrade/modification to meet the proposed flood hazard designation conditions identified in Volume 1 of this AEE. With this target in mind, flood modelling has been limited to using the pre-development state only (2.1º and 3.8 º climate change scenarios). The results of the hydraulic modelling were then used to identify areas of existing flood risk and where the designation may need to be widened to provide room for mitigation. Assessed flood level increases as a result of the proposed road design have not been considered, as the future design can be amended to mitigate flood effects without affecting the proposed designation boundary.

The NoRs traverses six major stormwater catchments: Puhinui Stream, Papakura Stream, Waimahia Creek, Pahurehure Inlet, Slippery Creek and Hingaia Stream. The risk from the existing and likely future MPD flood models considered development vulnerability and flood risk. Where the risk of flood hazard was identified, a recommendation has been made to achieve the outcomes of the proposed designation conditions. The designation boundary was set to ensure that the recommendations could be accommodated.

Other stormwater effects such as stormwater quality and retention/detention were not assessed and will be considered at a future regional consenting stage. However, provision was made for the future mitigation of potential stormwater effects by identifying the space required for stormwater management and treatment devices, and by incorporating sufficient land in the proposed designation boundaries for this purpose. The assessment also considered that flooding effects will be subject to further evaluation in accordance with the designation conditions at a future detailed design stage.

10.7.2 Positive effects

The positive effects of the NoRs in relation to flooding apply Project-wide and include the following:

- Culvert capacities have the potential to be improved and/or new stormwater infrastructure provided which will improve any ponding issues and stream flow in the area. This should be balanced against the potential increased effects on downstream land;
- Existing road levels that have been raised to prevent flood flows across the road will have a reduced flood hazard risk. This may lead to upstream flood effects on land or buildings (noting this is only a positive effect if all effects are fully considered); and

[13] Maximum Probable Development is the design case for consideration of future flows allowing for development within a catchment that takes into account the maximum impervious surface limits of the current zone or if the land is zoned Future Urban in the AUP, the probable level of development arising from zone changes.

- The Project will provide for stormwater treatment / water quality improvement and retention/detention for existing and proposed impervious areas where required. The process for identifying these requirements is set out in the Assessment of Alternatives report.

10.7.3 Construction effects

There may be some increases to flood hazards during the construction phase of the NoRs, primarily due to the temporary staging platforms required to construct new bridges and temporary diversions to construct new culverts. The details of the construction approach will be confirmed at detailed design stage.

The assessment concludes that there is unlikely to be significant additional risk of flood effects during construction. Proposed works will be located outside of flood plains and overland flow paths as far as practicable. Where this is not possible, potential flooding effects will be managed as described below in Section 10.7.5.

10.7.4 Operational effects

There are potential operational effects of increased flood levels on adjacent properties upstream and downstream of overland flow path crossings and where the vertical alignment of the road is subject to change. Some of the effects were assessed as moderate based on a flood depth of greater than 0.05m but less than 0.15m for more vulnerable uses (e.g. habitable buildings) and 0.5m for less vulnerable uses (e.g. open space).

Flood hazard risks from the operation of the Project may result from changes to:

- The flood freeboard to existing habitable buildings;
- Overland flow paths and flood prone areas;
- Flood levels on developable land (in the FUZ); and
- The ability to access property by residents and emergency vehicles.

Specific upstream properties and terrain features of each NoR alignment identified as having potential flood risk are set out in Table 10-8. Existing buildings and land zoned FUZ are assumed to be highly vulnerable in the future. Moderately vulnerable land uses consider both existing and future commercial / industrial buildings and roads, including the roads proposed for each NoR. Less vulnerable land includes both existing non-dwelling occupied land and land zoned rural residential.

Table 10-8: Summary of flooding risk ratings during operation

NoR	Typical Project works summary	Typical Flood Risk Rating
NoR 1	Intersection upgrades, road widening , addition of walking and cycling. One bridge upgrade for a major Stream (Otūwairoa / Slippery Creek)	Flooding risk is currently high in a number of locations, and in most cases, the road is a conveyance path and a controlling feature on flood levels
NoR 2	Great South Road vertical alignment and bridge changes between Hingaia Stream Crossing.	The majority of land adjacent to this NoR currently has a high flood hazard risk. Proposed bridge design and vertical alignment will mimimise flood risk arising from the proposed designated works

NoR	Typical Project works summary	Typical Flood Risk Rating
NoR 3	Existing Road widening and intersection upgrades along Alfriston Road	Currently mostly high flooding risks are present in defined overland flowpaths crossing perpendicularly to Alfriston Road
NoR 4	Road widening of Popes Road West and Porchester Road including an upgrade to the intersection of the two roads	Currently expansive high risk flood areas generated by the Papakura Stream. Additionally, land drains into channels along the two roads placing the drainage burden on the road corridor

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

Construction measures

As per the proposed conditions, a CEMP should be prepared to address the flood hazard effects for the construction phase in existing high hazard areas. In preparing the CEMP, key matters to include are (but should not be limited to):

- Siting construction yards, laydown areas and stockpiles outside the predicted flood plains;
- Maintaining overland flow paths around / through areas of work;
- Minimising the physical obstruction to flood flows at the road sag points;
- Staging and programming to provide new drainage prior to raising road design levels and carry out work when there is less risk of extreme flood events;
- Actions to take in response to heavy rain warnings which may include reducing the conveyance of materials and plant that are considered necessary to be stored or sited within the predicted flood plain or significant overland flow path;
- Carrying out earthworks during the summer / dry months to reduce the risk of flooding; and
- Managing the overland flow paths to make sure flows are not diverted toward existing buildings or properties.

Some new temporary flooding risks may be posed by the construction of new and existing bridges, culverts and stormwater devices associated with the works required. However, the details of the construction methodology will be confirmed in the future during detailed design and Outline Plan preparation. It is expected that the works can be carried out in a manner that appropriately manages these risks and this can be defined through the flood risk mitigation measures in the CEMP.

Operational measures

In order to manage operational flood risk, the proposed conditions require that the Project is designed to achieve the following flood risk outcomes:

- No increase in flood levels in a 1% Annual Exceedance Probability (**AEP**) event for existing authorised habitable floors that are already subject to flooding or have a freeboard less than 150mm;
- No more than a 10% reduction in freeboard in a 1% AEP event for existing authorised habitable floors with a freeboard over 150mm;
- No increase in 1% AEP flood levels for existing authorised community, commercial, industrial and network utility building floors that are already subject to flooding;

- No more than a 10% reduction in freeboard in a 1% AEP event for existing authorised community, commercial, industrial and network utility building floors;
- No increase of more than 50mm in flood level in a 1% AEP event on land zoned for urban or future urban development where there is no existing habitable dwelling;
- No new flood prone areas; and
- 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. The assessment shall be undertaken for the 1% AEP rainfall event.

Compliance with these outcomes should be demonstrated in the Outline Plan, which should include flood modelling of the pre-Project and post-Project 100-year ARI flood levels (for MPD land use and including climate change). Where the above outcomes can be achieved through alternative measures outside of the designation or varied with agreement of the relevant landowner, the Outline Plan should include confirmation that any necessary landowner and statutory approvals have been obtained for that work or alternative outcome. These alternative measures might include flood stop banks, flood walls, raising existing authorised habitable floor levels and new overland flow paths.

The Assessment of Flooding Effects identifies a number of potential measures to mitigate operational flood hazard effects, as follows:

- Size culverts and bridges to meet proposed conditions on flood hazard outcomes;
- Attenuation of the 10-year rainfall event when the NoR works are located in the lower half of the catchment and discharge to a Council pipe network;
- Attenuation for the 10-year and 100-year rainfall events in the upper half of the main catchment to the receiving environment;
- No flow attenuation in wetlands where the Project works are located in the lower half of the main catchment to the receiving environment and discharging to open channels near the coastal marine area. Additionally, where coincident flood peak effects are modelled to be an issue, a pass forward approach would be adopted;
- Provide diversion channels at the toe of fill embankments to reduce ponding;
- Maintain 1200mm freeboard to new bridge soffits using the 100 year ARI flood level with 3.8º Climate change hydrology;
- Extend or replace existing culverts with like for like diameter; and
- Avoid lifting or lowering the crown of the road to prevent adverse effects upstream or downstream, unless agreed with affected land owners.

In most locations the new alignment will pass through an established and built-up urban environment. In these cases, minimal change to the drainage system is recommended with additional wetlands or raingardens to manage the hydrological effects, the size of which can be determined at a later design stage when resource consents are sought.

Wetlands and swales will provide 10-year and 100-year ARI attenuation in the upper half of their larger catchment and avoid attenuation in the lower half unless discharging to the Auckland Council reticulated stormwater network, where 10-year attenuation to predevelopment flowrates is expected. This will balance the competing needs to hold back peak flowrates in the upper catchment, avoid peak flow coincidence effects in the lower reaches and manage the increases in flow to already under sized stormwater pipes. Bridges are recommended to maintain the same capacity to avoid causing effects upstream or downstream flood effects.

For the specific NoRs, the following recommendations are identified in Table 10-9 below.

Table 10-9: Summary of recommended NoR-specific operational flood risk measures

NoR	Recommendations to avoid or mitigate flood effects
NoR 1	• Keep the current vertical alignment with no lifting or lowering of the road crest (as proposed in concept design in all locations except new bridges); • Provide treatment, detention and attenuation in raingardens, and • Provide additional piped drainage, greater inlet capacity at new kerb locations.
NoR 2	• Provide treatment and detention in raingardens and avoid attenuation to prevent coincident flow flood effects on downstream land; and • At the detailed design stage, meet with Auckland Council to discuss arrangements of all Hingaia Stream crossings arising from adjacent projects and developments, and to test that the concept design still achieves an appropriate balance between flood protection to roads, property, public spaces, and cost. Note that the proposed flood hazard condition enables this by requiring that the Project is designed to meet the outcomes identified in the condition.
NoR 3	• Keep the current vertical alignment (as proposed in concept design in all locations except new bridges); • Provide treatment, detention and attenuation in raingardens for the road runoff; and • Provide additional piped drainage, to suit the changed kerb lines.
NoR 4	• Keep the current vertical alignment (as proposed in concept design); • Provide treatment, detention and attenuation in swales and wetlands to manage the changes in road runoff; • Provide additional piped drainage, to suit changed kerb lines; and • Keep clean water conveyance channels separate from treatment swales.

10.7.6 Conclusion on flood risk effects post mitigation

The flood risk measures required to manage potential flood effects during construction and operation of the NoR works have been captured through the series of requirements and design outcomes that are included as conditions on the NoRs to maintain effects of the Project to a level that is no more than minor. On this basis, all effects relating to flood risk hazards will be appropriately managed.

10.8 Social effects

The Social Impact Assessment (**SIA**), included in Volume 4, assesses the actual and potential social impacts associated with the planning (route protection phase), construction, operation and maintenance of the NoRs on regional, wider, and local communities. Assessment is based on the existing and likely future environment and provides recommended measures that may be implemented to avoid, remedy and/or mitigate these impacts. These effects are summarised below and should be read in conjunction with that report.

10.8.1 Assessment methodology

The methodology used for the SIA is guided by the International Association for Impact Assessment Guidelines and Waka Kotahi SIA Guidelines. The methodology has been developed to identify the potential social impacts of the Project during the pre-construction (designation), construction, and

operation phases, to assess the significance and severity of the impacts, and provide recommendations for potential mitigation measures. This has included the following steps:

- Developing an understanding of the proposal, scope and context including a review of the Project descriptions, site visits, designation drawings, and a literature review;
- Identifying a preliminary 'social area of influence' – a geographical extent within which social impacts are expected to be experienced. This includes consideration of geographic scales to investigate;
- Identifying and describing the stakeholders and communities (existing and future) likely to be impacted (both positively and negatively) by each NoR, at a range of scales. This included review of demographic data, technical reports, community reports, and engagement with stakeholders (described in further detail in the SIA, included at Volume 4);
- Impact identification and assessment - determining the nature and assessing the likely social impacts. The categories of likely social impacts that the SIA analyses are:
    - Way of life – how people carry out and get to their daily activities including consideration of access to and between communities and places/centres;
    - Community cohesion, stability, character, and severance;
    - Values and identity – shared beliefs, customs, values and stories, and connections to land, places, and buildings;
    - Quality of the living environment and amenity – access to and use of ecosystem services; public safety and security; access to and use of the natural and built environment; the quality of the air and water; the level of hazard or risk, dust, and noise they are exposed to; the adequacy of sanitation; their physical safety; and their access to and control over resources;
    - Health and wellbeing –including health being a state of complete physical, mental, social, and spiritual wellbeing and not merely the absence of disease or infirmity;
    - Personal and property rights – including whether economic livelihoods are affected, and whether people experience personal disadvantage or have their civil liberties affected;
    - Fears and aspirations – including perceptions about their safety, their fears and aspirations about their future community; and
    - Recommending mitigation and management opportunities to avoid, reduce, remedy or enhance identified social impacts.

10.8.2 Positive effects

Designating the Project routes now - ahead of redevelopment and new development that may occur in the area - has a positive impact on the aspirations of the wider community for improved transport options, and in particular for safe walking and cycling paths.

During construction there may be opportunities for employment for people from the local (as well as wider) community. Localised jobs mean shorter commutes and greater time for out of work activities. There may also be the opportunity for education and training such as local apprenticeships and partnering with local training providers. Construction will also generate activity within local areas and some businesses (who are able to remain) may be positively impacted by increased custom from construction workers.

Overall, once operable the NoRs will have **high positive** social impact effects for local and wider communities through the provision of more efficient and reliable public transport and safer separated cycling and walking paths. Improved transport options provide greater opportunities for people to connect both across the local community and through connections to the wider Auckland transport

network, especially for those who have no or limited access to a car. In turn, positive social impacts to equity of access, health and wellbeing through encouraging greater physical activity, and through reducing deaths and serious injuries, are expected.

10.8.3 Pre-implementation effects

During the pre-implementation phase, the designating of properties will not change current way of life for property owners, tenants, and business owners/operators, but has the potential to restrict people's future plans for their properties, and on the way they live, work or recreate in future (prior to acquisition). The long-term designations and uncertainty of timing mean that the immediate community (property owners, tenants and business owners of directly impacted properties) are likely to experience moderate to high adverse impacts. This is mainly due to impacts on and loss of autonomy over decision making on their own properties, and fears for future impacts on property value and amenity, stress and anxiety.

Impacts for other members of local communities may stem from changes in character due to property acquisition and maintenance. Some businesses may also choose to withdraw from or invest less into the maintenance of their premises as they know that the property is going to be acquired in the future. However, few physical changes are expected in this phase as early property acquisition is limited to property owners who request to have their properties acquired earlier.

Impacts on property owner's way of life and fears and aspirations are considered to be moderate to high negative. This phase is considered to have a low positive effect on the local community overall.

10.8.4 Construction effects

There is likely to be temporary disruption related to traffic congestion, increase travel times and business disruption during construction. If required, temporary closure of the Slippery Creek Bridge would result in significant disruption, in particular for pedestrians and cyclist given a long detour route would be required. Construction works immediately adjacent Papakura Normal Primary School may cause disruption for families, students and staff, and result in health and wellbeing impacts given increased safety risk for children walking to and from school or being picked up nearby. Most social impacts arising from these construction effects can be managed with appropriate construction and traffic management and communications.

Construction noise may result in increased stress, anxiety and sleep disturbance. Whilst it is expected that construction noise would be managed to certain times of the day, this could still cause disturbance given the higher proportion of families with young children, and of shift workers, who may sleep during the day noting that the type of affected receivers will need to be retested at the time of construction as contemplated by the CNVMP.

Property acquisition - particularly in Manurewa where the largest number of properties are designated (including the largest number of properties fully designated) - will also have a moderate negative impact with the loss of community connections, reduction in rental properties, loss of local shops, businesses, and larger employers, and also loss of facilities that are currently used by community programmes. Property acquisition is managed through the PWA.

With mitigation it is considered that overall, there will be a temporary moderate negative impact on the way of life of people within the wider community during construction.

10.8.5 Operational effects

While the Project will improve the reliability and efficiency of public transport and help to encourage mode shift, for those who continue to rely on private vehicles the potential adverse impacts from operation relate to a small increase in travel time for private vehicles (as noted in summary of transport assessment at Section 10.3 above), due to conversion of general traffic lanes to public transport lanes, upgrades to intersections to be signalised (which can increase waiting time), and in Manurewa, the removal of a direct vehicle connection from Beaumont Way to Weymouth Road.

A reduction in on-street parking in some areas may decrease convenience and ease of access for visitors of residential properties and customers of local businesses. Both of these impacts occur within the designation areas however further reduction in on-street parking and conversion of vehicle lanes to bus lanes is expected outside of the designations as part of the Project.

Some individual owners and occupiers of partially designated properties in Manurewa, Takaanini and Papakura may also experience a reduction in privacy, security and outlook with walking and cycling paths moving closer to residential houses however it is expected that this can be managed through the provision of screening during detailed design.

The operation of the NoRs will have an overall high positive social impact for local and wider communities, with adverse operational effects via minor increases to private vehicle travel times assessed as low negative.

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

The following measures are proposed in order to manage adverse effects during the pre-construction phase of the Projects:

- The proposed conditions (provided in Volume 1) include a Project Information condition which requires a Project website or equivalent virtual information source to be established within 12 months of the date the designation is included in the AUP:OP. All directly affected owners and occupiers will be notified in writing once the website has been established. The website will include information including the status of the Project, anticipated construction timeframes, contact details, what the designation means for someone's property and the s176 process under the RMA; and
- Under the RMA, section 176 provides a process for landowners to seek approval for development on designated land/buildings.

The following measures are proposed in order to manage adverse effects during the construction phase of the Projects:

- A SCEMP will be prepared prior to the start of construction for a stage of work. The SCEMP will include:
    - The contact details for the project liaison person which will be advertised on the project website;
    - The procedures for ensuring there is a contact person available for the duration of construction works, for public enquiries or complaints about the construction works;
    - A list of stakeholders, organisations and businesses who will be engaged with;
    - Identification of the properties whose owners will be engaged with;
    - Methods and timing to engage with landowners whose access is directly affected; and

  - Methods to communicate key project milestones and the proposed hours of construction activities.

- A CTMP will be prepared prior to construction for each stage of work which will detail methods to manage the effects of temporary traffic management activities on traffic, detour routes where required, methods to maintain access to properties and businesses, and methods for communicating traffic management measures to affected road users;
- In accordance with the proposed CTMP and SCEMP, meetings will be held with businesses prior to construction to address potential business disruption issues with regards to access and parking; and
- The preparation of construction management plans required by the proposed condition set (including a CTMP, ULDMP, CEMP and CNVMP will also enable the appropriate management of effects on the environment and local communities during construction.

The following measures are proposed in order to manage adverse effects during the operation phase of the Project:

- A ULDMP will be prepared prior to construction and will include details on how the NoRs will be integrated into the surrounding landscapes and communities; and
- The detailed design elements of the NoRs, including crossing locations, will be determined as part of the ULDMP, and integration outcomes will likely encourage crossing locations near community services.

10.9 Archaeological and heritage

An Assessment of Archaeological and Heritage Effects for the NoRs is included in Volume 4, prepared by CFG Heritage. This section provides a summary of the assessment, including the methodology applied and the recommended measures to manage effects.

10.9.1 Assessment methodology

Archaeological and heritage research undertaken for the Project included desktop assessment of archaeological reports, AUP:OP Schedules, databases maintained by the New Zealand Archaeological Association (**NZAA**) (ArchSite), Auckland Council's Cultural Heritage Inventory (**CHI**), the New Zealand Heritage List/Rārangi Kōrero and other resources such as aerial photographs. This was followed by a field survey to assess the results of the research and to determine if any unrecorded archaeological sites or heritage items were visible. The survey was limited to publicly accessible areas and was a surface assessment only; invasive techniques such as probing and test pitting were not used due to the high likelihood of services being present near the roads.

10.9.2 Construction effects

Across the NoRs, there is potential for unrecorded archaeological and heritage sites to be encountered during construction, particularly in undeveloped paddocks and near waterways. There are also several recorded archaeological and heritage sites within the proposed designation boundaries that have potential to be damaged and/or destroyed by construction of the Project.

Across the four NoRs, there are 25 recorded archaeological sites within 200m of the Project corridors, 19 of which are outside of the proposed designations. Nine sites scheduled in the AUP:OP and 38

items listed in the CHI were also identified within 200m of the Project corridors. Of the CHI items, 20 are outside the proposed designation boundary and 14 are trees with potential heritage value.

Table 10-10 summarises the potential construction effects, including which NoRs the effects relate to. In summary, construction of the Project has the potential to affect:

- Six of the recorded archaeological sites;
- Three sites scheduled in the AUP:OP;
- Four CHI items (excluding heritage trees which are the subject of the separate Assessment of Arboricultural Effects); and
- Six houses with potential unrecorded built heritage values (identified during the field assessment).

Table 10-10: Summary of potential archaeological and heritage effects

NoR	ID	Source	Name / Site Type	Potential effects
NoR 1 (Great South Road FTN Upgrade) NoR 2 (Great South Road Upgrade (Drury Section)) NoR 4 (Takaanini FTN - Porchester Road and Popes Road Upgrades)	Potential unrecorded pre-European Māori site	Desktop assessment and field visit	e.g. midden, postholes, fire features, artefactual material	Possible subsurface material related to pre-European Māori land use around waterways to be encountered and removed / destroyed.
NoR 1 (Great South Road FTN Upgrade)	R12/1154 (02830)	NZAA (**AUP:OP**)	Papakura Old Central School	1920s stone gate has potential to be destroyed.
	R12/1159	NZAA	Building	Possible subsurface material to be encountered and removed / destroyed.
	R12/1161	NZAA	Papakura Library	Possible subsurface material to be encountered and removed / destroyed.
	3048	CHI	Milepost 20	Low possibility for some subsurface material to be encountered and removed.
	12924 (02801)	CHI (**AUP:OP**)	WWI Memorial	Modifications to edges of memorial structure.
	20290	CHI	Milepost 21	Low possibility for some subsurface material to be encountered and removed.
	355 Great South Road	Field visit	Moderne style house	Building avoided, possible effects to context / frontage.

NoR	ID	Source	Name / Site Type	Potential effects
	359 Great South Road		Spanish Mission style house	Building avoided, possible effects to context / frontage.
	361 Great South Road		Spanish Mission style house	Building avoided, possible effects to context / frontage.
NoR 2 (Great South Road Upgrade (Drury Section))	257 Great South Road		Bungalow	Building avoided, possible effects to context / frontage.
NoR 3 (Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades)	R11/3477	NZAA	Manurewa Railway Station	Possibility for subsurface material related to station to be encountered and removed.
	12481	CHI	11 Alfriston Road	Building is within the proposed designation and would be destroyed by construction.
NoR 4 (Takaanini FTN - Porchester Road and Popes Road)	R11/2077	NZAA	Gorrie McInnes Homestead	Possible subsurface material to be encountered and removed / destroyed.
	R11/2078	NZAA	John de Carteret Flax Mill	Possible subsurface material to be encountered and removed / destroyed.
	279 Porchester Road	Field visit	Bungalow	Building avoided, possible effects to context / frontage.
	281 Porchester Road	Field visit	House	Building avoided, possible effects to context / frontage.

10.9.3 Operational effects

No potential operational effects on archaeology and heritage have been identified.

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

The following measures are recommended to avoid, remedy or mitigate potential archaeological and heritage effects of the NoRs:

- An authority to destroy, damage or modify recorded (R11/2077, R11/2078, R11/3477, R12/1154, R12/1159, R12/1161) and previously unrecorded archaeological sites that may be encountered

within the identified works areas should be applied for from Heritage New Zealand Pouhere Taonga (**HNZPT**) under Section 45 of the Heritage New Zealand Pouhere Taonga Act (noting that this is a legal requirement). As part of the authority preparation, consultation with the appropriate Manawhenua authorities should be undertaken;

- A HHMP should be prepared alongside other relevant disciplines (e.g., urban design) and implemented during construction to guide works including induction requirements for contractors (and sub-contractors), methods for managing effects on the sites and procedures for archaeological monitoring, inspection, and investigation. As per the proposed designation conditions, an HHMP will be prepared during the outline plan phase of the Project in conjunction with Manawhenua, Auckland Council and HNZPT;
- During construction, archaeological monitoring should take place in higher-risk areas and around known archaeological or heritage sites (including post-1900 sites). These areas will be identified in the HHMP. If any unrecorded archaeological or heritage material is encountered, it can be recorded, sampled, and analysed as is appropriate in order to mitigate any damage to archaeology following standard archaeological best practice;
- Appropriate tikanga (protocols) should be followed during works, as guided by Manawhenua; and
- Since archaeological survey cannot always detect sites of traditional significance to Māori, or wāhi tapu, Manawhenua should be consulted regarding the possible existence of such sites, and the recommendations in this report. Manawhenua consultation is provided for in both the HHMP condition, through the Cultural Advisory Report condition, and the Cultural Monitoring Plan condition.

While there is a risk of damage to archaeological/heritage sites, which is a negative effect, by having an archaeologist on site and available to record and analyse material encountered, there will be potential to learn more about the history of the area, partially mitigating the adverse effects that may be generated.

The Assessment of Archaeological and Heritage Effects also recommends that a built heritage expert assesses potential effects on the houses identified with potential heritage values (257, 355, 359, 361 Great South Road, 279 and 281 Porchester Road, 11 Alfriston Road [CHI 12481] and Gorrie McInnes Homestead [R11/2077]). This recommendation can be considered as part of future HHMP preparation.

10.10 Property effects

Construction of the designated works will have impacts on property. This section of the AEE assesses the potential effects from these impacts.

10.10.1 Methodology

The Project has sought to reduce potential adverse effects on existing private properties and businesses through corridor design and alignment choices, while acknowledging that planned urban growth will also result in changes to the area. The assessment has included specific consideration of the potential property and business impacts in the Assessment of Alternatives report set out in Appendix A. This is evident in the level of refinement of the corridor form and function that occurred through the optioneering process. Efforts have been made through engagement with affected stakeholders to further refine the corridor design and designation footprints. This process is summarised in Section 4.5.9 of this AEE.

The proposed designations will provide a sufficient footprint to enable the construction, operation, and maintenance of the Project. Properties that are directly affected vary across the Project extent and include residential, commercial, industrial, open space, and rural properties. Refer to the Form 18 for each NoR (Volume 1) for a list of the properties impacted by each corridor. The numbers of property interests affected are also summarised in Section 3.2 of this AEE. The existing and likely future land use environment is set out in Section 9.7 of this AEE.

There are a total of 747 property titles that are affected by the project. A number of properties/parcels are made up of multiple titles, so the extent of properties/parcels affected is a total of 566 partially affected or affected in full across the four NoRs, This number includes jointly owned access lots, park land, land around streams and land over road and rail.

10.10.2 Positive Effects

The Project enables transport upgrades which integrate with and support existing development and planned urban growth across South Auckland. Accordingly, while the proposed designations impact on private property, they also have the benefit of providing for infrastructure needed to support further development and in particular intensification of development on properties in the area.

The designations as a form of route protection have further benefits for landowners and developers, including:

- Providing certainty about the form and location of the future transport network;
- Providing certainty as to the level of impact and ability to plan for the future with greater certainty;
- Providing opportunities to integrate future infrastructure and development; and
- Ensuring that the development of infrastructure supporting future development is not precluded by incompatible development.

10.10.3 Pre-Implementation Effects

Uncertainty associated with extended lapse periods

Lapse periods of up to 15 years are sought for the designations. The rationale for the proposed periods is set out at Section 8 of this AEE and relates to the proposed implementation timing of the transport upgrades in the network and associated funding.

Longer lapse periods can result in a lack of certainty around the timing and nature of effects, and potential interim impacts such as how a designated property can be used, or whether it can be sold prior to works commencing. Notwithstanding the influence of any proposed mitigation, the significance of potential effects resulting from this lack of certainty is generally proportional to the length of the lapse period – i.e. a longer lapse period can create uncertainty for a longer period of time, and vice versa. In this regard, lapse periods of up to 15 years are longer than the default period of five years set out in the RMA, but are commonly sought for linear infrastructure projects, where corridors require protection from competing land use development pressures.

In the absence of a specific construction commencement date and more precise information regarding construction duration, it is considered that the most workable method for managing any residual uncertainty for affected landowners associated with the presence of the designations is ongoing communication as provided for through the proposed designation conditions – in particular the Project Information condition, and the SCEMP. In addition, the RMA also provides a process where affected landowners can seek approvals from AT to undertake certain works within the

designated corridor if they do not ultimately affect the later implementation of the Project works. These are discussed further below.

Continued use of land and the s176(1)(b) process for other works

The designations will not preclude the continued (unchanged) use of any directly affected properties prior to construction. However, in accordance with section 171(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 which could prevent or hinder the designated work without first obtaining the requiring authority's written consent. For properties partially designated, only works within the designation extent are required to obtain written consent. For properties adjacent to or proximate to the designations, development can continue to occur, informed by the designation.

Where feasible, AT will work with landowners and developers through the section 176(1)(b) process to help integrate earthworks, road upgrades, stormwater solutions, and development so that those works will not hinder the work authorised by the designation and enable written consent to be provided. Information on the section 176(1)(b) process can be obtained through the Project information website to be established as a requirement of the conditions.

Public Works Act process

Land may continue to be sold or leased whilst designated. Where landowners contact AT in advance of the property acquisition process, the requiring authority will engage with those landowners to:

- Direct them to public information on the PWA process and its provisions for landowners (noting that the PWA is a non-RMA process);
- Explain expected timeframes for the corridor delivery to address landowners' uncertainty; and
- Explain how to seek written consent under section 176(1)(b) of the RMA for works in the designation.

10.10.4 Construction effects

Land required permanently

Land required for the ongoing operation and maintenance of the Project (including project mitigation, ongoing maintenance, and operation) will be identified and 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. The PWA is a non-RMA process. Therefore, land required permanently will be purchased and owners relocated prior to construction occurring.

Land required temporarily

If temporary occupation of the land is required at the time of construction (such as construction area and access arrangements), it is typically licensed or leased in agreement with the property owner. Potential effects resulting from temporary use of land within the designation footprint include disruptions to property access (see Section 10.2), vegetation loss (see Section 10.5), and noise and vibration effects (see Section 10.4). The PWA provides for a statutory scheme of compensation and reinstatement. Relevant proposed designation conditions are discussed below.

10.10.5 Post-construction effects

Land no longer required following completion of works

On completion of the work, private land not required for ongoing operation, maintenance or effects management will be reintegrated with the balance of the land parcels in coordination and discussion with directly affected landowners. Land that is permanently required for the Project will have been purchased and those landowners will no longer be affected by the designation. There will therefore be no ongoing effects for these parties.

Temporarily affected properties will be reintegrated. This may include reintegration of private driveways, private parking, fences, gardens and yards, and reintegrating construction areas (e.g., batters, laydown areas, stormwater ponds) with the surrounding area. 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. For completeness, it is noted that this process is specifically provided for by the proposed designation review condition.

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

Land Use Uncertainty

As noted above, it is considered that the most workable method for managing any outstanding uncertainty associated with the lapse periods being sought is ongoing communication as provided for through the proposed designation conditions – in particular:

- The Project Information condition, which requires a Project website or equivalent virtual information source be established within twelve months of the date on which the designation is included in the AUP:OP, and that all directly affected owners and occupiers are notified in writing once this has been established. The condition requires a range of information to be provided, including the status of the Project, the anticipated construction timeframes, contact details for enquiries, and information on the section 176(1)(b) process;
- The SCEMP which is intended to identify how the public and stakeholders will be engaged with prior to and throughout the construction works.

In addition, it is noted that a LIP condition is proposed to encourage and facilitate the integration of master planning and land use development activity on land directly affected by or adjacent to the designation in the period between the confirmation of the designation and the start of construction.

Property Access

Disruption to property access will be managed via a CTMP provided for via condition on each NoR. A further condition (Existing Property Access) provides that the Outline Plan demonstrates how safe, reconfigured, or alternate access will be provided unless otherwise agreed with the landowner.

The approach is to maintain vehicle access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be practicable. Where legal access cannot be maintained, the impacted property typically falls wholly within the designation footprint and will likely require full acquisition prior to operation.

Future reintegration of property

Where property features are damaged within the designation on properties that are not fully designated and will remain in place, features will be reinstated, as far as practicable, including private driveways, parking, fences, gardens, and yards, and reintegration of construction areas with the surrounding landform.

Following Project completion, a review of the designation footprint as per section 182 of the RMA will be undertaken to identify areas no longer required for the ongoing use and operation of each transport corridor/station. For completeness, it is noted that this process is specifically provided for by the proposed designation review condition.

Construction activities

Construction activities can be expected to temporarily reduce amenity. Effects will be managed and minimised through implementation of a CEMP. At detailed design stage, affected parties will be engaged on the approach to temporary and permanent land impacted (including leasing or acquisition required, covered by the PWA discussed above).

Noise and vibration

Reductions in amenity from noise and vibration disturbing normal residential and business use will be managed by implementation of a CNVMP, which will include methods to communicate and engage with affected parties and minimise construction noise disruption. In addition to a CNVMP, it may be necessary to produce site specific or activity specific schedules where noise and / or vibration limits are predicted to be exceeded for a more sustained period or by a large margin (see Section 10.4).

10.11 Network Utilities

10.11.1 Potentially affected network utilities

Table 10-11 below summarises the existing known major network utility assets within and around the Project areas.

Table 10-11: Summary of major network utilities within the proposed designation boundaries

Utility Provider	Asset	Means of protection in the AUP:OP	Potential effect
KiwiRail Holdings Limited	North Island Main Trunk railway	Designation 6302	• Intersects NoR 3 where Weymouth Road bridge over NIMT will require replacement – need for future bridge construction over NIMT. • Adjacent to NoR 2 in Drury.
Waka Kotahi NZ Transport Agency	State Highway 1	Designations 6706, 6714	• Intersects NoR 3 where Alfriston Road bridge over SH1 will require replacement – need for future bridge construction over SH1. • Adjoins NoR 2 in Drury.

Utility Provider	Asset	Means of protection in the AUP:OP	Potential effect
Transpower New Zealand Limited	National Grid pylons and overhead lines	National Grid Overlay Corridor	• Construction adjacent to existing pylons – one pylon within NoR 3, one pylon adjacent to NoR 4. Note pylon within NoR 3 proposed to be decommissioned in the short term (see Section 4.5.7 above). • Underground fibre cable (not within National Grid Overlay Corridor) adjacent to NoR 4.
Spark New Zealand Limited	Spark Data Centre	-	• Data Centre adjacent to NoR 4, northern frontage partially affected. Note that a number of critical infrastructure items fall within the initially proposed NoR extent, resulting in reduction in boundary (see Section 4.5.7 above).
Watercare Services Limited	Waikato No. 1 Watermain	-	• Waikato No. 1 Watermain adjacent to NoR 2 in Drury on east side of Great South Road for a distance of approximately 300m.

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

Works in relation to any affected network utility will be undertaken in accordance with the procedure and mitigation measures contemplated by the NUMP (as provided for by the proposed conditions set out in Volume 1) as well as any agreements made with each network utility operator to ensure compliance with their methodologies, standards, and requirements. The exact scope of works in relation to affected network utility assets will be confirmed through site investigations and the respective utility operators will be consulted once detailed design of the Project is undertaken closer to implementation of the designated works.

Additionally, it is noted that engagement with network utility operators has been ongoing throughout the development of the Project (see Section 4.5.7 above). To date, feedback received has indicated that all network utility effects can be managed appropriately during detailed design of the designated works. It is recommended that this engagement continues throughout the detailed design and construction of the Project.

On this basis, any potential adverse effects on network utilities can be managed appropriately.

10.12 Effects on Cultural Sites, Landscapes and Values

10.12.1 Manawhenua Partnership

As outlined at Section 4.3 of this AEE, the Project Team has engaged and worked collaboratively with Manawhenua as partners throughout the business case process and throughout the preparation of this AEE. This engagement has taken place at a monthly kaitiaki forum over the past 5 years dating

back to the inception of Te Tupu Ngātahi, and at a Project-specific level since the inception of the DBC process in 2021.

There are nine iwi who have a direct interest in the Project area of which seven have directly and regularly engaged with the Project Team – Ngai Tai Ki Tāmaki, Ngāti Maru, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata Waiohua, Ngaati Whanaunga; and Te Ākitai Waiohua.

During the DBC process, the partnership with Manawhenua includes the following:

- Participation in workshops with project teams to inform the investment logic mapping process, and the constraints mapping process;
- Attendance on site visits with project teams and specialists;
- Participation in option development and assessment (MCA) workshops, subsequently reflected in the Assessment of Alternatives (included at Appendix A); and
- Feedback through the Hui/kaitiaki forum noted above.

During the NoR process and the preparation of this AEE, the partnership with Manawhenua includes the following (in addition to the above):

- Invitation to prepare CIAs and CVAs;
- Inputs and feedback on specialist technical assessments and the AEE; and
- Input into the development of designation conditions.

These matters are discussed further below.

10.12.2 General Feedback

Based on feedback received to date on the Project through this regular engagement forum, the Project Team understands there is:

- General support for the Project, in particular the prospect of faster and more frequent public transport on the routes proposed, an extended reach for frequent public transport, the idea of buses feeding and extending the spatial reach of the rail network, and in general greater accessibility for future generations;
- Despite general support, some iwi representatives queried the extent to which the Great South Road FTN in particular functionally duplicated rail services, and whether the effects and costs of the FTN were appropriate given the concurrent planning and investment in the rail network;
- There was a level of concern with the potential level of property impacts for the NoRs, and efforts to reduce the level of property impact from the proposed designations were supported;
- There was a clear expectation that the Project would deliver environmental gains when implemented, in particular for stormwater treatment;
- There was a clear expectation that existing features of cultural and environmental value in the context of the cultural landscape would be protected and enhanced by the Project, particularly waterbodies such as Otūwairoa/Slippery Creek, and the Papakura Stream; and
- There was a clear expectation that Manawhenua would continue to be involved as partners through future consenting, detailed design, and implementation phases of the Project; to be provided for through the designation conditions.

In addition, the Project Team engaged with Manawhenua on the specific question of how to ensure Manawhenua values, narratives, and heritage are incorporated into future design and implementation of the Project – in particular, how concepts of Rangatiratanga, Wairuatanga, Kaitiakitanga,

Manaakitanga, Kotahitanga, and Mātauranga Māori – could be incorporated into conditions. The Mana Whenua Kaitiaki Forum is proposed as a condition to facilitate this ongoing partnership and provide for the exercise of these concepts and values. This is discussed further below.

It is anticipated the Project Team's summary of feedback to date will be updated and supplemented upon receipt of the CVAs discussed below.

10.12.3 Invitation to provide Cultural Values Assessments

The Project Team invited Manawhenua to provide a CVA or CIA as inputs to this AEE in July 2023. Of the iwi groups regularly engaged, the team received notification that three would provide CVAs – Ngaati Te Ata Waiohua, Ngāti Tamaoho and Te Ākitai Waiohua.

At the time of finalising this AEE:

- Ngaati Te Ata Waiohua had provided a CVA, partially redacted to avoid any information being mistreated or misinterpreted. This document is provided as Appendix B to the AEE. A summary for the purposes of this AEE has yet to be finalised in consultation with the Ngaati Te Ata Waiohua kaitiaki representative and will be provided as appropriate in due course;
- Ngāti Tamaoho had yet to finalise its CVA. A further update will be provided in due course; and
- Te Ākitai Waiohua had yet to summarise its CVA for this Project. A further update will be provided in due course.

10.12.4 Recommended measures to avoid, remedy, or mitigate adverse effects

In response to the general feedback received throughout the development of the Project, and the CVAs received, a suite of conditions is proposed which includes provision for:

- Establishment of a Mana Whenua Kaitiaki Forum twelve months prior to the start of detailed design to provide a forum for Manawhenua participation as partners in all phases of the Project, including how Manawhenua will provide design input, how Manawhenua will be engaged in the preparation of management plans and future consenting processes, and how mātauranga Māori and tikanga Māori will be recognised in all phases of the Project;
- Requirement to invite Manawhenua to prepare a Cultural Advisory Report for the Project six months prior to the start of detailed design to assist in understanding and identifying Ngā Taonga Tuku Iho ('treasures handed down by our ancestors') affected by the Project;
- Requirement that a Cultural Monitoring Plan is prepared prior to the start of construction works by a suitably qualified person identified in collaboration with Manawhenua with the objective of identifying methods for undertaking cultural monitoring to assist in the management of any cultural effects during construction works; and
- Provision for Manawhenua involvement and opportunities to feed back on the preparation of relevant management plans required under other conditions, including the ULDMP.

This condition suite will provide for the continuation of the Manawhenua partnership established to date in future phases of the Project.

10.13 Summary of recommended mitigation and condition response

Table 10-12 below sets the actual and potential effects of the proposed designated works by topic together with the proposed mitigation responses and corresponding conditions where those responses are captured in conditions. This provides a summary form of the mitigation measures discussed in Sections 10.2 - 10.12 above.

Table 10-12: Summary of recommended mitigation and condition response

Matter	Condition
Transport	• Construction Traffic Management Plan • Stakeholder Communication and Engagement Management Plan • Existing Property Access
Landscape and Visual	• Construction Environmental Management Plan • Urban and Landscape Design Management Plan • Land Use Integration Process • Open Space Management Plan
Noise and vibration	• Construction Noise and Vibration Management Plan • Low Noise Road Surface • Traffic Noise conditions (which includes Best Practicable Options assessment for identified PPFs). • Land Use Integration Process
Arboriculture	• Tree Management Plan • Urban and Landscape Design Management Plan
Terrestrial ecology	• Pre-Construction Native Lizard Survey • Lizard Management Plan
Flooding	• Construction Environmental Management Plan • Flood Hazard
Social	• Project Information • Designation Review • Stakeholder Communication and Engagement Management Plan • Land Use Integration Process • Construction Traffic Management Plan • Construction Noise and Vibration Management Plan • Urban Landscape and Design Management Plan • Existing Property Access • Construction and Environmental Management Plan • Open Space Management Plan
Archaeology and heritage	• Historic Heritage Management Plan
Network utilities	• Network Utilities Management Plan

Matter	Condition
Cultural	• Cultural Advisory Report • Cultural Monitoring Plan • Mana Whenua Kaitiaki Forum • Stakeholder Communication and Engagement Management Plan • Urban and Landscape Design Management Plan

11 Statutory Assessment

The following sections provide an assessment of the NoRs against:

- Section 171(1)(a) of the RMA;
- Section 171(1)(d) of the RMA; and
- Part 2 of the RMA.

It is noted that the requirements of sections 171(1)(b) and 171(1)(c) are addressed in Sections 6 and 7 of this AEE respectively, and accordingly are not repeated here.

11.1 Section 171(1)(a) – Relevant statutory provisions

Section 171(1)(a) of the RMA requires territorial authorities, subject to Part 2 of the Act, to consider the environmental effects of NoRs having particular regard to any relevant provisions of:

- A national policy statement;
- A New Zealand coastal policy statement;
- A regional policy statement or proposed regional policy statement; and
- A plan or proposed plan.

In accordance with section 171(1)(a) of the RMA, an assessment of the Project in the context of the relevant statutory provisions has been undertaken. Table 11-1 outlines the statutory provisions that are considered relevant to the NoRs. Table 11-2 then provides a full assessment of the Project against these matters, and is organised thematically under the following headings:

- Enabling infrastructure;
- Urban growth, urban form, and amenity;
- Ecology and Natural Heritage;
- Historic Heritage;
- Manawhenua; and
- Natural Hazards.

As noted previously, only designations for the proposed NoR works are sought at this time. However, as also outlined previously, all relevant national, regional and district consenting matters and/or environmental features were considered for the purposes of informing the options assessment and design footprint for the NoRs. The following policy assessment focusses on key national, regional and district policy and plan matters relevant to the assessment of the proposed NoRs.

Table 11-1: Statutory provisions assessed

Type of statutory provision (section 171(1)(a))	**Relevance / Relevant Plans and Provisions**
National Policy Statements (**NPS**)	The following NPS's are considered relevant to the Project: • NPS on Urban Development; • NPS on Freshwater Management; • NPS on Electricity Transmission; • NPS on Indigenous Biodiversity; and • NZ Coastal Policy Statement.

Type of statutory provision (section 171(1)(a))	Relevance / Relevant Plans and Provisions
Regional Policy Statement	The Auckland Regional Policy Statement (**RPS**), contained in Chapter B of the AUP:OP, is relevant to this application. In particular: • B2 - Tāhuhu whakaruruhau ā-taone - Urban growth and form • B3 - Ngā pūnaha hanganga, kawekawe me ngā pūngao - Infrastructure, transport and energy • B4 - Te tiaki taonga tuku iho - Natural heritage • B5 – Ngā rawa tuku iho me te āhua – Historic heritage and special character • B6 – Manawhenua • B7 - Toitū te whenua, toitū te taiao - Natural resources • B10 - Ngā tūpono ki te taiao - Environmental risk

Plans or Proposed Plans	The following district plan provisions in the AUP:OP are considered relevant to this application:
	• Chapter D – Overlays
	  • D1 – High Use Aquifer Management Areas
	  • D9 – Significant Ecological Areas
	  • D13 – Notable Trees
	  • D17 – Historic Heritage
	  • D26 – National Grid Corridor
	• Chapter E – Auckland-Wide
	  • E12 – Land Disturbance – District
	  • E15 – Vegetation Management and Biodiversity
	  • E17 – Trees in Roads
	  • E25 – Noise and vibration
	  • E26 – Infrastructure
	  • E27 – Transport
	  • E36 – Natural hazards and flooding
	• Chapter I – Precincts
	  • I438 – Takanini Precinct
	  • I445 – Gatland and Great South Road Precinct
	  • I446 – Gatland Road Precinct
	  • I450 – Drury Centre Precinct

Note the following abbreviations are used Table 11-2 below:

- **AUP:OP** = Auckland Unitary Plan Operative in Part;
- **DP** = District Plan provisions;
- **NPS:ET** = National Policy Statement on Electricity Transmission;
- **NPS:FM** = National Policy Statement on Freshwater Management;
- **NPS:IB** = National Policy Statement on Indigenous Biodiversity;
- **NPS:UD** = National Policy Statement on Urban Development; and
- **RPS** = Regional Policy Statement.

Table 11-2: Assessment of Project against relevant objectives and policies

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
Theme 1 – Enabling Infrastructure while managing its adverse effects			
All	AUP:OP (RPS)	B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.1(4), B3.2.1(5), B3.2.1(8), B3.2.2(1), B3.2.2(2), B3.2.2(3), B3.2.2(6), B3.2.2(8), B3.3.1(1). B3.3.2(1), B3.3.2(2), B3.3.2(3), B3.3.2(4), B3.3.2(7).	**Summary of relevant objectives and policies** • The objectives and policies in both Chapters B3 and E26 of the AUP:OP recognise the essential role that infrastructure has in enabling social, economic, cultural, and environmental well-being. The provisions recognise the importance of transport infrastructure in the movement of people, goods, and services, in realising a quality compact urban form, and in enabling growth. Accordingly, the provisions anticipate and enable the planning (i.e. route protection), construction, operation, and maintenance of transport infrastructure. • As well as enabling infrastructure in general terms, the objectives and policies in these chapters specifically seek to enable infrastructure networks that are safe, resilient, effective, and efficient. The provisions also identify specifically the value of investment in existing infrastructure, and the need to provide for the development and upgrade of both existing and future transport infrastructure routes. • In enabling infrastructure, these provisions also anticipate that the construction, operation, and maintenance of infrastructure can have a range of adverse environmental effects which should be avoided, remedied, or mitigated. The objectives and policies also acknowledge that infrastructure can have functional and operational needs to locate in particular environments, including areas of identified value relating to natural heritage, natural resources, Manawhenua, the coastal environment, historic heritage, and special character. Accordingly, the plan directs that the effects of infrastructure are to be assessed in the context of the wider need for and benefits of the infrastructure proposed.
	AUP:OP (DP)	E26.2.1(1), E26.2.1(2), E26.2.1(3), E26.2.1(4), E26.2.1(5), E26.2.1(9) E26.2.2(1), E26.2.2(4), E26.2.2(5), E26.2.2(6),	

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
		E26.2.2(7); E26.2.2(14), E26.2.2(15) E25.2(1), E25.2(4), E25.3(2), E25.3(11) E12.2(1), E12.3(1), E12.3(3), E12.3(4), E12.3(5), E12.3(6)	**Assessment** • As discussed earlier in this AEE, the existing arterial network in South Auckland between Manukau and Drury has a number of deficiencies resulting in an over-reliance on private vehicles. These deficiencies include a lack of provision for high-quality public transport, and a lack of safe active mode facilities. Failure to address these deficiencies will result in continued car dependence, congestion, poor public transport accessibility, lack of travel choice and network resilience, elevated safety risks, and increased transport emissions. Without intervention, these deficiencies will be exacerbated by planned growth and increased travel demand. • The Project responds to and addresses these issues. The proposed works include provision for bus priority measures along Great South Road, Weymouth Road, and Alfriston Road; as well as new and upgraded active mode facilities and intersection improvements along the full Project extent. The Project has significant benefits which directly address existing deficiencies, and accordingly meets the objectives and policies which promote and enable the planning and delivery of infrastructure and infrastructure upgrades on the basis that they are beneficial to social and economic wellbeing. • As documented in Section 6 of the AEE and the Alternatives Assessment, the concept design and optioneering undertaken for the Project has sought to avoid areas and features of value identified as overlays in the AUP:OP relating to natural heritage, natural resources, Manawhenua, the coastal environment, historic heritage, and special character. As a part of this process, a functional and operational need for the location and extent of the upgraded infrastructure has been established. • Given the rigorous approach to concept design and optioneering, the Project's direct physical impacts on the features protected by overlays is limited. In particular: 1.1 Notable trees – The extent of NoR 1 contains or passes near eight notable trees or notable groups of trees. The concept design avoids the need to remove these trees, with impacts limited at worst to limited works within the root zone. A Tree Management Plan (**TMP**) is offered as a condition to secure a process at the Outline Plan stage to confirm how any effects on these trees will be managed; 1.2 Significant Ecological Areas (**SEA**) – The extent of NoR 1 includes an approximately 109m^2 extent of the Kirks Bush SEA (SEA_T_5248). This area is entirely within the existing road reserve and corresponds with a location in which the canopies of mature trees are already overhang the road. No further road widening is proposed into the SEA extent, so there is no effect; and 1.3 Historic heritage places and extents of place – The extent of NoR 1 contains two Historic Heritage Extents of Place in the Papakura area – the Papakura Old Central School, and the Papakura-Karaka War Memorial. While within the NoR extent, direct impacts on both features can be avoided by the concept design. A Historic Heritage Management Plan (**HHMP**) is offered as a condition to secure a process at the Outline Plan stage to confirm how any effects on these heritage features can be managed. • Given the above, the Project is consistent with objectives and policies seeking the avoidance, remediation, and mitigation of the effects of the upgraded infrastructure on features of identified value.

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
			• Potential construction and operational noise and vibration effects have been identified. The proposed conditions provide for suitable mitigation measures put forward as proposed conditions which include future development of a Construction Noise and Vibration Management Plan (CNVMP) incorporating a range of mitigation measures, and a suite of traffic noise conditions for mitigation purposes. Mitigation measures identified through these conditions will ensure the Project is consistent with the relevant identified objectives and policies of chapter E26 to manage adverse noise effects associated with the proposed upgrades. • The construction and operation of the Project will have adverse construction and operational effects that cannot be avoided. These include loss of (non-notable) trees, traffic effects resulting from both construction and operational changes to the transport network, and both construction and operational noise and vibration effects. The proposed conditions (see Volume 1) provide for suitable mitigation measures to manage these effects, noting that these effects are anticipated where a functional and operational need for the infrastructure can be established. The Project is therefore consistent with the objectives and policies which seek the avoidance, remediation, and mitigation of the effects of infrastructure; noting that the provisions direct that adverse effects are to be assessed in the context of the wider need for and benefits of the infrastructure proposed.
Subtheme 1a – Enabling Infrastructure (National Grid)			
NoR 2, 3, 4	NPS:ET	Objective 1 Policy 10	**Summary of relevant objectives and policies** • The objectives and policies in the NPS:ET and chapters D26 and E26 of the AUP:OP relevantly seek that the national significance of the electricity transmission network (national grid) is recognised and provided for, and that the adverse effects of other activities on this network are managed to ensure the security of electricity supply. To this end, the AUP:OP includes the National Grid Corridor Overlay which regulates activities within the footprint of national grid assets. **Assessment** • The National Grid Corridor Overlay traverses NoR 2, NoR 3, and two locations within NoR 4. Of these areas, single Transpower pylons sit within the proposed designation extent north of Alfriston Road and east of SH1 (within NoR 3), and at the intersection of Porchester and Airfield Roads (within NoR 4). Overhead lines traverse the road in the remaining locations. • The Project has no direct physical impact on the pylons within NoRs 3 and 4 – the concept design shown in the General Arrangement Plans show that impacts can be avoided within NoR 3 by retaining the SH1 bridge batter slope, and in NoR 4 by orienting the intersection of Porchester and Airfield Roads slightly eastwards. • Given the rigorous approach to concept design and optioneering, the Project's direct impact on the overlay is minimal. The NoRs apply to small areas, and the activities provided for by the NoRs do not fall within the definition of activities sensitive to the national grid. No impacts on national grid infrastructure are anticipated. Accordingly, the activities are permitted under the D26 provisions, and the Project is consistent with the relevant
	AUP:OP (RPS / DP)	B3.2.1(7) D26.2(1), D26.2.3(1) E26.2.1(7)	

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
			AUP:OP objectives and policies. Notwithstanding this, a NUMP is offered as a condition to secure a process at the Outline Plan stage to confirm how any effects on utilities including the national grid may be managed.
Theme 2 – Urban Growth and Urban Form			
All	NPS:UD	Objectives 1, 2, 3, 4, 6, 8 Policies 1, 2, 5, 6, 10	**Summary of relevant objectives and policies** • The NPS:UD, and the objectives and policies in chapters B2 and B3 of the AUP:OP, seek to provide for well-functioning urban environments. This umbrella term encompasses the need to plan/provide for sufficient development capacity to meet growth needs, the need to promote safe multi-modal accessibility in urban areas, the need to integrate urban development with infrastructure planning and funding decisions, and the need for urban environments to be conducive to reductions in greenhouse gas emissions. Objectives and policies in chapters E26 and E27 further 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. • Provisions in chapters B2 and E26 both direct that infrastructure should avoid, remedy, and mitigate its adverse effects on the amenity values of properties adjoining the infrastructure. Notwithstanding this, other provisions in the same chapters anticipate the adverse effects of infrastructure, and direct that these effects are assessed in the context of the wider need for and benefits of the proposed infrastructure. • Moreover, it is noted that the NPS:UD policy framework explicitly states that urban environments including their amenity values develop and change over time; and that the planned urban form may involve significant physical changes to an area. The planned urban form in turn has an interdependent relationship with the infrastructure required to support it. • The AUP:OP includes a number of Precincts which provide bespoke planning provisions to localised areas. Four of these Precincts adjoin the FTN routes adjacent to NoRs 1, 2, and 4. **Assessment** • As noted above, the existing arterial network in South Auckland between Manukau and Drury has a number of deficiencies resulting in an over-reliance on private vehicles. These deficiencies include a lack of provision for high-quality public transport, and a lack of safe active mode facilities. Failure to address these deficiencies will result in continued car dependence, congestion, poor public transport accessibility, lack of travel choice and network resilience, elevated safety risks, and increased transport emissions. Without intervention, these deficiencies will be exacerbated by planned growth and increased travel demand. In short, the existing arterial network in the Project area is antithetical to a well-functioning urban environment. • The Project responds to and addresses these issues. The proposed works include provision for bus priority measures along Great South Road, Weymouth Road, and Alfriston Road; as well as new and upgraded active mode facilities and intersection improvements along the full Project extent. The Project has significant benefits which directly address existing deficiencies. In particular, it directly responds to policy directives seeking to
	AUP:OP (RPS)	B2.2.1(1), B2.2.1(2), B2.2.1(3), B2.2.1(4), B2.2.1(5) B2.2.2(1), B2.2.1(2), B2.2.1(4), B2.2.1(5), B2.2.1(6), B2.2.1(7) B2.3.1(1), B2.3.1(2), B3.2.1(4)	
	AUP:OP (DP)	E26.2.1(3), E26.2.1(9) E26.2.2(5), E26.2.2(6), E26.2.2(15) E27.2(1), E27.2(2), E27.2(5) I438 – Takanini Precinct I445 – Gatland and Great South Road Precinct I446 – Gatland Road Precinct I450 – Drury Centre Precinct	

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
			promote greater accessibility and mobility by public transport, walking, and cycling; and contributes to mode shift, greater travel choice, and reductions in transport emissions. • The Project manifests in mode shift to public transport for numerous trip types, including greater accessibility to existing and planned centres within South Auckland (Manukau, Manurewa, Takaanini, Papakura, Drury); and to destinations further afield by providing for connections to the rail network at several existing and planned stations. • Moreover, the Project has been developed as part of a wider transport network responding to the increased travel demands associated with growth – both growth within the existing urban area which the majority of the Project traverses, as well as demands associated with future urban areas. The operative provisions of the AUP:OP, as well as the forthcoming PC78, provide for significant growth within the existing urban area which will increase travel demands in South Auckland. • The Project will constitute a change to the physical environment, and will result in localised adverse visual effects, and the loss of existing open space and vegetation that contribute to amenity values throughout the Project extent. While many of the proposed works comprise relatively minor road widening and upgrade measures, the four bridge structures (bridges over Otūwairoa/Slippery Creek in NoR 1, Hingaia Stream in NoR 2, and the NIMT and SH1 in NoR 3) in particular will have adverse visual effects. As documented in the Alternatives Assessment, the Project has established a functional and operational need for the size, location, and extent of this infrastructure – in particular the size of bridge structures is informed by required road and rail clearances, vertical geometry requirements, and flood freeboard requirements. These structures will need to be integrated with their urban surroundings, and an ULDMP condition is offered as a condition to this end to secure a process at the Outline Plan stage to identify how the Project can be integrated with its surroundings. • The provisions of chapters B2 and E26 of the AUP:OP anticipate the adverse effects of infrastructure, and direct that these effects are assessed in the context of the wider need for and benefits of the proposed infrastructure. Moreover, the NPS:UD policy framework provides that urban environments including their amenity values develop and change over time; and that the planned urban form may involve significant physical changes to an area. As noted above, the Project proposes conditions which provide for the identification of mitigation for these effects, has established a functional and operational need for the location and size of the bridge infrastructure, and has significant benefits. Accordingly, it is consistent with these objectives and policies. • The Project proposes a comprehensive suite of conditions to manage the construction disruption and associated amenity impacts including requirements for the preparation of a Construction and Environmental Management Plan (**CEMP**), Construction Traffic Management Plan (**CTMP**), Construction Noise and Vibration Management Plan (CNVMP), and Stakeholder Communication and Engagement Management Plan (**SCEMP**). • Finally, it is noted that the Project is not inconsistent with/does not preclude the urban form outcomes sought for each of the four Precincts identified above as adjoining parts of the NoR extents. In fact, in cases such as the Gatland and Great South Road Precinct, the Project has been designed around the outcomes provided for

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
			by the Precinct provisions (which for example provide for building setbacks along the Great South Road frontage in anticipation of the FTN route).
Theme 3 – Ecology and Natural Heritage			
All	NPS:FM	Objective 1 Policy 1, Policy 6, Policy 15	**Summary of relevant objectives and policies** • Freshwater – The objectives and policies of the NPS:FM broadly seek that freshwater is managed in a way which prioritises the health of water bodies. The provisions of chapter B7 of the AUP:OP further seek that degraded freshwater systems are enhanced, the loss of freshwater systems is minimised, that adverse effects of land use changes on freshwater are avoided, remedied, and mitigated; and that freshwater quality is progressively improved in degraded areas. The NPS: FM policy direction is reflected in chapter E1. To these ends, the E1 provisions contain a number of objectives and policies on integrated stormwater management system design (which in turn inform the requirements for high-use roads set out in E9. • Terrestrial Ecology – The objectives and policies of the NPS:IB seek to ensure that indigenous biodiversity is maintained with no overall loss of indigenous biodiversity after the commencement date, and enables the use of Significant Natural Areas (**SNA**) as a mechanism to protect significant indigenous vegetation and habitats of indigenous fauna. The objectives and policies of chapters B7 and E15 of the AUP:OP similarly seek to protect, maintain, and enhance areas of significant indigenous biodiversity from the effects of subdivision, use, and development. These features are most clearly identified in the plan through Significant Ecological Areas (**SEA**). The policies of chapter E15 further recognise that it is not always practicable to locate or design infrastructure to avoid areas with indigenous biodiversity values where a functional or operational need for the infrastructure has been established. • Trees – The D13 provisions provide that notable trees and notable groups of trees are retained and protected from inappropriate subdivision, use, and development. Moreover, the provisions of chapter E17 of the AUP:OP further direct that upgrades to the transport system maintain the ecological and amenity values of street trees, including the protection of scheduled notable trees. **Assessment** • Freshwater – Through optioneering and design, the Project has sought to avoid direct physical effects on freshwater bodies including streams and wetlands, particularly where the Project traverses streams – notably Otūwairoa / Slippery Creek (within NoR 1), the Hingaia Stream (within NoR 2), and the Papakura Stream (near NoR 4). While the concept design generally avoids streamworks, the Assessment of Ecological Effects has identified a number of small-scale construction impacts on natural inland wetlands. Authorisations for streamworks and works within wetlands are outside the scope of NoRs, and are therefore to be addressed in future regional and NES consenting processes. Notwithstanding this, a functional need for the location and extent of the proposed infrastructure has been established, and sufficient space has been allowed for within NoR boundaries to allow for flexibility in future design responses including options for localised avoidance of effects, offset, or compensation.
	NPS:IB	Objective 1 Policy 6, Policy 7	
	AUP:OP (RPS)	B7.2.1(1), B7.2.1(2) B7.2.2(5) B7.3.1(1), B7.3.1(2), B7.3.1(3) B7.3.2(1), B7.3.2(6)	
	AUP:OP (RP/DP)	D13.2(1), D13.3(2) E1.2(1), E1.2(3), E1.3(8), E1.3(9), E1.3(10), E1.3(11), E1.3(12), E1.3(13), E1.3(14) E15.2(2), E15.3(7) E17.2(3), E17.3(1)	

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
			• Terrestrial Ecology – The Project has avoided any effects on SEAs, noting that the 109m^2 extent of the Kirks Bush SEA (SEA_T_5248) is already entirely within the road reserve and corresponds with a location in which the canopies of mature trees already overhang the road. No further road widening is proposed into the SEA extent, so there is no effect. The Assessment of Ecological Effects has not identified any further SNAs within the Project area. Notwithstanding this, the assessment has identified that the loss of vegetation required for the Project will result in loss lizard habitat within NoRs 1, 2, and 3. Consequently, a Tree Management Plan (**TMP**) and Lizard Management Plan (**LMP**) are offered as conditions providing for the mitigation of these effects. • Trees – As noted under Theme 1, the extents of NoRs 1 and 3 contain or pass near nine notable trees or notable groups of trees. The concept design avoids the need to remove these trees, with impacts limited at worst to limited works within the root zone. While effects on notable trees are thus largely avoided, the Project does impact trees protected under the District Plan E17 provisions – 51 individual trees, and 42 groups of trees. A Tree Management Plan (**TMP**) is offered as a condition to secure a process at the Outline Plan stage to confirm how any effects on these trees will be managed.
Theme 4 – Historic Heritage			
All	AUP:OP (RPS)	B5.2.1(1), B5.2.2(6), B5.2.2(7)	**Summary of relevant objectives and policies** • The objectives and policies in chapters B5 and D17 of the AUP:OP relevantly seek to ensure that scheduled historic heritage places are protected from inappropriate use and development including demolition or destruction; and that where adverse effects cannot be avoided they are remedied or mitigated. • Notwithstanding that, the infrastructure objectives and policies of the plan (summarised under Theme 1) acknowledge that infrastructure can have functional or operational needs to locate in particular environments, including areas of identified value relating to historic heritage. **Assessment** • As documented in Section 6 of the AEE and the Alternatives Assessment, the concept design and optioneering undertaken for the Project has sought to avoid areas and features of value identified as overlays in the AUP:OP relating to historic heritage. As a part of this process, a functional and operational need for the location and extent of the upgraded infrastructure has been established. • Given the rigorous approach to concept design and optioneering, the Project's direct impacts on scheduled historic heritage features is limited. The extent of NoR 1 contains two Historic Heritage Extents of Place in the Papakura area – the Papakura Old Central School, and the Papakura-Karaka War Memorial. While within the NoR extent, direct impacts on both features can be avoided by the concept design. A HHMP is offered as a condition to secure a process at the Outline Plan stage to confirm how any effects on these heritage features can be managed. Accordingly, the Project is consistent with the relevant historic heritage objectives and policies.
	AUP:OP (DP)	D17.2(1), D17.2(2), D17.3(4)	

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
Theme 5 – Manawhenua			
All	AUP:OP (RPS)	B6.2.1(1), B6.2.1(2) B6.2.2(1) B6.3.1(2), B6.3.1(3) B6.3.2(1), B6.3.2(3), B6.3.2(4) B6.5.1(1), B6.5.1(2), B6.5.1(4), B6.5.1(5) B6.5.2(1), B6.5.2(2), B6.5.2(6), B6.5.2(8), B6.5.2(9)	**Summary of relevant objectives and policies** • The objectives and policies in chapter B6 of the AUP:OP seek recognition and provision for the principles of the Te Tiriti o Waitangi / the Treaty of Waitangi, and identify that this should occur through the active participation of Manawhenua in resource management planning processes as kaitiaki. The provisions further seek to ensure that Manawhenua cultural values are assessed and provided for through planning processes, and consequently that environmental health/mauri of natural and physical resources is ultimately enhanced. • The provisions also seek to protect the relationship of Manawhenua with environmental features scheduled in the plan, including sites and places of significance to Manawhenua, as well as natural heritage and natural resource features. This includes features already identified in the plan, and features that are newly identified. • The objectives and policies seek to ensure that mātauranga Māori and tikanga Māori protocols are followed when Manawhenua cultural heritage features are discovered during the subdivision, use, and development of land. • Finally, the provisions seek that Manawhenua cultural heritage information disclosed through resource management planning processes are treated with appropriate sensitivity. **Assessment** • Since its establishment, Te Tupu Ngātahi has sought to give effect to the principles of Te Tiriti o Waitangi / the Treaty of Waitangi. As discussed in Section 4.3 of the AEE, Manawhenua are actively involved as partners of Te Tupu Ngātahi. The Project Team has had regular direct engagement with Manawhenua representatives throughout the development of the business cases and planning application for the Project through Hui. These Hui have provided numerous opportunities for korero, knowledge sharing, and the exercise of Kaitiakitanga; particularly regarding outcomes that the Project needs to achieve in respect of the cultural landscape and values. Information has also been shared in written Cultural Values Assessment (CVA), and through oral histories. The partnership between Te Tupu Ngātahi and Manawhenua on the Project to date has therefore been consistent with the objectives and policies of chapter B6. • Conditions providing for an ongoing partnership relationship with Manawhenua throughout the detailed design and implementation of the Project are proposed – including through a Mana Whenua Kaitiaki Forum, provision for the preparation of Cultural Advisory Reports, and through involvement in the preparation of management plans at the Outline Plan stage. Providing for the continuation existing project relationships recognises and ensures that Manawhenua have the ability as partners to guide and advise on Project-specific opportunities to acknowledge and respond to the cultural landscape, which sits beyond the technical expertise and effects assessment set out in Section 10 of the AEE. • The Project area is not known to contain any Māori land or documented sites of significance to Manawhenua. The Project Team is aware that parts of NoR 1 and the whole of NoR 2 fall within the Ngāti Tamaoho Statutory

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
			Acknowledgement Area. As noted at Section 4.3 of the AEE, Ngāti Tamaoho have been engaged as partners throughout the development of the Project. • Any accidental discoveries during construction will follow the accidental discovery protocols set out in chapter E11 of the AUP:OP. This is a regional consenting matter, and accordingly is not a matter to be authorised or conditioned as part of the designation.
Theme 6 – Natural Hazards / Flooding			
All	NPS:UD	Objective 8; Policy 1	**Summary of relevant objectives and policies** • Chapter B3 of the AUP:OP contains a policy providing that infrastructure with a functional or operational need to locate in a natural hazard area should ensure that its location and design minimises risk from natural hazards; and that risks that cannot be avoided by location or design should be mitigated to the extent practicable. Similarly, the provisions of chapter B10, E26, and E36 require that the risks to infrastructure from natural hazards are not increased; and to this end that planning applications for infrastructure projects adequately assess natural hazards risks, and minimise risk through location and design. • Moreover, the NPS:UD policy framework requires that well-functioning urban environments are resilient to the effects of climate change. **Assessment** • As noted above, a functional and operational need for the Project location has been established through optioneering and design. The primary natural hazard risk identified in the context of the resultant Project area is flooding. The Assessment of Flooding Effects report in Volume 4 (and summarised in Section 10.7 of the AEE) identifies that the design and assessment parameters adopted for the Project have appropriately accounted for natural hazards objectives and policies, and have considered the effects of climate change (including modelling of maximum probable development impervious area with climate change-adjusted rainfall scenarios). • The Project design has sought to ensure the new infrastructure achieves flood neutrality for surrounding areas, enables volumetric compensation and new culverts where there are risks of minor flood displacement, and that the freeboard of new bridge structures considers climate change-adjusted rainfall scenarios. Accordingly, the Project is consistent with relevant objectives and policies of the NPS:UD, and chapters B3, B10, E26, and E36 of the AUP:OP. • The proposed flood hazard condition sets out the outcomes that must be achieved by the Project in respect of flood effects. The outcomes set out in the condition are broadly consistent with the outcomes sought by the relevant objectives and policies and are achieved by the concept design.
	AUP:OP (RPS)	B3.2.1(3), B3.2.2(9) B10.2.1(1), B10.2.1(2), B10.2.1(3), B10.2.1(4) B10.2.2(3), B10.2.2(4), B10.2.2(7), B10.2.2(12). E26.2.1(5), E26.2.2(15) E36.2(1), E36.2(2), E36.2(4), E36.2(5), E36.3(3), E36.3(13), E36.3(14), E36.3(15), E36.3(21), E36.3(23), E36.3(29), E36.3(30).	

Applicable NoRs	Plan / Policy Document	Key Objectives and Policies	Summary and Assessment
Theme 7 – Coastal Environment			
NoR 1	NZCPS	Policy 1	• NoRs 1 and 2 include new bridge crossings of Otūwairoa/Slippery Creek and the Hingaia Stream. Neither of these locations fall within the Coastal Marine Area (CMA) as defined in Appendix 7 of the AUP:OP, and neither fall within a coastal zone in the AUP:OP. • Notwithstanding the above, Policy 1 of the NZCPS (extent and characteristics of the coastal environment) provides that coastal environment includes areas outside the CMA including (relevantly) "areas where coastal processes, influence, or qualities are significant, including coastal lakes, lagoons, tidal estuaries, saltmarshes, coastal wetlands, and the margins of these". • Given the above, the ecological assessment notes that while no part of the Project is within the CMA, the intertidal zone extends beyond the CMA, and that impacts on tidal estuaries, coastal vegetation, and habitats of indigenous coastal species may still be relevant. Accordingly, the ecological assessment (and alternatives assessment) considered the construction and operational effects of the Project on coastal wetland vegetation and habitats of indigenous coastal species. The overall level of effects was assessed as negligible for all effects assessed. • Regional matters such as impacts on coastal wetlands have not been formally addressed at this stage. However, measures have been taken to avoid these features where possible, and to ensure that any future requirements to remedy or mitigate potential impacts are practical and achievable.

11.2 Section 171(1)(d) – Other matters

Section 171(1)(d) further requires consideration of the environmental effects of NoRs having 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 further matters under section 171(1)(d) that are reasonably necessary to make a recommendation on the NoR. Notwithstanding this, the following sections summarise a range of policy considerations which fall outside the bounds of the section 171(1)(d) requirements, but which nonetheless have been considered in the development of the Project.

11.2.1 Resource Management Amendment Act 2020

To date, the overlap between the RMA regime and climate change has historically been limited as sections 70A and 104E 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 Climate Change Response Act 2002 (**CCRA**), and in particular its 2019 amendment (the Climate Change Response (Zero Carbon) Amendment Act).

In particular, 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 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;
- 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; and
- 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 Emissions Reduction Plan (**ERP**), or national adaptation plan made in accordance with the CCRA.

The above RMA amendments do not directly affect the Project 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 section 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 Project (see Section 8) 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.

Notwithstanding the above, the transport assessment for the Project (summarised at Section 10.2 of this AEE and set out in full at Volume 4) demonstrates that the future mode shift attributable to the Project is predicted to result in a reduction in VKT compared to a future environment without the Project. The Project is therefore consistent with the overarching policy direction, and in particular contributes to ERP targets (see below).

11.2.2 Other policy considerations

Other legislation and policy that has been considered in the development of the Project and will inform future implementation is set out in Table 11-3 below.

Table 11-3: Assessment against other policy considerations

National legislation and policies
Government Policy Statement (GPS) on Land Transport for 2021/22-2030/31[14]
• The GPS is a policy document prepared under the Land Transport Management Act 2003 (**LTMA**) which outlines how Government transport policy priorities will inform transport investment over the next ten years. • The current GPS strategic priorities are safety, accessibility, climate change, and freight connections. • The Project is strongly aligned with these strategic priorities given that the bus priority measures, safe active mode facilities, and intersection upgrades that comprise it are intended to facilitate increased accessibility, mode shift, and transport choice; and in doing so reduce car dependence, VKT, and consequently transport emissions. The purpose and objectives of the Project are thus particularly well aligned with the accessibility, climate change, and safety strategic priorities. • The Project also contributes to the freight connections strategic priority. While the emphasis of the transport upgrades is on public transport and active modes, Great South Road will remain a freight route/overdimension route. Moreover, the Project seen in the context of the full planned network (see Section 2) complements a number of other planned arterial corridors that will carry freight traffic.
Climate Change Response Act 2002 and Emissions Reduction Plan (ERP) 2022

• The CCRA sets a long-term target (net zero GHG emissions by 2050) and a system of emissions budgets and emissions reduction plans to achieve it. The CCRA sets an overarching legal framework to drive domestic emissions reductions. Section 5ZN of the CCRA provides that a person or body in exercising or performing a public function power or duty under law may take into account the 2050 target, emissions budget, or ERP.
• In May 2022 the Govt published the first three emissions budgets (2022-25, 2026-30, and 2031-35) and the first ERP. The ERP set the following transport-specific targets:
  ◦ Reduce VKT by 20% by 2035
  ◦ Increase zero emissions vehicles to 30% of the fleet by 2035
  ◦ Reduce emissions from freight by 35% by 2035
  ◦ Reduce emissions intensity of transport fuel by 10% by 2035.
• The VKT target is the most pertinent to the development of transport infrastructure projects.
• To this end, the Project is well-placed to contribute proportionally to the target given that the bus priority measures, safe active mode facilities, and intersection upgrades that comprise it are intended to facilitate increased accessibility, mode shift, and transport choice; and in doing so reduce car dependence, VKT, and consequently transport emissions. The Assessment of Transport Effects (summarised at Section 10.2 and included in Volume 4) demonstrates that the Project delivers on these benefits.
• In short, the purpose and objectives of the Project are well-aligned with the ERP.

Regional strategies and policies
Auckland Plan 2050
• The Auckland Plan is the spatial plan mandated by s. 79 of the Local Government (Auckland Council) Act 2009, the purpose of which is to contribute to Auckland's social, economic, environmental, and cultural

[14] Note that the Draft GPS for the 2024/25-2033/34 was released for consultation in August 2023, and has not been assessed here given it is not yet Government policy. The Project however remains well aligned with the draft strategic priorities in that document.

well-being through a comprehensive and effective long-term strategy for Auckland's growth and development.

- The transport and access provisions of the plan place significant emphasis on the need to make better use of existing transport networks (Focus Area 1), in particular through reallocation of road space to public transport and active modes. The Project is by definition a project which upgrades and reallocates existing road space to public transport and active modes, and accordingly is strongly aligned with this part of the Auckland Plan.

Auckland Regional Land Transport Plan (RLTP) 2021-2031

- The RLTP is a policy document prepared under the LTMA which outlines transport investment priorities for Auckland over a ten-year period.
- Given that the Project is not proposed to be implemented during the period covered by the current RLTP, there is no funding assigned to the Project currently. Notwithstanding this, the Project is consistent with the strategic direction of the RLTP (informed by the GPS discussed above; and the Auckland Plan discussed below).
- Moreover, a number of the projects funded via the RLTP include shorter-term transport upgrades that the Project is intended to complement and build on in the longer term – e.g. shorter-term proposals for Great South Road. It is further noted that existing bus services funded under the current RLTP will be enhanced by the Project in future (e.g. existing route 33 on Great South Road).

- **Auckland Regional Public Transport Plan (RPTP) 2023-2031**

- The RPTP is a document prepared under the LTMA which identifies the public transport services that are integral to the public transport network, their levels of service (i.e. routes, frequency, service span), the policies and procedures applying to those services, and the information and infrastructure to support those services.
- The RPTP defines the level of service for FTN routes (as bus services operating at least every 15 minutes between 7am-7pm, 7 days a week; supported by priority measures). The Project enables infrastructure necessary to support this level of service.
- Great South Road already has an FTN bus service (route 33) operating as far south as Papakura with inconsistent bus priority measures. The RPTP proposes the extension of services to Drury in the 2023-31 period, which is consistent with the wider Project proposals.
- The current RPTP does not include FTN services on the route proposed as the Takaanini FTN given that the Takaanini FTN is proposed as a longer-term intervention. However, several sections of the proposed route already have lower-level connector services operating or proposed to be operating under the RPTP, including Alfriston Road and parts of Porchester Road.
- Accordingly, while the Project is focused on longer-term transport upgrades than provided for within the 2023-31 period covered by the RPTP, the proposed routes are consistent with the broader strategic direction and longer-term aspirations for the public transport network in South Auckland.

Vision Zero for Tāmaki Makaurau: a transport safety strategy and action plan to 2030

- Vision Zero is Auckland's transport safety strategy which states there will be no deaths or serious injuries on the transport system by 2050. The current Vision Zero safety strategy and action plan document identifies actions to work towards this target with a 2030 planning horizon.
- The Project includes numerous safety improvements, including provision for safe active mode facilities over much of the Project extent, is therefore well-aligned with this document.

Te Tāruke-ā-Tāwhiri: Auckland's Climate Action Framework and Plan

- Te Tāruke-ā-Tāwhiri is a non-statutory climate change mitigation and adaptation plan developed by Auckland Council to apply to Auckland regionally. It sets a target of halving Auckland's greenhouse gas emissions by 2030 and reaching net-zero emissions by 2050.

- As noted above, the Project is well-placed to contribute to these transport emissions targets given that the bus priority measures, safe active mode facilities, and intersection upgrades that comprise it are intended to facilitate increased accessibility, mode shift, and transport choice; and in doing so reduce car dependence, VKT, and consequently transport emissions.

Future Development Strategy

- In response to NPS-UD requirements, Auckland Council published a draft FDS in April 2023. The draft FDS proposed changes to the spatial composition of urban growth in Auckland, including removal of the Takaanini FUZ due to natural hazard risks.
- The draft FDS was not considered during the gap analysis undertaken at the outset of the alternatives assessment as was yet to be published. However, the Project Team has since recognised that the outcome of the final FDS could have a material impact on optioneering and the project scope. In particular, it was noted in the Assessment of Alternatives that the case for route protection along the eastern part of Popes Road (Popes Road East) was premised on future urbanisation. The changes to the required form and function along Popes Road East in the event downzoning is confirmed would mean that there is no longer a case for route protection of this part of the network.
- At the time of finalising this AEE, the Council officer recommendations on the final FDS had been published. The removal of the Takaanini FUZ continues to be recommended due to natural hazard risks. However, the final FDS is yet to be endorsed by the Auckland Council Planning Committee at the time of writing.
- On the basis of the most recent officer recommendations on the FDS, the upgrade of Popes Road East has not been included as part of NoR 4.

Local Plans

Local Board Plans

- The Project traverses several South Auckland Local Board areas – Ōtara-Papatoetoe, Manurewa, Papakura, and Franklin. Each has a Local Board Plan, and the Project is generally consistent with actions, strategic priorities, and advocacy identified in each. In particular:
  - The Ōtara-Papatoetoe Local Board Plan contains “key safety, cycling, and bus priority projects… specifically improvements around Manukau City Centre and Great South Road” as a transport priority. Moreover, the Board has advocated for a south-facing rail connection to promote greater accessibility to Manukau from the south for a long period. While this falls beyond the project scope, the Great South Road FTN route deals with the issue of accessibility to Manukau from the south and enables numerous connections to the rail network. The Project is therefore strongly aligned with these Local Board priorities.
  - The Manurewa Local Board Plan identifies a number of relevant actions including advocacy to increase the frequency and capacity of public transport services, and provision for safer active mode facilities, particular on routes within the Manurewa Local Paths Plan which include Great South Road and Alfriston Road. The Project is strongly aligned with these Local Board priorities. The Manurewa Local Board has also advocated for improved access to Te Mahia train station – this is beyond the Project scope, but the Project does directly adjoin the existing station access from Great South Road so will in time form part of this improved access.
  - The Papakura Local Board Plan identifies transport actions including implementation of its greenways plan, advocacy for safe walking and cycling, and increased public transport use. While these actions are not specific, the Project is generally well aligned.
  - The Franklin Local Board Plan identifies the new Drury and Paerata rail stations as an opportunity, including provision for connecting buses to the stations. This is well aligned with the Project which enables bus connections to the Drury stations.

Manurewa-Takaanini-Papakura Integrated Area Plan 2018
• This document is an integrated spatial plan for the Manurewa, Takaanini, and Papakura areas prepared jointly by Auckland Council Plans & Places, the Manurewa and Papakura Local Boards, the Southern Initiative, and the Arts Community and Events Department. • The plan identifies a number of actions relevant across the wider Manurewa-Takaanini-Papakura area, as well as more localised actions within each of the individual centres. The actions pertinent to the Project include general advocacy to progress Te Tupu Ngātahi projects, enhance access to Te Mahia Station (see above), and implement streetscape improvements along Great South Road. These actions are generally well aligned with the Project.
Manurewa Sport and Active Recreation Facilities Plan
• Non-statutory plan to support decision-making and direction for sport and active recreation provision in the Manurewa Local Board area. Identifies the existing provision in the area and priorities for future investment. • Of 34 facilities identified in the plan, one (Gallaher Park) is partially impacted by the South FTN. This is a partial impact resulting in some impacts on access, parking, and a limited loss of adjacent open space to accommodate a stormwater treatment wetland. The existing playing fields and toilet/changing room complex is not impacted.

11.3 Assessment under Part 2 of the RMA

Section 171(1) states that when considering a NoR, a territorial authority must consider the effects on the environment having particular regard to a number of matters (assessed above) and subject to Part 2 of the RMA.

Section 5(1) of the RMA states that the purpose of the RMA is to promote the sustainable management of natural and physical resources.

Section 5(2) of the RMA then provides a definition of sustainable management. In our view, in determining whether the Network promotes sustainable management, consideration of Sections 6, 7 and 8 of the RMA is required before drawing any conclusions regarding consistency with Section 5 of the RMA.

The following section provides an assessment of the effects of the Project subject to Part 2 of the RMA.

11.3.1 Matters of national importance

Section 6 of the RMA states that in achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for specified matters of national importance. We consider the following matters of national importance to be relevant to the Project, see Table 11-4 below:

Table 11-4: Matters of national importance

Matter of national importance	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	The Project is not located in the Coastal Marine Area, but does traverse Otūwairoa / Slippery Creek, the Hingaia Stream, and the Papakura Stream. Adjacent to these riparian areas are areas of natural inland wetlands. Optioneering and design for the Project has sought to preserve the natural character of these areas in the first instance by avoidance. Where small-scale impacts on wetlands have not been completely avoidable, the Project will seek to preserve the natural character through mitigation and/or compensation planting. These will be the subject of future regional and NES consenting processes. Sufficient space has been allowed for within NoR boundaries to allow for flexibility in future design responses, including options for localised avoidance of effects, offset, or compensation.
the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development	The Project does not impact any outstanding natural features and landscapes.
the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna	The Project does not impact on any areas of significant indigenous vegetation beyond a 109m^2 extent of the Kirks Bush SEA which is already within road reserve. No further SNAs have been identified in the ecological assessment. Vegetation removal as part of the Project has been identified as having a potential effect on lizard habitat. A Tree Management Plan and Lizard Management Plan are offered as conditions providing for the mitigation of these effects.
the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers	The Project does not impact public access to and along the coastal marine area, lakes and rivers.
the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	As noted in Section 4.3, Manawhenua have been actively involved in a partnership capacity throughout the development of the Project. The Project is not known to contain Māori land, or documented sites of significance to Manawhenua. The Project area is within the Ngāti Tamaoho Statutory Acknowledgement area. The Project has 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. The Project has sought to avoid, remedy, and mitigate adverse effects on these values through design, optioneering, and conditions. The Project proposes conditions to provide for an ongoing relationship with Manawhenua throughout the detailed design and implementation of the Project. It also ensures that Manawhenua have the ability as partners and as kaitiaki to guide and advise on Project specific opportunities to acknowledge and respond to the cultural landscape. It is acknowledged that the cultural landscape and narrative sits beyond

Matter of national importance	Assessment
	the technical expertise and assessment provided in Section 10 above.
the protection of historic heritage from inappropriate subdivision, use, and development	The Project will not adversely affect scheduled historic heritage sites. As noted in Section 10.9 above, while two historic heritage extents of place fall within the boundaries of NoR 1, direct impacts on the features are avoided by the concept design.
the protection of protected customary rights	The Project does not impact upon any known protected customary rights.
the management of significant risks from natural hazards	The primary natural hazard risk identified in the context of the Project is flooding. The design and assessment parameters adopted for the Project have appropriately considered the effects of flooding while allowing for climate change effects. This includes modelling of maximum probable development impervious area with climate change-adjusted rainfall scenarios. The Project have sought to ensure that new infrastructure achieves flood neutrality for surrounding areas, provides sufficient space in the designation for volumetric compensation and new culverts where there are risks of minor flood displacement, and that the freeboard of new bridge structures considers climate change-adjusted rainfall scenarios.

11.3.2 Other matters

Section 7 of the RMA states that, in achieving the purpose of the RMA, particular regard shall be had to specified other matters. We consider the following other matters in Table 11-5 below to be relevant to the Project:

Table 11-5: Other matters that are relevant to the Project

Other matter	Assessment
kaitiakitanga	Manawhenua have been actively involved through the NoR phase of the Project and will continue to exercise kaitiakitanga through the future phases of the Project as provided for by the proposed designation conditions. This includes the preparation of management plans and the involvement of Manawhenua as partners in the detailed design and consenting phases of the Project.
the ethic of stewardship	This has been recognised through engagement with key stakeholders, business associations, community groups and the wider community who exercise stewardship over particular resources.
the efficient use and development of natural and physical resources	Through the assessment of alternatives process, the Project was determined to be the most efficient use of natural and physical resources, particularly as it utilises existing transport corridors.
the efficiency of the end use of energy	Not considered relevant to the Project.

Other matter	Assessment
the maintenance and enhancement of amenity values	The Project has sought to maintain and enhance amenity values through the development of the concept design. This ULDMP proposed as a requirement of the designation conditions provides a mechanism at the Outline Plan stage to demonstrate at a more detailed level how the maintenance and enhancement of amenity values will be achieved.
intrinsic values of ecosystems	The concept design has sought to avoid adverse effects on ecosystems as far as practicable while providing sufficient width within the proposed designation boundaries for further refinement during detailed design.
maintenance and enhancement of the quality of the environment	The concept design has sought to maintain and enhance the quality of the environment. Conditions requiring a suite of management plans at the Outline Plan stage will demonstrate at a more detailed level how this will be achieved.
any finite characteristics of natural and physical resources	Not considered relevant to the Project.
the protection of the habitat of trout and salmon	Not considered relevant to the Project.
the effects of climate change	The Project responds to the effects of climate change and the reduction of greenhouse gas emissions by providing for high-quality public transport and safe walking and cycling facilities, and by extension enabling a mode shift which results in future VKT reduction. The Project will also respond to the effects of climate change through the provision of planting.
the benefits to be derived from the use and development of renewable energy	Not considered relevant to the Project.

11.3.3 Te Tiriti o Waitangi | Treaty of Waitangi

In achieving the purpose of the RMA, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Manawhenua have been involved as a partner throughout the development of the Project. To date this has involved identifying the recommended Project corridors, input into the technical assessments and the development of the NoR conditions.

Manawhenua will be involved as partners in the future phases of the Project, and this has been provided for through the conditions on the proposed designation.

Accordingly, the Project is considered to have taken into account the principles of Treaty of Waitangi (Te Tiriti o Waitangi).

11.3.4 The purpose of the Act

Section 5 of the RMA sets out the purpose of the RMA which is to promote the sustainable management of natural and physical resources.

The Project will result in some adverse effects as discussed in Section 10 above, however, when considering the significant regional and local benefits of the Project, and the measures proposed to avoid, remedy and mitigate the adverse effects, the Project achieves the purpose and principles of the RMA

1 Appendix A – Assessment of Alternatives

2 Appendix B – CVA (partially redacted)